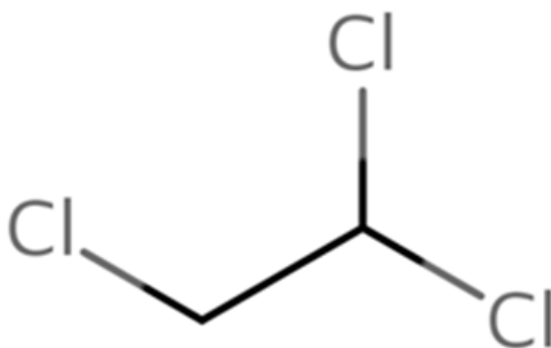

**Draft Data Quality Evaluation Information for
Human Health Hazard Animal Toxicology for
1,1,2-Trichloroethane**

Systematic Review Support Document for the Draft Risk Evaluation

CASRN: 79-00-5



May 2026

This supplemental file contains information regarding the data quality evaluation conducted for key references that met PECO screening criteria and were identified by EPA as described in the *Draft Human Health and Environmental Hazard Assessment for 1,1,2-Trichloroethane*. EPA conducted data quality evaluation based on author-reported descriptions and results; additional analyses (*e.g.*, statistical analyses performed during data integration into the risk evaluation) potentially conducted by EPA are not contained in this supplemental file. For the data quality evaluation, EPA used the TSCA systematic review process described in the *Draft Systematic Review Protocol Supporting TSCA Risk Evaluations for Chemical Substances* (referred to hereafter as the '2021 Draft Systematic Review Protocol'). Any updated steps in the systematic review process since the publication of the 2021 Draft Systematic Review Protocol are described in the *Draft Systematic Review Protocol for 1,1,2-Trichloroethane*.

Table of Contents

HERO ID	Reference	Page
1,1,2-Trichloroethane		
Acute (less than or equal to 24 hr)		
29336	Carlson, G. P. (1973). Effect of phenobarbital and 3-methylcholanthrene pretreatment on the hepatotoxicity of 1,1,1-trichloroethane and 1,1,2-trichloroethane. <i>Life Sciences</i> 13(1):67-73.	9
660794	Charbonneau, M., Greselin, E., Brodeur, J., Plaa, G. L. (1991). Influence of acetone on the severity of the liver injury induced by haloalkane mixtures. <i>Canadian Journal of Physiology and Pharmacology</i> 69(12):1901-1907.	13
194679	Crebelli, R., Carere, A., Leopardi, P., Conti, L., Fassio, F., Raiteri, F., Barone, D., Ciliutti, P., Cinelli, S., Vericat, J. A. (1999). Evaluation of 10 aliphatic halogenated hydrocarbons in the mouse bone marrow micronucleus test. <i>Mutagenesis</i> 14(2):207-215.	15
10699088	Dow Chemical, (1960). Results of range finding toxicological tests on 1,1,2-trichloroethane.	21
725343	Dow Chemical, (1956). Results of skin absorption studies on carbon tetrachloride, ethylene dichloride, tetrachloroethylene, trichloroethylene, and chloroethene.	35
29227	Gehring, P. J. (1968). Hepatotoxic potency of various chlorinated hydrocarbon vapours relative to their narcotic and lethal potencies in mice. <i>Toxicology and Applied Pharmacology</i> 13(3):287-298.	39
58005	Harms, M. S., Peterson, R. E., Fujimoto, J. M., Erwin, C. P. (1976). Increased "bile duct-pancreatic fluid" flow in chlorinated hydrocarbon-treated rats. <i>Toxicology and Applied Pharmacology</i> 35(1):41-49.	48
64549	Klaassen, C. D., Plaa, G. L. (1966). Relative effects of various chlorinated hydrocarbons on liver and kidney function in mice. <i>Toxicology and Applied Pharmacology</i> 9(1):139-151.	50
64550	Klaassen, C. D., Plaa, G. L. (1967). Relative effects of various chlorinated hydrocarbons on liver and kidney function in dogs. <i>Toxicology and Applied Pharmacology</i> 10(1):119-131.	56
9913	Klaassen, C. D., Plaa, G. L. (1969). Comparison of the biochemical alterations elicited in livers from rats treated with carbon tetrachloride, chloroform, 1,1,2-trichloroethane and 1,1,1-trichloroethane. <i>Biochemical Pharmacology</i> 18(8):2019-2027.	62
1740624	Kronevi, T., Wahlberg, J., Holmberg, B. (1977). Morphological lesions in guinea pigs during skin exposure to 1,1,2-trichloroethane. <i>Acta Pharmacologica et Toxicologica</i> 41(4):298-305.	68
62934	Lundberg, I., Ekdahl, M., Kronevi, T., Lidums, V., Lundberg, S. (1986). Relative hepatotoxicity of some industrial solvents after intraperitoneal injection or inhalation exposure in rats. <i>Environmental Research</i> 40(2):411-420.	75
5466893	Mellon Institute, (1946). Acute inhalation toxicity of 1,1,2-trichloroethane and 1,1,2,2-tetrachloroethylene in rats.	79
200479	Milman, H. A., Story, D. L., Riccio, E. S., Sivak, A., Tu, A. S., Williams, G. M., Tong, C., Tyson, C. A. (1988). Rat liver foci and in vitro assays to detect initiating and promoting effects of chlorinated ethanes and ethylenes. <i>Annals of the New York Academy of Sciences</i> 534:521-530.	81

1,1,2-Trichloroethane

Table of Contents

18954	Moody, D. E., James, J. L., Clawson, G. A., Smuckler, E. A. (1981). Correlations among the changes in hepatic microsomal components after intoxication with alkyl halides and other hepatotoxins. <i>Molecular Pharmacology</i> 20(3):685-693.	87
68728	Niklasson, M., Tham, R., Larsby, B., Eriksson, B. (1993). Effects of toluene, styrene, trichloroethylene, and trichloroethane on the vestibulo- and opto-oculo motor system in rats. <i>Neurotoxicology and Teratology</i> 15(5):327-334.	94
29447	Plaa, G. L., Evans, E. A., Hine, C. H. (1958). Relative hepatotoxicity of seven halogenated hydrocarbons. <i>Journal of Pharmacology and Experimental Therapeutics</i> 123:224-229.	96
64411	Plaa, G. L., Larson, R. E. (1965). Relative nephrotoxic properties of chlorinated methane, ethane, and ethylene derivatives in mice. <i>Toxicology and Applied Pharmacology</i> 7(1):37-44.	102
64561	Tyson, C. A., Hawk-Prather, K., Story, D. L., Gould, D. H. (1983). Correlations of in vitro and in vivo hepatotoxicity for five haloalkanes. <i>Toxicology and Applied Pharmacology</i> 70(2):289-302.	106
74541	Wahlberg, J. E. (1976). Percutaneous toxicity of solvents: a comparative investigation in the guinea pig with benzene, toluene and 1,1,2-trichloroethane. <i>Annals of Occupational Hygiene</i> 19(2):115-119.	108
64564	White, K. L., Jr, Sanders, V. M., Barnes, D. W., Shopp, G. M., Jr, Munson, A. E. (1985). Toxicology of 1,1,2-trichloroethane in the mouse. <i>Drug and Chemical Toxicology</i> 8(5):333-355.	110
6547036	WIL Research, (2004). An acute neurotoxicity study of 1,1,2-trichloroethane in rats.	122
664458	WIL Research, (2001). Acute inhalation toxicity (with histopathology) study of 1,1,2-trichloroethane (1,1,2-TCE) in rats.	125
659098	Xia, L., Yu, T. (1992). Study of the relationship between the hepatotoxicity and free radical induced by 1,1,2-trichloroethane and 1,1,1-trichloroethane in rat. <i>Biomedical and Environmental Sciences</i> 5(4):303-313.	135
Short-term (>1-30 days)		
10699088	Dow Chemical, (1960). Results of range finding toxicological tests on 1,1,2-trichloroethane.	137
64411	Plaa, G. L., Larson, R. E. (1965). Relative nephrotoxic properties of chlorinated methane, ethane, and ethylene derivatives in mice. <i>Toxicology and Applied Pharmacology</i> 7(1):37-44.	139
64556	Sanders, V. M., White, K. L., Jr, Shopp, G. M., Jr, Munson, A. E. (1985). Humoral and cell-mediated immune status of mice exposed to 1,1,2-trichloroethane. <i>Drug and Chemical Toxicology</i> 8(5):357-372.	141
5469150	Wahlberg, J. E. (1984). Edema-inducing effects of solvents following topical administration. <i>Dermatosen in Beruf und Umwelt</i> 32(3):91-94.	143
74541	Wahlberg, J. E. (1976). Percutaneous toxicity of solvents: a comparative investigation in the guinea pig with benzene, toluene and 1,1,2-trichloroethane. <i>Annals of Occupational Hygiene</i> 19(2):115-119.	145
64564	White, K. L., Jr, Sanders, V. M., Barnes, D. W., Shopp, G. M., Jr, Munson, A. E. (1985). Toxicology of 1,1,2-trichloroethane in the mouse. <i>Drug and Chemical Toxicology</i> 8(5):333-355.	149
Subchronic (>30-91 days)		
6547037	Dow Chemical, (2005). 1,1,2-Trichloroethane: Subchronic neurotoxicity study in F344/DUCRL rats.	170

1,1,2-Trichloroethane

Table of Contents

200479	Milman, H. A., Story, D. L., Riccio, E. S., Sivak, A., Tu, A. S., Williams, G. M., Tong, C., Tyson, C. A. (1988). Rat liver foci and in vitro assays to detect initiating and promoting effects of chlorinated ethanes and ethylenes. <i>Annals of the New York Academy of Sciences</i> 534:521-530.	177
64556	Sanders, V. M., White, K. L., Jr, Shopp, G. M., Jr, Munson, A. E. (1985). Humoral and cell-mediated immune status of mice exposed to 1,1,2-trichloroethane. <i>Drug and Chemical Toxicology</i> 8(5):357-372.	183
64564	White, K. L., Jr, Sanders, V. M., Barnes, D. W., Shopp, G. M., Jr, Munson, A. E. (1985). Toxicology of 1,1,2-trichloroethane in the mouse. <i>Drug and Chemical Toxicology</i> 8(5):333-355.	185
6324088	WIL Research, (2002). A 90-day inhalation study of 1,1,2-trichloroethane (1,1,2-TCE) in rats (with satellite groups for pharmacokinetic evaluations in rats and mice)..	210
Chronic (>91 days)		
1973131	Mellon Institute, (1947). Repeated exposure of rats and dogs to vapors of eight chlorinated hydrocarbons.	225
64554	NCI, (1978). Bioassay of 1,1,2-trichloroethane for possible carcinogenicity. National Cancer Institute Carcinogenesis Technical Report Series 74:1-104.	240
659081	Norpoth, K., Heger, M., Muller, G., Mohtashampur, E., Kemena, A., Witting, C. (1988). Investigations on metabolism and carcinogenicity of 1,1,2- trichloroethane. <i>Journal of Cancer Research and Clinical Oncology</i> 114(2):158-162.	254
Reproductive/Developmental		
6547034	DuPont, (2006). 1,1,2-Trichloroethane: Multigeneration reproduction study in rats.	259
64557	Seidenberg, J. M., Anderson, D. G., Becker, R. A. (1986). Validation of an in vivo developmental toxicity screen in the mouse. <i>Teratogenesis, Carcinogenesis, and Mutagenesis</i> 6(5):361-374.	263
6547035	WIL Research, (2005). A prenatal developmental toxicity study of 1,1,2-trichloroethane via drinking water rats.	270
Other (specify)		
10699088	Dow Chemical, (1960). Results of range finding toxicological tests on 1,1,2-trichloroethane.	276

Isomer: 1,1,1-Trichloroethane

Acute (less than or equal to 24 hr)

5454703	Bowen, S. E., Balster, R. L. (1998). A direct comparison of inhalant effects on locomotor activity and schedule-controlled behavior in mice. <i>Experimental and Clinical Psychopharmacology</i> 6(3):235-247.	278
29371	Carlson, G. (1981). Effect of alterations in drug metabolism on epinephrine-induced cardiac arrhythmias in rabbits exposed to Methylchloroform. <i>Toxicology Letters</i> 9(4):307-313.	280
29336	Carlson, G. P. (1973). Effect of phenobarbital and 3-methylcholanthrene pretreatment on the hepatotoxicity of 1,1,1-trichloroethane and 1,1,2-trichloroethane. <i>Life Sciences</i> 13(1):67-73.	284

Table of Contents

660794	Charbonneau, M., Greselin, E., Brodeur, J., Plaa, G. L. (1991). Influence of acetone on the severity of the liver injury induced by haloalkane mixtures. <i>Canadian Journal of Physiology and Pharmacology</i> 69(12):1901-1907.	288
5466898	Dow Chemical, (1988). Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688.	290
5360	Evans, E. B., Balster, R. L. (1993). Inhaled 1,1,1-trichloroethane-produced physical dependence in mice: effects of drugs and vapors on withdrawal. <i>Journal of Pharmacology and Experimental Therapeutics</i> 264(2):726-733.	324
29227	Gehring, P. J. (1968). Hepatotoxic potency of various chlorinated hydrocarbon vapours relative to their narcotic and lethal potencies in mice. <i>Toxicology and Applied Pharmacology</i> 13(3):287-298.	336
75061	Hobara, T., Kobayashi, H., Higashihara, E., Kawamoto, T., Sakai, T. (1984). Acute effects of 1,1,1-trichloroethane, trichloroethylene, and toluene on the hematologic parameters in dogs. <i>Archives of Environmental Contamination and Toxicology</i> 13(5):589-593.	350
64549	Klaassen, C. D., Plaa, G. L. (1966). Relative effects of various chlorinated hydrocarbons on liver and kidney function in mice. <i>Toxicology and Applied Pharmacology</i> 9(1):139-151.	359
64550	Klaassen, C. D., Plaa, G. L. (1967). Relative effects of various chlorinated hydrocarbons on liver and kidney function in dogs. <i>Toxicology and Applied Pharmacology</i> 10(1):119-131.	365
9913	Klaassen, C. D., Plaa, G. L. (1969). Comparison of the biochemical alterations elicited in livers from rats treated with carbon tetrachloride, chloroform, 1,1,2-trichloroethane and 1,1,1-trichloroethane. <i>Biochemical Pharmacology</i> 18(8):2019-2027.	372
62934	Lundberg, I., Ekdahl, M., Kronevi, T., Lidums, V., Lundberg, S. (1986). Relative hepatotoxicity of some industrial solvents after intraperitoneal injection or inhalation exposure in rats. <i>Environmental Research</i> 40(2):411-420.	378
200479	Milman, H. A., Story, D. L., Riccio, E. S., Sivak, A., Tu, A. S., Williams, G. M., Tong, C., Tyson, C. A. (1988). Rat liver foci and in vitro assays to detect initiating and promoting effects of chlorinated ethanes and ethylenes. <i>Annals of the New York Academy of Sciences</i> 534:521-530.	382
95470	Moser, V. C., Balster, R. L. (1986). The effects of inhaled toluene, halothane, 1,1,1-trichloroethane, and ethanol on fixed-interval responding in mice. <i>Neurotoxicology and Teratology</i> 8(5):525-531.	388
29447	Plaa, G. L., Evans, E. A., Hine, C. H. (1958). Relative hepatotoxicity of seven halogenated hydrocarbons. <i>Journal of Pharmacology and Experimental Therapeutics</i> 123:224-229.	390
64411	Plaa, G. L., Larson, R. E. (1965). Relative nephrotoxic properties of chlorinated methane, ethane, and ethylene derivatives in mice. <i>Toxicology and Applied Pharmacology</i> 7(1):37-44.	392
5465564	Stacey, N. H. (1989). Toxicity of combinations of chlorinated aliphatic hydrocarbons in-vitro and in-vivo. <i>Toxicology In Vitro</i> 3(2):137-144.	396
75357	Stacey, N. H. (1989). Toxicity of mixtures of trichloroethylene, tetrachloroethylene and 1,1,1-trichloroethane: Similarity of in vitro to in vivo responses. <i>Toxicology and Industrial Health</i> 5(3):441-450.	400
83190	Stadler, J. C., Kennedy, G. L., Jr (1996). Evaluation of the sensory irritation potential of volatile organic chemicals from carpets: Alone and in combination. <i>Food and Chemical Toxicology</i> 34(11-12):1125-1130.	402
5554867	Umezu, T., Shibata, Y. (2014). Different behavioral effect dose-response profiles in mice exposed to two-carbon chlorinated hydrocarbons: influence of structural and physical properties. <i>Toxicology and Applied Pharmacology</i> 279(2):103-112.	404
61688	Wahlberg, J. E., Boman, A. (1979). Comparative percutaneous toxicity of ten industrial solvents in the guinea pig. <i>Scandinavian Journal of Work, Environment and Health</i> 5(4):345-351.	408

Table of Contents

5465795	Wiley, J. L., Bowen, S. E., Balster, R. L. (2001). Effects of volatile inhalants on sensorimotor reactivity in rats. <i>Addiction Biology</i> 6(1):35-43.	412
659098	Xia, L., Yu, T. (1992). Study of the relationship between the hepatotoxicity and free radical induced by 1,1,2-trichloroethane and 1,1,1-trichloroethane in rat. <i>Biomedical and Environmental Sciences</i> 5(4):303-313.	414
Short-term (>1-30 days)		
64580	Bernard, A. M., Russis, de, R., Normand, J. C., Lauwerys, R. R. (1989). Evaluation of the subacute nephrotoxicity of cyclohexane and other industrial solvents in the female Sprague-Dawley rat. <i>Toxicology Letters</i> 45(2-3):271-280.	416
62385	Kjellstrand, P., Bjerkemo, M., Adler-Maihofer, M., Holmquist, B. (1985). Effects of solvent exposure on testosterone levels and butyrylcholinesterase activity in mice. <i>Acta Pharmacologica et Toxicologica</i> 57(4):242-249.	418
5471358	Koizumi, A., Fujita, H., Sadamoto, T., Yamamoto, M., Kumai, M., Ikeda, M. (1984). Inhibition of delta-aminolevulinic acid dehydratase by trichloroethylene. <i>Toxicology</i> 30(2):93-102.	427
631732	Kyrklund, T., Haglid, K. G. (1990). Exposure of rats to high concentrations of 1,1,1-trichloroethane and its effects on brain lipid and fatty acid composition. <i>Pharmacology & Toxicology</i> 67(5):384-386.	430
5465638	Nakahama, T., Sarutani, S., Inouye, Y. (2000). Effects of tetrachloroethylene and 1,1,1-trichloroethane on the expression of P450 isoforms in rat lung and liver. <i>Journal of Health Science</i> 46(1):21-28.	437
64411	Plaa, G. L., Larson, R. E. (1965). Relative nephrotoxic properties of chlorinated methane, ethane, and ethylene derivatives in mice. <i>Toxicology and Applied Pharmacology</i> 7(1):37-44.	439
5469150	Wahlberg, J. E. (1984). Edema-inducing effects of solvents following topical administration. <i>Dermatosen in Beruf und Umwelt</i> 32(3):91-94.	441
Subchronic (>30-91 days)		
5469437	Chan, P. C. (2000). NTP technical report on the toxicity studies of 1,1,1-trichloroethane (CAS No. 71-55-6) administered in microcapsules in feed to F344/N rats and B6C3F1 mice. <i>Toxicity Report Series</i> , vol. 41 41(1):1-E20.	443
200479	Milman, H. A., Story, D. L., Riccio, E. S., Sivak, A., Tu, A. S., Williams, G. M., Tong, C., Tyson, C. A. (1988). Rat liver foci and in vitro assays to detect initiating and promoting effects of chlorinated ethanes and ethylenes. <i>Annals of the New York Academy of Sciences</i> 534:521-530.	445
Reproductive/Developmental		
196341	Coleman, C. N., Mason, T., Hooker, E. P., Robinson, S. E. (1999). Developmental effects of intermittent prenatal exposure to 1,1,1-trichloroethane in the rat. <i>Neurotoxicology and Teratology</i> 21(6):699-708.	451
5365	George, J. D., Price, C. J., Marr, M. C., Sadler, B. M., Schwetz, B. A., Birnbaum, L. S., Morrissey, R. E. (1989). Developmental toxicity of 1,1,1-trichloroethane in CD rats. <i>Toxicological Sciences</i> 13(4):641-651.	457
62609	Lane, R. W., Riddle, B. L., Borzelleca, J. F. (1982). Effects of 1,2-dichloroethane and 1,1,1-trichloroethane in drinking water on reproduction and development in mice. <i>Toxicology and Applied Pharmacology</i> 63(3):409-421.	462

1,1,2-Trichloroethane

Table of Contents

5467064	Run., Bushy (1987). Initial submission: Developmental toxicity study with inhaled 1,1,1-trichloroethane in New Zealand white rabbits with cover letter dated 08/28/92.	466

Isomer: Trichloroethane

Short-term (>1-30 days)

3501912	Al-Griw, M. A., Alghazeer, R. O., Al-Azreg, S. A., Bennour, E. M. (2016). Cellular and molecular etiology of hepatocyte injury in a murine model of environmentally induced liver abnormality. 6(3):150-157.	470
4333726	Al-Griw, M. A., Treesh, S. A., Alghazeer, R. O., Regeai, S. O. (2017). Environmentally toxicant exposures induced intragenerational transmission of liver abnormalities in mice. 7(3):244-253.	476

Metabolite: 1,1,1-Trichloroethane

Acute (less than or equal to 24 hr)

58151	Kronevi, T., Wahlberg, J. E., Holmberg, B. (1981). Skin pathology following epicutaneous exposure to seven organic solvents. International Journal of Tissue Reactions 3(1):21-30.	480

Study Citation:	Carlson, G. P. (1973). Effect of phenobarbital and 3-methylcholanthrene pretreatment on the hepatotoxicity of 1,1,1-trichloroethane and 1,1,2-trichloroethane. Life Sciences 13(1):67-73.			
Health Outcome(s):	Mortality; Hepatic/Liver;			
Reported Health Effect(s):	Mortality: Death; Hepatic/Liver: Relative liver weight, serum SGOT (AST), serum SGPT (ALT) and liver glucose-6-phosphatase levels;			
Duration:	Acute (less than or equal to 24 hr) Acute			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	29336			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	All Outcomes: Test substance was identified as 1,1,2-trichloroethane.	
	Metric 2: Test Substance Source	Low	All Outcomes: The source of the test substance was not identified.	
	Metric 3: Test Substance Purity	Low	All Outcomes: The purity of the test substance was not reported.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	High	All Outcomes: Appropriate negative controls were included.	
	Metric 5: Positive Controls	N/A	All Outcomes: A positive control was not needed. Positive responses were seen in other groups verifying assays.	
	Metric 6: Randomized Allocation of Animals	Low	All Outcomes: The authors do not report how the animals were allocated.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	Mortality: Preparation and storage conditions were not provided. Given the volatility of the test substance, this information would be useful.; Hepatic/Liver: Preparation and storage conditions were not provided. Given the volatility of the test substance, this information would be useful.	
	Metric 8: Consistency of Exposure Administration	High	All Outcomes: Test substance was administered consistently across study groups.	
	Metric 9: Reporting of Doses/Concentrations	Medium	All Outcomes: Measured concentrations were reported in the table legend. Target concentrations were not reported.	
	Metric 10: Exposure Frequency and Duration	High	All Outcomes: Exposure frequency and duration were appropriate for an acute study.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Medium	Mortality: A full range of responses (i.e. both a NOAEL and LOAEL, with at least one dose above the LOAEL) were not obtained with concentrations studied. Justification for concentrations used was not provided.; Hepatic/Liver: A full range of responses (i.e. both a NOAEL and LOAEL, with at least one dose above the LOAEL) were not obtained with concentrations studied. Justification for concentrations used was not provided.	
	Metric 12: Exposure Route and Method	Low	Mortality: A dynamic whole body chamber was used. The number of air exchanges was not reported. Minimal details were provided.; Hepatic/Liver: A dynamic whole body chamber was used. The number of air exchanges was not reported. Minimal details were provided.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Medium	All Outcomes: Age and starting body weight were not reported; however, this is unlikely to have a substantial impact on results.	

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Study Citation:	Carlson, G. P. (1973). Effect of phenobarbital and 3-methylcholanthrene pretreatment on the hepatotoxicity of 1,1,1-trichloroethane and 1,1,2-trichloroethane. Life Sciences 13(1):67-73.
Health Outcome(s):	Mortality; Hepatic/Liver;
Reported Health Effect(s):	Mortality: Death; Hepatic/Liver: Relative liver weight, serum SGOT (AST), serum SGPT (ALT) and liver glucose-6-phosphatase levels;
Duration:	Acute (less than or equal to 24 hr) Acute
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	29336

Domain	Metric	Rating	Comments
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	All Outcomes: No husbandry conditions were not reported.
	Metric 15: Number of Animals per Group	Medium	All Outcomes: The number of animals/groups was appropriate (n=5).
Domain 5: Outcome Assessment			
	Metric 16: Outcome Assessment Methodology	High	All Outcomes: Outcome assessment methodology was appropriate to measure outcome of interest.
	Metric 17: Consistency of Outcome Assessment	Medium	All Outcomes: Minimal details were provided pertaining to outcomes assessment.
	Metric 18: Sampling Adequacy	High	All Outcomes: The sampling was adequate.
	Metric 19: Blinding of Assessors	N/A	All Outcomes: Blinding was not necessary.
	Metric 20: Negative Control Response	High	All Outcomes: The negative control response was appropriate.
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	Low	All Outcomes: Test substance is a respiratory irritant and therefore respiratory rate should be provided.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	All Outcomes: There was no information to support or dismiss the suggestion of health outcomes differences unrelated to exposure.
	Metric 23: Data Presentation and Analysis	High	All Outcomes: Statistical methods were described and appropriate.
	Metric 24: Reporting of Data	High	All Outcomes: All data were reported.

Additional Comments: none

Overall Quality Determination**Medium**

Study Citation:	Carlson, G. P. (1973). Effect of phenobarbital and 3-methylcholanthrene pretreatment on the hepatotoxicity of 1,1,1-trichloroethane and 1,1,2-trichloroethane. Life Sciences 13(1):67-73.			
Health Outcome(s):	Nutritional/Metabolic			
Reported Health Effect(s):	Nutritional/Metabolic: Body weights			
Duration:	Acute (less than or equal to 24 hr) Acute			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	29336			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Test substance was identified as 1,1,2-trichloroethane.
	Metric 2:	Test Substance Source	Low	The source of the test substance was not identified.
	Metric 3:	Test Substance Purity	Low	The purity of the test substance was not reported.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	High	Appropriate negative controls were included.
	Metric 5:	Positive Controls	N/A	A positive control was not needed. Positive responses were seen in other groups verifying assays.
	Metric 6:	Randomized Allocation of Animals	Low	The authors do not report how the animals were allocated.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Low	Preparation and storage conditions were not provided. Given the volatility of the test substance, this information would be useful.
	Metric 8:	Consistency of Exposure Administration	High	Test substance was administered consistently across study groups.
	Metric 9:	Reporting of Doses/Concentrations	Medium	Measured concentrations were reported in the table legend. Target concentrations were not reported.
	Metric 10:	Exposure Frequency and Duration	High	Exposure frequency and duration were appropriate for an acute study.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Medium	A full range of responses (i.e. both a NOAEL and LOAEL, with at least one dose above the LOAEL) were not obtained with concentrations studied. Justification for concentrations used was not provided.
	Metric 12:	Exposure Route and Method	Low	A dynamic whole body chamber was used. The number of air exchanges was not reported. Minimal details were provided.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	Medium	Age and starting body weight were not reported; however, this is unlikely to have a substantial impact on results.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	No husbandry conditions were not reported.
	Metric 15:	Number of Animals per Group	Medium	The number of animals/groups was appropriate (n=5).
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	High	Outcome assessment methodology was appropriate to measure outcome of interest.
	Metric 17:	Consistency of Outcome Assessment	Medium	Minimal details were provided pertaining to outcomes assessment.
	Metric 18:	Sampling Adequacy	High	The sampling was adequate.

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Study Citation:	Carlson, G. P. (1973). Effect of phenobarbital and 3-methylcholanthrene pretreatment on the hepatotoxicity of 1,1,1-trichloroethane and 1,1,2-trichloroethane. Life Sciences 13(1):67-73.			
Health Outcome(s):	Nutritional/Metabolic			
Reported Health Effect(s):	Nutritional/Metabolic: Body weights			
Duration:	Acute (less than or equal to 24 hr) Acute			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	29336			
Domain	Metric	Rating	Comments	
	Metric 19:	Blinding of Assessors	N/A	Blinding was not necessary.
	Metric 20:	Negative Control Response	Low	The negative control response was not reported.
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Low	Test substance is a respiratory irritant and therefore respiratory rate should be provided.
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There was no information to support or dismiss the suggestion of health outcomes differences unrelated to exposure.
	Metric 23:	Data Presentation and Analysis	Uninformative	Data and statistics on body weight were not reported.
	Metric 24:	Reporting of Data	Uninformative	Body weight data were not reported.
Additional Comments:	Body weight data were not reported.			

Overall Quality Determination**Uninformative**

Study Citation:	Charbonneau, M., Greselin, E., Brodeur, J., Plaa, G. L. (1991). Influence of acetone on the severity of the liver injury induced by haloalkane mixtures. Canadian Journal of Physiology and Pharmacology 69(12):1901-1907.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: Histology of liver tissue and plasma alanine aminotransferase (ALT) activity.			
Duration:	Acute (less than or equal to 24 hr) 1 day			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	660794			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	The chemical was identified as 1,1,2-trichloroethane.	
	Metric 2: Test Substance Source	Low	The source was identified as Aldrich Chemical Co., Milwaukee, WI, but batch/lot number was not provided.	
	Metric 3: Test Substance Purity	Medium	Purity was reported to be 95%.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	Low	It is unclear if the control group that did not receive a haloalkane was sham treated when the haloalkanes were administered to other treatment groups (Table 1 shows no sham treatment and the text does not describe sham treatment for this group).	
	Metric 5: Positive Controls	N/A	Positive controls are not required for this study type.	
	Metric 6: Randomized Allocation of Animals	Low	The study did not report how animals were allocated to study groups.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	Methods of test substance preparation and storage prior to administration of the single dose were not reported and may affect the results (substance may be volatile).	
	Metric 8: Consistency of Exposure Administration	High	Exposure administration appears to have been generally consistent across groups.	
	Metric 9: Reporting of Doses/Concentrations	High	The i.p. injected dose level was reported without ambiguity.	
	Metric 10: Exposure Frequency and Duration	High	The single i.p. injection dose was appropriate for the study type.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	N/A	Only one dose was tested but the study was not intended to provide dose-response information.	
	Metric 12: Exposure Route and Method	High	The route and method of exposure were suited to the test substance.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Medium	Age was not reported.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Temperature and humidity were not reported.	
	Metric 15: Number of Animals per Group	Medium	There were six male rats per treatment group.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	Medium	Parameters evaluated for liver effects included plasma ALT and quantitative histological evaluation of necrotic (plus inflammatory cells), degenerated, and normal hepatocytes between the central vein and the portal triad.	

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Study Citation:	Charbonneau, M., Greselin, E., Brodeur, J., Plaa, G. L. (1991). Influence of acetone on the severity of the liver injury induced by haloalkane mixtures. Canadian Journal of Physiology and Pharmacology 69(12):1901-1907.
Health Outcome(s):	Hepatic/Liver
Reported Health Effect(s):	Hepatic/Liver: Histology of liver tissue and plasma alanine aminotransferase (ALT) activity.
Duration:	Acute (less than or equal to 24 hr) 1 day
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	660794

Domain	Metric	Rating	Comments
	Metric 17: Consistency of Outcome Assessment	Low	Details regarding the execution of the study protocol for outcome assessment (e.g., timing of assessment across treatment and control group) were not sufficiently described.
	Metric 18: Sampling Adequacy	High	Six animals in each treatment group were evaluated for each endpoint.
	Metric 19: Blinding of Assessors	N/A	Blinding was not required.
	Metric 20: Negative Control Response	High	The negative control response was adequate.
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	Although the study did not report all information to determine confounding, the reported information did not identify differences among the study groups.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were any differences among groups in animal attrition or health outcomes unrelated to exposure that could influence the outcome assessment.
	Metric 23: Data Presentation and Analysis	High	Statistical methods were clearly described.
	Metric 24: Reporting of Data	High	Data were presented for all outcomes.

Additional Comments: None

Overall Quality Determination**Medium**

Study Citation:	Crebelli, R., Carere, A., Leopardi, P., Conti, L., Fassio, F., Raiteri, F., Barone, D., Ciliutti, P., Cinelli, S., Vericat, J. A. (1999). Evaluation of 10 aliphatic halogenated hydrocarbons in the mouse bone marrow micronucleus test. <i>Mutagenesis</i> 14(2):207-215.		
Health Outcome(s):	Genotoxicity (Genotoxicity)		
Reported Health Effect(s):	Genotoxicity (Genotoxicity): In vivo bone marrow micronucleus test		
Duration:	Acute (less than or equal to 24 hr) single dose		
Chemical:	1,1,2-Trichloroethane- Parent compound		
HERO ID:	194679		
Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	High	Chemical name and CAS number identified.
	Metric 2: Test Substance Source	High	Source identified; no batch or lot number was reported.
	Metric 3: Test Substance Purity	High	Purity reported as 98%
Domain 2: Test Design			
	Metric 4: Negative and Vehicle Controls	High	Vehicle control was used (olive oil)
	Metric 5: Positive Controls	Medium	Colchicine and mitomycin C were tested as positive controls; a positive response was observed
	Metric 6: Randomized Allocation of Animals	Medium	The study noted that mice were randomly allocated to treatment groups for the main in vivo bone marrow micronucleus test; it is not specified how the animals were randomized.
Domain 3: Exposure Characterization			
	Metric 7: Preparation and Storage of Test Substance	Medium	Limited test substance preparation details were provided; noted olive oil was used as a vehicle at 10 ml/kg bd wt. It is a single dose study; therefore, omission of details are unlikely to have an impact on the study.
	Metric 8: Consistency of Exposure Administration	High	Single i.p. dose exposure administered consistently
	Metric 9: Reporting of Doses/Concentrations	High	Administered doses were reported without ambiguity in the results section.
	Metric 10: Exposure Frequency and Duration	High	Single dose
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	High	The administered doses were reported in a range; dose levels were selected based on LD50 values determined in preliminary toxicity trials (EEC Guideline B.1 and OECD 401).
	Metric 12: Exposure Route and Method	High	i.p. exposure
Domain 4: Test Animals			
	Metric 13: Test Animal Characteristics	Medium	Species, strain, sex, and source was reported; no starting age was reported and only the terminal weights were reported
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	High	Animal husbandry conditions were reported for the main in vivo bone marrow micronucleus test
	Metric 15: Number of Animals per Group	Medium	5 animals/sex were tested for the bone marrow micronucleus assay
Domain 5: Outcome Assessment			

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Study Citation:	Crebelli, R., Carere, A., Leopardi, P., Conti, L., Fassio, F., Raiteri, F., Barone, D., Ciliutti, P., Cinelli, S., Vericat, J. A. (1999). Evaluation of 10 aliphatic halogenated hydrocarbons in the mouse bone marrow micronucleus test. <i>Mutagenesis</i> 14(2):207-215.			
Health Outcome(s):	Genotoxicity (Genotoxicity)			
Reported Health Effect(s):	Genotoxicity (Genotoxicity): In vivo bone marrow micronucleus test			
Duration:	Acute (less than or equal to 24 hr) single dose			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	194679			
Domain	Metric	Rating	Comments	
	Metric 16:	Outcome Assessment Methodology	High	The outcome assessment methodology was reported and scoring method described.
	Metric 17:	Consistency of Outcome Assessment	High	Details of the assessment protocol were reported including harvest/scoring times
	Metric 18:	Sampling Adequacy	High	5 animals/sex
	Metric 19:	Blinding of Assessors	N/A	Not applicable
	Metric 20:	Negative Control Response	High	The biological response of the control was appropriate and adequate; "the incidence of micronucleated PCEs in vehicle-treated mice was within the accepted spontaneous range for this strain of mouse with no significant sex differences"
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Medium	The study did not report all information to determine confounding factors; however, reported information did not identify differences among study groups
	Metric 22:	Health Outcomes Unrelated to Exposure	High	There was no attrition in animals in any treated animal or controls
	Metric 23:	Data Presentation and Analysis	High	Statistical methods were described; incidence were compared by X-square test, controlling for within group heterogeneity with analysis of variance. PCE/NCE ration were compared by t-test.
	Metric 24:	Reporting of Data	High	Data for exposure-related findings were presented for all outcomes by exposure group and sex
Additional Comments:	The study included results from a preliminary toxicity test used to determine dose levels for the main in vivo bone marrow micronucleus assay. The purpose of the study was the mouse bone marrow micronucleus assay, which is categorized as mechanistic/genotoxicity data.			

Overall Quality Determination**High**

Study Citation:	Crebelli, R., Carere, A., Leopardi, P., Conti, L., Fassio, F., Raiteri, F., Barone, D., Ciliutti, P., Cinelli, S., Vericat, J. A. (1999). Evaluation of 10 aliphatic halogenated hydrocarbons in the mouse bone marrow micronucleus test. <i>Mutagenesis</i> 14(2):207-215.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: LD50			
Duration:	Acute (less than or equal to 24 hr) single dose			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	194679			
Domain	Metric		Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Chemical name and CAS number identified.5.1,1,2-Trichloroethane (CASRN 79-00-5)
	Metric 2:	Test Substance Source	High	Source identified; no batch or lot number was reported.
	Metric 3:	Test Substance Purity	High	Purity reported as 98%
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	N/A	It is not clear if negative controls were used for the preliminary acute toxicity test, though no control is required for acute lethality tests.
	Metric 5:	Positive Controls	N/A	Not required for this study design
	Metric 6:	Randomized Allocation of Animals	Low	The study noted that mice were randomly allocated to treatment groups for the main in vivo bone marrow micronucleus test; however, did not specify if this was done in the pre-liminary toxicity trials. The preliminary toxicity trials were noted to have followed the EEC guideline B.1 and OECD 401, which required that animals are randomly selected
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Medium	Limited test substance preparation details were provided; noted olive oil was used as a vehicle at 10 ml/kg bd wt.; it is a single dose study; therefore, omission of details are unlikely to have an impact on the study.
	Metric 8:	Consistency of Exposure Administration	Low	Details of exposure administration are incompletely reported for the acute lethality toxicity test
	Metric 9:	Reporting of Doses/Concentrations	Low	Administered doses were reported as a range
	Metric 10:	Exposure Frequency and Duration	High	Single dose
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Uninformative	The administered doses were reported in a range; it is unclear how many doses were tested. dose levels were selected on the basis of published LD50 values. The LD50 was higher than the the upper range of administered doses
	Metric 12:	Exposure Route and Method	High	i.p. exposure
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	Medium	Species, strain, sex, and source was reported; no starting age was reported and only the terminal weights were reported
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	Animal husbandry conditions were reported for the main in vivo bone marrow micronucleus test; however, husbandry conditions for the preliminary toxicity test were not; it is unclear if they were similar.
	Metric 15:	Number of Animals per Group	Low	5 animals/sex were tested for the preliminary toxicity test; number of animals were not reported in the methods section but were reported in the results table. It is unclear how many dose groups there were and it is unclear if 5 animals per dose group were tested
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Study Citation:	Crebelli, R., Carere, A., Leopardi, P., Conti, L., Fassio, F., Raiteri, F., Barone, D., Ciliutti, P., Cinelli, S., Vericat, J. A. (1999). Evaluation of 10 aliphatic halogenated hydrocarbons in the mouse bone marrow micronucleus test. Mutagenesis 14(2):207-215.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: LD50			
Duration:	Acute (less than or equal to 24 hr) single dose			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	194679			
Domain	Metric	Rating	Comments	
Domain 5: Outcome Assessment				
Metric 16:	Outcome Assessment Methodology	Low	The outcome assessment methodology was partially addressed; observations of deaths and 24- and 48-hour LD50 are appropriate outcomes for this endpoint. This study was unable to derive an LD50 for this substance; an LD50 from the literature was reported.	
Metric 17:	Consistency of Outcome Assessment	Medium	There was incomplete reporting of details of outcome assessment protocol execution, but unlikely to have substantial impact on results.	
Metric 18:	Sampling Adequacy	Medium	5 animals/sex for a preliminary toxicity test; unclear if 5/sex/dose group	
Metric 19:	Blinding of Assessors	N/A	Not applicable	
Metric 20:	Negative Control Response	N/A	A negative control was not required	
Domain 6: Confounding / Variable Control				
Metric 21:	Confounding Variables in Test Design and Procedures	Medium	The preliminary toxicity study did not report information to determine confounding variable, but no information was reported that identified differences among the group	
Metric 22:	Health Outcomes Unrelated to Exposure	Medium	For the preliminary toxicity test, there was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure	
Metric 23:	Data Presentation and Analysis	Low	Methods used to derive LD50s were not reported.	
Metric 24:	Reporting of Data	Low	LD50 was not reported by sex; no confidence intervals were reported with the LD50; mortality incidence data were not reported; The reported LD50 in the results table was taken from previously published literature.	
Additional Comments:	The study included results from a preliminary toxicity test used to determine dose levels for the main in vivo bone marrow micronucleus assay. The methodology and reporting are limited for the toxicity test. The purpose of the study was the mouse bone marrow micronucleus assay, which is categorized as mechanistic data. Only the apical endpoints (mortality [LD50] and signs of clinical toxicity) are included in this evaluation for this study.			

Overall Quality Determination**Low**

Study Citation:	Crebelli, R., Carere, A., Leopardi, P., Conti, L., Fassio, F., Raiteri, F., Barone, D., Ciliutti, P., Cinelli, S., Vericat, J. A. (1999). Evaluation of 10 aliphatic halogenated hydrocarbons in the mouse bone marrow micronucleus test. <i>Mutagenesis</i> 14(2):207-215.
Health Outcome(s):	Clinical signs (Clinical signs of toxicity)
Reported Health Effect(s):	Clinical signs (Clinical signs of toxicity): Acute clinical signs of toxicity: piloerection, hypoactivity, hunched posture, sedation, shallow breathing
Duration:	Acute (less than or equal to 24 hr) single dose
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	194679

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	High	Chemical name and CAS number identified.
	Metric 2: Test Substance Source	High	Source identified; no batch or lot number was reported.
	Metric 3: Test Substance Purity	High	Purity reported as 98%
Domain 2: Test Design			
	Metric 4: Negative and Vehicle Controls	N/A	It is not clear if negative controls were used for the preliminary acute toxicity test, though no control is required for acute lethality tests.
	Metric 5: Positive Controls	N/A	Not required for this study design
	Metric 6: Randomized Allocation of Animals	Low	The study noted that mice were randomly allocated to treatment groups for the main in vivo bone marrow micronucleus test; however, did not specify if this was done in the preliminary toxicity trials. The preliminary toxicity trials were noted to have followed the EEC guideline B.1 and OECD 401, which required that animals are randomly selected
Domain 3: Exposure Characterization			
	Metric 7: Preparation and Storage of Test Substance	Medium	Limited test substance preparation details were provided; noted olive oil was used as a vehicle at 10 ml/kg bd wt.; it is a single dose study; therefore, omission of details are unlikely to have an impact on the study.
	Metric 8: Consistency of Exposure Administration	Low	Details of exposure administration are incompletely reported for the acute lethality toxicity test
	Metric 9: Reporting of Doses/Concentrations	Low	Administered doses were reported as a range
	Metric 10: Exposure Frequency and Duration	High	Single dose
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Uninformative	The administered doses were reported in a range; it is unclear how many doses were tested. dose levels were selected on the basis of published LD50 values.
	Metric 12: Exposure Route and Method	High	i.p. exposure
Domain 4: Test Animals			
	Metric 13: Test Animal Characteristics	Medium	Species, strain, sex, and source was reported; no starting age was reported and only the terminal weights were reported
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Animal husbandry conditions were reported for the main in vivo bone marrow micronucleus test; however, husbandry conditions for the preliminary toxicity test were not; it is unclear if they were similar.
	Metric 15: Number of Animals per Group	Low	5 animals/sex were tested for the preliminary toxicity test; number of animals were not reported in the methods section but were reported in the results table. It is unclear how many dose groups there were and it is unclear if 5 animals per dose group were tested

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Study Citation:	Crebelli, R., Carere, A., Leopardi, P., Conti, L., Fassio, F., Raiteri, F., Barone, D., Ciliutti, P., Cinelli, S., Vericat, J. A. (1999). Evaluation of 10 aliphatic halogenated hydrocarbons in the mouse bone marrow micronucleus test. Mutagenesis 14(2):207-215.			
Health Outcome(s):	Clinical signs (Clinical signs of toxicity)			
Reported Health Effect(s):	Clinical signs (Clinical signs of toxicity): Acute clinical signs of toxicity: piloerection, hypoactivity, hunched posture, sedation, shallow breathing			
Duration:	Acute (less than or equal to 24 hr) single dose			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	194679			
Domain	Metric	Rating	Comments	
Domain 5: Outcome Assessment				
Metric 16:	Outcome Assessment Methodology	Medium	The outcome assessment methodology was partially addressed; observations of clinical signs of toxicity	
Metric 17:	Consistency of Outcome Assessment	Low	There was incomplete reporting of details of outcome assessment protocol execution	
Metric 18:	Sampling Adequacy	Medium	5 animals/sex for a preliminary toxicity test; unclear if 5 animals per sex per dose	
Metric 19:	Blinding of Assessors	N/A	Not applicable	
Metric 20:	Negative Control Response	N/A	A negative control was not required	
Domain 6: Confounding / Variable Control				
Metric 21:	Confounding Variables in Test Design and Procedures	Medium	The preliminary toxicity study did not report information to determine confounding variable, but no information was reported that identified differences among the group	
Metric 22:	Health Outcomes Unrelated to Exposure	Medium	For the preliminary toxicity test, there was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure	
Metric 23:	Data Presentation and Analysis	N/A	Statistical analysis not necessary; observations of an acute toxicity test; incidence not reported.	
Metric 24:	Reporting of Data	Low	Clinical signs of toxicity were not reported by sex; incidence data were not reported	
Additional Comments:	The study included results from a preliminary toxicity test used to determine dose levels for the main in vivo bone marrow micronucleus assay. The methodology and reporting are limited for the toxicity test. The purpose of the study was the mouse bone marrow micronucleus assay, which is categorized as mechanistic data. Only the apical endpoints (mortality [LD50] and signs of clinical toxicity) are included in this evaluation for this study.			

Overall Quality Determination**Uninformative**

Study Citation:	Dow Chemical, (1960). Results of range finding toxicological tests on 1,1,2-trichloroethane.			
Health Outcome(s):	Clinical signs, gross pathology (Clinical signs, gross necropsy)			
Reported Health Effect(s):	Clinical signs, gross pathology (Clinical signs, gross necropsy): Clinical signs, gross pathology			
Duration:	Acute (less than or equal to 24 hr) Single dose-Oral			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	10699088			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Medium	The test substance was identified as 1,1,2-trichloroethane.
	Metric 2:	Test Substance Source	Low	The test substance source was not reported and there is no indication that the substance was analytically verified.
	Metric 3:	Test Substance Purity	Low	The test substance purity and/or grade were not reported.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	N/A	A negative control group is not required for an acute toxicity study.
	Metric 5:	Positive Controls	N/A	A positive control is not required for this type of study.
	Metric 6:	Randomized Allocation of Animals	Low	The study did not report how animals were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Low	Information on preparation and storage of the test substance were not reported.
	Metric 8:	Consistency of Exposure	Low	Details of the exposure were not reported.
	Metric 9:	Administration Reporting of Doses/Concentrations	Low	Exposure concentrations were reported, but there is no information on body weight to determine how doses were calculated.
	Metric 10:	Exposure Frequency and Duration	High	This was a single exposure study.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Low	There are several doses and percent solutions included; however, there is no justification for the selection.
	Metric 12:	Exposure Route and Method	Uninformative	No information on the exposure method was provided (assumed gavage but method not described).
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	Low	The test animal age, source, and body weights were not provided. The sex and strain are unclear. The animal is listed as F. Rat, so it is assumed that this means female rat, although it could potentially be F-344 rat.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	The animal husbandry conditions were not provided.
	Metric 15:	Number of Animals per Group	Low	The number of animals (2 females/group) is lower than the typical number used in acute toxicity studies.
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	Low	The outcome assessment methodology was not reported.

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Study Citation:	Dow Chemical, (1960). Results of range finding toxicological tests on 1,1,2-trichloroethane.			
Health Outcome(s):	Clinical signs, gross pathology (Clinical signs, gross necropsy)			
Reported Health Effect(s):	Clinical signs, gross pathology (Clinical signs, gross necropsy): Clinical signs, gross pathology			
Duration:	Acute (less than or equal to 24 hr) Single dose-Oral			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	10699088			
Domain	Metric	Rating	Comments	
	Metric 17: Consistency of Outcome Assessment	Low	Details regarding the outcome methodology were not reported.	
	Metric 18: Sampling Adequacy	Low	Details regarding sampling were not reported.	
	Metric 19: Blinding of Assessors	Medium	Blinding was not reported, but this is not expected to have a substantial impact on the results.	
	Metric 20: Negative Control Response	N/A	There is no indication that a negative control was included, although it is not required for an acute toxicity study.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Low	Not enough information was provided to determine if confounders were present.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.	
	Metric 23: Data Presentation and Analysis	N/A	Statistical analysis is not required for clinical signs or gross pathology.	
	Metric 24: Reporting of Data	Low	Qualitative results for clinical signs and gross necropsy of the liver, lungs, and kidneys were reported, but it is unclear if those were the only outcomes examined.	
Additional Comments:	None			

Overall Quality Determination**Uninformative**

Study Citation:	Dow Chemical, (1960). Results of range finding toxicological tests on 1,1,2-trichloroethane.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: Mortality			
Duration:	Acute (less than or equal to 24 hr) Single dose-Oral			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	10699088			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	Medium	The test substance was identified as 1,1,2-trichloroethane.	
	Metric 2: Test Substance Source	Low	The test substance source was not reported and there is no indication that the substance was analytically verified.	
	Metric 3: Test Substance Purity	Low	The test substance purity and/or grade were not reported.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	N/A	A negative control group is not required for an acute toxicity study.	
	Metric 5: Positive Controls	N/A	A positive control is not required for this type of study.	
	Metric 6: Randomized Allocation of Animals	Low	The study did not report how animals were allocated to study groups.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	Information on preparation and storage of the test substance were not reported.	
	Metric 8: Consistency of Exposure Administration	Low	Details of the exposure were not reported.	
	Metric 9: Reporting of Doses/Concentrations	Low	Exposure concentrations were reported, but there is no information on body weight to determine how doses were calculated.	
	Metric 10: Exposure Frequency and Duration	High	This was a single exposure study.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Low	There are several doses and percent solutions included; however, there is no justification for the selection.	
	Metric 12: Exposure Route and Method	Uninformative	No information on the exposure method was provided (assumed gavage but method not described).	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Low	The test animal age, source, and body weights were not provided. The sex and strain are unclear. The animal is listed as F. Rat, so it is assumed that this means female rat, although it could potentially be F-344 rat.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	The animal husbandry conditions were not provided.	
	Metric 15: Number of Animals per Group	Low	The number of animals (2 females/group) is lower than the typical number used in acute toxicity studies.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	Low	The outcome assessment methodology was not reported.	
	Metric 17: Consistency of Outcome Assessment	Low	Details regarding the outcome methodology were not reported.	
	Metric 18: Sampling Adequacy	Low	Details regarding sampling were not reported.	

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Study Citation:	Dow Chemical, (1960). Results of range finding toxicological tests on 1,1,2-trichloroethane.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: Mortality			
Duration:	Acute (less than or equal to 24 hr) Single dose-Oral			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	10699088			
Domain		Metric	Rating	Comments
	Metric 19:	Blinding of Assessors	N/A	Mortality is not a subjective measure.
	Metric 20:	Negative Control Response	N/A	There is no indication that a negative control was included, although it is not required for an acute toxicity study.
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Low	Not enough information was provided to determine if confounders were present.
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.
	Metric 23:	Data Presentation and Analysis	N/A	Statistical analysis is not required for mortality data.
	Metric 24:	Reporting of Data	Medium	Animal mortality was presented for each group, but the timing of the deaths were not reported.
Additional Comments:	None			

Overall Quality Determination**Uninformative**

Study Citation:	Dow Chemical, (1960). Results of range finding toxicological tests on 1,1,2-trichloroethane.			
Health Outcome(s):	Nutritional/Metabolic			
Reported Health Effect(s):	Nutritional/Metabolic: Body weight			
Duration:	Acute (less than or equal to 24 hr) Single dose-Dermal			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	10699088			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	Medium	The test substance was identified as 1,1,2-trichloroethane.	
	Metric 2: Test Substance Source	Low	The test substance source was not reported and there is no indication that the substance was analytically verified.	
	Metric 3: Test Substance Purity	Low	The test substance purity and/or grade were not reported.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	N/A	A negative control group is not required for an acute toxicity study.	
	Metric 5: Positive Controls	N/A	A positive control is not required for this type of study.	
	Metric 6: Randomized Allocation of Animals	Low	The study did not report how animals were allocated to study groups.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	There was no mention of the preparation or storage of the test substance.	
	Metric 8: Consistency of Exposure Administration	Low	Details of the exposure are not reported.	
	Metric 9: Reporting of Doses/Concentrations	Low	Exposure concentrations were provided, but body weights were not, so it is unclear how the doses were calculated.	
	Metric 10: Exposure Frequency and Duration	Low	The exposure duration was reported as 24 hours, although it is not clear if that is a single application or multiple applications.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Low	Two doses are provided, but there is no justification for the selection of the doses.	
	Metric 12: Exposure Route and Method	Uninformative	No information on the exposure method was provided, including whether the application site was covered.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Low	The test animal strain, sex, source, age, and body weights were not provided. The only information provided was that the species was rabbits, which is an acceptable species for this endpoint.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	The animal husbandry conditions were not provided.	
	Metric 15: Number of Animals per Group	Low	The number of animals was reported (2/group) but this is less than the typical number of animals used in an acute toxicity study.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	Low	The outcome assessment methodology was not reported.	
	Metric 17: Consistency of Outcome Assessment	Low	Details regarding the outcome methodology were not reported.	

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Study Citation:	Dow Chemical, (1960). Results of range finding toxicological tests on 1,1,2-trichloroethane.			
Health Outcome(s):	Nutritional/Metabolic			
Reported Health Effect(s):	Nutritional/Metabolic: Body weight			
Duration:	Acute (less than or equal to 24 hr) Single dose-Dermal			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	10699088			
Domain	Metric	Rating	Comments	
	Metric 18:	Sampling Adequacy	Low	Details regarding sampling were not reported.
	Metric 19:	Blinding of Assessors	N/A	Body weight is not a subjective measure.
	Metric 20:	Negative Control Response	N/A	There is no indication that a negative control was included, although it is not required for an acute toxicity study.
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Low	Not enough information was provided to determine if confounders were present.
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.
	Metric 23:	Data Presentation and Analysis	N/A	Statistical analysis was not performed for body weight, but there were only 2 animals/group.
	Metric 24:	Reporting of Data	Low	Qualitative body weight descriptions are provided, but not per animal.
Additional Comments:	None			

Overall Quality Determination**Uninformative**

Study Citation:	Dow Chemical, (1960). Results of range finding toxicological tests on 1,1,2-trichloroethane.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: Mortality			
Duration:	Acute (less than or equal to 24 hr) Single dose-Dermal			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	10699088			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	Medium	The test substance was identified as 1,1,2-trichloroethane.	
	Metric 2: Test Substance Source	Low	The test substance source was not reported and there is no indication that the substance was analytically verified.	
	Metric 3: Test Substance Purity	Low	The test substance purity and/or grade were not reported.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	N/A	A negative control group is not required for an acute toxicity study.	
	Metric 5: Positive Controls	N/A	A positive control is not required for this type of study.	
	Metric 6: Randomized Allocation of Animals	Low	The study did not report how animals were allocated to study groups.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	There was no mention of the preparation or storage of the test substance.	
	Metric 8: Consistency of Exposure Administration	Low	Details of the exposure are not reported.	
	Metric 9: Reporting of Doses/Concentrations	Low	Exposure concentrations were provided, but body weights were not, so it is unclear how the doses were calculated.	
	Metric 10: Exposure Frequency and Duration	Medium	The exposure duration was reported as 24 hours, although it is not clear if that is a single application or multiple applications.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Medium	Two doses are provided, but there is no justification for the selection of the doses.	
	Metric 12: Exposure Route and Method	Uninformative	No information on the exposure method was provided, including whether the application site was covered.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Low	The test animal strain, sex, source, age, and body weights were not provided. The only information provided was that the species was rabbits, which is an acceptable species for this endpoint.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	The animal husbandry conditions were not provided.	
	Metric 15: Number of Animals per Group	Low	The number of animals was reported (2/group) but this is less than the typical number of animals used in an acute toxicity study.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	Low	The outcome assessment methodology was not reported.	
	Metric 17: Consistency of Outcome Assessment	Low	Details regarding the outcome methodology were not reported.	

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Study Citation:	Dow Chemical, (1960). Results of range finding toxicological tests on 1,1,2-trichloroethane.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: Mortality			
Duration:	Acute (less than or equal to 24 hr) Single dose-Dermal			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	10699088			
Domain		Metric	Rating	Comments
	Metric 18:	Sampling Adequacy	Low	Details regarding sampling were not reported.
	Metric 19:	Blinding of Assessors	N/A	Mortality is not a subjective measure.
	Metric 20:	Negative Control Response	N/A	There is no indication that a negative control was included, although it is not required for an acute toxicity study.
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Low	Not enough information was provided to determine if confounders were present.
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.
	Metric 23:	Data Presentation and Analysis	N/A	Statistical analysis is not required for mortality data.
	Metric 24:	Reporting of Data	Medium	Mortality incidence data was provided, but timing on the observed mortality was not.
Additional Comments:	None			

Overall Quality Determination**Uninformative**

Study Citation:	Dow Chemical, (1960). Results of range finding toxicological tests on 1,1,2-trichloroethane.			
Health Outcome(s):	Irritation			
Reported Health Effect(s):	Irritation: Eye and skin irritation			
Duration:	Acute (less than or equal to 24 hr) Single dose-Dermal			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	10699088			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	Medium	The test substance was identified as 1,1,2-trichloroethane.	
	Metric 2: Test Substance Source	Low	The test substance source was not reported and there is no indication that the substance was analytically verified.	
	Metric 3: Test Substance Purity	Low	The test substance purity and/or grade were not reported.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	Uninformative	In skin irritation studies (e.g., OECD TG 404), an untreated skin area typically serves as a control. This study did not specify the use of an untreated skin area as a control and did not report any control responses.	
	Metric 5: Positive Controls	N/A	A positive control is not required for this type of study.	
	Metric 6: Randomized Allocation of Animals	Low	The study did not report how animals were allocated to study groups.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	There was no mention of the preparation or storage of the test substance.	
	Metric 8: Consistency of Exposure Administration	Low	Details of the exposure are not reported.	
	Metric 9: Reporting of Doses/Concentrations	Low	Exposure concentrations were provided, but body weights were not, so it is unclear how the doses were calculated.	
	Metric 10: Exposure Frequency and Duration	Low	For skin irritation, the exposure duration was reported as 24 hours, although it is not clear if that is a single application or multiple applications.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Low	For skin irritation, two doses are provided, but there is no justification for the selection of the doses.	
	Metric 12: Exposure Route and Method	Uninformative	No information on the exposure method was provided, including whether the application site was covered.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Low	The test animal strain, sex, source, age, and body weights were not provided. The only information provided was that the species was rabbits, which is an acceptable species for this endpoint.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	The animal husbandry conditions were not provided.	
	Metric 15: Number of Animals per Group	Low	The number of animals was reported (2/group) but this is less than the typical number of animals used in an irritation study.	
Domain 5: Outcome Assessment				
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Study Citation:	Dow Chemical, (1960). Results of range finding toxicological tests on 1,1,2-trichloroethane.			
Health Outcome(s):	Irritation			
Reported Health Effect(s):	Irritation: Eye and skin irritation			
Duration:	Acute (less than or equal to 24 hr) Single dose-Dermal			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	10699088			
Domain	Metric	Rating	Comments	
	Metric 16: Outcome Assessment Methodology	Low	The outcome assessment methodology was not reported.	
	Metric 17: Consistency of Outcome Assessment	Low	Details regarding the outcome methodology were not reported.	
	Metric 18: Sampling Adequacy	Low	Details regarding sampling were not reported.	
	Metric 19: Blinding of Assessors	N/A	Blinding was not reported, although irritation is a relatively objective measure, and is not required as per OECD TG 404.	
	Metric 20: Negative Control Response	Low	There is no indication that a negative control was included.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Low	Not enough information was provided to determine if confounders were present.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.	
	Metric 23: Data Presentation and Analysis	N/A	Statistical analysis is not required for irritation data.	
	Metric 24: Reporting of Data	Medium	Qualitative irritation descriptions are provided, but not per animals, and not on the timing on the observed irritation.	
Additional Comments:	None			

Overall Quality Determination**Uninformative**

Study Citation:	Dow Chemical, (1960). Results of range finding toxicological tests on 1,1,2-trichloroethane.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: Mortality			
Duration:	Acute (less than or equal to 24 hr) Single dose-Inhalation			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	10699088			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	Medium	The test substance was identified as 1,1,2-trichloroethane.	
	Metric 2: Test Substance Source	Low	The test substance source was not reported and there is no indication that the substance was analytically verified.	
	Metric 3: Test Substance Purity	Low	The test substance purity and/or grade were not reported.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	Uninformative	A negative control group was not discussed/included. It is not clear if the study was an acute lethality study intended to only measure an LC50.	
	Metric 5: Positive Controls	N/A	A positive control is not required for this type of study.	
	Metric 6: Randomized Allocation of Animals	Low	The study did not report how animals were allocated to study groups.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	There was no mention of the methods and equipment used to generate the test substance.	
	Metric 8: Consistency of Exposure Administration	Low	Details of the exposure are not reported.	
	Metric 9: Reporting of Doses/Concentrations	Low	A single exposure concentration was provided, although it is not clear if it is a target, nominal, or analytical concentration.	
	Metric 10: Exposure Frequency and Duration	Medium	The exposure duration was reported as 7 hours; however, this is longer than a typical acute toxicity inhalation study (LC50), which are usually 1 or 4 hours (this study was not specifically designated as an LC50 study, but mortality is the only end point).	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Low	It is unclear if there are multiple dose groups as only a single dose was reported. This study was not specifically designated as an LC50 study, so additional doses would be expected.	
	Metric 12: Exposure Route and Method	Uninformative	No information on the exposure method was provided.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Uninformative	The test species, strain, sex, age, and body weights were not provided.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	The animal husbandry conditions were not provided.	
	Metric 15: Number of Animals per Group	Low	The number of animals was not reported.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	Low	The outcome assessment methodology was not reported.	
	Metric 17: Consistency of Outcome Assessment	Low	Details regarding the outcome methodology were not reported.	
	Metric 18: Sampling Adequacy	Low	Details regarding sampling were not reported.	

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Study Citation:	Dow Chemical, (1960). Results of range finding toxicological tests on 1,1,2-trichloroethane.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: Mortality			
Duration:	Acute (less than or equal to 24 hr) Single dose-Inhalation			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	10699088			
Domain	Metric	Rating	Comments	
	Metric 19:	Blinding of Assessors	N/A	Mortality is not a subjective measure.
	Metric 20:	Negative Control Response	Low	There is no indication that a negative control was included.
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Low	Not enough information was provided to determine if confounders were present.
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.
	Metric 23:	Data Presentation and Analysis	N/A	Statistical analysis is not required for mortality data.
	Metric 24:	Reporting of Data	Uninformative	Data presentation was inadequate (approximately one half of the animals died, but it is unclear how many were tested and how many died).
Additional Comments:	None			
Overall Quality Determination		Uninformative		

Study Citation:	Dow Chemical, (1960). Results of range finding toxicological tests on 1,1,2-trichloroethane.			
Health Outcome(s):	Irritation			
Reported Health Effect(s):	Irritation: Eye and skin irritation			
Duration:	Acute (less than or equal to 24 hr) Single dose- eye irritation			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	10699088			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance	Metric 1: Test Substance Identity	Medium	The test substance was identified as 1,1,2-trichloroethane.	
	Metric 2: Test Substance Source	Low	The test substance source was not reported and there is no indication that the substance was analytically verified.	
	Metric 3: Test Substance Purity	Low	The test substance purity and/or grade were not reported.	
Domain 2: Test Design	Metric 4: Negative and Vehicle Controls	Uninformative	In eye irritation studies (e.g., OECD TG 405), the untreated eye typically serves as a control. This study did not specify whether any eyes remained untreated and did not report a control response.	
	Metric 5: Positive Controls	N/A	A positive control is not required for this type of study.	
	Metric 6: Randomized Allocation of Animals	Low	The study did not report how animals were allocated to study groups.	
Domain 3: Exposure Characterization	Metric 7: Preparation and Storage of Test Substance	Low	There was no mention of the preparation or storage of the test substance.	
	Metric 8: Consistency of Exposure Administration	Low	Details of the exposure are not sufficiently reported.	
	Metric 9: Reporting of Doses/Concentrations	Uninformative	The test substance was administered undiluted; however, the volume instilled into the eye was not reported.	
	Metric 10: Exposure Frequency and Duration	Low	The duration was not specified. It is assumed that the test substance was applied as a single instillation, but this was not explicitly stated. In some cases, eyes were washed. The timing of washing (e.g., at 24 hours), was not reported.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Medium	The study tested a single concentration (undiluted), although the dose volume(s) were not specified. A single undiluted dose is appropriate for an initial in vivo test.	
	Metric 12: Exposure Route and Method	Low	Specific details of ocular exposure were not provided (e.g., whether the test substance was instilled into the conjunctival sac, whether eyes were briefly held closed, and if the test substance was liquid or solid); however, the route of exposure is appropriate for an eye irritation study.	
Domain 4: Test Animals	Metric 13: Test Animal Characteristics	Low	The test strain, sex, age, and body weights were not provided; this is not uncommon for some eye irritation studies. The only information provided was that it was rabbits, which is an acceptable species for testing the potential for eye irritation. The source of the animals was not reported.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	The animal husbandry conditions were not provided.	

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Study Citation:	Dow Chemical, (1960). Results of range finding toxicological tests on 1,1,2-trichloroethane.			
Health Outcome(s):	Irritation			
Reported Health Effect(s):	Irritation: Eye and skin irritation			
Duration:	Acute (less than or equal to 24 hr) Single dose- eye irritation			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	10699088			
Domain		Metric	Rating	Comments
	Metric 15:	Number of Animals per Group	Low	The number of animals was not provided; however, according to OECD TG 405, it is recommended that initial eye irritation tests are performed on a single animal.
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	Low	The outcome assessment methodology (e.g., method of scoring) was not reported.
	Metric 17:	Consistency of Outcome Assessment	Low	Details regarding the outcome methodology were not reported.
	Metric 18:	Sampling Adequacy	Low	Details regarding sampling were not reported.
	Metric 19:	Blinding of Assessors	N/A	Blinding was not reported, although irritation is a relatively objective measure, and is not required as per OECD TG 405.
	Metric 20:	Negative Control Response	Low	There is no indication that a negative control was included.
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Low	Not enough information was provided to determine if confounders were present.
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.
	Metric 23:	Data Presentation and Analysis	N/A	Statistical analysis is not required for irritation data.
	Metric 24:	Reporting of Data	Low	Qualitative irritation descriptions are provided. It was not specified whether the reactions were the same for washed and unwashed eyes. The timing of the observed responses and irritation scores were not provided. The study did indicate reversibility within 7 days.

Additional Comments: None

Overall Quality Determination**Uninformative**

Study Citation:	Dow Chemical, (1956). Results of skin absorption studies on carbon tetrachloride, ethylene dichloride, tetrachloroethylene, trichloroethylene, and chloroethene.			
Health Outcome(s):	Irritation; Irritation;			
Reported Health Effect(s):	Irritation: Irritation, corrosion and damage to the skin were assessed.; Irritation: Irritation, corrosion and damage to the skin were assessed.;			
Duration:	Acute (less than or equal to 24 hr) 24 hrs - Dermal			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	725343			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
Metric 1:	Test Substance Identity	High	Irritation: The test substance was identified as 1,1,2-trichloroethane. A molecular and structural formula was provided. No CASRN was specified.; Irritation: The test substance was identified as 1,1,1-trichloroethane. A molecular and structural formula was provided. No CASRN was specified.	
Metric 2:	Test Substance Source	Low	All Outcomes: The chemical source was not reported and the test substance was not analytically verified.	
Metric 3:	Test Substance Purity	Low	All Outcomes: The purity was not reported.	
Domain 2: Test Design				
Metric 4:	Negative and Vehicle Controls	N/A	All Outcomes: Negative controls are not necessary for an acute toxicity test (and untreated parts of the body can be used as controls for dermal irritation studies).	
Metric 5:	Positive Controls	N/A	All Outcomes: Not necessary for the study type	
Metric 6:	Randomized Allocation of Animals	Low	All Outcomes: The study did not report how animals were allocated to study groups; however, this is not typically relevant for an acute toxicity study.	
Domain 3: Exposure Characterization				
Metric 7:	Preparation and Storage of Test Substance	Medium	All Outcomes: Details of preparation and storage were not provided; however, this is unlikely to have a substantial impact on results in an acute duration study.	
Metric 8:	Consistency of Exposure Administration	Medium	All Outcomes: Limited Details of exposure administration were provided; missing details (e.g., volume and coverage area) are not expected to have a substantial impact on results.	
Metric 9:	Reporting of Doses/Concentrations	Medium	All Outcomes: Doses were clearly reported. It is unclear if they are nominal or analytical.	
Metric 10:	Exposure Frequency and Duration	High	All Outcomes: Exposure frequency and duration is consistent with dermal acute toxicity studies.	
Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Medium	All Outcomes: The number of exposure groups and spacing were acceptable; however, the doses tested are above those currently recommended for this study type.	
Metric 12:	Exposure Route and Method	High	All Outcomes: The exposure route and method were appropriate	
Domain 4: Test Animals				
Metric 13:	Test Animal Characteristics	Low	All Outcomes: Strain, sex, and starting body weights and source were not provided.	
Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	All Outcomes: Animal husbandry conditions were not provided.	

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Study Citation:	Dow Chemical, (1956). Results of skin absorption studies on carbon tetrachloride, ethylene dichloride, tetrachloroethylene, trichloroethylene, and chlorothene.
Health Outcome(s):	Irritation; Irritation;
Reported Health Effect(s):	Irritation: Irritation, corrosion and damage to the skin were assessed.; Irritation: Irritation, corrosion and damage to the skin were assessed.;
Duration:	Acute (less than or equal to 24 hr) 24 hrs - Dermal
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	725343

Domain	Metric	Rating	Comments
	Metric 15: Number of Animals per Group	Medium	All Outcomes: The number of animals per group is above the required/recommended numbers in the current OECD TG 404 guideline.
Domain 5: Outcome Assessment			
	Metric 16: Outcome Assessment Methodology	Low	All Outcomes: The methods for evaluating effects on the skin were not specified, and it is unclear whether scoring was done (e.g., Draize). It was not specified how long animals were observed following exposure (e.g., the recommended duration is 14 days), or if any of the effects were reversible.
	Metric 17: Consistency of Outcome Assessment	Medium	All Outcomes: There were limited details in the execution of the outcome assessment protocol, but it is assumed all animals were consistently assessed.
	Metric 18: Sampling Adequacy	Low	All Outcomes: Details regarding sampling of outcomes were not reported.
	Metric 19: Blinding of Assessors	N/A	All Outcomes: Not necessary for the study type
	Metric 20: Negative Control Response	N/A	All Outcomes: Not applicable for the study type
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	Low	All Outcomes: The study did not report information to determine whether confounding was an issue.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	All Outcomes: There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.
	Metric 23: Data Presentation and Analysis	N/A	All Outcomes: Statistical analysis is not necessary for the study type
	Metric 24: Reporting of Data	Low	All Outcomes: No irritation scores were provided. Incidences were not provided. It is unknown if localized effects were seen on all animals or only those that died.

Additional Comments: This form is for 1,1,2-trichloroethane.

Overall Quality Determination**Low**

Study Citation:	Dow Chemical, (1956). Results of skin absorption studies on carbon tetrachloride, ethylene dichloride, tetrachloroethylene, trichloroethylene, and chloroethene.			
Health Outcome(s):	Mortality; Mortality;			
Reported Health Effect(s):	Mortality; Mortality; Mortality; Mortality;			
Duration:	Acute (less than or equal to 24 hr) 24 hrs - Dermal			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	725343			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	Mortality: The test substance was identified as 1,1,1-trichloroethane. A molecular and structural formula was provided. No CASRN was specified.; Mortality: The test substance was identified as 1,1,2-trichloroethane. A molecular and structural formula was provided. No CASRN was specified.	
	Metric 2: Test Substance Source	Low	All Outcomes: The chemical source was not reported and the test substance was not analytically verified.	
	Metric 3: Test Substance Purity	Low	All Outcomes: The purity was not reported.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	N/A	All Outcomes: Negative controls are not necessary for an acute toxicity test.	
	Metric 5: Positive Controls	N/A	All Outcomes: Not necessary for the study type	
	Metric 6: Randomized Allocation of Animals	Low	All Outcomes: The study did not report how animals were allocated to study groups; however, this is not typically relevant for an acute toxicity study.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Medium	All Outcomes: Details of preparation and storage were not provided; however, this is unlikely to have a substantial impact on results in an acute duration study.	
	Metric 8: Consistency of Exposure Administration	Medium	Mortality: Limited details of exposure administration were provided; missing details (e.g., volume and coverage area) are not expected to have a substantial impact on results.; Mortality: Limited Details of exposure administration were provided; missing details (e.g., volume and coverage area) are not expected to have a substantial impact on results.	
	Metric 9: Reporting of Doses/Concentrations	Medium	All Outcomes: Doses were clearly reported. It is unclear if they are nominal or analytical.	
	Metric 10: Exposure Frequency and Duration	High	All Outcomes: Exposure frequency and duration is consistent with dermal acute toxicity studies.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Medium	All Outcomes: The number of exposure groups and spacing were acceptable; however, the doses tested are above those currently recommended for this study type.	
	Metric 12: Exposure Route and Method	High	All Outcomes: The exposure route and method were appropriate	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Low	All Outcomes: Strain, sex, and starting body weights and source were not provided.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	All Outcomes: Animal husbandry conditions were not provided.	
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Study Citation:	Dow Chemical, (1956). Results of skin absorption studies on carbon tetrachloride, ethylene dichloride, tetrachloroethylene, trichloroethylene, and chloroethene.			
Health Outcome(s):	Mortality; Mortality;			
Reported Health Effect(s):	Mortality; Mortality; Mortality; Mortality;			
Duration:	Acute (less than or equal to 24 hr) 24 hrs - Dermal			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	725343			
Domain		Metric	Rating	Comments
	Metric 15:	Number of Animals per Group	Medium	All Outcomes: The number of animals per group is above the required/recommended numbers in the current OECD TG 402 guideline.
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	Medium	All Outcomes: Animals were observed for mortality; however, it was not specified how long animals were observed following exposure (e.g., the recommended duration is 14 days).
	Metric 17:	Consistency of Outcome Assessment	Medium	All Outcomes: There were limited details in the execution of the outcome assessment protocol, but it is assumed all animals were consistently assessed.
	Metric 18:	Sampling Adequacy	High	All Outcomes: Reported information indicates the study used adequate sampling for the outcome(s) of interest
	Metric 19:	Blinding of Assessors	N/A	All Outcomes: Not necessary for the study type
	Metric 20:	Negative Control Response	N/A	All Outcomes: Not applicable for the study type
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Low	All Outcomes: The study did not report information to determine whether confounding was an issue.
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	All Outcomes: There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.
	Metric 23:	Data Presentation and Analysis	N/A	All Outcomes: Statistical analysis is not necessary for the study type
	Metric 24:	Reporting of Data	Medium	All Outcomes: The timing and cause of death was not reported.
Additional Comments:	This form is for the 1,1,1-trichloroethane isomer			
Overall Quality Determination			Medium	

Study Citation:	Gehring, P. J. (1968). Hepatotoxic potency of various chlorinated hydrocarbon vapours relative to their narcotic and lethal potencies in mice. Toxicology and Applied Pharmacology 13(3):287-298.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: death			
Duration:	Acute (less than or equal to 24 hr) 17h inhalation; 1,1,2-TCA			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	29227; Linked HERO ID(s): 29227, 2799686			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	The test substance was identified as 1,1,2-trichlorethane. CASRN was not reported.	
	Metric 2: Test Substance Source	Low	The source of the test substance was not reported. The test substance was not analytical verified.	
	Metric 3: Test Substance Purity	High	All chemicals contained less than 0.5% impurities	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	High	A concurrent air-exposed control group was included.	
	Metric 5: Positive Controls	N/A	Positive controls are not required for the study type.	
	Metric 6: Randomized Allocation of Animals	Low	The study authors did not report how animals were allocated to the study groups.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Medium	Method and equipment for the production of the test substance vapor were cited (Adams, 1940 and Rowe et al., 1952) and briefly described here with limited details. Storage conditions were not reported.	
	Metric 8: Consistency of Exposure Administration	Medium	Exposure durations were varied between groups, but this was the design of the study. The study varied the duration of exposure but kept the concentration consistent. Concentration of test substance during exposure was continuously analyzed and did not vary more than 7% (data not shown). The chamber design was consistent. The number of animals/chamber was not reported.	
	Metric 9: Reporting of Doses/Concentrations	Medium	Target concentration was reported. Concentrations in the inhalation chamber were analytically determined. It was stated by study authors that if deviations greater than 7% occurred, the data were not used, and the exposure was repeated. Analytical concentrations not shown.	
	Metric 10: Exposure Frequency and Duration	Low	Exposure duration varied but encompassed standard study design.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Medium	A single concentration was studied with varied exposure durations. The aim of the study was to determine the time at which effects were observed; therefore the single concentration was acceptable.	

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Study Citation:	Gehring, P. J. (1968). Hepatotoxic potency of various chlorinated hydrocarbon vapours relative to their narcotic and lethal potencies in mice. Toxicology and Applied Pharmacology 13(3):287-298.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: death			
Duration:	Acute (less than or equal to 24 hr) 17h inhalation; 1,1,2-TCA			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	29227; Linked HERO ID(s): 29227, 2799686			
Domain	Metric	Rating	Comments	
	Metric 12:	Exposure Route and Method	Low	A whole-body inhalation chamber was used. The test solution was metered at a "constant rate into a tube, heat being applied at the point of vaporization as needed to effect complete volatilization. All air entering the chamber passes through this tube and enters the chamber..." The air flow ranged from 17-30 L/min in a 160 L chamber. The number of animals in the chamber at one time was not reported. The authors do state that the design of the chamber allowed for animals to be introduced and withdrawn with little change in concentration. It is not clear if deceased animals were removed during the exposure period or new ones were added.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	Medium	The species, strain, sex, and starting body weight were described and appropriate, age was not reported. The source of animals was not reported but "arrival in the laboratory" indicates external source. Mice are commonly used for study type.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not reported and could not be evaluated.
	Metric 15:	Number of Animals per Group	Low	The number of animals exposed to the test substance was not reported.
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	High	Outcome assessment methodology appeared appropriate for mortality (time when respiratory movements stopped).
	Metric 17:	Consistency of Outcome Assessment	Medium	Study authors state animals were "repeatedly observed" for death. Exact timing of observations was not reported.
	Metric 18:	Sampling Adequacy	High	The number of animals evaluated is reported in the figure legend. Data is reported for 20 animals/group and is adequate for the study type.
	Metric 19:	Blinding of Assessors	N/A	Blinding was not reported; however, blinding is not required for the outcomes of interest.
	Metric 20:	Negative Control Response	N/A	Not relevant for study type.
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Low	The control animals were sham treated. The details related to food consumption, water intake, and individual body weights were not reported. Respiratory rates were not measured in an inhalation study, and the test substance may be a respiratory irritant.
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.
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Study Citation:	Gehring, P. J. (1968). Hepatotoxic potency of various chlorinated hydrocarbon vapours relative to their narcotic and lethal potencies in mice. Toxicology and Applied Pharmacology 13(3):287-298.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: death			
Duration:	Acute (less than or equal to 24 hr) 17h inhalation; 1,1,2-TCA			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	29227; Linked HERO ID(s): 29227, 2799686			
Domain	Metric		Rating	Comments
	Metric 23:	Data Presentation and Analysis	High	Statistical methods to determine LT50s and ET50s were done according to the method published by Litchfield and Wilcoxon 1949 (A Simplified Method of Evaluating Dose-Effect Experiments, Experimental Therapeutics, 1949). The cited paper describes in detail the method to determine ED50s with confidence limits. Although this study determined LT50s and ET50s, the method described in the paper seems applicable and appropriate. There was also sufficient data reported where an independent analysis could be performed (estimated from figures 3 and 7).
	Metric 24:	Reporting of Data	Medium	Study authors reported LT50s with 95% confidence limits in Table 3. The percentage of mice that died at different time points is shown graphically.
Additional Comments:	11.14.2025 DH (dherber@srcinc.com). The following metric scores were changed: Metric 8, 11, 15, 16, 21, and 23. Text changes to comments fields were made for all metrics.			
Overall Quality Determination			Medium	

Study Citation:	Gehring, P. J. (1968). Hepatotoxic potency of various chlorinated hydrocarbon vapours relative to their narcotic and lethal potencies in mice. Toxicology and Applied Pharmacology 13(3):287-298.			
Health Outcome(s):	Neurological/Behavioral			
Reported Health Effect(s):	Neurological/Behavioral: anesthesia/immobilization			
Duration:	Acute (less than or equal to 24 hr) 17h inhalation; 1,1,2-TCA			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	29227; Linked HERO ID(s): 29227, 2799686			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified as 1,1,2-trichlorethane. CASRN was not reported.
	Metric 2:	Test Substance Source	Low	The source of the test substance was not reported. The test substance was not analytical verified.
	Metric 3:	Test Substance Purity	High	All chemicals contained less than 0.5% impurities
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	High	A concurrent air-exposed control group was included.
	Metric 5:	Positive Controls	N/A	Positive controls are not required for the study type.
	Metric 6:	Randomized Allocation of Animals	Low	The study authors did not report how animals were allocated to the study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Medium	Method and equipment for the production of the test substance vapor were cited (Adams, 1940 and Rowe et al., 1952) and briefly described here with limited details. Storage conditions were not reported.
	Metric 8:	Consistency of Exposure Administration	Medium	Exposure durations were varied between groups, but this was the design of the study. The study varied the duration of exposure but kept the concentration consistent. Concentration of test substance during exposure was continuously analyzed and did not vary more than 7% (data not shown). The chamber design was consistent. The number of animals/chamber was not reported.
	Metric 9:	Reporting of Doses/Concentrations	Medium	Target concentration was reported. Concentrations in the inhalation chamber were analytically determined. It was stated by study authors that if deviations greater than 7% occurred, the data were not used, and the exposure was repeated. Analytical concentrations not shown.
	Metric 10:	Exposure Frequency and Duration	Low	Exposure duration varied but encompassed standard study design.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Medium	A single concentration was studied with varied exposure durations. The aim of the study was to determine the time at which effects were observed; therefore the single concentration was acceptable.
	Metric 12:	Exposure Route and Method	Low	A whole-body inhalation chamber was used. The test solution was metered at a "constant rate into a tube, heat being applied at the point of vaporization as needed to effect complete volatilization. All air entering the chamber passes through this tube and enters the chamber..." The air flow ranged from 17-30 L/min in a 160 L chamber. The number of animals in the chamber at one time was not reported. The authors do state that the design of the chamber allowed for animals to be introduced and withdrawn with little change in concentration. It is not clear if deceased animals were removed during the exposure period or new ones were added.

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Study Citation:	Gehring, P. J. (1968). Hepatotoxic potency of various chlorinated hydrocarbon vapours relative to their narcotic and lethal potencies in mice. Toxicology and Applied Pharmacology 13(3):287-298.			
Health Outcome(s):	Neurological/Behavioral			
Reported Health Effect(s):	Neurological/Behavioral: anesthesia/immobilization			
Duration:	Acute (less than or equal to 24 hr) 17h inhalation; 1,1,2-TCA			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	29227; Linked HERO ID(s): 29227, 2799686			
Domain	Metric	Rating	Comments	
Domain 4: Test Animals				
Metric 13:	Test Animal Characteristics	Medium	The species, strain, sex, and starting body weight were described and appropriate, age was not reported. The source of animals was not reported but "arrival in the laboratory" indicates external source. Mice are commonly used for study type.	
Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not reported and could not be evaluated.	
Metric 15:	Number of Animals per Group	Low	The number of animals exposed to the test substance was not reported.	
Domain 5: Outcome Assessment				
Metric 16:	Outcome Assessment Methodology	Low	The methodology had limited details and was described only as "The duration of time between the initiation of an exposure and onset of anesthesia was also recorded for each mouse. Onset of anesthesia was considered to be the time at which the mouse became immobilized," which was when the mouse remained within the same square marked on the floor of the cage. Because the neuro outcome was limited to immobilization (prior to death) and the methodology was based primarily on observation, this metric is scored low as it was unclear whether the methods were sensitive for the outcome of interest.	
Metric 17:	Consistency of Outcome Assessment	Medium	Animals were observed in anesthetic/immobilized condition during exposure. "Onset of anesthesia was considered to be the time at which the mouse became immobilized." It is unclear the exact criteria and if this assessed consistently for all animals.	
Metric 18:	Sampling Adequacy	High	The number of animals evaluated is reported in the figure legend. Data is reported for 20 animals/group and is adequate for the study type.	
Metric 19:	Blinding of Assessors	Low	Blinding was not reported; assessment of immobilization could be subjective and should be assessed blindly.	
Metric 20:	Negative Control Response	Low	The negative control response was not reported.	
Domain 6: Confounding / Variable Control				
Metric 21:	Confounding Variables in Test Design and Procedures	Low	The control animals were sham treated. The details related to food consumption, water intake, and individual body weights were not reported. Respiratory rates were not measured in an inhalation study, and the test substance may be a respiratory irritant.	
Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.	
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Study Citation:	Gehring, P. J. (1968). Hepatotoxic potency of various chlorinated hydrocarbon vapours relative to their narcotic and lethal potencies in mice. Toxicology and Applied Pharmacology 13(3):287-298.
Health Outcome(s):	Neurological/Behavioral
Reported Health Effect(s):	Neurological/Behavioral: anesthesia/immobilization
Duration:	Acute (less than or equal to 24 hr) 17h inhalation; 1,1,2-TCA
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	29227; Linked HERO ID(s): 29227, 2799686

Domain	Metric	Rating	Comments
	Metric 23: Data Presentation and Analysis	High	Statistical methods to determine LT50s and ET50s were done according to the method published by Litchfield and Wilcoxon 1949 (A Simplified Method of Evaluating Dose-Effect Experiments, Experimental Therapeutics, 1949). The cited paper describes in detail the method to determine ED50s with confidence limits. Although this study determined LT50s and ET50s, the method described in the paper seems applicable and appropriate. There was also sufficient data reported where an independent analysis could be performed (estimated from figures 3 and 7).
	Metric 24: Reporting of Data	Medium	Study authors reported ET50s with 95% confidence limits in Table 3. The percentage of mice affected at different time points is shown graphically.

Additional Comments: 11.14.2025 DH (dherber@srcinc.com). The following metric scores were changed: Metric 8, 11, 15, 19, 23, and 24. Text changes to comments fields were made for all metrics.

Overall Quality Determination

Medium

Study Citation:	Gehring, P. J. (1968). Hepatotoxic potency of various chlorinated hydrocarbon vapours relative to their narcotic and lethal potencies in mice. Toxicology and Applied Pharmacology 13(3):287-298.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: serum ALT (SGPT activity)			
Duration:	Acute (less than or equal to 24 hr) 17h inhalation; 1,1,2-TCA			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	29227; Linked HERO ID(s): 29227, 2799686			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	The test substance was identified as 1,1,2-trichlorethane. CASRN was not reported.	
	Metric 2: Test Substance Source	Low	The source of the test substance was not reported. The test substance was not analytical verified.	
	Metric 3: Test Substance Purity	High	All chemicals contained less than 0.5% impurities	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	High	A concurrent air-exposed control group was included.	
	Metric 5: Positive Controls	N/A	Positive controls are not required for the study type.	
	Metric 6: Randomized Allocation of Animals	Low	The study authors did not report how animals were allocated to the study groups.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Medium	Method and equipment for the production of the test substance vapor were cited (Adams, 1940 and Rowe et al., 1952) and briefly described here with limited details. Storage conditions were not reported.	
	Metric 8: Consistency of Exposure Administration	Medium	Exposure durations were varied between groups, but this was the design of the study. The study varied the duration of exposure but kept the concentration consistent. Concentration of test substance during exposure was continuously analyzed and did not vary more than 7% (data not shown). The chamber design was consistent. The number of animals/chamber was not reported.	
	Metric 9: Reporting of Doses/Concentrations	Medium	Target concentration was reported. Concentrations in the inhalation chamber were analytically determined. It was stated by study authors that if deviations greater than 7% occurred, the data were not used, and the exposure was repeated. Analytical concentrations not shown.	
	Metric 10: Exposure Frequency and Duration	Low	Exposure duration varied but encompassed standard study design.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Medium	A single concentration was studied with varied exposure durations. The aim of the study was to determine the time at which effects were observed; therefore the single concentration was acceptable.	
	Metric 12: Exposure Route and Method	Low	A whole-body inhalation chamber was used. The test solution was metered at a "constant rate into a tube, heat being applied at the point of vaporization as needed to effect complete volatilization. All air entering the chamber passes through this tube and enters the chamber..." The air flow ranged from 17-30 L/min in a 160 L chamber. The number of animals in the chamber at one time was not reported. The authors do state that the design of the chamber allowed for animals to be introduced and withdrawn with little change in concentration. It is not clear if deceased animals were removed during the exposure period or new ones were added.	

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Study Citation:	Gehring, P. J. (1968). Hepatotoxic potency of various chlorinated hydrocarbon vapours relative to their narcotic and lethal potencies in mice. Toxicology and Applied Pharmacology 13(3):287-298.
Health Outcome(s):	Hepatic/Liver
Reported Health Effect(s):	Hepatic/Liver: serum ALT (SGPT activity)
Duration:	Acute (less than or equal to 24 hr) 17h inhalation; 1,1,2-TCA
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	29227; Linked HERO ID(s): 29227, 2799686

Domain	Metric	Rating	Comments
Domain 4: Test Animals			
Metric 13:	Test Animal Characteristics	Medium	The species, strain, sex, and starting body weight were described and appropriate, age was not reported. The source of animals was not reported but "arrival in the laboratory" indicates external source. Mice are commonly used for study type.
Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not reported and could not be evaluated.
Metric 15:	Number of Animals per Group	Low	The number of animals exposed to the test substance was not reported.
Domain 5: Outcome Assessment			
Metric 16:	Outcome Assessment Methodology	Low	Outcome assessment methodology partially addressed outcome of interest. Only serum ALT (SGPT) was used to determine hepatic effects. Method was cited previously (Reitman and Frankel 1957 and specified in the Sigman Technical Bulletin 505 1964); limited details were provided in current study.
Metric 17:	Consistency of Outcome Assessment	Medium	For SGPT levels in the blood, the outcome assessment was performed "Twenty-four hours after the beginning of an exposure or the injection of an agent" by collecting a blood sample via cardiac puncture under anesthesia. Then the SGPT was determined using the cited source "the method of Reitman and Frankel (1957) as specified in the Sigma Technical Bulletin 505 (1964)". The criteria for SGPT effect were ~2 fold higher than the SGPT levels determined in the control mice is considered an abnormal change. The ET50 for ALT activity was defined as the duration of exposure that produced increased ALT levels in one-half of the exposed mice. According to the Figure 3 and 7, serum ALT levels were determined at earlier time points than 24 hours after exposure was initiated. This may have been an oversight in reporting methods by the study authors, as serum ALT levels were determined 24 hours after i.p. injection. Timing of evaluation of serum ALT can be determined from Figures, but it is unclear if these are all the timepoints evaluated. The outcome assessment appears to be consistent across groups, but there are some incompletely reported/confusing details and missing details which are unlikely to have a substantial impact on results.
Metric 18:	Sampling Adequacy	High	The number of animals evaluated is reported in the figure legend. Data is reported for 9-25 animals/group and is adequate for the study type.
Metric 19:	Blinding of Assessors	N/A	Blinding was not reported; however, blinding is not required for the outcomes of interest.
Metric 20:	Negative Control Response	Low	Control ALT levels were not reported for the group of mice concurrently ran with the test substance, rather a composite of 254 control mice that were air-exposed were used to determine control serum ALT levels. These control animals were the concurrent controls for several different chemicals.

Domain 6: Confounding / Variable Control

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Study Citation:	Gehring, P. J. (1968). Hepatotoxic potency of various chlorinated hydrocarbon vapours relative to their narcotic and lethal potencies in mice. Toxicology and Applied Pharmacology 13(3):287-298.
Health Outcome(s):	Hepatic/Liver
Reported Health Effect(s):	Hepatic/Liver: serum ALT (SGPT activity)
Duration:	Acute (less than or equal to 24 hr) 17h inhalation; 1,1,2-TCA
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	29227; Linked HERO ID(s): 29227, 2799686

Domain	Metric	Rating	Comments
	Metric 21: Confounding Variables in Test Design and Procedures	Low	The control animals were sham treated. The details related to food consumption, water intake, and individual body weights were not reported. Respiratory rates were not measured in an inhalation study, and the test substance may be a respiratory irritant.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.
	Metric 23: Data Presentation and Analysis	High	Statistical methods to determine LT50s and ET50s were done according to the method published by Litchfield and Wilcoxon 1949 (A Simplified Method of Evaluating Dose-Effect Experiments, Experimental Therapeutics, 1949). The cited paper describes in detail the method to determine ED50s with confidence limits. Although this study determined LT50s and ET50s, the method described in the paper seems applicable and appropriate. There was also sufficient data reported where an independent analysis could be performed (estimated from figures 3 and 7).
	Metric 24: Reporting of Data	Medium	Study authors reported ET50s with 95% confidence limits in Table 3. The percentage of mice affected at different time points is shown graphically.

Additional Comments: 11.14.2025 DH (dherber@srcinc.com). The following metric scores were changed Metric 8, 11, 15, 23, and 24. Text changes to comments fields were made for all metrics.

Overall Quality Determination

Medium

Study Citation:	Harms, M. S., Peterson, R. E., Fujimoto, J. M., Erwin, C. P. (1976). Increased "bile duct-pancreatic fluid" flow in chlorinated hydrocarbon-treated rats. Toxicology and Applied Pharmacology 35(1):41-49.			
Health Outcome(s):	Hepatic/Liver; Gastrointestinal;			
Reported Health Effect(s):	Hepatic/Liver: Bile duct-pancreatic fluid flowSerum ALT levels and histopathology on liver, and common bile duct; Gastrointestinal: Histopathology on pancreas;			
Duration:	Acute (less than or equal to 24 hr) Single i.p. injection			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	58005			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	All Outcomes: Test substance was identified as 1,1,2-trichloroethane.	
	Metric 2: Test Substance Source	Low	All Outcomes: The source of the test substance was not reported.	
	Metric 3: Test Substance Purity	Low	All Outcomes: The purity of the test substance was not reported.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	High	All Outcomes: The negative control was appropriate (vehicle).	
	Metric 5: Positive Controls	N/A	All Outcomes: Not applicable for this study.	
	Metric 6: Randomized Allocation of Animals	Low	All Outcomes: Study does not state how animals were allocated into study groups.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	All Outcomes: Preparation and storage of test substance were not adequately reported given the volatility of the test substance.	
	Metric 8: Consistency of Exposure Administration	Medium	All Outcomes: The volume of test substance and vehicle injected were not provided. The study only states "These compounds were given ip in four volumes of corn oil"	
	Metric 9: Reporting of Doses/Concentrations	High	All Outcomes: Doses are reported without ambiguity.	
	Metric 10: Exposure Frequency and Duration	High	All Outcomes: Exposure frequency and duration were appropriate for this study type.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Medium	All Outcomes: A full range of responses were not obtained. The dose studied was based on previous reports showing toxic effects.	
	Metric 12: Exposure Route and Method	High	All Outcomes: The route of exposure was appropriate.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Medium	All Outcomes: Age of the test animals was not reported.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	All Outcomes: Husbandry conditions were not reported.	
	Metric 15: Number of Animals per Group	Low	All Outcomes: The number of animals treated per study group was not reported.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	High	All Outcomes: The outcome assessment methodology addressed the intended outcomes of interest.	
	Metric 17: Consistency of Outcome Assessment	High	All Outcomes: Outcomes were assessed consistently across study groups.	
	Metric 18: Sampling Adequacy	High	All Outcomes: Sampling was adequate (n=5-8).	
	Metric 19: Blinding of Assessors	N/A	All Outcomes: Blinding was not necessary.	

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Study Citation:	Harms, M. S., Peterson, R. E., Fujimoto, J. M., Erwin, C. P. (1976). Increased "bile duct-pancreatic fluid" flow in chlorinated hydrocarbon-treated rats. Toxicology and Applied Pharmacology 35(1):41-49.
Health Outcome(s):	Hepatic/Liver; Gastrointestinal;
Reported Health Effect(s):	Hepatic/Liver: Bile duct-pancreatic fluid flowSerum ALT levels and histopathology on liver, and common bile duct; Gastrointestinal: Histopathology on pancreas;
Duration:	Acute (less than or equal to 24 hr) Single i.p. injection
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	58005

Domain	Metric	Rating	Comments
	Metric 20: Negative Control Response	High	All Outcomes: The negative control response was appropriate.
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	All Outcomes: Although the study did not report all information to determine confounding, reported information did not identify differences.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	All Outcomes: There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.
	Metric 23: Data Presentation and Analysis	High	All Outcomes: Statistical analysis was appropriate.
	Metric 24: Reporting of Data	Medium	All Outcomes: Histopathological data are not fully reported, however this is unlikely to have a substantial impact on results.

Additional Comments: None

Overall Quality Determination**Medium**

Study Citation:	Klaassen, C. D., Plaa, G. L. (1966). Relative effects of various chlorinated hydrocarbons on liver and kidney function in mice. Toxicology and Applied Pharmacology 9(1):139-151.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: Changes to liver function - increase in sulfobromophthalein retention, increase in serum ALT activity and changes to histopathology (cellular infiltration, vacuolation, and necrosis)			
Duration:	Acute (less than or equal to 24 hr) Acute; single injection			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	64549; Linked HERO ID(s): 64549, 2799680			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	Test substance was identified.	
	Metric 2: Test Substance Source	High	The test substance was analytically verified by Dow Chemical Company using infrared spectroscopy.	
	Metric 3: Test Substance Purity	High	The test substance was analytically verified by Dow Chemical Company and impurities were reported. The test substance was reported to be highly pure.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	Low	Details regarding the control mice are not provided. Study reports two sets of control mice (one referring to 59, oil treated run simultaneously; and another group of 77 control mice). It is not clear if 77 mice were run simultaneously or if data is based off of historic information. Also, it was unclear if negative controls were performed to evaluate changes to histopathology.	
	Metric 5: Positive Controls	N/A	Not needed for this study	
	Metric 6: Randomized Allocation of Animals	Low	Animals were randomly allocated into cages (10/cage). Authors do not report how study groups were formed.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	Preparation and storage conditions were not properly reported given the volatility of the test substance.	
	Metric 8: Consistency of Exposure Administration	High	Exposure was consistent across study groups.	
	Metric 9: Reporting of Doses/Concentrations	Uninformative	All doses that were used for histopathology and the liver function changes during the LD50 study were not reported. The only reported doses were the LD50, LD10, and to study BSP retention and ALT activity in the presence or absence of ethanol.	
	Metric 10: Exposure Frequency and Duration	High	Exposure and frequency were appropriate for outcome studied.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Low	The number of exposure groups and doses were not reported to assess liver function changes during the LD50 study. For histopathology, the number of groups used was not reported. The number of groups for the LD10 and for the impact of ethanol on BSP retention and ALT activity was reported because there was only one dosing group per study.	
	Metric 12: Exposure Route and Method	High	Route of exposure was i.p. injection.	
Domain 4: Test Animals				
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Study Citation:	Klaassen, C. D., Plaa, G. L. (1966). Relative effects of various chlorinated hydrocarbons on liver and kidney function in mice. Toxicology and Applied Pharmacology 9(1):139-151.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: Changes to liver function - increase in sulfobromophthalein retention, increase in serum ALT activity and changes to histopathology (cellular infiltration, vacuolation, and necrosis)			
Duration:	Acute (less than or equal to 24 hr) Acute; single injection			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	64549; Linked HERO ID(s): 64549, 2799680			
Domain	Metric	Rating	Comments	
	Metric 13: Test Animal Characteristics	Low	The source and age of the mice were not reported.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not reported.	
	Metric 15: Number of Animals per Group	Medium	The number of animals per study groups were reported in the table or text. The number of animals used in histopathology studies was ambiguous and listed as 10-15.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	High	The outcome assessment and methodology were appropriate.	
	Metric 17: Consistency of Outcome Assessment	High	Details regarding outcome assessment were reported and assessments were assessed consistently.	
	Metric 18: Sampling Adequacy	Medium	Details regarding sampling of outcomes were not adequately reported.	
	Metric 19: Blinding of Assessors	N/A	Blinding of assessor is not needed for this study	
	Metric 20: Negative Control Response	Medium	Negative control responses were reported in text and were appropriate, however negative control histology was not reported.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	Although the study did not report all information to determine confounding, reported information did not identify differences between the groups.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.	
	Metric 23: Data Presentation and Analysis	High	Statistical analysis was adequately described.	
	Metric 24: Reporting of Data	Low	Data for each study group were not reported for in the assessment of histopathology and for liver dysfunction parameters assessed in the LD50 study.	
Additional Comments:	None			

Overall Quality Determination**Low**

Study Citation:	Klaassen, C. D., Plaa, G. L. (1966). Relative effects of various chlorinated hydrocarbons on liver and kidney function in mice. Toxicology and Applied Pharmacology 9(1):139-151.			
Health Outcome(s):	Renal/Kidney			
Reported Health Effect(s):	Renal/Kidney: Changes to kidney function - increased excretion of urine protein and/or glucose, decreased phenolsulfonephthalein excretion, and changes to kidney histopathology (hyaline droplets, hydropic degeneration, increased eosinophilia, and necrosis).			
Duration:	Acute (less than or equal to 24 hr) Acute; single injection			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	64549; Linked HERO ID(s): 64549, 2799680			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	Test substance was identified as 1,1,2-trichloroethane.	
	Metric 2: Test Substance Source	High	The test substance was analytically verified by Dow Chemical Company using infrared spectroscopy.	
	Metric 3: Test Substance Purity	High	The test substance was analytically verified by Dow Chemical Company and impurities were reported. The test substance was reported to be highly pure.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	Low	Details regarding the control mice are not provided. It is not clear if the control mice were run simultaneously or if data is based off of historic information. Also, it was unclear if negative controls were performed to evaluate changes to histopathology.	
	Metric 5: Positive Controls	N/A	Not needed for this study	
	Metric 6: Randomized Allocation of Animals	Low	Animals were randomly allocated into cages (10/cage). Authors do not report how study groups were formed.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	Preparation and storage conditions were not properly reported given the volatility of the test substance.	
	Metric 8: Consistency of Exposure Administration	High	Exposure was consistent across study groups.	
	Metric 9: Reporting of Doses/Concentrations	Uninformative	Study does not report the doses that were administered. The only doses reported are a LD50 and ED50. However, it is not clearly reported if these were the actual doses used to study changes to the histopathology.	
	Metric 10: Exposure Frequency and Duration	High	Exposure and frequency were appropriate for outcome studied.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Uninformative	The number of exposure groups and doses were not reported for the assessment of alterations to kidney function or for the assessment of changes to histopathology.	
	Metric 12: Exposure Route and Method	High	Route of exposure was i.p. injection.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Low	The source and age of the mice were not reported.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not reported.	
	Metric 15: Number of Animals per Group	Medium	The number of animals per study groups were reported in the table or text. The number of animals used in histopathology studies was ambiguous and listed as 10-15.	
Domain 5: Outcome Assessment				

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Study Citation:	Klaassen, C. D., Plaa, G. L. (1966). Relative effects of various chlorinated hydrocarbons on liver and kidney function in mice. Toxicology and Applied Pharmacology 9(1):139-151.			
Health Outcome(s):	Renal/Kidney			
Reported Health Effect(s):	Renal/Kidney: Changes to kidney function - increased excretion of urine protein and/or glucose, decreased phenolsulfonephthalein excretion, and changes to kidney histopathology (hyaline droplets, hydropic degeneration, increased eosinophilia, and necrosis).			
Duration:	Acute (less than or equal to 24 hr) Acute; single injection			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	64549; Linked HERO ID(s): 64549, 2799680			
Domain	Metric	Rating	Comments	
	Metric 16: Outcome Assessment Methodology	High	The outcome assessment and methodology were appropriate.	
	Metric 17: Consistency of Outcome Assessment	High	Details regarding outcome assessment were reported and assessments were performed consistently.	
	Metric 18: Sampling Adequacy	Medium	Details regarding sampling of outcomes were provided with some limitation.	
	Metric 19: Blinding of Assessors	N/A	Blinding is not needed in this study	
	Metric 20: Negative Control Response	Medium	Negative control responses were reported in text and were appropriate, however negative control histology was not reported.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	Although the study did not report all information to determine confounding, reported information did not identify differences between the groups.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.	
	Metric 23: Data Presentation and Analysis	High	Statistical analysis was adequately described.	
	Metric 24: Reporting of Data	Low	Data for each study group were not reported in the assessment of histopathology and for the determination of the ED50 for a decrease in phenolsulfonphthalein excretion	
Additional Comments:	Doses were not adequately reported.			
Overall Quality Determination		Low		

Study Citation:	Klaassen, C. D., Plaa, G. L. (1966). Relative effects of various chlorinated hydrocarbons on liver and kidney function in mice. Toxicology and Applied Pharmacology 9(1):139-151.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: Determination of LD50 after 24 h			
Duration:	Acute (less than or equal to 24 hr) Acute; single injection			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	64549; Linked HERO ID(s): 64549, 2799680			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	Test substance was identified.	
	Metric 2: Test Substance Source	High	The test substance was analytically verified by Dow Chemical Company using infrared spectroscopy.	
	Metric 3: Test Substance Purity	High	The test substance was analytically verified by Dow Chemical Company and impurities were reported. The test substance was reported to be highly pure.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	N/A	No control was required (LD50)	
	Metric 5: Positive Controls	N/A	Not needed for this study	
	Metric 6: Randomized Allocation of Animals	Low	Animals were randomly allocated into cages (10/cage). Authors do not report how study groups were formed.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	Preparation and storage conditions were not properly reported given the volatility of the test substance.	
	Metric 8: Consistency of Exposure Administration	High	Exposure was consistent across study groups.	
	Metric 9: Reporting of Doses/Concentrations	Uninformative	Study does not report the doses that were administered.	
	Metric 10: Exposure Frequency and Duration	High	Exposure and frequency were appropriate for outcome studied.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Uninformative	The doses were not reported so the number of study groups could not be determined.	
	Metric 12: Exposure Route and Method	High	Route of exposure was i.p. injection.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Low	The source and age of the mice were not reported.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not reported.	
	Metric 15: Number of Animals per Group	Medium	The number of animals/groups are reported (n=10).	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	High	The outcome assessment and methodology were appropriate.	
	Metric 17: Consistency of Outcome Assessment	High	Details regarding outcome assessment were reported and assessments were assessed consistently.	
	Metric 18: Sampling Adequacy	Medium	Details regarding sampling of outcomes were not adequately reported.	

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Study Citation:	Klaassen, C. D., Plaa, G. L. (1966). Relative effects of various chlorinated hydrocarbons on liver and kidney function in mice. Toxicology and Applied Pharmacology 9(1):139-151.
Health Outcome(s):	Mortality
Reported Health Effect(s):	Mortality: Determination of LD50 after 24 h
Duration:	Acute (less than or equal to 24 hr) Acute; single injection
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64549; Linked HERO ID(s): 64549, 2799680

Domain	Metric	Rating	Comments
	Metric 19: Blinding of Assessors	N/A	Blinding of assessors was not needed.
	Metric 20: Negative Control Response	N/A	Negative control was not required (LD50)
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	Although the study did not report all information to determine confounding, reported information did not identify differences between the groups.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.
	Metric 23: Data Presentation and Analysis	High	Statistical analysis was adequately described.
	Metric 24: Reporting of Data	Low	Data for the different dose groups were not reported.

Additional Comments: This study did not report the doses that were administered and is therefore rated as unacceptable.

Overall Quality Determination

Low

Study Citation:	Klaassen, C. D., Plaa, G. L. (1967). Relative effects of various chlorinated hydrocarbons on liver and kidney function in dogs. Toxicology and Applied Pharmacology 10(1):119-131.			
Health Outcome(s):	Hepatic/Liver; Renal/Kidney;			
Reported Health Effect(s):	Hepatic/Liver: Increased SGPT activity, liver histopathology; Renal/Kidney: Decreased PSP excretion, kidney histopathology;			
Duration:	Acute (less than or equal to 24 hr) Single injection - 1,1,2-TCE			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	64550			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	All Outcomes: The test substance was identified as 1,1,2-trichloroethane.
	Metric 2:	Test Substance Source	Low	All Outcomes: The source of the test substance was not reported.
	Metric 3:	Test Substance Purity	Low	All Outcomes: The authors did not report the purity or grade of the test substance.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	Low	Hepatic/Liver: The paper indicates that controls were included for measurement of liver function. However, the paper does not specify how controls were treated (it is unclear whether negative controls were administered the vehicle).; Renal/Kidney: The paper indicates that controls were included for measurement of kidney function. However, the paper does not specify how controls were treated (it is unclear whether negative controls were administered the vehicle).
	Metric 5:	Positive Controls	N/A	All Outcomes: Positive controls are not needed for the evaluated endpoint.
	Metric 6:	Randomized Allocation of Animals	Low	All Outcomes: The paper did not report how animals were allocated to each dose level.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Low	All Outcomes: Information on preparation and storage was not provided, and the test substance is volatile. The paper simply states that the test substance was mixed with corn oil, with no further details.
	Metric 8:	Consistency of Exposure Administration	Low	All Outcomes: The volume used for ip injection was not reported. It is unknown whether the exposures were administered consistently across dose groups.
	Metric 9:	Reporting of Doses/Concentrations	High	All Outcomes: Doses were reported without ambiguity, in units of mL/kg.
	Metric 10:	Exposure Frequency and Duration	High	Hepatic/Liver: A single injection is acceptable for determination of acute effects on the liver.; Renal/Kidney: A single injection is acceptable for determination of acute effects on the kidney.
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Study Citation:	Klaassen, C. D., Plaa, G. L. (1967). Relative effects of various chlorinated hydrocarbons on liver and kidney function in dogs. Toxicology and Applied Pharmacology 10(1):119-131.			
Health Outcome(s):	Hepatic/Liver; Renal/Kidney;			
Reported Health Effect(s):	Hepatic/Liver: Increased SGPT activity, liver histopathology; Renal/Kidney: Decreased PSP excretion, kidney histopathology;			
Duration:	Acute (less than or equal to 24 hr) Single injection - 1,1,2-TCE			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	64550			
Domain	Metric	Rating	Comments	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Medium	Hepatic/Liver: The authors did not justify the selected range of doses. Some hepatic effects were observed, but it was unclear whether the dose range sufficiently covered the full range of responses because detailed quantitative results were not reported. Three dose levels (0.24, 0.37, and 0.50 mL/kg) were used for SGPT measurements and responses were described as either elevated (greater than the control mean + 2SD) or normal (within control mean + 2SD). Histology was examined at the following dose levels: 0.24, 0.35, 0.37, 0.45, and 0.50 mL/kg; hepatic lesions were reported qualitatively (incidence data not reported for each dose level), preventing assessment of the range of responses.; Renal/Kidney: The authors did not justify the selected range of doses. Some effects on kidney function were observed, but it was unclear whether the dose range sufficiently covered the full range of responses because detailed quantitative results were not reported. Three dose levels (0.28, 0.40, and 0.52 mL/kg) were used for PSP excretion measurements and responses were described as either diminished (less than the control mean - 2SD) or normal (within control mean + 2SD). Histology was examined at the following dose levels: 0.28, 0.35, 0.40, 0.45, and 0.52 mL/kg; kidney lesions were reported qualitatively (incidence data not reported for each dose level), preventing assessment of the range of responses.	
	Metric 12: Exposure Route and Method	High	All Outcomes: The route of exposure (ip injection) is suited to the test substance.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Low	All Outcomes: Mongrel dogs of both sexes were used (a specific breed was not used). The age and source of animals were not reported. Also, there was a wide range of starting body weights (7-14 kg).	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	All Outcomes: Husbandry conditions were not reported.	
	Metric 15: Number of Animals per Group	Low	Hepatic/Liver: There were 1-3 dogs used per dose level. This is fewer than the typical number used to assess hepatic toxicity, but is acceptable given the species used.; Renal/Kidney: There were 1-2 dogs used per dose level. This is fewer than the typical number used to assess kidney toxicity, but is acceptable given the species used.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	Medium	Hepatic/Liver: Only SGPT activity and histology were evaluated. Additional endpoints (e.g., other serum chemistry measurements) would have been useful for assessing hepatic effects.; Renal/Kidney: Only PSP excretion and histology were evaluated. Additional endpoints (e.g., serum chemistry and urinary measurements) would have been useful for assessing kidney effects.	
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Study Citation:	Klaassen, C. D., Plaa, G. L. (1967). Relative effects of various chlorinated hydrocarbons on liver and kidney function in dogs. Toxicology and Applied Pharmacology 10(1):119-131.			
Health Outcome(s):	Hepatic/Liver; Renal/Kidney;			
Reported Health Effect(s):	Hepatic/Liver: Increased SGPT activity, liver histopathology; Renal/Kidney: Decreased PSP excretion, kidney histopathology;			
Duration:	Acute (less than or equal to 24 hr) Single injection - 1,1,2-TCE			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	64550			
Domain	Metric	Rating	Comments	
	Metric 17: Consistency of Outcome Assessment	Medium	Hepatic/Liver: SGPT activity was measured consistently across dose levels (at 24 or 48 hours after dosing, but only data from 24 hours are reported). There were minor differences in the timing of assessment of histology across dose levels (at 24 hours in animals from the LD50 study and at 48 hours in animals from the ED50 study).; Renal/Kidney: The PSP test was consistently administered across dose levels (at 24 hours after dosing). There were minor differences in the timing of assessment of histology across dose levels (at 24 hours in animals from the LD50 study and at 48 hours in animals from the ED50 study).	
	Metric 18: Sampling Adequacy	High	Hepatic/Liver: All surviving animals were evaluated for histology. SGPT activity was measured in all animals dosed for that purpose. Metric 15 was downgraded for the low number of animals per group, and the study is not further downgraded in Metric 18 because all dosed animals were evaluated.; Renal/Kidney: All surviving animals were evaluated for histology. PSP excretion was measured in all animals dosed for that purpose. Metric 15 was downgraded for the low number of animals per group, and the study is not further downgraded in Metric 18 because all dosed animals were evaluated.	
	Metric 19: Blinding of Assessors	N/A	Hepatic/Liver: The outcome of SGPT activity is not subjective, and blinding is not required for initial histopathology review.; Renal/Kidney: The outcome of the PSP test is not subjective, and blinding is not required for initial histopathology review.	
	Metric 20: Negative Control Response	Medium	Hepatic/Liver: SGPT activity in control dogs appears adequate, but histology of control dogs is not reported.; Renal/Kidney: PSP excretion in control dogs was reported and appears acceptable, but the authors do not indicate the normal historical control range for this endpoint. Histology of control dogs is not reported.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	All Outcomes: Limited details were provided, but the reported information did not identify differences among study groups that would have confounded the results.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	All Outcomes: There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.	
	Metric 23: Data Presentation and Analysis	N/A	Hepatic/Liver: Statistical analysis was not possible due to the low number of animals per group (n=1-3).; Renal/Kidney: Statistical analysis was not possible due to the low number of animals per group (n=1-2).	
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Study Citation:	Klaassen, C. D., Plaa, G. L. (1967). Relative effects of various chlorinated hydrocarbons on liver and kidney function in dogs. Toxicology and Applied Pharmacology 10(1):119-131.			
Health Outcome(s):	Hepatic/Liver; Renal/Kidney;			
Reported Health Effect(s):	Hepatic/Liver: Increased SGPT activity, liver histopathology; Renal/Kidney: Decreased PSP excretion, kidney histopathology;			
Duration:	Acute (less than or equal to 24 hr) Single injection - 1,1,2-TCE			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	64550			
Domain	Metric	Rating	Comments	
	Metric 24: Reporting of Data	Uninformative	Hepatic/Liver: For SGPT activity, numerical data are not provided; results are only reported as "normal" (within control mean + 2SD) or "elevated" (greater than control mean + 2SD). These results cannot be interpreted for biological relevance without more information on magnitude and variability. For histopathology, results are only described qualitatively, and the report does not differentiate among findings in multiple exposure groups.; Renal/Kidney: For PSP excretion, numerical data are not provided; results are only reported as "normal" (within control mean - 2SD) or "diminished" (less than control mean - 2SD). These results cannot be interpreted for biological relevance without more information on magnitude and variability. For histopathology, results are only described qualitatively, and the report does not differentiate among findings in multiple exposure groups.	

Additional Comments: This form is for 1,1,2-trichloroethane. Due to the lack of quantitative data for each dose level, reliable NOAEL and LOAEL values cannot be identified.

Overall Quality Determination

Uninformative

Study Citation:	Klaassen, C. D., Plaa, G. L. (1967). Relative effects of various chlorinated hydrocarbons on liver and kidney function in dogs. Toxicology and Applied Pharmacology 10(1):119-131.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: Increased mortality			
Duration:	Acute (less than or equal to 24 hr) Single injection - 1,1,2-TCE			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	64550			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	The test substance was identified as 1,1,2-trichloroethane.	
	Metric 2: Test Substance Source	Low	The source of the test substance was not reported.	
	Metric 3: Test Substance Purity	Low	The authors did not report the purity or grade of the test substance.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	N/A	The paper did not indicate whether controls were used for the lethality part of the study. However, controls are not required for acute lethality (LD50) determination.	
	Metric 5: Positive Controls	N/A	Positive controls are not needed for the evaluated endpoint.	
	Metric 6: Randomized Allocation of Animals	Low	The paper did not report how animals were allocated to each dose level.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	Information on preparation and storage was not provided, and the test substance is volatile. The paper simply states that the test substance was mixed with corn oil, with no further details.	
	Metric 8: Consistency of Exposure Administration	Low	The volume used for ip injection was not reported. It is unknown whether the exposures were administered consistently across dose groups.	
	Metric 9: Reporting of Doses/Concentrations	High	Doses were reported without ambiguity, in units of mL/kg.	
	Metric 10: Exposure Frequency and Duration	High	A single injection is appropriate for determination of the LD50.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	High	The authors followed the up-and-down method described by Brownlee et al. (1953). The doses used to determine lethality were 0.35, 0.45, and 0.55 mL/kg. A range of responses (survival or death) was observed.	
	Metric 12: Exposure Route and Method	High	The route of exposure (ip injection) is suited to the test substance.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Low	Mongrel dogs of both sexes were used (a specific breed was not used). The age and source of animals were not reported. Also, there was a wide range of starting body weights (7-14 kg).	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not reported.	
	Metric 15: Number of Animals per Group	Low	There were 1-2 dogs used per dose level. This is fewer than the number that would have been used if the guidance provided in OECD 425 (up-and-down procedure for acute toxicity in rodents) had been followed, but is acceptable given the species used.	
Domain 5: Outcome Assessment				
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Study Citation:	Klaassen, C. D., Plaa, G. L. (1967). Relative effects of various chlorinated hydrocarbons on liver and kidney function in dogs. Toxicology and Applied Pharmacology 10(1):119-131.
Health Outcome(s):	Mortality
Reported Health Effect(s):	Mortality: Increased mortality
Duration:	Acute (less than or equal to 24 hr) Single injection - 1,1,2-TCE
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64550

Domain	Metric	Rating	Comments
	Metric 16: Outcome Assessment Methodology	Medium	The outcome was mortality within 24 hours after dosing. Current OECD guidance for determination of lethal effects recommends observation for 14 days after dosing.
	Metric 17: Consistency of Outcome Assessment	High	The outcome of mortality was assessed consistently across study groups (i.e., at 24 hours after dosing).
	Metric 18: Sampling Adequacy	High	All animals were evaluated for survival. Metric 15 was downgraded for the low number of animals per group, and the study is not further downgraded in Metric 18 because all dosed animals were evaluated.
	Metric 19: Blinding of Assessors	N/A	The outcome (mortality) is not subjective.
	Metric 20: Negative Control Response	N/A	There was no negative control, and one is not required for LD50 determination.
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	High	It is unlikely that there were confounding variables in test design or procedures that affected the outcome of mortality.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.
	Metric 23: Data Presentation and Analysis	High	The method of Brownlee et al. (1953) was followed but not described herein. However, sufficient data were provided to conduct an independent statistical analysis.
	Metric 24: Reporting of Data	High	Survival data are provided for each dose and for each animal.
Additional Comments: This form is for 1,1,2-trichloroethane. The up-and-down procedure used here appears sufficient to determine an approximate LD50, although a more reliable value would be obtained with additional animals.			

Overall Quality Determination**Medium**

Study Citation:	Klaassen, C. D., Plaa, G. L. (1969). Comparison of the biochemical alterations elicited in livers from rats treated with carbon tetrachloride, chloroform, 1,1,2-trichloroethane and 1,1,1-trichloroethane. Biochemical Pharmacology 18(8):2019-2027.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: Liver triglycerides, glucose 6-phosphatase and lipid peroxidation			
Duration:	Acute (less than or equal to 24 hr) Liver G-6-P and lipid peroxidation			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	9913			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	Test substance was identified as 1,1,2-trichloroethane.	
	Metric 2: Test Substance Source	Low	The source of the test substance was not reported.	
	Metric 3: Test Substance Purity	High	Test substance was identified as analytical grade.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	Low	Time 0 was reported. It is not clear if these animals were administered a vehicle or were untreated or if these were run concurrently.	
	Metric 5: Positive Controls	N/A	A positive control group was not necessary.	
	Metric 6: Randomized Allocation of Animals	Low	The study did not report how animals were allocated.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	Preparation and storage were not described adequately given the volatility of the test substance.	
	Metric 8: Consistency of Exposure Administration	Medium	Details of exposure were limited; however, this is unlikely to substantially impact results.	
	Metric 9: Reporting of Doses/Concentrations	Medium	Dose was reported but with some ambiguity. Reported as 0.75 x LD50	
	Metric 10: Exposure Frequency and Duration	High	Exposure duration was appropriate for study.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Low	Only one dose studied which was based off of the LD50.	
	Metric 12: Exposure Route and Method	High	Exposure route was appropriate (i.p injection).	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Low	Source of test animals was not reported.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not reported.	
	Metric 15: Number of Animals per Group	Low	Numbers of animal/group were not reported.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	Medium	Liver histology and serum chemistry were not evaluated to assess hepatotoxicity.	
	Metric 17: Consistency of Outcome Assessment	Medium	Details regarding outcome assessment were limited.	
	Metric 18: Sampling Adequacy	Low	Number of animals/group were not reported	
	Metric 19: Blinding of Assessors	N/A	Blinding was not necessary for this study.	

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Study Citation:	Klaassen, C. D., Plaa, G. L. (1969). Comparison of the biochemical alterations elicited in livers from rats treated with carbon tetrachloride, chloroform, 1,1,2-trichloroethane and 1,1,1-trichloroethane. Biochemical Pharmacology 18(8):2019-2027.
Health Outcome(s):	Hepatic/Liver
Reported Health Effect(s):	Hepatic/Liver: Liver triglycerides, glucose 6-phosphatase and lipid peroxidation
Duration:	Acute (less than or equal to 24 hr) Liver G-6-P and lipid peroxidation
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	9913

Domain	Metric	Rating	Comments
	Metric 20: Negative Control Response	Low	Data from timepoint 0 hour was reported (not clear if this was run concurrently).
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	Study did not report all information to determine confounding, reported information did not identify differences between groups.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	No information was provided to either to support or dismiss differences in groups in health outcomes or attrition.
	Metric 23: Data Presentation and Analysis	High	Statistical analysis was appropriate.
	Metric 24: Reporting of Data	Medium	There were were some deficiencies in reported data.

Additional Comments: none

Overall Quality Determination**Medium**

Study Citation:	Klaassen, C. D., Plaa, G. L. (1969). Comparison of the biochemical alterations elicited in livers from rats treated with carbon tetrachloride, chloroform, 1,1,2-trichloroethane and 1,1,1-trichloroethane. Biochemical Pharmacology 18(8):2019-2027.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: LD50			
Duration:	Acute (less than or equal to 24 hr) Single i.p injection			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	9913			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	Test substance was identified as 1,1,2-trichloroethane.	
	Metric 2: Test Substance Source	Low	The source of the test substance was not reported.	
	Metric 3: Test Substance Purity	High	Test substance was identified as analytical grade.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	N/A	Not applicable for LD50 study.	
	Metric 5: Positive Controls	N/A	A positive control group was not necessary.	
	Metric 6: Randomized Allocation of Animals	Low	The study did not report how animals were allocated.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	Preparation and storage were not described adequately given the volatility of the test substance.	
	Metric 8: Consistency of Exposure Administration	Medium	Details of exposure were limited; however, this is unlikely to substantially impact results.	
	Metric 9: Reporting of Doses/Concentrations	Uninformative	The doses administered were not reported.	
	Metric 10: Exposure Frequency and Duration	High	Exposure duration was appropriate for study.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Uninformative	The number of exposure groups were reported as 4-5, but doses were not reported.	
	Metric 12: Exposure Route and Method	High	Exposure route was appropriate (i.p injection).	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Low	Source of test animals was not reported.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not reported.	
	Metric 15: Number of Animals per Group	Medium	The number of animals /group were appropriate.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	High	Outcome assessment was appropriate.	
	Metric 17: Consistency of Outcome Assessment	Medium	Details regarding outcome assessment were limited.	
	Metric 18: Sampling Adequacy	Low	Details regarding sampling of outcomes were not reported.	
	Metric 19: Blinding of Assessors	N/A	Blinding was not necessary for this study.	
	Metric 20: Negative Control Response	N/A	Negative control not necessary for LD50	
Domain 6: Confounding / Variable Control				
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Study Citation:	Klaassen, C. D., Plaa, G. L. (1969). Comparison of the biochemical alterations elicited in livers from rats treated with carbon tetrachloride, chloroform, 1,1,2-trichloroethane and 1,1,1-trichloroethane. Biochemical Pharmacology 18(8):2019-2027.
Health Outcome(s):	Mortality
Reported Health Effect(s):	Mortality: LD50
Duration:	Acute (less than or equal to 24 hr) Single i.p injection
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	9913

Domain	Metric	Rating	Comments
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	Study did not report all information to determine confounding, reported information did not identify differences between groups.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	No information was provided to either to support or dismiss differences in groups in health outcomes or attrition.
	Metric 23: Data Presentation and Analysis	High	Statistical analysis was appropriate.
	Metric 24: Reporting of Data	Low	Data were not adequately reported.

Additional Comments: The study did not report the doses administered, thereby generating a score that is deemed unacceptable (Metric 9 and 11). However, it is not uncommon for LD50 studies not report this information and simply report an LD50. The study was therefore upgraded to low.

Overall Quality Determination

Low

Study Citation:	Klaassen, C. D., Plaa, G. L. (1969). Comparison of the biochemical alterations elicited in livers from rats treated with carbon tetrachloride, chloroform, 1,1,2-trichloroethane and 1,1,1-trichloroethane. Biochemical Pharmacology 18(8):2019-2027.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: Liver triglycerides, glucose 6-phosphatase and lipid peroxidation			
Duration:	Acute (less than or equal to 24 hr) Liver triglycerides			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	9913			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	Test substance was identified as 1,1,2-trichloroethane.	
	Metric 2: Test Substance Source	Low	The source of the test substance was not reported.	
	Metric 3: Test Substance Purity	High	Test substance was identified as analytical grade.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	Uninformative	A negative control group was not reported.	
	Metric 5: Positive Controls	N/A	A positive control group was not necessary.	
	Metric 6: Randomized Allocation of Animals	Low	The study did not report how animals were allocated.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	Preparation and storage were not described adequately given the volatility of the test substance.	
	Metric 8: Consistency of Exposure Administration	Medium	Details of exposure were limited; however, this is unlikely to substantially impact results.	
	Metric 9: Reporting of Doses/Concentrations	Low	The doses were not reported without ambiguity.	
	Metric 10: Exposure Frequency and Duration	High	Exposure duration was appropriate for study.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Low	Full range of responses were not obtained.	
	Metric 12: Exposure Route and Method	High	Exposure route was appropriate (i.p injection).	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Low	Source of test animals was not reported.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not reported.	
	Metric 15: Number of Animals per Group	Low	Numbers of animal/group were not reported.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	Medium	Liver histology and serum chemistry were not evaluated to assess hepatotoxicity.	
	Metric 17: Consistency of Outcome Assessment	Medium	Details regarding outcome assessment were limited.	
	Metric 18: Sampling Adequacy	Medium	3 animals/group were evaluated	
	Metric 19: Blinding of Assessors	N/A	Blinding was not necessary for this study.	
	Metric 20: Negative Control Response	Low	Negative control response was not reported.	
Domain 6: Confounding / Variable Control				
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Study Citation:	Klaassen, C. D., Plaa, G. L. (1969). Comparison of the biochemical alterations elicited in livers from rats treated with carbon tetrachloride, chloroform, 1,1,2-trichloroethane and 1,1,1-trichloroethane. Biochemical Pharmacology 18(8):2019-2027.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: Liver triglycerides, glucose 6-phosphatase and lipid peroxidation			
Duration:	Acute (less than or equal to 24 hr) Liver triglycerides			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	9913			
Domain	Metric	Rating	Comments	
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	Study did not report all information to determine confounding, reported information did not identify differences between groups.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	No information was provided to either to support or dismiss differences in groups in health outcomes or attrition.	
	Metric 23: Data Presentation and Analysis	High	Statistical analysis was appropriate.	
	Metric 24: Reporting of Data	High	Data were adequately reported.	
Additional Comments:	A negative control group was not included therefore the study was rated as unacceptable.			

Overall Quality Determination**Uninformative**

Study Citation:	Kronevi, T., Wahlberg, J., Holmberg, B. (1977). Morphological lesions in guinea pigs during skin exposure to 1,1,2-trichloroethane. Acta Pharmacologica et Toxicologica 41(4):298-305.		
Health Outcome(s):	Skin/Connective Tissue		
Reported Health Effect(s):	Skin/Connective Tissue: morphological changes in epidermis		
Duration:	Acute (less than or equal to 24 hr) up to 12 hours		
Chemical:	1,1,2-Trichloroethane- Parent compound		
HERO ID:	1740624		
Domain	Metric	Rating	Comments
Domain 1: Test Substance			
Metric 1:	Test Substance Identity	Medium	Test substance: 1,1,2-trichloroethane (vinyl trichloride). CAS number or structure was not reported.
Metric 2:	Test Substance Source	Low	Source: Fluka, AG, Buchs SG, Switzerland; lot or batch number was not reported.
Metric 3:	Test Substance Purity	High	Reported as analytical grade
Domain 2: Test Design			
Metric 4:	Negative and Vehicle Controls	Low	Unexposed skin near exposed of same animal were used for control for skin evaluations. for liver evaluation, 1 anaesthetized but not exposed animal and 2 solvent exposed but not anaesthetized animals served as controls (to control for anaesthetic agent). It is not clear if control animals also had skin depots applied with cyanolit glue on to clipped skin or if unexposed control skin was taken from under a skin depot with adhesive (under the same conditions).
Metric 5:	Positive Controls	N/A	Not applicable for this study type
Metric 6:	Randomized Allocation of Animals	Low	The study did not report how animals were allocated to study groups.
Domain 3: Exposure Characterization			
Metric 7:	Preparation and Storage of Test Substance	Medium	No preparation was necessary; pure solvent was applied. Storage conditions of the test substance prior to application was not reported.
Metric 8:	Consistency of Exposure Administration	Uninformative	Details of exposure administration are reported, but consistency is unclear. One to four glass rings/cover glass with central hole, were used per animal. A previously published study (Wahlberg 1976) was cited in the exposure methodology; however, this study is unavailable to assess. Pure solvent was applied through the hole in the cover glass for periods between 15 minutes and 12 hours. It is unclear if 1,1,2-trichloroethane was applied in 1 or 4 rings of individual animals.
Metric 9:	Reporting of Doses/Concentrations	Low	Study notes that 1.0 ml of pure solvent was applied to guinea pigs weighing 400-500 g. The dose could be calculated. It is unclear if (or which) individual animals received one or up to four of the doses.
Metric 10:	Exposure Frequency and Duration	High	Exposure was noted to be a single dermal application through a skin depot and left on for 15 and 30 minutes and 1, 1.5, 2, 3, 4, 5, 6, and 12 hours.
Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Uninformative	The number of exposure groups is not clear. It is unclear if all animals had a single-dose time course. The study noted animals had 1 to 4 rings so it is possible some animals received up to 4 ml of the test substance.

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Study Citation:	Kronevi, T., Wahlberg, J., Holmberg, B. (1977). Morphological lesions in guinea pigs during skin exposure to 1,1,2-trichloroethane. Acta Pharmacologica et Toxicologica 41(4):298-305.			
Health Outcome(s):	Skin/Connective Tissue			
Reported Health Effect(s):	Skin/Connective Tissue: morphological changes in epidermis			
Duration:	Acute (less than or equal to 24 hr) up to 12 hours			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	1740624			
Domain	Metric	Rating	Comments	
	Metric 12:	Exposure Route and Method	Low	Guinea pigs were exposed through a central hole on a glass covers that were closed with the cyanolit glue. The study does attempt to mitigate the volatility of the test substance by plugging with cyanolit glue; however, the concentrations inside the ring is not measured and it is unclear if the mitigation was successful.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	Low	Outbred guinea pigs; The sex (male and female) and a range of weight was reported. The study notes that guinea pigs were commercially sourced but does not specify the commercial source.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not reported.
	Metric 15:	Number of Animals per Group	Uninformative	A total of 11 guinea pigs were used. It is not clear if animals were grouped other than 1 unexposed animal and 2 exposed but not anaesthetized animals. It can be assumed that 1 animal was used per timepoint (8 timepoints and 3 controls). This number of animals is insufficient to characterize effects.
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	Low	The outcome assessment methodology addressed the timing of skin biopsy and liver, kidney and brain biopsies. Although brief descriptions of the biopsy methodologies are reported, there are deficiencies in the reporting. It is not clear what specific outcomes were being assessed. This methodology was sensitive for some outcomes (skin and liver changes) but is unclear if the methodology is sensitive for other outcomes (kidney and brain); there were no changes observed in these outcomes.
	Metric 17:	Consistency of Outcome Assessment	Medium	Details regarding the execution of the study protocol for outcome assessment were limited. The timing of specimen collection was reported; it is not clear when assessment was conducted.
	Metric 18:	Sampling Adequacy	Low	11 guinea pigs total were sampled. It is unclear how many animals were sampled for liver, kidney and brain.
	Metric 19:	Blinding of Assessors	N/A	Not applicable for this study type.
	Metric 20:	Negative Control Response	Low	The biological response of control groups for skin outcomes were not reported.
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Medium	The study did not report all information to determine confounding variables; however, the information reported did not identify differences among animals that would be considered confounding. The study authors suggest that anesthesia may interact with 1,1,2-trichloroethane resulting in effects but did not address the potential confounding.
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Study Citation:	Kronevi, T., Wahlberg, J., Holmberg, B. (1977). Morphological lesions in guinea pigs during skin exposure to 1,1,2-trichloroethane. Acta Pharmacologica et Toxicologica 41(4):298-305.			
Health Outcome(s):	Skin/Connective Tissue			
Reported Health Effect(s):	Skin/Connective Tissue: morphological changes in epidermis			
Duration:	Acute (less than or equal to 24 hr) up to 12 hours			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	1740624			
Domain	Metric		Rating	Comments
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.
	Metric 23:	Data Presentation and Analysis	N/A	Statistical analysis was not possible due to limited sample sizes,
	Metric 24:	Reporting of Data	Low	The findings were described in the text for most outcomes and time points with some visual histopathology slides. Outcomes and slides were not shown for control skin outcomes or for controls used for liver, kidney and brain outcomes.
Additional Comments:	11 male and female guinea pigs were administered a single 1.0 ml of pure 1,1,2-trichloroethane in a central hole of one- to- four glass covers and rings glued to the clipped back of the skin with cyanolit. Skin biopsies were conducted after 15 and 30 minutes, 1, 1.5, 2, 3, 4, 5, 6, and 12 hours of exposure. It can be assumed that 1 animal was used per time-point (8 timepoints and 3 controls). This number of animals is insufficient to characterize effects. Control specimens were noted to have been taken from unexposed skin "in the neighborhood". There does not appear to be controls for unexposed skin under the skin depots with cyanolit glue. It is unclear how many animals had one skin depot up to 4 depots. It is unclear if animals would have received 1 ml or up to 4 ml of the test substance. The biological response of control groups for skin outcomes was not reported.			

Overall Quality Determination**Uninformative**

Study Citation:	Kronevi, T., Wahlberg, J., Holmberg, B. (1977). Morphological lesions in guinea pigs during skin exposure to 1,1,2-trichloroethane. Acta Pharmacologica et Toxicologica 41(4):298-305.			
Health Outcome(s):	Hepatic/Liver; Renal/Kidney; Neurological/Behavioral;			
Reported Health Effect(s):	Hepatic/Liver: morphological changes in liver tissue; Renal/Kidney: morphological changes in kidney tissue; Neurological/Behavioral: morphological changes in brain tissue;			
Duration:	Acute (less than or equal to 24 hr) up to 12 hours			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	1740624			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Medium	All Outcomes: Test substance: 1,1,2-trichloroethane (vinyl chloride). CAS number or structure was not reported.
	Metric 2:	Test Substance Source	Low	All Outcomes: Source: Fluka, AG, Buchs SG, Switzerland; lot or batch number was not reported.
	Metric 3:	Test Substance Purity	High	All Outcomes: Reported as analytical grade
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	Low	All Outcomes: Unexposed skin near exposed of same animal were used for control for skin evaluations. for liver evaluation, 1 anaesthetized but not exposed animal and 2 solvent exposed but not anaesthetized animals served as controls (to control for anaesthetic agent). It is not clear if control animals also had skin depots applied with cyanolit glue on to clipped skin or if unexposed control skin was taken from under a skin depot with adhesive (under the same conditions).
	Metric 5:	Positive Controls	N/A	Hepatic/Liver: Not applicable for this study type; Renal/Kidney: Not applicable for this study type; Neurological/Behavioral: Not applicable for this study type.
	Metric 6:	Randomized Allocation of Animals	Low	Hepatic/Liver: The study did not report how animals were allocated to study groups; Renal/Kidney: The study did not report how animals were allocated to study groups.; Neurological/Behavioral: The study did not report how animals were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Medium	Hepatic/Liver: No preparation was necessary; pure solvent was applied. Storage conditions of the test substance prior to application was not reported; Renal/Kidney: No preparation was necessary; pure solvent was applied. Storage conditions of the test substance prior to application was not reported.; Neurological/Behavioral: No preparation was necessary; pure solvent was applied. Storage conditions of the test substance prior to application was not reported.
	Metric 8:	Consistency of Exposure Administration	Uninformative	All Outcomes: Details of exposure administration are reported, but consistency is unclear. One to four glass rings/cover glass with central hole, were used per animal. A previously published study (Wahlberg 1976) was cited in the exposure methodology; however, this study is unavailable to assess. Pure solvent was applied through the hole in the cover glass for periods between 15 minutes and 12 hours. It is unclear if 1,1,2-trichloroethane was applied in 1 or 4 rings of individual animals.
	Metric 9:	Reporting of Doses/Concentrations	Low	All Outcomes: Study notes that 1.0 ml of pure solvent was applied to guinea pigs weighing 400-500 g. The dose could be calculated. It is unclear if (or which) individual animals received one or up to four of the doses.

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Study Citation:	Kronevi, T., Wahlberg, J., Holmberg, B. (1977). Morphological lesions in guinea pigs during skin exposure to 1,1,2-trichloroethane. Acta Pharmacologica et Toxicologica 41(4):298-305.			
Health Outcome(s):	Hepatic/Liver; Renal/Kidney; Neurological/Behavioral;			
Reported Health Effect(s):	Hepatic/Liver: morphological changes in liver tissue; Renal/Kidney: morphological changes in kidney tissue; Neurological/Behavioral: morphological changes in brain tissue;			
Duration:	Acute (less than or equal to 24 hr) up to 12 hours			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	1740624			
Domain	Metric	Rating	Comments	
	Metric 10:	Exposure Frequency and Duration	High	All Outcomes: Exposure was noted to be a single dermal application through a skin depot and left on for 15 and 30 minutes and 1, 1.5, 2, 3, 4, 5, 6, and 12 hours. Liver, kidney, and brain specimens were collected at 2, 6, and 12 hours after start of exposure.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Uninformative	All Outcomes: The number of exposure groups is not clear. It is unclear if all animals had a single-dose time course. The study noted animals had 1 to 4 rings so it is possible some animals received up to 4 ml of the test substance.
	Metric 12:	Exposure Route and Method	Low	Hepatic/Liver: Guinea pigs were exposed through a central hole on a glass covers that were closed with the cyanolit glue. The study does attempt to mitigate the volatility of the test substance by plugging with cyanolit glue; however, the concentrations inside the ring is not measured and it is unclear if the mitigation was successful; Renal/Kidney: Guinea pigs were exposed through a central hole on a glass covers that were closed with the cyanolit glue. The study does attempt to mitigate the volatility of the test substance by plugging with cyanolit glue; however, the concentrations inside the ring is not measured and it is unclear if the mitigation was successful.; Neurological/Behavioral: Guinea pigs were exposed through a central hole on a glass covers that were closed with the cyanolit glue. The study does attempt to mitigate the volatility of the test substance by plugging with cyanolit glue; however, the concentrations inside the ring is not measured and it is unclear if the mitigation was successful.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	Low	All Outcomes: Outbred guinea pigs; The sex (male and female) and a range of weight was reported. The study notes that guinea pigs were commercially sourced but does not specify the commercial source.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	Hepatic/Liver: Husbandry conditions were not reported; Renal/Kidney: Husbandry conditions were not reported.; Neurological/Behavioral: Husbandry conditions were not reported.
	Metric 15:	Number of Animals per Group	Uninformative	All Outcomes: A total of 11 guinea pigs were used. It is not clear if animals were grouped other than 1 unexposed animal and 2 exposed but not anaesthetized animals. It can be assumed that 1 animal was used per time-point (8 time-points and 3 controls). This number of animals is insufficient to characterize effects.
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	Low	All Outcomes: The outcome assessment methodology addressed the timing of skin biopsy and liver, kidney and brain biopsies. Although brief descriptions of the biopsy methodologies are reported, there are deficiencies in the reporting. It is not clear what specific outcomes were being assessed. This methodology was sensitive for some outcomes (skin and liver changes) but is unclear if the methodology is sensitive for other outcomes (kidney and brain); there were no changes observed in these outcomes.

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Study Citation:	Kronevi, T., Wahlberg, J., Holmberg, B. (1977). Morphological lesions in guinea pigs during skin exposure to 1,1,2-trichloroethane. Acta Pharmacologica et Toxicologica 41(4):298-305.			
Health Outcome(s):	Hepatic/Liver; Renal/Kidney; Neurological/Behavioral;			
Reported Health Effect(s):	Hepatic/Liver: morphological changes in liver tissue; Renal/Kidney: morphological changes in kidney tissue; Neurological/Behavioral: morphological changes in brain tissue;			
Duration:	Acute (less than or equal to 24 hr) up to 12 hours			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	1740624			
Domain	Metric	Rating	Comments	
	Metric 17: Consistency of Outcome Assessment	Medium	All Outcomes: Details regarding the execution of the study protocol for outcome assessment were limited. The timing of specimen collection was reported; it is not clear when assessment was conducted.	
	Metric 18: Sampling Adequacy	Low	All Outcomes: 11 guinea pigs total were sampled. It is unclear how many animals were sampled for liver, kidney and brain.	
	Metric 19: Blinding of Assessors	N/A	Hepatic/Liver: Not applicable for this study type; Renal/Kidney: Not applicable for this study type; Neurological/Behavioral: Not applicable for this study type.	
	Metric 20: Negative Control Response	Uninformative	All Outcomes: The biological response of control groups for skin outcomes were not reported. Biological responses of the anaesthetized and non- exposed control and non-anaesthetized and exposed controls were reported for the liver morphology outcomes. Controls exposed to TCE, but not anesthesia had no liver effects. The study authors suggest that anesthesia may interact with 1,1,2-trichloroethane resulting in liver effects. No changes in kidney and brain were noted for any animal.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	Hepatic/Liver: The study did not report all information to determine confounding variables, however, the information reported did not identify differences among animals that would be considered confounding. The study authors suggest that anesthesia may interact with 1,1,2-trichloroethane resulting in effects but did not address the potential confounding.; Renal/Kidney: The study did not report all information to determine confounding variables; however, the information reported did not identify differences among animals that would be considered confounding.; Neurological/Behavioral: The study did not report all information to determine confounding variables; however, the information reported did not identify differences among animals that would be considered confounding.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	Hepatic/Liver: There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure; Renal/Kidney: There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.; Neurological/Behavioral: There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.	
	Metric 23: Data Presentation and Analysis	N/A	Hepatic/Liver: Statistical analysis was not possible; Renal/Kidney: Statistical analysis was not possible due to small sample size.; Neurological/Behavioral: Statistical analysis was not possible due to small sample size.	
	Metric 24: Reporting of Data	Low	All Outcomes: The findings were described in the text for most outcomes and time points with some visual histopathology slides. Outcomes and slides were not shown for control skin outcomes or for controls used for liver, kidney and bran outcomes.	

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Study Citation:	Kronevi, T., Wahlberg, J., Holmberg, B. (1977). Morphological lesions in guinea pigs during skin exposure to 1,1,2-trichloroethane. Acta Pharmacologica et Toxicologica 41(4):298-305.		
Health Outcome(s):	Hepatic/Liver; Renal/Kidney; Neurological/Behavioral;		
Reported Health Effect(s):	Hepatic/Liver: morphological changes in liver tissue; Renal/Kidney: morphological changes in kidney tissue; Neurological/Behavioral: morphological changes in brain tissue;		
Duration:	Acute (less than or equal to 24 hr) up to 12 hours		
Chemical:	1,1,2-Trichloroethane- Parent compound		
HERO ID:	1740624		
Domain	Metric	Rating	Comments
Additional Comments:	11 male and female guinea pigs were administered a single 1.0 ml of pure 1,1,2-trichloroethane in a central hole of one- to- four glass covers and rings glued to the clipped back of the skin with cyanolit. Liver samples were collected for biopsy at 2, 6, and 12 hours of exposure. Skin was collected for biopsy after 15 and 30 minutes, 1, 1.5, 2, 3, 4, 5, 6, and 12 hours of exposure. It can be assumed that 1 animal was used per time-point (8 timepoints and 3 controls). This number of animals is insufficient to characterize effects. It is unclear how many animals had one skin depot up to 4 depots. It is unclear if animals would have received 1 ml or up to 4 ml of the test substance. The biological response of control groups for skin outcomes was not reported. . Biological responses of the anaesthetized and non- exposed control and non-anaesthetized and exposed controls were reported for the liver morphology outcomes. Controls exposed to TCE, but not anesthesia had no liver effects. The study authors suggest that anesthesia may interact with 1,1,2-trichloroethane resulting in effects but did not address the potential confounding. It is unclear if this interaction could be applicable to kidney and brain changes. No changes in kidney and brain were noted for any animal.		

Overall Quality Determination**Uninformative**

Study Citation:	Lundberg, I., Ekdahl, M., Kronevi, T., Lidums, V., Lundberg, S. (1986). Relative hepatotoxicity of some industrial solvents after intraperitoneal injection or inhalation exposure in rats. Environmental Research 40(2):411-420.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: Sorbitol dehydrogenase activity			
Duration:	Acute (less than or equal to 24 hr) single administration			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	62934			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Test substance definitively identified as 1,1,2, trichloroethane.
	Metric 2:	Test Substance Source	Low	The source was not reported and the test substance identity was not analytically verified.
	Metric 3:	Test Substance Purity	High	Study authors state that 1,1,2-trichloroethane was of "purum" quality with a guaranteed solvent content more than 98%.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	High	A vehicle control group was included (rats injected with 1.0 ml of peanut oil).
	Metric 5:	Positive Controls	N/A	Not necessary for this study type.
	Metric 6:	Randomized Allocation of Animals	Low	The study did not report how animals were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Medium	The test substance was diluted in peanut oil. Additional details of test substance preparation and storage were not reported, however, this is a single dose acute study so this is unlikely to substantially impact study results.
	Metric 8:	Consistency of Exposure Administration	Low	Details of exposure administration are not completely reported. Authors do report that solvents were diluted in peanut oil "making the finally administered volume 0.1 to 1.0 ml."
	Metric 9:	Reporting of Doses/Concentrations	Medium	Exact dose levels were not reported, however, study authors state that doses were 1/8, 1/16, and 1/32 of the 24 hour LD50 value, which enables doses to be independently calculated.
	Metric 10:	Exposure Frequency and Duration	High	The test substance was administered as a single ip injection, which is appropriate for an acute study.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	High	This study included 3 treatment groups. Dose levels were 1/8, 1/16, and 1/32 of the 24 hour LD50. A small (magnitude of chance not reported) increase in SDH activity was observed at the highest dose group enabling NOELs and LOELs to be identified.
	Metric 12:	Exposure Route and Method	High	The route and method (ip injection) of exposure were reported and were suited to the test substance.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	Medium	Species, strain, sex, and weight were reported and are appropriate, age was not reported. It was not specified if animals were sourced commercially or in house.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not sufficiently reported to evaluate if husbandry was adequate.
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Study Citation:	Lundberg, I., Ekdahl, M., Kronevi, T., Lidums, V., Lundberg, S. (1986). Relative hepatotoxicity of some industrial solvents after intraperitoneal injection or inhalation exposure in rats. Environmental Research 40(2):411-420.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: Sorbitol dehydrogenase activity			
Duration:	Acute (less than or equal to 24 hr) single administration			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	62934			
Domain	Metric	Rating	Comments	
	Metric 15:	Number of Animals per Group	Medium	Six rats were included per dose group. This is appropriate for acute toxicity testing.
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	Low	Hepatotoxicity was evaluated based on a biomarker (i.e., serum SDH). Other measures of hepatotoxicity were not measured (i.e., liver weight, gross pathology, histopathology, serum ALT, AST, ALP).
	Metric 17:	Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported and outcomes were assessed consistently across study groups. All ip injections were performed at 2pm and then animals were sacrificed at 8am the following morning. Blood samples were collected and frozen at -20C and SDH activity was analyzed within a week after sacrifice.
	Metric 18:	Sampling Adequacy	Low	Details regarding sampling of outcomes were not reported.
	Metric 19:	Blinding of Assessors	N/A	Not necessary for this study type.
	Metric 20:	Negative Control Response	High	The biological responses of the negative control group(s) were adequate.
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Medium	Body weight changes and food/water intake were not reported. However, given the acute nature of this study, this is not likely to substantially impact results.
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.
	Metric 23:	Data Presentation and Analysis	Low	Study authors state that "statistical evaluation was carried out using Student's t test. Two-sided tests were applied. Statistical significance means that P <0.05." No further description is provided. Numerous pairwise comparisons to the control were made, and it is unclear if any corrections for multiple comparisons were made.
	Metric 24:	Reporting of Data	High	Data for exposure-related findings were presented for all outcomes by exposure group. Serum SDH activity is reported as mean +/- SEM in Figure 1.
Additional Comments: None				
Overall Quality Determination			Medium	

Study Citation:	Lundberg, I., Ekdahl, M., Kronevi, T., Lidums, V., Lundberg, S. (1986). Relative hepatotoxicity of some industrial solvents after intraperitoneal injection or inhalation exposure in rats. Environmental Research 40(2):411-420.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: LD50			
Duration:	Acute (less than or equal to 24 hr) single administration			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	62934			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Test substance definitively identified as 1,1,2, trichloroethane.
	Metric 2:	Test Substance Source	Low	The source was not reported and the test substance identity was not analytically verified.
	Metric 3:	Test Substance Purity	High	Study authors state that 1,1,2-trichloroethane was of "purum" quality with a guaranteed solvent content more than 98%.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	N/A	Not necessary acute acute lethality testing.
	Metric 5:	Positive Controls	N/A	Not necessary for this study type.
	Metric 6:	Randomized Allocation of Animals	Low	The study did not report how animals were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Medium	The test substance was diluted in peanut oil. Additional details of test substance preparation and storage were not reported, however, this is a single dose acute study so this is unlikely to substantially impact study results.
	Metric 8:	Consistency of Exposure Administration	Low	Details of exposure administration are not completely reported. Authors report that solvents were diluted in peanut oil "making the finally administered volume 0.1 to 1.0 ml." This indicates that volume differed across treatment groups.
	Metric 9:	Reporting of Doses/Concentrations	Uninformative	Study authors state that groups of six rats "were administered solvent doses according to a geometric series." However, exact dosage groups are not reported.
	Metric 10:	Exposure Frequency and Duration	High	The test substance was administered as a single ip injection, which is appropriate for acute lethality testing.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Uninformative	Study authors state that groups of six rats "were administered solvent doses according to a geometric series." However, the number of dosage groups was not reported.
	Metric 12:	Exposure Route and Method	High	The route and method (ip injection) of exposure were reported and were suited to the test substance.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	Medium	Species, strain, sex, and weight were reported and are appropriate, age was not reported. It was not specified if animals were sourced commercially or in house.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not sufficiently reported to evaluate if husbandry was adequate.
	Metric 15:	Number of Animals per Group	Medium	Six rats were included per dose group. This is appropriate for acute lethality testing.
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed the intended outcome of interest.
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Study Citation:	Lundberg, I., Ekdahl, M., Kronevi, T., Lidums, V., Lundberg, S. (1986). Relative hepatotoxicity of some industrial solvents after intraperitoneal injection or inhalation exposure in rats. Environmental Research 40(2):411-420.
Health Outcome(s):	Mortality
Reported Health Effect(s):	Mortality: LD50
Duration:	Acute (less than or equal to 24 hr) single administration
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	62934

Domain	Metric	Rating	Comments
	Metric 17: Consistency of Outcome Assessment	Medium	Details were not completely reported (i.e., the timing of when animals in various dose groups were observed for mortality or signs of morbidity was not reported). However, this is unlikely to have a substantial impact on results.
	Metric 18: Sampling Adequacy	Low	Details regarding sampling of the outcome of interest were not reported.
	Metric 19: Blinding of Assessors	N/A	Not necessary for this study type.
	Metric 20: Negative Control Response	N/A	Negative controls are not necessary for acute lethality testing.

Domain 6: Confounding / Variable Control

Metric 21:	Confounding Variables in Test Design and Procedures	Medium	Although the study did not report all information to determine confounding, reported information did not identify differences.
Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.
Metric 23:	Data Presentation and Analysis	N/A	Statistical analysis is not necessary for LD50 calculations.
Metric 24:	Reporting of Data	Medium	LD50 and 95% confidence intervals were reported, however, data for lethality at each dose level was not reported.

Additional Comments: None

Overall Quality Determination**Low**

Study Citation:	Mellon Institute, (1946). Acute inhalation toxicity of 1,1,2-trichloroethane and 1,1,2,2-tetrachloroethylene in rats.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: 1,1,2-trichloroethane: 1/6 deaths			
Duration:	Acute (less than or equal to 24 hr) 4 hours			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	5466893			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
Metric 1:	Test Substance Identity	High	The test substance was identified as 1,1,2-trichloroethane (CAS No. 79-00-5). The study noted 1,1,2-trichloroethane was a gas at room temperature.	
Metric 2:	Test Substance Source	Low	The test substance was received from S. Charleston. Analytical verification of the test substance identity was not reported.	
Metric 3:	Test Substance Purity	Low	Purity and/or grade of test substance were not reported.	
Domain 2: Test Design				
Metric 4:	Negative and Vehicle Controls	N/A	Negative controls are not required for acute toxicity tests.	
Metric 5:	Positive Controls	N/A	Positive controls are not required for acute toxicity tests.	
Metric 6:	Randomized Allocation of Animals	Low	The study did not report how animals were allocated to study groups.	
Domain 3: Exposure Characterization				
Metric 7:	Preparation and Storage of Test Substance	Low	Information on preparation and storage was not reported and lack of details could substantially impact results. There was no mention of the method and equipment used to generate the test substance for this inhalation study.	
Metric 8:	Consistency of Exposure Administration	Low	Details of exposure administration are insufficiently reported. Chamber designs and the number of animals/chamber were not reported.	
Metric 9:	Reporting of Doses/Concentrations	Low	A singular vapor concentration of 500 ppm was used in this acute toxicity study. An MMAD or other particle size summary statistic was not reported. The analytical method used to determine the concentration was not specified.	
Metric 10:	Exposure Frequency and Duration	High	The inhalation exposure occurred for 4 hours as a single exposure. This is appropriate for an acute inhalation toxicity study.	
Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Low	Only one concentration was used in this study, and this did not prove sufficient information to determine an LD50 for this study (1/6 deaths occurred). The rationale for choosing this concentration was not provided.	
Metric 12:	Exposure Route and Method	Low	The type of air chamber, exposure method, and number of air changes per hour were not described, resulting in significant uncertainty about the true exposure parameters.	
Domain 4: Test Animals				
Metric 13:	Test Animal Characteristics	Low	The strain, source, and sex of the test animal (rat) were not reported. Starting body-weights were not reported. These deficiencies are likely to have a substantial impact on results. Rats were appropriate to us in this acute inhalation toxicity study.	
Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not sufficiently reported to evaluate if husbandry was adequate.	
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Study Citation:	Mellon Institute, (1946). Acute inhalation toxicity of 1,1,2-trichloroethane and 1,1,2,2-tetrachloroethylene in rats.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: 1,1,2-trichloroethane: 1/6 deaths			
Duration:	Acute (less than or equal to 24 hr) 4 hours			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	5466893			
Domain	Metric	Rating	Comments	
	Metric 15:	Number of Animals per Group	Low	6 animals were used as the exposure group, and the sex was not specified. The reported number of animals per study group was lower than the typical number used in studies of the same or similar type (5/sex).
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	Low	It was not reported how long animals were evaluated for mortality following the exposure. It was unclear whether methods were sensitive for the outcome of interest. Mortality was the only endpoint evaluated.
	Metric 17:	Consistency of Outcome Assessment	Low	Details regarding the execution of the study protocol for outcome assessment were not reported.
	Metric 18:	Sampling Adequacy	High	Results were provided for mortality as 1/6, indicating 6 animals were evaluated for mortality.
	Metric 19:	Blinding of Assessors	N/A	Blinding of assessors is not required to assess mortality in an acute toxicity study.
	Metric 20:	Negative Control Response	N/A	Negative controls were not required for acute toxicity.
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Low	Respiratory rate, bodyweight changes, food/water intake, and clinical signs were not reported.
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.
	Metric 23:	Data Presentation and Analysis	High	Statistical analysis was not performed but the number of deaths was reported. It is possible to conduct an independent statistical analysis.
	Metric 24:	Reporting of Data	Medium	The number of mortalities (1/6) were reported in a table for the single exposure group used. Sex of the animals was not specified. Timing of the death observed and the observation period were not reported.
Additional Comments: A single page of information was provided for this study. Limited details were provided.				

Overall Quality Determination**Low**

Study Citation:	Milman, H. A., Story, D. L., Riccio, E. S., Sivak, A., Tu, A. S., Williams, G. M., Tong, C., Tyson, C. A. (1988). Rat liver foci and in vitro assays to detect initiating and promoting effects of chlorinated ethanes and ethylenes. Annals of the New York Academy of Sciences 534:521-530.			
Health Outcome(s):	Cancer/Carcinogenesis			
Reported Health Effect(s):	Cancer/Carcinogenesis: Increased incidence of GGT-positive liver foci in rats dosed during promotion phase (1,1,2-TCE only)			
Duration:	Acute (less than or equal to 24 hr) Single dose (initiation protocol)			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	200479; Linked HERO ID(s): 200479, 200616			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Source	Low	The source was reported as Aldrich, but a batch or lot number was not provided.
	Metric 3:	Test Substance Purity	Medium	Purity was reported as 97 to 99%.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	High	A concurrent negative control group received vehicle (corn oil) only.
	Metric 5:	Positive Controls	Medium	Diethylnitrosamine was used as a positive control for the tumor initiation protocol.
	Metric 6:	Randomized Allocation of Animals	Medium	The study reports randomization of animals.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Low	The study does not report test substance storage and preparation conditions, and the test substance is volatile.
	Metric 8:	Consistency of Exposure Administration	Low	Gavage volume is not reported for treated animals.
	Metric 9:	Reporting of Doses/Concentrations	High	Doses were reported without ambiguity in mg/kg.
	Metric 10:	Exposure Frequency and Duration	High	A single gavage dose appears sufficient for determination of tumor initiation potential (similar protocol used by Pereira et al., 1982).
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Medium	Only a single dose level was used, but it was justified as the MTD.
	Metric 12:	Exposure Route and Method	High	The exposure route (gavage) was appropriate for the test substance.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	Low	Species, sex, strain, and starting body weight were reported. Age and source were not reported.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	Temperature, humidity, and light-dark cycle were not reported and it is not possible to determine whether differences occurred between control and exposed populations.
	Metric 15:	Number of Animals per Group	Medium	The number of animals per study group (10) was appropriate for the study type and outcome analysis.
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	High	The outcome assessment was appropriate and sensitive for tumor initiation potential.
	Metric 17:	Consistency of Outcome Assessment	High	Timing of necropsy was consistent across groups.

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Study Citation:	Milman, H. A., Story, D. L., Riccio, E. S., Sivak, A., Tu, A. S., Williams, G. M., Tong, C., Tyson, C. A. (1988). Rat liver foci and in vitro assays to detect initiating and promoting effects of chlorinated ethanes and ethylenes. Annals of the New York Academy of Sciences 534:521-530.
Health Outcome(s):	Cancer/Carcinogenesis
Reported Health Effect(s):	Cancer/Carcinogenesis: Increased incidence of GGT-positive liver foci in rats dosed during promotion phase (1,1,2-TCE only)
Duration:	Acute (less than or equal to 24 hr) Single dose (initiation protocol)
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	200479; Linked HERO ID(s): 200479, 200616

Domain	Metric	Rating	Comments
	Metric 18: Sampling Adequacy	High	Sample size (n = 10) was adequate for assessment of tumor initiation potential.
	Metric 19: Blinding of Assessors	N/A	Blinding is not required for initial histopathology review.
	Metric 20: Negative Control Response	High	The biological response (incidence of GGT-positive foci) of the negative control group was adequate.
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	High	There is no evidence of confounding variables in test design and procedures that would affect tumor initiation.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	No animal attrition occurred in this experiment. There was no information either to support or dismiss the suggestion that differences among groups in other health outcomes unrelated to exposure could influence the outcome assessment.
	Metric 23: Data Presentation and Analysis	Low	Statistical analysis was performed, but the methods were not described.
	Metric 24: Reporting of Data	High	Incidence data, with standard errors, are reported for each group in Table 3.

Additional Comments: The primary purpose of this study was to evaluate the tumor initiation and promotion potential of the chemical.

Overall Quality Determination

High

Study Citation:	Milman, H. A., Story, D. L., Riccio, E. S., Sivak, A., Tu, A. S., Williams, G. M., Tong, C., Tyson, C. A. (1988). Rat liver foci and in vitro assays to detect initiating and promoting effects of chlorinated ethanes and ethylenes. Annals of the New York Academy of Sciences 534:521-530.			
Health Outcome(s):	Nutritional/Metabolic			
Reported Health Effect(s):	Nutritional/Metabolic: Decreased body weight gain (1,1,2-TCE only)			
Duration:	Acute (less than or equal to 24 hr) Single dose (initiation protocol)			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	200479; Linked HERO ID(s): 200479, 200616			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	The test substance was identified by name.	
	Metric 2: Test Substance Source	Low	The source was reported as Aldrich, but a batch or lot number was not provided.	
	Metric 3: Test Substance Purity	Medium	Purity was reported as 97 to 99%.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	High	A concurrent negative control group received vehicle (corn oil) only.	
	Metric 5: Positive Controls	N/A	A positive control is not required for the endpoint of body weight.	
	Metric 6: Randomized Allocation of Animals	Medium	The study reports randomization of animals.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	The study does not report test substance storage and preparation conditions, and the test substance is volatile.	
	Metric 8: Consistency of Exposure Administration	Low	Gavage volume is not reported for treated animals.	
	Metric 9: Reporting of Doses/Concentrations	High	Doses were reported without ambiguity in mg/kg.	
	Metric 10: Exposure Frequency and Duration	High	A single gavage dose is appropriate for determination of acute effects.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Medium	Only a single dose level was used, but it was justified as the MTD.	
	Metric 12: Exposure Route and Method	High	The exposure route (gavage) was appropriate for the test substance.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Low	Species, sex, strain, and starting body weight were reported. Age and source were not reported.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Temperature, humidity, and light-dark cycle were not reported and it is not possible to determine whether differences occurred between control and exposed populations.	
	Metric 15: Number of Animals per Group	Medium	The number of animals per study group (10) was appropriate for the study type and outcome analysis.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	High	The outcome assessment methodology was appropriate. Body weight and body weight gain were measured.	
	Metric 17: Consistency of Outcome Assessment	Low	The timing of body weight measurements was not reported.	
	Metric 18: Sampling Adequacy	Low	Sample size for body weight and body weight gain was not reported.	
	Metric 19: Blinding of Assessors	N/A	The outcome (body weight) is not subjective.	

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Study Citation:	Milman, H. A., Story, D. L., Riccio, E. S., Sivak, A., Tu, A. S., Williams, G. M., Tong, C., Tyson, C. A. (1988). Rat liver foci and in vitro assays to detect initiating and promoting effects of chlorinated ethanes and ethylenes. Annals of the New York Academy of Sciences 534:521-530.			
Health Outcome(s):	Nutritional/Metabolic			
Reported Health Effect(s):	Nutritional/Metabolic: Decreased body weight gain (1,1,2-TCE only)			
Duration:	Acute (less than or equal to 24 hr) Single dose (initiation protocol)			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	200479; Linked HERO ID(s): 200479, 200616			
Domain	Metric	Rating	Comments	
	Metric 20:	Negative Control Response	Low	The biological response (body weight) of the negative control group was not reported.
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	High	Food and water were provided ad libitum. There is no evidence of confounding variables in test design and procedures that would affect the endpoint of body weight.
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	No animal attrition occurred in this experiment. There was no information either to support or dismiss the suggestion that differences among groups in other health outcomes unrelated to exposure could influence the outcome assessment.
	Metric 23:	Data Presentation and Analysis	Low	Statistical analysis was performed, but the methods were not described.
	Metric 24:	Reporting of Data	Low	Results were described only in the text. Numerical values (i.e., body weight, body weight gain) were not provided.
Additional Comments:	The primary purpose of this study was to evaluate the tumor initiation and promotion potential of the chemical. Effects on body weight and body weight gain were not the primary purpose of the study, and only minimal details are provided for these endpoints.			

Overall Quality Determination**Medium**

Study Citation:	Milman, H. A., Story, D. L., Riccio, E. S., Sivak, A., Tu, A. S., Williams, G. M., Tong, C., Tyson, C. A. (1988). Rat liver foci and in vitro assays to detect initiating and promoting effects of chlorinated ethanes and ethylenes. Annals of the New York Academy of Sciences 534:521-530.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: Decreased absolute liver weight (1,1,2-TCE only)			
Duration:	Acute (less than or equal to 24 hr) Single dose (initiation protocol)			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	200479; Linked HERO ID(s): 200479, 200616			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	The test substance was identified by name.	
	Metric 2: Test Substance Source	Low	The source was reported as Aldrich, but a batch or lot number was not provided.	
	Metric 3: Test Substance Purity	Medium	Purity was reported as 97 to 99%.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	High	A concurrent negative control group received vehicle (corn oil) only.	
	Metric 5: Positive Controls	N/A	A positive control is not required for the endpoint of liver weight.	
	Metric 6: Randomized Allocation of Animals	Medium	The study reports randomization of animals.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	The study does not report test substance storage and preparation conditions, and the test substance is volatile.	
	Metric 8: Consistency of Exposure Administration	Low	Gavage volume is not reported for treated animals.	
	Metric 9: Reporting of Doses/Concentrations	High	Doses were reported without ambiguity in mg/kg.	
	Metric 10: Exposure Frequency and Duration	High	A single gavage dose is appropriate for determination of acute effects.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Medium	Only a single dose level was used, but it was justified as the MTD.	
	Metric 12: Exposure Route and Method	High	The exposure route (gavage) was appropriate for the test substance.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Low	Species, sex, strain, and starting body weight were reported. Age and source were not reported.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Temperature, humidity, and light-dark cycle were not reported and it is not possible to determine whether differences occurred between control and exposed populations.	
	Metric 15: Number of Animals per Group	Medium	The number of animals per study group (10) was appropriate for the study type and outcome analysis.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	Low	The outcome assessment for liver was very limited (liver weight only).	
	Metric 17: Consistency of Outcome Assessment	High	Timing of necropsy was consistent across groups.	
	Metric 18: Sampling Adequacy	Low	Sample size for liver weight measurements was not reported.	
	Metric 19: Blinding of Assessors	N/A	The outcome (liver weight) is not subjective.	
	Metric 20: Negative Control Response	Low	The biological response (liver weight) of the negative control group was not reported.	

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Study Citation:	Milman, H. A., Story, D. L., Riccio, E. S., Sivak, A., Tu, A. S., Williams, G. M., Tong, C., Tyson, C. A. (1988). Rat liver foci and in vitro assays to detect initiating and promoting effects of chlorinated ethanes and ethylenes. Annals of the New York Academy of Sciences 534:521-530.
Health Outcome(s):	Hepatic/Liver
Reported Health Effect(s):	Hepatic/Liver: Decreased absolute liver weight (1,1,2-TCE only)
Duration:	Acute (less than or equal to 24 hr) Single dose (initiation protocol)
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	200479; Linked HERO ID(s): 200479, 200616

Domain	Metric	Rating	Comments
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	High	Food and water were provided ad libitum. There is no evidence of confounding variables in test design and procedures that would affect the endpoint of liver weight.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	No animal attrition occurred in this experiment. There was no information either to support or dismiss the suggestion that differences among groups in other health outcomes unrelated to exposure could influence the outcome assessment.
	Metric 23: Data Presentation and Analysis	Low	Statistical analysis was performed, but the methods were not described.
	Metric 24: Reporting of Data	Low	Results were described only in the text. Numerical values (i.e., absolute and relative liver weights) were not provided.

Additional Comments: The primary purpose of this study was to evaluate the tumor initiation and promotion potential of the chemical. Effects on liver weight were not the primary purpose of the study, and only minimal details are provided for this endpoint.

Overall Quality Determination

Medium

Study Citation:	Moody, D. E., James, J. L., Clawson, G. A., Smuckler, E. A. (1981). Correlations among the changes in hepatic microsomal components after intoxication with alkyl halides and other hepatotoxins. Molecular Pharmacology 20(3):685-693.			
Health Outcome(s):	Nutritional/Metabolic			
Reported Health Effect(s):	Nutritional/Metabolic: Body weights			
Duration:	Acute (less than or equal to 24 hr) Single oral dose			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	18954			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified definitively by name, a CASRN was not provided.
	Metric 2:	Test Substance Source	Low	A commercial source was reported; a batch and/or lot number was not included. The identity was not analytically verified by the performing laboratory and could not be confirmed on the source website.
	Metric 3:	Test Substance Purity	High	The test substance was reported to be "technical grade"
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	Low	A negative control was included; however, details of the control (untreated vs. vehicle) were not specified. The study tested multiple chemical compounds that were dissolved in different vehicles. It is unclear whether there was one, or many control groups.
	Metric 5:	Positive Controls	N/A	Not necessary for the study type.
	Metric 6:	Randomized Allocation of Animals	Low	The study did not report how animals were allocated into groups.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Medium	The test substance was dissolved in mineral oil. No further details regarding preparation were provided. Storage details were not specified; however, given the acute nature of the study, this is not expected to have a major impact on the study results.
	Metric 8:	Consistency of Exposure Administration	Medium	All animals were dosed with a consistent volume of 5 ml/kg; however, there is ambiguity as to whether control animals were left untreated, or were dosed with a vehicle.
	Metric 9:	Reporting of Doses/Concentrations	High	The dose was clearly reported.
	Metric 10:	Exposure Frequency and Duration	High	The exposure frequency and duration (single oral dose) was appropriate for the purposes of the study.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	High	Only a single dose group was used, precluding the ability to determine a dose-response, although this was not the purpose of the study. The authors reported using "relatively high doses" (0.5-2.0 times the reported LD50 values) in order to maximize the changes produced.
	Metric 12:	Exposure Route and Method	High	The exposure route and method (gavage) was appropriate and suited for the test substance.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	Medium	Animal species, strain, sex, source, and starting body weights were provided. Age was not specified. The animals were appropriate for the study.
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Study Citation:	Moody, D. E., James, J. L., Clawson, G. A., Smuckler, E. A. (1981). Correlations among the changes in hepatic microsomal components after intoxication with alkyl halides and other hepatotoxins. Molecular Pharmacology 20(3):685-693.
Health Outcome(s):	Nutritional/Metabolic
Reported Health Effect(s):	Nutritional/Metabolic: Body weights
Duration:	Acute (less than or equal to 24 hr) Single oral dose
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	18954

Domain	Metric	Rating	Comments
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Limited information on animal husbandry conditions (cage type and food) was provided. Other details were not sufficiently reported to determine whether there were differences between groups.
	Metric 15: Number of Animals per Group	Medium	The number of animals was low (3/group), but was sufficient for statistical analysis and appeared to be appropriate for the purposes of the study.
Domain 5: Outcome Assessment			
	Metric 16: Outcome Assessment Methodology	High	Methodological details for measuring animal body weights were not provided; however, this is not expected to have a substantial impact on the study results.
	Metric 17: Consistency of Outcome Assessment	Low	Details regarding the execution of the study protocol for outcome assessment were not reported. The timing of body weight measurements was not specified. This deficiency could have a substantial impact on the results.
	Metric 18: Sampling Adequacy	Low	There is a lack of methodological and reporting details for this outcome of interest, it is presumed that the body weights of all animals were measured; however, this cannot be confirmed based on the data available.
	Metric 19: Blinding of Assessors	N/A	Blinding was not necessary for the outcome of interest.
	Metric 20: Negative Control Response	Low	The negative control response for this outcome of interest was not reported.
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	Although the study did not report all information to determine confounding, reported information did not identify differences among study groups
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.
	Metric 23: Data Presentation and Analysis	High	Statistical methods were clearly reported and appropriate for the outcomes of interest.
	Metric 24: Reporting of Data	Low	Results for an exposure-related finding were described in the text, but quantitative data were not provided for independent review.

Additional Comments: None

Overall Quality Determination**Medium**

Study Citation:	Moody, D. E., James, J. L., Clawson, G. A., Smuckler, E. A. (1981). Correlations among the changes in hepatic microsomal components after intoxication with alkyl halides and other hepatotoxins. Molecular Pharmacology 20(3):685-693.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: Survival			
Duration:	Acute (less than or equal to 24 hr) Single oral dose			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	18954			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	The test substance was identified definitively by name, a CASRN was not provided.	
	Metric 2: Test Substance Source	Low	A commercial source was reported; a batch and/or lot number was not included. The identity was not analytically verified by the performing laboratory and could not be confirmed on the source website.	
	Metric 3: Test Substance Purity	High	The test substance was reported to be "technical grade"	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	Low	A negative control was included; however, details of the control (untreated vs. vehicle) were not specified. The study tested multiple chemical compounds that were dissolved in different vehicles. It is unclear whether there was one, or many control groups.	
	Metric 5: Positive Controls	N/A	Not necessary for the study type.	
	Metric 6: Randomized Allocation of Animals	Low	The study did not report how animals were allocated into groups.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Medium	The test substance was dissolved in mineral oil. No further details regarding preparation were provided. Storage details were not specified; however, given the acute nature of the study, this is not expected to have a major impact on the study results.	
	Metric 8: Consistency of Exposure Administration	Medium	All animals were dosed with a consistent volume of 5 ml/kg; however, there is ambiguity as to whether control animals were left untreated, or were dosed with a vehicle.	
	Metric 9: Reporting of Doses/Concentrations	High	The dose was clearly reported.	
	Metric 10: Exposure Frequency and Duration	High	The exposure frequency and duration (single oral dose) was appropriate for the purposes of the study.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	High	Only a single dose group was used, precluding the ability to determine a dose-response, although this was not the purpose of the study. The authors reported using "relatively high doses" (0.5-2.0 times the reported LD50 values) in order to maximize the changes produced.	
	Metric 12: Exposure Route and Method	High	The exposure route and method (gavage) was appropriate and suited for the test substance.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Medium	Animal species, strain, sex, source, and starting body weights were provided. Age was not specified. The animals were appropriate for the study.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Limited information on animal husbandry conditions (cage type and food) was provided. Other details were not sufficiently reported to determine whether there were differences between groups.	
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Study Citation:	Moody, D. E., James, J. L., Clawson, G. A., Smuckler, E. A. (1981). Correlations among the changes in hepatic microsomal components after intoxication with alkyl halides and other hepatotoxins. Molecular Pharmacology 20(3):685-693.
Health Outcome(s):	Mortality
Reported Health Effect(s):	Mortality: Survival
Duration:	Acute (less than or equal to 24 hr) Single oral dose
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	18954

Domain	Metric	Rating	Comments
	Metric 15: Number of Animals per Group	Medium	The number of animals was low (3/group), but was sufficient for statistical analysis and appeared to be appropriate for the purposes of the study.
Domain 5: Outcome Assessment			
	Metric 16: Outcome Assessment Methodology	High	Methodological details of outcome assessment were not provided; however, for the endpoint of interest (mortality), this is not expected to have a substantial impact on results.
	Metric 17: Consistency of Outcome Assessment	Medium	Details regarding the execution of the study protocol for outcome assessment were not reported; however, for the endpoint of interest (mortality), this is not expected to have a substantial impact on results.
	Metric 18: Sampling Adequacy	High	Quantitative data were not provided for the endpoint of interest, but the reporting of results suggests that all animals were evaluated for the outcome of interest.
	Metric 19: Blinding of Assessors	N/A	Blinding was not necessary for the outcome of interest.
	Metric 20: Negative Control Response	Medium	The negative control response for this outcome of interest was not explicitly reported; however the text and data tables indicated that no animals died.
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	Although the study did not report all information to determine confounding, reported information did not identify differences among study groups
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.
	Metric 23: Data Presentation and Analysis	High	Statistical methods were clearly reported and appropriate for the outcomes of interest.
	Metric 24: Reporting of Data	High	Negative findings were reported qualitatively in the text.

Additional Comments: None

Overall Quality Determination**High**

Study Citation:	Moody, D. E., James, J. L., Clawson, G. A., Smuckler, E. A. (1981). Correlations among the changes in hepatic microsomal components after intoxication with alkyl halides and other hepatotoxins. Molecular Pharmacology 20(3):685-693.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: Systemic: Relative liver weightsMechanistic: measurements of microsomal total protein, RNA content, phospholipids, and diene conjugates. Cytochrome P-450 content, NADPH cytochrome reductase, and cytochrome B5 content were also measured along with the relative content of fatty acids from lipid extracts and measurements of linoleic and arachidonic acid.			
Duration:	Acute (less than or equal to 24 hr) Single oral dose			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	18954			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	The test substance was identified definitively by name, a CASRN was not provided.	
	Metric 2: Test Substance Source	Low	A commercial source was reported; a batch and/or lot number was not included. The identity was not analytically verified by the performing laboratory and could not be confirmed on the source website.	
	Metric 3: Test Substance Purity	High	The test substance was reported to be "technical grade"	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	Low	A negative control was included; however, details of the control (untreated vs. vehicle) were not specified. The study tested multiple chemical compounds that were dissolved in different vehicles. It is unclear whether there was one, or many control groups.	
	Metric 5: Positive Controls	N/A	Not necessary for the study type.	
	Metric 6: Randomized Allocation of Animals	Low	The study did not report how animals were allocated into groups.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Medium	The test substance was dissolved in mineral oil. No further details regarding preparation were provided. Storage details were not specified; however, given the acute nature of the study, this is not expected to have a major impact on the study results.	
	Metric 8: Consistency of Exposure Administration	Medium	All animals were dosed with a consistent volume of 5 ml/kg; however, there is ambiguity as to whether control animals were left untreated, or were dosed with a vehicle.	
	Metric 9: Reporting of Doses/Concentrations	High	The dose was clearly reported.	
	Metric 10: Exposure Frequency and Duration	High	The exposure frequency and duration (single oral dose) was appropriate for the purposes of the study.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	High	Only a single dose group was used, precluding the ability to determine a dose-response, although this was not the purpose of the study. The authors reported using "relatively high doses" (0.5-2.0 times the reported LD50 values) in order to maximize the changes produced.	
	Metric 12: Exposure Route and Method	High	The exposure route and method (gavage) was appropriate and suited for the test substance.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Medium	Animal species, strain, sex, source, and starting body weights were provided. Age was not specified. The animals were appropriate for the study.	

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Study Citation:	Moody, D. E., James, J. L., Clawson, G. A., Smuckler, E. A. (1981). Correlations among the changes in hepatic microsomal components after intoxication with alkyl halides and other hepatotoxins. Molecular Pharmacology 20(3):685-693.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: Systemic: Relative liver weightsMechanistic: measurements of microsomal total protein, RNA content, phospholipids, and diene conjugates. Cytochrome P-450 content, NADPH cytochrome reductase, and cytochrome B5 content were also measured along with the relative content of fatty acids from lipid extracts and measurements of linoleic and arachidonic acid.			
Duration:	Acute (less than or equal to 24 hr) Single oral dose			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	18954			
Domain	Metric	Rating	Comments	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Limited information on animal husbandry conditions (cage type and food) was provided. Other details were not sufficiently reported to determine whether there were differences between groups.	
	Metric 15: Number of Animals per Group	Medium	The number of animals was low (3/group), but was sufficient for statistical analysis and appeared to be appropriate for the purposes of the study.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	High	Methodological details for measuring relative liver weight were not provided; however, this is not expected to have a substantial impact on the study results. Outcome assessment methodologies for the mechanistic endpoints were adequately described.	
	Metric 17: Consistency of Outcome Assessment	Medium	Details regarding the execution of the study protocol for outcome assessment of liver weights were not reported. Details of the outcome assessment for mechanistic endpoints were adequately described and suggest there was consistency across groups.	
	Metric 18: Sampling Adequacy	Medium	There is a lack of methodological and reporting details for organ weight measurements; it is assumed the liver weights of all animals were weighed, although this cannot be confirmed based on the data available. Sampling for mechanistic endpoints were appropriate.	
	Metric 19: Blinding of Assessors	N/A	Blinding was not necessary for the outcome of interest.	
	Metric 20: Negative Control Response	Medium	The negative control responses for liver weights were not provided (no quantitative data). Negative control responses for other mechanistic endpoints were adequately shown.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	Although the study did not report all information to determine confounding, reported information did not identify differences among study groups	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.	
	Metric 23: Data Presentation and Analysis	High	Statistical methods were clearly reported and appropriate for the outcomes of interest.	
	Metric 24: Reporting of Data	Medium	Data for an exposure-related finding (increased liver weight) was described in the text, but results were not shown. Data for mechanistic endpoints were displayed graphically and included measures of variance and indications of statistical significance.	
Additional Comments:	None			

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Study Citation:	Moody, D. E., James, J. L., Clawson, G. A., Smuckler, E. A. (1981). Correlations among the changes in hepatic microsomal components after intoxication with alkyl halides and other hepatotoxins. Molecular Pharmacology 20(3):685-693.		
Health Outcome(s):	Hepatic/Liver		
Reported Health Effect(s):	Hepatic/Liver: Systemic: Relative liver weightsMechanistic: measurements of microsomal total protein, RNA content, phospholipids, and diene conjugates. Cytochrome P-450 content, NADPH cytochrome reductase, and cytochrome B5 content were also measured along with the relative content of fatty acids from lipid extracts and measurements of linoleic and arachidonic acid.		
Duration:	Acute (less than or equal to 24 hr) Single oral dose		
Chemical:	1,1,2-Trichloroethane- Parent compound		
HERO ID:	18954		
Domain	Metric	Rating	Comments
Overall Quality Determination		Medium	

Study Citation:	Niklasson, M., Tham, R., Larsby, B., Eriksson, B. (1993). Effects of toluene, styrene, trichloroethylene, and trichloroethane on the vestibulo- and opto-oculo motor system in rats. Neurotoxicology and Teratology 15(5):327-334.			
Health Outcome(s):	Neurological/Behavioral			
Reported Health Effect(s):	Neurological/Behavioral: vestibulo- and opto-oculo motor system			
Duration:	Acute (less than or equal to 24 hr) 1h			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	68728			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	test substance reported by name: 1,1,2 trichloroethane
	Metric 2:	Test Substance Source	High	source reported Fluka, CH
	Metric 3:	Test Substance Purity	High	The paper reported that analytical grade was used.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	High	animal served as its own control prior to exposure
	Metric 5:	Positive Controls	N/A	Positive control was not indicated by study type.
	Metric 6:	Randomized Allocation of Animals	Low	animal allocation was not reported
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Medium	test substance preparation was reported but storage was not.
	Metric 8:	Consistency of Exposure	High	exposure administration was consistent across groups
	Metric 9:	Administration Reporting of Doses/Concentrations	High	analytical means were reported in text and variation was within 8%
	Metric 10:	Exposure Frequency and Duration	Medium	exposure duration was approximately 1h and is appropriate for the study
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Medium	The number of groups and spacing were based on a previous range-finding study (not reported) and were adequate to show effects. However, effects were observed at the lowest dose, therefore it is unlikely the low dose was low enough.
	Metric 12:	Exposure Route and Method	High	the route of exposure was suited to the test substance
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	Low	The strain and source of the animals were not reported
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	husbandry conditions were not reported and could not be evaluated
	Metric 15:	Number of Animals per Group	Medium	number of animals was reported to be 24 (17F and 7 M). The study did not specify the number per group, but was stated "at least 5 experiments with different rats at each level" indicating it was 5-6 animals
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	High	assessment methodology was appropriate for the outcome of interest
	Metric 17:	Consistency of Outcome Assessment	Medium	reported details indicate that outcome assessment was consistent and unreported details are unlikely to substantially impact results

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Study Citation:	Niklasson, M., Tham, R., Larsby, B., Eriksson, B. (1993). Effects of toluene, styrene, trichloroethylene, and trichloroethane on the vestibulo- and opto-oculo motor system in rats. Neurotoxicology and Teratology 15(5):327-334.
Health Outcome(s):	Neurological/Behavioral
Reported Health Effect(s):	Neurological/Behavioral: vestibulo- and opto-oculo motor system
Duration:	Acute (less than or equal to 24 hr) 1h
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	68728

Domain	Metric	Rating	Comments
	Metric 18: Sampling Adequacy	High	mean was determined from "at least 5 experiments with different rats at each level of exposure"
	Metric 19: Blinding of Assessors	N/A	blinding was not necessary as apparatus measured eye movement
	Metric 20: Negative Control Response	High	animals were evaluated as their own control, pre-exposure and responded appropriately
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	information was not completely reported to determine confounding; however, no differences among study groups were reported.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was insufficient information to support or dismiss outcomes unrelated to exposure.
	Metric 23: Data Presentation and Analysis	High	statistical methods were described and appropriate
	Metric 24: Reporting of Data	Medium	data were reported for each group but were not stratified by sex. negative results were described in text

Additional Comments: None

Overall Quality Determination**High**

Study Citation:	Plaa, G. L., Evans, E. A., Hine, C. H. (1958). Relative hepatotoxicity of seven halogenated hydrocarbons. Journal of Pharmacology and Experimental Therapeutics 123:224-229.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: Sleeping time following sodium pentobarbital exposure, gross and microscopic examinations, bromsulfalein (BSP) retention.			
Duration:	Acute (less than or equal to 24 hr) Single injection			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	29447			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	The test substance was identified as 1,1,2-trichloroethane. A CASRN was not provided.	
	Metric 2: Test Substance Source	Low	The test substance was fractionally distilled in the testing laboratory. Further validation or analytical analysis of the test substance was not provided in the report.	
	Metric 3: Test Substance Purity	Low	The purity was not explicitly reported.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	Low	The negative control data was generated prior to the treatments and therefore was not concurrent. The sleeping time of ALL animals used in the study (270 total) was tested. These data were pooled to determine the "normal" duration of anaesthesia and this value was used as the untreated control value for data analysis. It does not appear that a vehicle (peanut oil) control group was included in the study.	
	Metric 5: Positive Controls	Medium	A positive control was included (Tannic acid); it is unclear if experiments with these animals were performed concurrently with those treated with the test substance.	
	Metric 6: Randomized Allocation of Animals	Low	The study did not report how animals were allocated into groups.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Medium	The test substance was diluted into peanut oil. No further information on preparation, homogeneity, or storage was provided. Storage is not expected to be an issue for this study because animals were administered single injections only.	
	Metric 8: Consistency of Exposure Administration	High	The study indicates that injection volumes for all dose groups were 0.1mL "whenever possible"	
	Metric 9: Reporting of Doses/Concentrations	High	The dose concentrations were reported in units of mM/kg. Doses in mg/kg can be determined using the molecular weight of the test substance.	
	Metric 10: Exposure Frequency and Duration	High	The exposure frequency (single dose) was appropriate for the purposes of the study.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	High	The number of exposure groups were appropriate to determined ED50 and LD50 values	
	Metric 12: Exposure Route and Method	Low	No justification was provided for the route of exposure (subcutaneous injection), and it is unlikely this is the most relevant route of exposure for evaluating hepatotoxicity which was the purpose of the study.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Medium	Animal species, strain, sex, and ranges of starting body weights were provided. Animal age and source were not reported.	

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Study Citation:	Plaa, G. L., Evans, E. A., Hine, C. H. (1958). Relative hepatotoxicity of seven halogenated hydrocarbons. Journal of Pharmacology and Experimental Therapeutics 123:224-229.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: Sleeping time following sodium pentobarbital exposure, gross and microscopic examinations, bromsulfalein (BSP) retention.			
Duration:	Acute (less than or equal to 24 hr) Single injection			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	29447			
Domain	Metric	Rating	Comments	
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	Animal husbandry conditions were not reported.
	Metric 15:	Number of Animals per Group	Medium	The number of animals per group varied (5-10 for sleeping time studies and 10-15 for LD50 determination). It was not indicated why there were different animal numbers per group.
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	Medium	The methods used were appropriate for the purposes of the study. Organ weights and relative clinical chemistry measurements were not included in the study; however, the study focus was on liver function.
	Metric 17:	Consistency of Outcome Assessment	Medium	The sleeping time data for the untreated controls was recorded prior to treatment.
	Metric 18:	Sampling Adequacy	Medium	Based on the data provided, there were enough samples to evaluate the outcomes of interest. The sampling for some outcomes was not clear due to lack of data reporting.
	Metric 19:	Blinding of Assessors	N/A	Blinding was not required for the outcomes of interest.
	Metric 20:	Negative Control Response	Medium	There is no indication in the text that the control responses were not acceptable. Control responses weren't reported for histopathology.
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Medium	The study did not report information to determine confounding.
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.
	Metric 23:	Data Presentation and Analysis	Low	The methods for EC50 and LD50 determinations were clearly reported. It does not appear that incidences of histopathological findings were statistically analyzed, and these data were not reported for an independent analysis.
	Metric 24:	Reporting of Data	Medium	Data for exposure-related findings were reported for most, but not all outcomes by exposure group. The gross and histopathology data were qualitatively described in the text; not all dose groups were mentioned, and incidences were not provided.
Additional Comments: This form is for 1,1,2-trichloroethane				

Overall Quality Determination**Medium**

Study Citation:	Plaa, G. L., Evans, E. A., Hine, C. H. (1958). Relative hepatotoxicity of seven halogenated hydrocarbons. Journal of Pharmacology and Experimental Therapeutics 123:224-229.			
Health Outcome(s):	Mortality; Mortality;			
Reported Health Effect(s):	Mortality: Mortality; Mortality: Mortality;			
Duration:	Acute (less than or equal to 24 hr) Single injection			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	29447			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
Metric 1:	Test Substance Identity	High	Mortality: The test substance was identified as 1,1,2-trichloroethane. A CASRN was not provided.; Mortality: The test substance was identified as 1,1,1-trichloroethane. A CASRN was not provided.	
Metric 2:	Test Substance Source	Low	All Outcomes: The test substance was fractionally distilled in the testing laboratory. Further validation or analytical analysis of the test substance was not provided in the report.	
Metric 3:	Test Substance Purity	Low	All Outcomes: The purity was not explicitly reported.	
Domain 2: Test Design				
Metric 4:	Negative and Vehicle Controls	N/A	All Outcomes: Negative controls are not necessary for acute lethality studies.	
Metric 5:	Positive Controls	N/A	All Outcomes: A positive control was not necessary for the outcome of interest.	
Metric 6:	Randomized Allocation of Animals	Low	All Outcomes: The study did not report how animals were allocated into groups.	
Domain 3: Exposure Characterization				
Metric 7:	Preparation and Storage of Test Substance	Medium	All Outcomes: The test substance was diluted into peanut oil. No further information on preparation, homogeneity, or storage was provided. Storage is not expected to be an issue for this study because animals were administered single injections only.	
Metric 8:	Consistency of Exposure Administration	High	Mortality: The study indicates that injection volumes for all dose groups were 0.1mL "whenever possible"; Mortality: The study indicates that injection volumes for all dose groups were 0.1mL "whenever possible"	
Metric 9:	Reporting of Doses/Concentrations	High	All Outcomes: The dose concentrations were reported in units of mM/kg. Doses in mg/kg can be determined using the molecular weight of the test substance.	
Metric 10:	Exposure Frequency and Duration	High	All Outcomes: The exposure frequency (single dose) was appropriate for the purposes of the study.	
Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	High	All Outcomes: The number of exposure groups were appropriate to determined ED50 and LD50 values.	
Metric 12:	Exposure Route and Method	Medium	All Outcomes: No justification was provided for the route of exposure (subcutaneous injection).	
Domain 4: Test Animals				
Metric 13:	Test Animal Characteristics	Medium	All Outcomes: Animal species, strain, sex, and ranges of starting body weights were provided. Animal age and source were not reported.	
Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	All Outcomes: Animal husbandry conditions were not reported.	
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Study Citation:	Plaa, G. L., Evans, E. A., Hine, C. H. (1958). Relative hepatotoxicity of seven halogenated hydrocarbons. Journal of Pharmacology and Experimental Therapeutics 123:224-229.
Health Outcome(s):	Mortality; Mortality;
Reported Health Effect(s):	Mortality; Mortality; Mortality; Mortality;
Duration:	Acute (less than or equal to 24 hr) Single injection
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	29447

Domain	Metric	Rating	Comments
	Metric 15: Number of Animals per Group	Medium	All Outcomes: The number of animals per group varied (10-15 per group for LD50 determination). It was not indicated why there were different animal numbers per group.
Domain 5: Outcome Assessment			
	Metric 16: Outcome Assessment Methodology	Medium	All Outcomes: Animals were monitored for 10 days. Typically animals are monitored for 14 days for lethality studies.
	Metric 17: Consistency of Outcome Assessment	High	All Outcomes: The animals across groups appeared to be consistently evaluated for mortality.
	Metric 18: Sampling Adequacy	High	All Outcomes: All animals were sampled.
	Metric 19: Blinding of Assessors	N/A	All Outcomes: Blinding was not required for the outcomes of interest.
	Metric 20: Negative Control Response	N/A	All Outcomes: Negative controls were not used.
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	All Outcomes: The study did not report information to determine confounding.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	All Outcomes: There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.
	Metric 23: Data Presentation and Analysis	High	All Outcomes: The methods for EC50 and LD50 determinations were clearly reported.
	Metric 24: Reporting of Data	High	All Outcomes: Mortality incidences were clearly reported for each dose group and an LD50 value was determined.

Additional Comments: This form is for 1,1,2-trichloroethane.

Overall Quality Determination**High**

Study Citation:	Plaa, G. L., Evans, E. A., Hine, C. H. (1958). Relative hepatotoxicity of seven halogenated hydrocarbons. Journal of Pharmacology and Experimental Therapeutics 123:224-229.			
Health Outcome(s):	Renal/Kidney			
Reported Health Effect(s):	Renal/Kidney: Gross and histopathological examinations			
Duration:	Acute (less than or equal to 24 hr) Single injection			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	29447			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	The test substance was identified as 1,1,2-trichloroethane. A CASRN was not provided.	
	Metric 2: Test Substance Source	Low	The test substance was fractionally distilled in the testing laboratory. Further validation or analytical analysis of the test substance was not provided in the report.	
	Metric 3: Test Substance Purity	Low	The purity was not explicitly reported.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	Uninformative	It is not clear that there were any untreated animals that were microscopically examined.	
	Metric 5: Positive Controls	N/A	A positive control was not necessary for the outcome of interest.	
	Metric 6: Randomized Allocation of Animals	Low	The study did not report how animals were allocated into groups.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Medium	The test substance was diluted into peanut oil. No further information on preparation, homogeneity, or storage was provided. Storage is not expected to be an issue for this study because animals were administered single injections only.	
	Metric 8: Consistency of Exposure Administration	High	The study indicates that injection volumes for all dose groups were 0.1mL "whenever possible"	
	Metric 9: Reporting of Doses/Concentrations	High	The dose concentrations were reported in units of mM/kg. Doses in mg/kg can be determined using the molecular weight of the test substance.	
	Metric 10: Exposure Frequency and Duration	High	The exposure frequency (single dose) was appropriate for the purposes of the study (focused on liver toxicity)	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Low	Due to data reporting limitations, it is unclear if the dose spacing was appropriate for this outcome.	
	Metric 12: Exposure Route and Method	Low	No justification was provided for the route of exposure (subcutaneous injection), and it is unlikely this is the most relevant route of exposure for evaluating hepatotoxicity which was the purpose of the study.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Medium	Animal species, strain, sex, and ranges of starting body weights were provided. Animal age and source were not reported.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Animal husbandry conditions were not reported.	
	Metric 15: Number of Animals per Group	Medium	The number of animals per group varied (5-10 for sleeping time studies and 10-15 for LD50 determination). It was not indicated why there were different animal numbers per group.	

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Study Citation:	Plaa, G. L., Evans, E. A., Hine, C. H. (1958). Relative hepatotoxicity of seven halogenated hydrocarbons. Journal of Pharmacology and Experimental Therapeutics 123:224-229.			
Health Outcome(s):	Renal/Kidney			
Reported Health Effect(s):	Renal/Kidney: Gross and histopathological examinations			
Duration:	Acute (less than or equal to 24 hr) Single injection			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	29447			
Domain		Metric	Rating	Comments
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	Low	Gross and microscopic examinations were performed. Organ weights and relative clinical chemistry measurements were not included in the study. Details of assessment methodology (when animals were sacrificed/examined) post-dosing was not clearly specified.
	Metric 17:	Consistency of Outcome Assessment	Low	Details of outcome assessment were not adequately reported.
	Metric 18:	Sampling Adequacy	Low	Details regarding sampling of outcomes were not reported.
	Metric 19:	Blinding of Assessors	N/A	Blinding was not required for the outcomes of interest.
	Metric 20:	Negative Control Response	Low	Control responses weren't reported for histopathology.
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Medium	The study did not report information to determine confounding.
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.
	Metric 23:	Data Presentation and Analysis	Uninformative	Statistical analysis was not performed and data enabling independent statistical analysis were not provided.
	Metric 24:	Reporting of Data	Uninformative	Data presentation was inadequate (e.g., the report does not differentiate among findings in multiple exposure groups).
Additional Comments:	This form is for 1,1,2-trichloroethane			

Overall Quality Determination**Uninformative**

Study Citation:	Plaa, G. L., Larson, R. E. (1965). Relative nephrotoxic properties of chlorinated methane, ethane, and ethylene derivatives in mice. Toxicology and Applied Pharmacology 7(1):37-44.			
Health Outcome(s):	Renal/Kidney			
Reported Health Effect(s):	Renal/Kidney: Urinary glucose and protein; renal histopathology			
Duration:	Acute (less than or equal to 24 hr) Acute- single dose			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	64411			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Test substance was identified as 1,1,2-trichloroethane.
	Metric 2:	Test Substance Source	Low	The source of the test substance was not reported.
	Metric 3:	Test Substance Purity	Low	The purity of the test substance was not reported.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	Uninformative	Details of negative control are not reported. It appears the data on the negative controls come from historic data. The strain, age, sex of the animals are not provided nor is information on if the animals were sham or untreated.
	Metric 5:	Positive Controls	N/A	Not applicable for this study.
	Metric 6:	Randomized Allocation of Animals	Low	Authors do not report if how study groups were formed.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Low	Preparation and storage conditions were not properly reported given the volatility of the test substance.
	Metric 8:	Consistency of Exposure Administration	Medium	Details of exposure administration are incomplete.
	Metric 9:	Reporting of Doses/Concentrations	High	Exposure doses were reported without ambiguity.
	Metric 10:	Exposure Frequency and Duration	High	Exposure and frequency were appropriate for outcome studied.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Medium	There were minor limitation in dose spacing.
	Metric 12:	Exposure Route and Method	High	Route of exposure was i.p. injection.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	Low	The source and age of the mice was not reported.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not reported.
	Metric 15:	Number of Animals per Group	Medium	The number of animals exposed/group was not reported as 10 in each group (Table 4 legend).
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	Medium	Some details regarding the outcome assessment methodology were lacking (e.g how long urine was collected for).

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Study Citation:	Plaa, G. L., Larson, R. E. (1965). Relative nephrotoxic properties of chlorinated methane, ethane, and ethylene derivatives in mice. Toxicology and Applied Pharmacology 7(1):37-44.			
Health Outcome(s):	Renal/Kidney			
Reported Health Effect(s):	Renal/Kidney: Urinary glucose and protein; renal histopathology			
Duration:	Acute (less than or equal to 24 hr) Acute- single dose			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	64411			
Domain	Metric	Rating	Comments	
	Metric 17:	Consistency of Outcome Assessment	High	Outcomes were assessed consistently across study groups.
	Metric 18:	Sampling Adequacy	Medium	The sampling was adequate (all surviving mice)
	Metric 19:	Blinding of Assessors	N/A	Blinding was not necessary for outcomes studied.
	Metric 20:	Negative Control Response	High	Negative control responses for urinary parameters were reported in text and were appropriate for some outcomes.
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Medium	Study did not report all information to determine confounding, reported information did not identify differences among study groups.
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.
	Metric 23:	Data Presentation and Analysis	Low	Statistics analysis were not performed. Significance of increased urinary glucose or protein was determined by a cutoff number set by the authors.
	Metric 24:	Reporting of Data	Medium	Incidence data is provided for presence of urinary glucose or protein above cutoff level. The measured level of glucose and protein would be more useful.
Additional Comments:	Study is rated as unacceptable based on lack of information regarding the negative control.			
Overall Quality Determination		Uninformative		

Study Citation:	Plaa, G. L., Larson, R. E. (1965). Relative nephrotoxic properties of chlorinated methane, ethane, and ethylene derivatives in mice. Toxicology and Applied Pharmacology 7(1):37-44.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: Mortality			
Duration:	Acute (less than or equal to 24 hr) Acute- single dose			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	64411			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Test substance was identified as 1,1,2-trichloroethane.
	Metric 2:	Test Substance Source	Low	The source of the test substance was not reported.
	Metric 3:	Test Substance Purity	Low	The purity of the test substance was not reported.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	Uninformative	Details of negative control are not reported. It appears the data on the negative controls come from historic data. The strain, age, sex of the animals are not provided nor is information on if the animals were sham or untreated.
	Metric 5:	Positive Controls	N/A	Not applicable for this study.
	Metric 6:	Randomized Allocation of Animals	Low	Authors do not report if how study groups were formed.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Low	Preparation and storage conditions were not properly reported given the volatility of the test substance.
	Metric 8:	Consistency of Exposure Administration	Medium	Details of exposure administration are incomplete.
	Metric 9:	Reporting of Doses/Concentrations	High	Exposure doses were reported without ambiguity.
	Metric 10:	Exposure Frequency and Duration	High	Exposure and frequency were appropriate for outcome studied.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Medium	There were minor limitation in dose spacing.
	Metric 12:	Exposure Route and Method	High	Route of exposure was i.p. injection.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	Low	The source and age of the mice was not reported.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not reported.
	Metric 15:	Number of Animals per Group	Medium	The number of animals exposed/group was not reported as 10 in each group (Table 4 legend).
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	Medium	Details regarding the outcome assessment methodology were lacking.
	Metric 17:	Consistency of Outcome Assessment	High	Outcomes were assessed consistently across study groups.
	Metric 18:	Sampling Adequacy	Medium	The sampling was adequate.
	Metric 19:	Blinding of Assessors	N/A	Blinding was not necessary for outcomes studied.

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Study Citation:	Plaa, G. L., Larson, R. E. (1965). Relative nephrotoxic properties of chlorinated methane, ethane, and ethylene derivatives in mice. Toxicology and Applied Pharmacology 7(1):37-44.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: Mortality			
Duration:	Acute (less than or equal to 24 hr) Acute- single dose			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	64411			
Domain	Metric		Rating	Comments
	Metric 20:	Negative Control Response	Low	Negative control responses was not reported.
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Medium	Study did not report all information to determine confounding, reported information did not identify differences among study groups.
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.
	Metric 23:	Data Presentation and Analysis	High	Statistics analysis were not performed but data is presented so that independent analysis can be done.
	Metric 24:	Reporting of Data	High	Mortality data is adequately presented.
Additional Comments: Study is rated as unacceptable based on lack of information regarding the negative control.				

Overall Quality Determination**Uninformative**

Study Citation:	Tyson, C. A., Hawk-Prather, K., Story, D. L., Gould, D. H. (1983). Correlations of in vitro and in vivo hepatotoxicity for five haloalkanes. Toxicology and Applied Pharmacology 70(2):289-302.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: Serum AST (SGOT) and ALT (SGPT) level			
Duration:	Acute (less than or equal to 24 hr) Single dose			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	64561			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
Metric 1:	Test Substance Identity	High	The test substance was identified as 1,1,2- trichloroethane.	
Metric 2:	Test Substance Source	High	The source was identified (Aldrich Chemical Co., Milwaukee Wisc.).	
Metric 3:	Test Substance Purity	Low	The purity was not reported; given the year this study was published (1983), the purity reported on the company’s website may not be accurate. The study indicated that ”all other chemicals were reagent grade.”	
Domain 2: Test Design				
Metric 4:	Negative and Vehicle Controls	High	A vehicle control group was included.	
Metric 5:	Positive Controls	N/A	A positive control is not required for this study type.	
Metric 6:	Randomized Allocation of Animals	Low	The study did not report how animals were allocated to study groups.	
Domain 3: Exposure Characterization				
Metric 7:	Preparation and Storage of Test Substance	Medium	The test substance was dissolved in corn oil. Details on preparation and storage were not reported. Given the dosing period (single gavage), the lack of this information is unlikely to have a substantial impact on results.	
Metric 8:	Consistency of Exposure Administration	High	Test substance was delivered consistently (1ml/200g body weight) at the same time of day.	
Metric 9:	Reporting of Doses/Concentrations	Medium	Three doses were tested. The concentrations were shown in a figure and could be estimated.	
Metric 10:	Exposure Frequency and Duration	High	The exposure frequency and duration were appropriate for the aim of the study.	
Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	High	The study included three dose groups (ranging from ~0.35 to ~1.5 mmol/kg) plus a control. The doses were based on fractions of the acute LD50s reported in the literature.	
Metric 12:	Exposure Route and Method	High	Animals were dosed via gavage, which is an appropriate route/method for the test substance.	
Domain 4: Test Animals				
Metric 13:	Test Animal Characteristics	Medium	The species, strain, source, sex and starting body weights were reported. Age was not reported.	
Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Medium	Husbandry conditions were not fully reported. Animals were housed 2-3/cage in well-ventilated rooms. Temperature, humidity, and photoperiod were not reported. Animals were fasted 16-24 hours prior to dosing and allowed to resume feeding after dosing.	
Metric 15:	Number of Animals per Group	Low	The number of animals dosed was not reported.	

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Study Citation:	Tyson, C. A., Hawk-Prather, K., Story, D. L., Gould, D. H. (1983). Correlations of in vitro and in vivo hepatotoxicity for five haloalkanes. Toxicology and Applied Pharmacology 70(2):289-302.
Health Outcome(s):	Hepatic/Liver
Reported Health Effect(s):	Hepatic/Liver: Serum AST (SGOT) and ALT (SGPT) level
Duration:	Acute (less than or equal to 24 hr) Single dose
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64561

Domain	Metric	Rating	Comments
Domain 5: Outcome Assessment			
	Metric 16: Outcome Assessment Methodology	High	Outcome methodology was adequately reported and appropriate for the purposes of the study.
	Metric 17: Consistency of Outcome Assessment	High	Outcomes were assessed consistency across study groups.
	Metric 18: Sampling Adequacy	Low	The number of animals reported in the Table (n=3-5 for dosed groups). It is not clear if the same animal was used for different time points. The number of animals in the control group was not reported.
	Metric 19: Blinding of Assessors	N/A	Blinding was not reported but was not required outcomes of interest.
	Metric 20: Negative Control Response	High	The negative control response was reported and appropriate.
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	Although the study did not report all information to determine confounding, reported information did not identify differences (or identified only minor differences) among study groups in the above listed confounding factors.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.
	Metric 23: Data Presentation and Analysis	High	ED50s were calculated by the method of Litchfield and Wilcoxon (1949).
	Metric 24: Reporting of Data	Low	Data were mostly reported. "Data at some time points that were not used in the evaluation of response were omitted from the figures". The 6-hour timepoint data were not reported. Standard errors were not reported.

Additional Comments: None

Overall Quality Determination**Medium**

Study Citation:	Wahlberg, J. E. (1976). Percutaneous toxicity of solvents: a comparative investigation in the guinea pig with benzene, toluene and 1,1,2-trichloroethane. Annals of Occupational Hygiene 19(2):115-119.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: Death, mean time to death			
Duration:	Acute (less than or equal to 24 hr) Single exposure			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	74541			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	The test substance was definitively identified (as 1,1,2-trichloroethane).	
	Metric 2: Test Substance Source	Low	The source of the test substance was reported (a manufacturer); no batch/lot number was provided.	
	Metric 3: Test Substance Purity	High	The test substance was reported to be analytical grade.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	High	A distilled water control group was used; pure solvents (undiluted) were used as the experimental condition(s). Both groups were treated similarly except with respect to the substance (and amount) that was applied.	
	Metric 5: Positive Controls	N/A	Not required by study type.	
	Metric 6: Randomized Allocation of Animals	Low	Allocation of animals to study groups was not reported.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	Details on test substance storage/preparation were not provided (the test substance is volatile).	
	Metric 8: Consistency of Exposure Administration	Medium	The study report indicates that animals were exposed to 0.25 mL, 0.5 mL, or 2.0 mL of pure solvents (or 2.0 mL distilled water control).	
	Metric 9: Reporting of Doses/Concentrations	High	Administered doses (in mL) were reported without ambiguity.	
	Metric 10: Exposure Frequency and Duration	High	The exposure frequency and duration were reported (i.e., single application). The frequency was considered adequate to evaluate mortality.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Low	3 doses of 1,1,2-trichloroethane were used; all doses caused substantial toxicity. No dose of the test substance was used that did not cause mortality/could be used to establish a NOAEL.	
	Metric 12: Exposure Route and Method	Medium	The test substance was administered by i.p. injection as a single dose; this method appears suitable for the test substance.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Low	Guinea pigs were used; no strain or source of these animals was indicated. Life-stage was not reported (presumably adults). The study indicated that guinea pigs of both sexes were used. Starting body weights were reported per group.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not reported (temperature, humidity, light/dark cycle). The study report indicated that animals were kept in groups of 5 per cage (presumably during the exposure and observational periods).	
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Study Citation:	Wahlberg, J. E. (1976). Percutaneous toxicity of solvents: a comparative investigation in the guinea pig with benzene, toluene and 1,1,2-trichloroethane. Annals of Occupational Hygiene 19(2):115-119.
Health Outcome(s):	Mortality
Reported Health Effect(s):	Mortality: Death, mean time to death
Duration:	Acute (less than or equal to 24 hr) Single exposure
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	74541

Domain	Metric	Rating	Comments
	Metric 15: Number of Animals per Group	Medium	There were 10 animals per group "in the same proportion;" therefore, 5/sex/group for each dose of 1,1,2-trichloroethane.
Domain 5: Outcome Assessment			
	Metric 16: Outcome Assessment Methodology	High	Mortality was regularly evaluated as the outcome of interest.
	Metric 17: Consistency of Outcome Assessment	Medium	The methods did not specifically address the outcome methodology for the i.p. study (how often mortality was evaluated). Based on the results provided, it appears that mortality was assessed within the sensitive window (up to 48 hours after dosing).
	Metric 18: Sampling Adequacy	High	Mortality of all animals used in the study was presumably evaluated.
	Metric 19: Blinding of Assessors	N/A	Not a subjective outcome; blinding not required.
	Metric 20: Negative Control Response	High	No mortality occurred in the control group.
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	The study did not report all information to evaluate confounding (e.g., food consumption), but omitted details are unlikely to impact assessment of the outcome (mortality), especially given the short study duration.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information about differences among groups unrelated to exposure.
	Metric 23: Data Presentation and Analysis	N/A	Mortality was not evaluated statistically.
	Metric 24: Reporting of Data	Low	Data were not reported separately by sex.

Additional Comments: none

Overall Quality Determination**Medium**

Study Citation:	White, K. L., Jr, Sanders, V. M., Barnes, D. W., Shopp, G. M., Jr, Munson, A. E. (1985). Toxicology of 1,1,2-trichloroethane in the mouse. Drug and Chemical Toxicology 8(5):333-355.		
Health Outcome(s):	Gastrointestinal; Hepatic/Liver; Lung/Respiratory;		
Reported Health Effect(s):	Gastrointestinal: Acute: Dose-dependent upper gastrointestinal tract irritation was observed, with irritation observed in all animals at and above 500 mg/kg bw/day; Hepatic/Liver: The liver was a target of TCE toxicity in both sexes as demonstrated by dose-dependent alterations in hepatic microsomal enzyme activities and serum enzyme levels.Acute: Pale livers were observed in 50-75% of animals in each dose group14-Day Study: Lactic dehydrogenase activity was significantly decreased in high-dose males (21%). Relative liver weight was significantly increased (10%) at 3.8 mg/kg bw/day, but absolute liver weights were not significantly different from controls and no significant differences were observed in high-dose animals.90-Day Study: Cholesterol and serum alkaline phosphatase (SAP) were significantly increased in males at 305 mg/kg bw/day and glutathione was significantly decreased at and above 46 mg/kg bw/day. Cholesterol, SGPT, and glutathione were significantly increased in females at 384 mg/kg bw/day. SGOT and SAP were significantly increased in all test groups of females. Cytochrome P-450 and aniline hydroxylase were significantly decreased in females at and above 44 mg/kg bw/day. Absolute liver (11% and 12%, respectively) weights were significantly decreased in males at 46 and 305 mg/kg bw/day. Absolute (32%) and relative (26%) liver weights were significantly increased in females at 384 mg/kg bw/day.; Lung/Respiratory: Acute: Reddened or hemorrhagic lungs were observed in up to 25% of animals14-Day Study: No significant changes in lung weight. 90-Day Study: No significant changes in lung weight.;		
Duration:	Acute (less than or equal to 24 hr) Single dose		
Chemical:	1,1,2-Trichloroethane- Parent compound		
HERO ID:	64564; Linked HERO ID(s): 64564, 64556		
Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	Medium	All Outcomes: The test substance was identified as 1,1,2-trichloroethane. The chemical structure was verified. The specific form was not identified.
	Metric 2: Test Substance Source	High	All Outcomes: The test substance was purchased from Aldrich Chemical Co. in Milwaukee, WI, with lot numbers of 070177 and 061197. The chemical structure was verified using infrared spectrometry.
	Metric 3: Test Substance Purity	Medium	All Outcomes: The purity was reported as 95% and was verified by gas chromatography. It was reported that no stabilizers or preservatives were present, but the other constituents were not specified.
Domain 2: Test Design			
	Metric 4: Negative and Vehicle Controls	N/A	All Outcomes: Negative controls are not required for acute toxicity tests.
	Metric 5: Positive Controls	N/A	All Outcomes: Positive controls are not required for acute toxicity tests.
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Study Citation:	White, K. L., Jr, Sanders, V. M., Barnes, D. W., Shopp, G. M., Jr, Munson, A. E. (1985). Toxicology of 1,1,2-trichloroethane in the mouse. Drug and Chemical Toxicology 8(5):333-355.
Health Outcome(s):	Gastrointestinal; Hepatic/Liver; Lung/Respiratory;
Reported Health Effect(s):	Gastrointestinal: Acute: Dose-dependent upper gastrointestinal tract irritation was observed, with irritation observed in all animals at and above 500 mg/kg bw/day; Hepatic/Liver: The liver was a target of TCE toxicity in both sexes as demonstrated by dose-dependent alterations in hepatic microsomal enzyme activities and serum enzyme levels. Acute: Pale livers were observed in 50-75% of animals in each dose group 14-Day Study: Lactic dehydrogenase activity was significantly decreased in high-dose males (21%). Relative liver weight was significantly increased (10%) at 3.8 mg/kg bw/day, but absolute liver weights were not significantly different from controls and no significant differences were observed in high-dose animals. 90-Day Study: Cholesterol and serum alkaline phosphatase (SAP) were significantly increased in males at 305 mg/kg bw/day and glutathione was significantly decreased at and above 46 mg/kg bw/day. Cholesterol, SGPT, and glutathione were significantly increased in females at 384 mg/kg bw/day. SGOT and SAP were significantly increased in all test groups of females. Cytochrome P-450 and aniline hydroxylase were significantly decreased in females at and above 44 mg/kg bw/day. Absolute liver (11% and 12%, respectively) weights were significantly decreased in males at 46 and 305 mg/kg bw/day. Absolute (32%) and relative (26%) liver weights were significantly increased in females at 384 mg/kg bw/day.; Lung/Respiratory: Acute: Reddened or hemorrhagic lungs were observed in up to 25% of animals 14-Day Study: No significant changes in lung weight. 90-Day Study: No significant changes in lung weight.;
Duration:	Acute (less than or equal to 24 hr) Single dose
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
	Metric 6: Randomized Allocation of Animals	Low	Gastrointestinal: The study did not report how animals were allocated to study groups. The study authors cited the methods to White et al. 1985, which is not available on HERO and only the abstract is available online. here is a related reference HERO ID r064563 by White et al 1985, Immunotoxicological Investigations in the Mouse: General Approach and Methods.; Hepatic/Liver: The study did not report how animals were allocated to study groups. The study authors cited the methods to White et al. 1985, which is not available on HERO and only the abstract is available online. There is a related reference HERO ID r064563 by White et al 1985, Immunotoxicological Investigations in the Mouse: General Approach and Methods.; Lung/Respiratory: The study did not report how animals were allocated to study groups. The study authors cited the methods to White et al. 1985, which is not available on HERO and only the abstract is available online. There is a related reference HERO ID r064563 by White et al 1985, Immunotoxicological Investigations in the Mouse: General Approach and Methods.

Domain 3: Exposure Characterization

Metric 7: Preparation and Storage of Test Substance	Medium	All Outcomes: The test solutions were prepared fresh daily using a 1:9 (v/v) solution of emulphor in deionized water. Solutions were stored in a dark glass container at 4 deg. C. No other details were provided (sealing of the container, stability, homogeneity, stirring methods, etc.).
Metric 8: Consistency of Exposure Administration	Medium	All Outcomes: Details of exposure administration are incompletely reported, but the missing information is unlikely to have a substantial impact on results. Volumes of 0.01 mL/g bw were administered via gavage.
Metric 9: Reporting of Doses/Concentrations	Medium	All Outcomes: 7 doses from 200 to 600 mg/kg bw were administered via oral gavage as a single dose. All doses used were not reported.
Metric 10: Exposure Frequency and Duration	High	All Outcomes: A single dose was administered via gavage for an acute toxicity study.

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Health Outcome(s):	Gastrointestinal; Hepatic/Liver; Lung/Respiratory;
Reported Health Effect(s):	Gastrointestinal: Acute: Dose-dependent upper gastrointestinal tract irritation was observed, with irritation observed in all animals at and above 500 mg/kg bw/day; Hepatic/Liver: The liver was a target of TCE toxicity in both sexes as demonstrated by dose-dependent alterations in hepatic microsomal enzyme activities and serum enzyme levels. Acute: Pale livers were observed in 50-75% of animals in each dose group 14-Day Study: Lactic dehydrogenase activity was significantly decreased in high-dose males (21%). Relative liver weight was significantly increased (10%) at 3.8 mg/kg bw/day, but absolute liver weights were not significantly different from controls and no significant differences were observed in high-dose animals. 90-Day Study: Cholesterol and serum alkaline phosphatase (SAP) were significantly increased in males at 305 mg/kg bw/day and glutathione was significantly decreased at and above 46 mg/kg bw/day. Cholesterol, SGPT, and glutathione were significantly increased in females at 384 mg/kg bw/day. SGOT and SAP were significantly increased in all test groups of females. Cytochrome P-450 and aniline hydroxylase were significantly decreased in females at and above 44 mg/kg bw/day. Absolute liver (11% and 12%, respectively) weights were significantly decreased in males at 46 and 305 mg/kg bw/day. Absolute (32%) and relative (26%) liver weights were significantly increased in females at 384 mg/kg bw/day.; Lung/Respiratory: Acute: Reddened or hemorrhagic lungs were observed in up to 25% of animals 14-Day Study: No significant changes in lung weight. 90-Day Study: No significant changes in lung weight.;
Duration:	Acute (less than or equal to 24 hr) Single dose
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Medium	Gastrointestinal: The number of exposure groups and dose/concentration spacing were not justified by the study authors, but LD50s were established in both sexes and dose-dependent irritation of the GI tract were observed, with all animals showing GI irritation at and above 500 mg/kg bw.; Hepatic/Liver: The number of exposure groups and dose/concentration spacing were not justified by the study authors, but LD50s were established in both sexes and pale livers were observed in 50-75% of animals (dose groups not specified).; Lung/Respiratory: The number of exposure groups and dose/concentration spacing were not justified by the study authors, but LD50s were established in both sexes and lung damage was observed in up to 25% of animals (dose groups not specified).
	Metric 12: Exposure Route and Method	Medium	All Outcomes: Test solutions were administered via gavage. The route of exposure was appropriate for the outcome. Mice were fasted for 18 hours prior to the test substance administration. It is unclear if the researchers accounted for the volatility of the test substance, but did prepare test solutions daily.

Domain 4: Test Animals

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Study Citation:	White, K. L., Jr, Sanders, V. M., Barnes, D. W., Shopp, G. M., Jr, Munson, A. E. (1985). Toxicology of 1,1,2-trichloroethane in the mouse. Drug and Chemical Toxicology 8(5):333-355.
Health Outcome(s):	Gastrointestinal; Hepatic/Liver; Lung/Respiratory;
Reported Health Effect(s):	Gastrointestinal: Acute: Dose-dependent upper gastrointestinal tract irritation was observed, with irritation observed in all animals at and above 500 mg/kg bw/day; Hepatic/Liver: The liver was a target of TCE toxicity in both sexes as demonstrated by dose-dependent alterations in hepatic microsomal enzyme activities and serum enzyme levels. Acute: Pale livers were observed in 50-75% of animals in each dose group 14-Day Study: Lactic dehydrogenase activity was significantly decreased in high-dose males (21%). Relative liver weight was significantly increased (10%) at 3.8 mg/kg bw/day, but absolute liver weights were not significantly different from controls and no significant differences were observed in high-dose animals. 90-Day Study: Cholesterol and serum alkaline phosphatase (SAP) were significantly increased in males at 305 mg/kg bw/day and glutathione was significantly decreased at and above 46 mg/kg bw/day. Cholesterol, SGPT, and glutathione were significantly increased in females at 384 mg/kg bw/day. SGOT and SAP were significantly increased in all test groups of females. Cytochrome P-450 and aniline hydroxylase were significantly decreased in females at and above 44 mg/kg bw/day. Absolute liver (11% and 12%, respectively) weights were significantly decreased in males at 46 and 305 mg/kg bw/day. Absolute (32%) and relative (26%) liver weights were significantly increased in females at 384 mg/kg bw/day.; Lung/Respiratory: Acute: Reddened or hemorrhagic lungs were observed in up to 25% of animals 14-Day Study: No significant changes in lung weight. 90-Day Study: No significant changes in lung weight.;
Duration:	Acute (less than or equal to 24 hr) Single dose
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
Metric 13:	Test Animal Characteristics	Low	Gastrointestinal: Male and female CD-1 mice were used in this study. The source of the test animals was not reported. No additional details on the animals were provided. It is not clear if White et al. 1985 reported any test animal characteristics. Note by QCer: There is a related reference HERO ID r064563 by White et al 1985, Immunotoxicological Investigations in the Mouse: General Approach and Methods. This reference only reported that animals were random-bred CD-1 mice from Charles River Breeding Laboratories, Wilmington, MA, presumably. No other details were provided. .; Hepatic/Liver: Male and female CD-1 mice were used in this study. The source of the test animals was not reported. No additional details on the animals were provided. It is not clear if White et al. 1985 reported any test animal characteristics. Note by QCer: There is a related reference HERO ID r064563 by White et al 1985, Immunotoxicological Investigations in the Mouse: General Approach and Methods. This reference only reported that animals were random-bred CD-1 mice from Charles River Breeding Laboratories, Wilmington, MA, presumably. No other details were provided.; Lung/Respiratory: Male and female CD-1 mice were used in this study. The source of the test animals was not reported. No additional details on the animals were provided. It is not clear if White et al. 1985 reported any test animal characteristics. Note by QCer: There is a related reference HERO ID r064563 by White et al 1985, Immunotoxicological Investigations in the Mouse: General Approach and Methods. This reference only reported that animals were random-bred CD-1 mice from Charles River Breeding Laboratories, Wilmington, MA, presumably. No other details were provided. .

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Health Outcome(s):	Gastrointestinal; Hepatic/Liver; Lung/Respiratory;
Reported Health Effect(s):	Gastrointestinal: Acute: Dose-dependent upper gastrointestinal tract irritation was observed, with irritation observed in all animals at and above 500 mg/kg bw/day; Hepatic/Liver: The liver was a target of TCE toxicity in both sexes as demonstrated by dose-dependent alterations in hepatic microsomal enzyme activities and serum enzyme levels. Acute: Pale livers were observed in 50-75% of animals in each dose group. 14-Day Study: Lactic dehydrogenase activity was significantly decreased in high-dose males (21%). Relative liver weight was significantly increased (10%) at 3.8 mg/kg bw/day, but absolute liver weights were not significantly different from controls and no significant differences were observed in high-dose animals. 90-Day Study: Cholesterol and serum alkaline phosphatase (SAP) were significantly increased in males at 305 mg/kg bw/day and glutathione was significantly decreased at and above 46 mg/kg bw/day. Cholesterol, SGPT, and glutathione were significantly increased in females at 384 mg/kg bw/day. SGOT and SAP were significantly increased in all test groups of females. Cytochrome P-450 and aniline hydroxylase were significantly decreased in females at and above 44 mg/kg bw/day. Absolute liver (11% and 12%, respectively) weights were significantly decreased in males at 46 and 305 mg/kg bw/day. Absolute (32%) and relative (26%) liver weights were significantly increased in females at 384 mg/kg bw/day.; Lung/Respiratory: Acute: Reddened or hemorrhagic lungs were observed in up to 25% of animals. 14-Day Study: No significant changes in lung weight. 90-Day Study: No significant changes in lung weight.;
Duration:	Acute (less than or equal to 24 hr) Single dose
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Gastrointestinal: Husbandry conditions were not sufficiently reported to evaluate if husbandry was adequate. It is not clear if White et al. 1985 reported any animal husbandry conditions. Note by QCER: White et al. 1985 reported that upon arrival all animals were housed four per cage in plastic shoe box cages with sawdust bedding and quarantined for 7 days.; Hepatic/Liver: Husbandry conditions were not sufficiently reported to evaluate if husbandry was adequate. It is not clear if White et al. 1985 reported any animal husbandry conditions. Note by QCER: White et al. 1985 reported that upon arrival all animals were housed four per cage in plastic shoe box cages with sawdust bedding and quarantined for 7 days.; Lung/Respiratory: Husbandry conditions were not sufficiently reported to evaluate if husbandry was adequate. It is not clear if White et al. 1985 reported any animal husbandry conditions. Note by QCER: White et al. 1985 reported that upon arrival all animals were housed four per cage in plastic shoe box cages with sawdust bedding and quarantined for 7 days.
	Metric 15: Number of Animals per Group	Low	All Outcomes: 56 mice/sex were used, but it is not clear if this is the total number of mice used in the acute study, or the number of mice used per dose group.
Domain 5: Outcome Assessment			
	Metric 16: Outcome Assessment Methodology	Low	Gastrointestinal: Necropsies were performed at the time of death, but no additional details on the procedure were provided. The outcome assessment methodology was not clearly reported for assessments of the GI tract during necropsy.; Hepatic/Liver: Necropsies were performed at the time of death, but no additional details on the procedure were provided. The outcome assessment methodology was not clearly reported for assessments of livers during necropsy.; Lung/Respiratory: Necropsies were performed at the time of death, but no additional details on the procedure were provided. The outcome assessment methodology was not clearly reported for assessments of lungs during necropsy.
	Metric 17: Consistency of Outcome Assessment	Low	All Outcomes: Details regarding the execution of the study protocol for outcome assessment were not reported.
	Metric 18: Sampling Adequacy	Low	All Outcomes: The number of animals evaluated in each group was not specified.

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Health Outcome(s):	Gastrointestinal; Hepatic/Liver; Lung/Respiratory;
Reported Health Effect(s):	Gastrointestinal: Acute: Dose-dependent upper gastrointestinal tract irritation was observed, with irritation observed in all animals at and above 500 mg/kg bw/day; Hepatic/Liver: The liver was a target of TCE toxicity in both sexes as demonstrated by dose-dependent alterations in hepatic microsomal enzyme activities and serum enzyme levels. Acute: Pale livers were observed in 50-75% of animals in each dose group 14-Day Study: Lactic dehydrogenase activity was significantly decreased in high-dose males (21%). Relative liver weight was significantly increased (10%) at 3.8 mg/kg bw/day, but absolute liver weights were not significantly different from controls and no significant differences were observed in high-dose animals. 90-Day Study: Cholesterol and serum alkaline phosphatase (SAP) were significantly increased in males at 305 mg/kg bw/day and glutathione was significantly decreased at and above 46 mg/kg bw/day. Cholesterol, SGPT, and glutathione were significantly increased in females at 384 mg/kg bw/day. SGOT and SAP were significantly increased in all test groups of females. Cytochrome P-450 and aniline hydroxylase were significantly decreased in females at and above 44 mg/kg bw/day. Absolute liver (11% and 12%, respectively) weights were significantly decreased in males at 46 and 305 mg/kg bw/day. Absolute (32%) and relative (26%) liver weights were significantly increased in females at 384 mg/kg bw/day.; Lung/Respiratory: Acute: Reddened or hemorrhagic lungs were observed in up to 25% of animals 14-Day Study: No significant changes in lung weight. 90-Day Study: No significant changes in lung weight.;
Duration:	Acute (less than or equal to 24 hr) Single dose
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
	Metric 19: Blinding of Assessors	N/A	All Outcomes: Blinding of assessors is not required for necropsies.
	Metric 20: Negative Control Response	N/A	All Outcomes: Negative controls are not required for acute toxicity studies.

Domain 6: Confounding / Variable Control

Metric 21:	Confounding Variables in Test Design and Procedures	Low	All Outcomes: Bodyweight changes and food/water consumption were not reported.
Metric 22:	Health Outcomes Unrelated to Exposure	Medium	All Outcomes: There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.
Metric 23:	Data Presentation and Analysis	Low	All Outcomes: Sufficient data to conduct an independent analysis were not provided and no statistical analysis was performed for the changes observed during necropsy.
Metric 24:	Reporting of Data	Low	Gastrointestinal: The number of animals with irritation observed in the GI tract was not reported for either sex or for each dose group. The results were generally described in the text as dose-dependent, with 100% of animals showing GI irritation at 500 and 600 mg/kg bw.; Hepatic/Liver: The number of animals with pale livers was not reported for either sex or for each dose group. The results were generally described in the text.; Lung/Respiratory: The number of animals with reddened or hemorrhagic areas in the lungs was not reported for either sex or for each dose group. The results were generally described in the text.

Additional Comments: None

Overall Quality Determination**Low**

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Health Outcome(s):	Clinical signs of toxicity		
Reported Health Effect(s):	Clinical signs of toxicity: Acute: Sedation within an hour and loss of righting reflex in 10% of animals were observed at and above 450 mg/kg bw. 14 day: Lactic dehydrogenase activity was depressed 21% below control in the 38 mg/kg group.		
Duration:	Acute (less than or equal to 24 hr) Single dose		
Chemical:	1,1,2-Trichloroethane- Parent compound		
HERO ID:	64564; Linked HERO ID(s): 64564, 64556		
Domain	Metric	Rating	Comments
Domain 1: Test Substance			
Metric 1:	Test Substance Identity	Medium	The test substance was identified as 1,1,2-trichloroethane. The chemical structure was verified. The specific form was not identified.
Metric 2:	Test Substance Source	High	The test substance was purchased from Aldrich Chemical Co. in Milwaukee, WI, with lot numbers of 070177 and 061197. The chemical structure was verified using infrared spectrometry.
Metric 3:	Test Substance Purity	Medium	The purity was reported as 95% and was verified by gas chromatography. It was reported that no stabilizers or preservatives were present, but the other constituents were not specified.
Domain 2: Test Design			
Metric 4:	Negative and Vehicle Controls	N/A	Negative controls are not required for acute toxicity tests.
Metric 5:	Positive Controls	N/A	Positive controls are not required for acute toxicity tests.
Metric 6:	Randomized Allocation of Animals	Low	The study did not report how animals were allocated to study groups. The study authors cited the methods to White et al. 1985, which is not available on HERO and only the abstract is available online. Note by QCer: There is a related reference HERO ID r064563 by White et al 1985, Immunotoxicological Investigations in the Mouse: General Approach and Methods.
Domain 3: Exposure Characterization			
Metric 7:	Preparation and Storage of Test Substance	Medium	The test solutions were prepared fresh daily using a 1:9 (v/v) solution of emulphor in deionized water. Solutions were stored in a dark glass container at 4 deg. C. No other details were provided (sealing of the container, stability, homogeneity, stirring methods, etc.).
Metric 8:	Consistency of Exposure Administration	Medium	Details of exposure administration are incompletely reported, but the missing information is unlikely to have a substantial impact on results. Volumes of 0.01 mL/g bw were administered via gavage.
Metric 9:	Reporting of Doses/Concentrations	Medium	7 doses from 200 to 600 mg/kg bw were administered via oral gavage as a single dose. All doses used were not reported.
Metric 10:	Exposure Frequency and Duration	High	A single dose was administered via gavage for an acute toxicity study.
Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Medium	The number of exposure groups and dose/concentration spacing were not justified by the study authors, but LD50s were established in both sexes and clinical signs were observed at and above 450 mg/kg bw.
Metric 12:	Exposure Route and Method	Medium	Test solutions were administered via gavage. The route of exposure was appropriate for the outcome. Mice were fasted for 18 hours prior to the test substance administration. It is unclear if the researchers accounted for the volatility of the test substance, but did prepare test solutions daily.

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Health Outcome(s):	Clinical signs of toxicity
Reported Health Effect(s):	Clinical signs of toxicity: Acute: Sedation within an hour and loss of righting reflex in 10% of animals were observed at and above 450 mg/kg bw. 14 day: Lactic dehydrogenase activity was depressed 21% below control in the 38 mg/kg group.
Duration:	Acute (less than or equal to 24 hr) Single dose
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
Domain 4: Test Animals			
Metric 13:	Test Animal Characteristics	Low	Male and female CD-1 mice were used in this study. The source of the test animals was not reported. No additional details on the animals were provided. It is not clear if White et al. 1985 reported any test animal characteristics. Note by QCer: There is a related reference HERO ID r064563 by White et al 1985, Immunotoxicological Investigations in the Mouse: General Approach and Methods. This reference only reported that animals were random-bred CD-1 mice from Charles River Breeding Laboratories, Wilmington, MA, presumably. No other details were provided. .
Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not sufficiently reported to evaluate if husbandry was adequate. It is not clear if White et al. 1985 reported any animal husbandry conditions. Note by QCer: White et al. 1985 reported that upon arrival all animals were housed four per cage in plastic shoe box cages with sawdust bedding and quarantined for 7 days.
Metric 15:	Number of Animals per Group	Low	56 mice/sex were used, but it is not clear if this is the total number of mice used in the acute study, or the number of mice used per dose group.
Domain 5: Outcome Assessment			
Metric 16:	Outcome Assessment Methodology	Medium	The outcome assessment methodology was not clearly reported for the assessment of clinical signs of toxicity, but animals were observed for 14 days following test substance administration.
Metric 17:	Consistency of Outcome Assessment	Low	Details regarding the execution of the study protocol for outcome assessment were not reported.
Metric 18:	Sampling Adequacy	Low	The number of animals evaluated in each group was not specified.
Metric 19:	Blinding of Assessors	N/A	Blinding of assessors is not required for the assessment of clinical signs of toxicity.
Metric 20:	Negative Control Response	N/A	Negative controls are not required for acute toxicity studies.
Domain 6: Confounding / Variable Control			
Metric 21:	Confounding Variables in Test Design and Procedures	Low	Bodyweight changes and food/water consumption were not reported.
Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.
Metric 23:	Data Presentation and Analysis	Low	Sufficient data to conduct an independent analysis were not provided. The number of animals with clinical signs of toxicity was not specified for each sex and dose group.
Metric 24:	Reporting of Data	Low	Clinical signs of toxicity were generally reported, but the number of animals per sex per dose group that were affected were not specified.
Additional Comments:	None		

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Health Outcome(s):	Clinical signs of toxicity
Reported Health Effect(s):	Clinical signs of toxicity: Acute: Sedation within an hour and loss of righting reflex in 10% of animals were observed at and above 450 mg/kg bw. 14 day: Lactic dehydrogenase activity was depressed 21% below control in the 38 mg/kg group.
Duration:	Acute (less than or equal to 24 hr) Single dose
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
Overall Quality Determination		Low	

Study Citation:	White, K. L., Jr, Sanders, V. M., Barnes, D. W., Shopp, G. M., Jr, Munson, A. E. (1985). Toxicology of 1,1,2-trichloroethane in the mouse. Drug and Chemical Toxicology 8(5):333-355.
Health Outcome(s):	Mortality
Reported Health Effect(s):	Mortality: Acute: LD50 for males was 378 mg/kg bw and for females was 491 mg/kg bw 14-Day Study: No test substance-related mortality was observed (not further described)
Duration:	Acute (less than or equal to 24 hr) Single dose
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	Medium	The test substance was identified as 1,1,2-trichloroethane. The chemical structure was verified. The specific form was not identified.
	Metric 2: Test Substance Source	High	The test substance was purchased from Aldrich Chemical Co. in Milwaukee, WI, with lot numbers of 070177 and 061197. The chemical structure was verified using infrared spectrometry.
	Metric 3: Test Substance Purity	Medium	The purity was reported as 95% and was verified by gas chromatography. It was reported that no stabilizers or preservatives were present, but the other constituents were not specified.
Domain 2: Test Design			
	Metric 4: Negative and Vehicle Controls	N/A	Negative controls are not required for acute toxicity tests.
	Metric 5: Positive Controls	N/A	Positive controls are not required for acute toxicity tests.
	Metric 6: Randomized Allocation of Animals	Low	The study did not report how animals were allocated to study groups. The study authors cited the methods to White et al. 1985, which is not available on HERO and only the abstract is available online. Note by QCer: There is a related reference HERO ID r064563 by White et al 1985, Immunotoxicological Investigations in the Mouse: General Approach and Methods.
Domain 3: Exposure Characterization			
	Metric 7: Preparation and Storage of Test Substance	Medium	The test solutions were prepared fresh daily using a 1:9 (v/v) solution of emulphor in deionized water. Solutions were stored in a dark glass container at 4 deg. C. No other details were provided (sealing of the container, stability, homogeneity, stirring methods, etc.).
	Metric 8: Consistency of Exposure Administration	Medium	Details of exposure administration are incompletely reported, but the missing information is unlikely to have a substantial impact on results. Volumes of 0.01 mL/g bw were administered via gavage.
	Metric 9: Reporting of Doses/Concentrations	Medium	7 doses from 200 to 600 mg/kg bw were administered via oral gavage as a single dose. All doses used were not reported.
	Metric 10: Exposure Frequency and Duration	High	A single dose was administered via gavage for an acute toxicity study.
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Medium	The number of exposure groups and dose/concentration spacing were not justified by the study authors, but LD50s were established in both sexes.
	Metric 12: Exposure Route and Method	Medium	Test solutions were administered via gavage. The route of exposure was appropriate for the outcome. Mice were fasted for 18 hours prior to the test substance administration. It is unclear if the researchers accounted for the volatility of the test substance, but did prepare test solutions daily.

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Health Outcome(s):	Mortality
Reported Health Effect(s):	Mortality: Acute: LD50 for males was 378 mg/kg bw and for females was 491 mg/kg bw 14-Day Study: No test substance-related mortality was observed (not further described)
Duration:	Acute (less than or equal to 24 hr) Single dose
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
Domain 4: Test Animals			
Metric 13:	Test Animal Characteristics	Low	Male and female CD-1 mice were used in this study. The source of the test animals was not reported. No additional details on the animals were provided. Note by QCer: There is a related reference HERO ID r064563 by White et al 1985, Immunotoxicological Investigations in the Mouse: General Approach and Methods. This reference only reported that animals were random-bred CD-1 mice from Charles River Breeding Laboratories, Wilmington, MA, presumably. No other details were provided. .
Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not sufficiently reported to evaluate if husbandry was adequate. White et al. 1985 reported that upon arrival all animals were housed four per cage in plastic shoe box cages with sawdust bedding and quarantined for 7 days.
Metric 15:	Number of Animals per Group	Low	56 mice/sex were used, but it is not clear if this is the total number of mice used in the acute study, or the number of mice used per dose group.
Domain 5: Outcome Assessment			
Metric 16:	Outcome Assessment Methodology	Medium	The outcome assessment methodology was not clearly reported for mortality assessment, but animals were observed for 14 days following test substance administration.
Metric 17:	Consistency of Outcome Assessment	Low	Details regarding the execution of the study protocol for outcome assessment were not reported.
Metric 18:	Sampling Adequacy	Low	The number of animals evaluated in each group was not specified.
Metric 19:	Blinding of Assessors	N/A	Blinding of assessors is not required for mortality assessment.
Metric 20:	Negative Control Response	N/A	Negative controls are not required for acute toxicity studies.
Domain 6: Confounding / Variable Control			
Metric 21:	Confounding Variables in Test Design and Procedures	Low	Bodyweight changes and food/water consumption were not reported.
Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.
Metric 23:	Data Presentation and Analysis	Low	The LD50s and 95% CI were calculated according to the Log Probit Procedure, but no additional details were provided and sufficient data to conduct an independent analysis were not provided.
Metric 24:	Reporting of Data	Medium	LD50s and 95% CI were reported for each sex, but the number of deaths per dose group were not provided. All deaths occurred within 24 hours following the test substance administration.
Additional Comments:	None		

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Study Citation:	White, K. L., Jr, Sanders, V. M., Barnes, D. W., Shopp, G. M., Jr, Munson, A. E. (1985). Toxicology of 1,1,2-trichloroethane in the mouse. Drug and Chemical Toxicology 8(5):333-355.
Health Outcome(s):	Mortality
Reported Health Effect(s):	Mortality: Acute: LD50 for males was 378 mg/kg bw and for females was 491 mg/kg bw 14-Day Study: No test substance-related mortality was observed (not further described)
Duration:	Acute (less than or equal to 24 hr) Single dose
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
Overall Quality Determination		Low	

Study Citation:	WIL Research, (2004). An acute neurotoxicity study of 1,1,2-trichloroethane in rats.		
Health Outcome(s):	Nutritional/Metabolic; Neurological/Behavioral; Mortality;		
Reported Health Effect(s):	Nutritional/Metabolic: Body weight, body weight gain; Neurological/Behavioral: Clinical, home cage, and handling observations, FOB, open field, sensory, neuromuscular, and physiological observations, locomotor activity, body temperatures, brain weight and neuropathology including macroscopic and microscopic examinations of central and peripheral nervous system tissues.; Mortality: Survival (e.g., mortality and moribundity);		
Duration:	Acute (less than or equal to 24 hr) Single oral gavage dose		
Chemical:	1,1,2-Trichloroethane- Parent compound		
HERO ID:	6547036		
Domain	Metric	Rating	Comments
Domain 1: Test Substance			
Metric 1:	Test Substance Identity	High	All Outcomes: Test substance identified as 1,1,2-trichloroethane; a CASRN was not provided.
Metric 2:	Test Substance Source	High	All Outcomes: The source was Dow Chemical company which provided a certificate of analysis.
Metric 3:	Test Substance Purity	High	All Outcomes: Purity was 99.9%
Domain 2: Test Design			
Metric 4:	Negative and Vehicle Controls	High	All Outcomes: Negative control animals were administered the corn oil vehicle.
Metric 5:	Positive Controls	Medium	All Outcomes: OECD TG 424 indicates a laboratory must present data demonstrating its capability of carrying out the procedures used. Data from non-concurrent positive controls were presented in the appendices fulfilling the requirement.
Metric 6:	Randomized Allocation of Animals	Medium	All Outcomes: A computerized randomization procedure was used to ensure homogeneity of group means and variances for body weight.
Domain 3: Exposure Characterization			
Metric 7:	Preparation and Storage of Test Substance	High	All Outcomes: The study conducted homogeneity and stability assessments.
Metric 8:	Consistency of Exposure Administration	High	All Outcomes: Animals were consistently exposed across groups; dose volumes were 10 mL/Kg
Metric 9:	Reporting of Doses/Concentrations	High	All Outcomes: Dose concentrations were adequately reported without ambiguity
Metric 10:	Exposure Frequency and Duration	High	All Outcomes: The duration (single dose-acute) was appropriate for the goals of the study (to evaluate acute neurotoxicity), OECD TG 424 can be applied to both acute and RD durations
Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	High	All Outcomes: The number of exposure groups and spacing was adequate to identify a dose-response. The doses were selected based on previous pharmacokinetic studies. The high dose was selected to produce frank toxicity. The low dose was not expected to produce toxicity.
Metric 12:	Exposure Route and Method	High	All Outcomes: The exposure route (gavage) was appropriate for the purposes of the study.
Domain 4: Test Animals			
Metric 13:	Test Animal Characteristics	High	All Outcomes: Animal species, strain, sex, age, source, and starting body weights were reported.

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Study Citation:	WIL Research, (2004). An acute neurotoxicity study of 1,1,2-trichloroethane in rats.			
Health Outcome(s):	Nutritional/Metabolic; Neurological/Behavioral; Mortality;			
Reported Health Effect(s):	Nutritional/Metabolic: Body weight, body weight gain; Neurological/Behavioral: Clinical, home cage, and handling observations, FOB, open field, sensory, neuromuscular, and physiological observations, locomotor activity, body temperatures, brain weight and neuropathology including macroscopic and microscopic examinations of central and peripheral nervous system tissues.; Mortality: Survival (e.g., mortality and moribundity);			
Duration:	Acute (less than or equal to 24 hr) Single oral gavage dose			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	6547036			
Domain	Metric	Rating	Comments	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	High	All Outcomes: Details of cages, diet and water availability, and all room environmental conditions were reported and adequate.	
	Metric 15: Number of Animals per Group	Medium	All Outcomes: The number of animals 12/sex/group was sufficient to allow statistical analysis. This number is less than recommended (i.e., 20/sex) for repeated dose studies of the same study type	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	High	Nutritional/Metabolic: The outcome assessment methodology followed OECD TG 424 and was sensitive for the outcome of interest.; Neurological/Behavioral: The outcome assessment methodology followed OECD TG 424 and was sensitive for the outcome of interest.; Mortality: The outcome assessment methodology followed OECD TG 424	
	Metric 17: Consistency of Outcome Assessment	High	All Outcomes: Details of the outcome assessment protocol were reported and outcomes were assessed consistently across study groups (e.g., at the same time after initial exposure) using the same protocol in all study groups	
	Metric 18: Sampling Adequacy	High	Nutritional/Metabolic: The study used adequate sampling for the outcome(s) of interest. For neurological tests, each group of 12/sex was randomly divided into 4 replicates; Neurological/Behavioral: The study used adequate sampling for the outcome(s) of interest. For neurological tests, each group of 12/sex was randomly divided into 4 replicates; Mortality: The study used adequate sampling for the outcome(s) of interest. Each group of 12/sex was randomly divided into 4 replicates	
	Metric 19: Blinding of Assessors	High	All Outcomes: The study indicated that testing was performed by trained technicians who did not know the group assignment of the animals.	
	Metric 20: Negative Control Response	High	All Outcomes: The biological responses of the negative control group(s) were adequate (e.g., no/low incidence of outcomes of interest in the study).	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	All Outcomes: The study did not report all information to determine confounding, but of the data reported, there is no indication that there were differences between study groups.	
	Metric 22: Health Outcomes Unrelated to Exposure	High	All Outcomes: There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.	
	Metric 23: Data Presentation and Analysis	N/A	All Outcomes: Not necessary (negative findings across all study groups)	
	Metric 24: Reporting of Data	High	Nutritional/Metabolic: Data were presented as means $\pm$ SD for each study group. Individual animal data were also provided.; Neurological/Behavioral: Data for all dose groups were adequately reported.; Mortality: Negative findings were reported quantitatively reported (no deaths were observed).	
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Study Citation:	WIL Research, (2004). An acute neurotoxicity study of 1,1,2-trichloroethane in rats.
Health Outcome(s):	Nutritional/Metabolic; Neurological/Behavioral; Mortality;
Reported Health Effect(s):	Nutritional/Metabolic: Body weight, body weight gain; Neurological/Behavioral: Clinical, home cage, and handling observations, FOB, open field, sensory, neuromuscular, and physiological observations, locomotor activity, body temperatures, brain weight and neuropathology including macroscopic and microscopic examinations of central and peripheral nervous system tissues.; Mortality: Survival (e.g., mortality and moribundity);
Duration:	Acute (less than or equal to 24 hr) Single oral gavage dose
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	6547036

Domain	Metric	Rating	Comments
Additional Comments: None			

Overall Quality Determination**High**

Study Citation:	WIL Research, (2001). Acute inhalation toxicity (with histopathology) study of 1,1,2-trichloroethane (1,1,2-TCE) in rats.			
Health Outcome(s):	Mortality; Gastrointestinal; Nutritional/Metabolic; Lung/Respiratory; Renal/Kidney;			
Reported Health Effect(s):	Mortality: Survival; Gastrointestinal: Gross necropsy (salivary glands, esophagus, stomach, duodenum, jejunum, ileum, cecum, colon, rectum), histopathology (stomach); Nutritional/Metabolic: Body weight gain and body weight; Lung/Respiratory: Gross necropsy (nasal tissues, lungs [including bronchi], larynx, trachea); organ weight (lung); histopathology (nasal tissues, larynx, trachea, bronchi and lungs including airways, terminal and respiratory bronchioles, alveolar ducts, and sacs and interstitial tissues); brnchoalveolar lavage fluid (analyzed for total protein and differential cell counts); Renal/Kidney: Gross necropsy (kidney and urinary bladder), histopathology (kidney), kidney weight;			
Duration:	Acute (less than or equal to 24 hr) Acute- 4 hours			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	664458			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	All Outcomes: Test substance was identified as 1,1,2-Trichloroethane.
	Metric 2:	Test Substance Source	High	Mortality: The source of the test substance was Dow Chemical (Freeport, TX). Lot number was provided.; Gastrointestinal: The source of the test substance was Dow Chemical (Freeport, TX). Lot number was provided.; Nutritional/Metabolic: The source of the test substance was Dow Chemical (Freeport, TX). Lot number was provided.; Lung/Respiratory: The source of the test substance was Dow Chemical (Freeport, TX). Lot number was provided.; Renal/Kidney: The source of the test substance was Dow Chemical (Freeport, TX). Lot number was provided.
	Metric 3:	Test Substance Purity	High	All Outcomes: The purity of the test substance was greater than 99.56%.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	High	All Outcomes: Appropriate negative controls were used (clean air).
	Metric 5:	Positive Controls	N/A	All Outcomes: Positive control was not required in this study.
	Metric 6:	Randomized Allocation of Animals	Medium	All Outcomes: Animals were assigned to groups using stratified randomization based on body weight.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	High	All Outcomes: The method and equipment used to generate the test substance vapor were reported and were appropriate for the test substance.
	Metric 8:	Consistency of Exposure Administration	Medium	All Outcomes: Consistent chamber designs were used. Minor discrepancies in administering test substance was reported that is unlikely to substantial impact results. “For the animal exposure at 181 ppm on February 25, 2001, the exposure period was extended 54 minutes to compensate for a syringe pump failure that resulted in a period of low atmosphere concentration.”
	Metric 9:	Reporting of Doses/Concentrations	High	All Outcomes: Target, nominal, and analytical chamber concentrations are reported. Chamber concentrations were measured using an appropriate analytical method (i.e., gas chromatography).
	Metric 10:	Exposure Frequency and Duration	High	All Outcomes: Exposure frequency and duration were reported and appropriate.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	High	All Outcomes: The number of exposure groups and dose spacing was appropriate and sufficient to cover the full range of responses.
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Study Citation:	WIL Research, (2001). Acute inhalation toxicity (with histopathology) study of 1,1,2-trichloroethane (1,1,2-TCE) in rats.			
Health Outcome(s):	Mortality; Gastrointestinal; Nutritional/Metabolic; Lung/Respiratory; Renal/Kidney;			
Reported Health Effect(s):	Mortality: Survival; Gastrointestinal: Gross necropsy (salivary glands, esophagus, stomach, duodenum, jejunum, ileum, cecum, colon, rectum), histopathology (stomach); Nutritional/Metabolic: Body weight gain and body weight; Lung/Respiratory: Gross necropsy (nasal tissues, lungs [including bronchi], larynx, trachea); organ weight (lung); histopathology (nasal tissues, larynx, trachea, bronchi and lungs including airways, terminal and respiratory bronchioles, alveolar ducts, and sacs and interstitial tissues); brnchoalveolar lavage fluid (analyzed for total protein and differential cell counts); Renal/Kidney: Gross necropsy (kidney and urinary bladder), histopathology (kidney), kidney weight;			
Duration:	Acute (less than or equal to 24 hr) Acute- 4 hours			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	664458			
Domain	Metric	Rating	Comments	
	Metric 12: Exposure Route and Method	Medium	All Outcomes: Animals were exposed to test substance vapor in dynamic whole-body chamber. A nose-only chamber is preferable. 12 +/-1 air changes/hour was reported.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	High	All Outcomes: All test animal characteristics were reported and the test animal was obtained from a commercial source.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	High	All Outcomes: All husbandry conditions were reported and were adequate and the same for control and exposed populations.	
	Metric 15: Number of Animals per Group	Medium	All Outcomes: The number of animals exposed per group was appropriate (n=5).	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	High	Mortality: Animals were observed for mortality on the day of exposure and the day following exposure.; Gastrointestinal: Gross necropsy and histology (stomach) were evaluated.; Nutritional/Metabolic: Body weight was appropriately assessed.; Lung/Respiratory: The outcome assessment methodology addressed the intended outcome of interest and the assessment methodology was sensitive and appropriate for the outcomes of interest. Organ weight (lung), gross necropsy and histology (respiratory tract) were evaluated. BALF outcome assessment methodology was appropriate.; Renal/Kidney: Kidney weight, gross necropsy and histology were evaluated. Other biomarkers of renal toxicity (e.g., BUN) were not evaluated.	
	Metric 17: Consistency of Outcome Assessment	High	All Outcomes: Details of outcomes assessment were reported in detail and were consistent.	
	Metric 18: Sampling Adequacy	High	All Outcomes: Sampling was adequate for the measured outcomes.	
	Metric 19: Blinding of Assessors	N/A	All Outcomes: Blinding was not necessary for this study.	
	Metric 20: Negative Control Response	High	Mortality: The negative control responses were appropriate (no mortality was observed in the control group).; Gastrointestinal: The negative control responses were appropriate.; Nutritional/Metabolic: The negative control responses were appropriate.; Lung/Respiratory: The negative control responses were appropriate.; Renal/Kidney: The negative control responses were appropriate.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Low	All Outcomes: Study states decreased respiration was seen in some groups, however, respiratory rates with measures of variability were not reported. Food/water intake was not reported.	
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Study Citation:	WIL Research, (2001). Acute inhalation toxicity (with histopathology) study of 1,1,2-trichloroethane (1,1,2-TCE) in rats.			
Health Outcome(s):	Mortality; Gastrointestinal; Nutritional/Metabolic; Lung/Respiratory; Renal/Kidney;			
Reported Health Effect(s):	Mortality: Survival; Gastrointestinal: Gross necropsy (salivary glands, esophagus, stomach, duodenum, jejunum, ileum, cecum, colon, rectum), histopathology (stomach); Nutritional/Metabolic: Body weight gain and body weight; Lung/Respiratory: Gross necropsy (nasal tissues, lungs [including bronchi], larynx, trachea); organ weight (lung); histopathology (nasal tissues, larynx, trachea, bronchi and lungs including airways, terminal and respiratory bronchioles, alveolar ducts, and sacs and interstitial tissues); brnchoalveolar lavage fluid (analyzed for total protein and differential cell counts); Renal/Kidney: Gross necropsy (kidney and urinary bladder), histopathology (kidney), kidney weight;			
Duration:	Acute (less than or equal to 24 hr) Acute- 4 hours			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	664458			
Domain	Metric	Rating	Comments	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	All Outcomes: No information was provided to either to support or dismiss differences in groups in health outcomes or attrition. 5 animals/sex were subjected to serological screening for diseases after the acclimation period, but these were not the animals exposed to the test substance.	
	Metric 23: Data Presentation and Analysis	High	Mortality: Sufficient data were provided to conduct an independent statistical analysis.; Gastrointestinal: A statistical analysis of histology data was not conducted, however, sufficient data were provided to conduct an independent analysis.; Nutritional/Metabolic: Statistical analysis performed was appropriate.; Lung/Respiratory: Statistical analysis performed was appropriate.; Renal/Kidney: Statistical methods were appropriate and were clearly described for organ weight changes. A statistical analysis was not performed on histology data, however, sufficient data were provided to conduct an independent analysis.	
	Metric 24: Reporting of Data	High	Mortality: All data were adequately reported for all measured outcomes by exposure group and sex.; Gastrointestinal: All data were adequately reported for all measured outcomes by exposure group and sex.; Nutritional/Metabolic: All data were adequately reported for all measured outcomes by exposure group and sex.; Lung/Respiratory: Data were reported sufficiently.; Renal/Kidney: All data were adequately reported for all measured outcomes by exposure group and sex.	
Additional Comments:	None			

Overall Quality Determination**High**

Study Citation:	WIL Research, (2001). Acute inhalation toxicity (with histopathology) study of 1,1,2-trichloroethane (1,1,2-TCE) in rats.			
Health Outcome(s):	Musculoskeletal; Immune/Hematological;			
Reported Health Effect(s):	Musculoskeletal: Gross necropsy of bone with marrow (sternebrae) and skeletal muscle (rectus femoris); Immune/Hematological: Gross necropsy of lymph nodes (mediastinal and tracheobronchial), spleen, and thymus;			
Duration:	Acute (less than or equal to 24 hr) Acute- 4 hours			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	664458			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	All Outcomes: Test substance was identified as 1,1,2-Trichloroethane.	
	Metric 2: Test Substance Source	High	All Outcomes: The source of the test substance was Dow Chemical (Freeport, TX). Lot number was provided.	
	Metric 3: Test Substance Purity	High	All Outcomes: The purity of the test substance was greater than 99.56%.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	High	All Outcomes: Appropriate negative controls were used (clean air).	
	Metric 5: Positive Controls	N/A	All Outcomes: Positive control was not required in this study.	
	Metric 6: Randomized Allocation of Animals	Medium	All Outcomes: Animals were assigned to groups using stratified randomization based on body weight.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	High	All Outcomes: The method and equipment used to generate the test substance vapor were reported and were appropriate for the test substance.	
	Metric 8: Consistency of Exposure Administration	Medium	All Outcomes: Consistent chamber designs were used. Minor discrepancies in administering test substance was reported that is unlikely to substantial impact results. “For the animal exposure at 181 ppm on February 25, 2001, the exposure period was extended 54 minutes to compensate for a syringe pump failure that resulted in a period of low atmosphere concentration.”	
	Metric 9: Reporting of Doses/Concentrations	High	All Outcomes: Target, nominal, and analytical chamber concentrations are reported. Chamber concentrations were measured using an appropriate analytical method (i.e., gas chromatography).	
	Metric 10: Exposure Frequency and Duration	High	All Outcomes: Exposure frequency and duration were reported and appropriate.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	High	All Outcomes: The number of exposure groups and dose spacing was appropriate and sufficient to cover the full range of responses.	
	Metric 12: Exposure Route and Method	Medium	All Outcomes: Animals were exposed to test substance vapor in dynamic whole-body chamber. A nose-only chamber is preferable. 12 +/-1 air changes/hour was reported.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	High	All Outcomes: All test animal characteristics were reported and the test animal was obtained from a commercial source.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	High	All Outcomes: All husbandry conditions were reported and were adequate and the same for control and exposed populations.	
	Metric 15: Number of Animals per Group	Medium	All Outcomes: The number of animals exposed per group was appropriate (n=5).	
Domain 5: Outcome Assessment				
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Study Citation:	WIL Research, (2001). Acute inhalation toxicity (with histopathology) study of 1,1,2-trichloroethane (1,1,2-TCE) in rats.			
Health Outcome(s):	Musculoskeletal; Immune/Hematological;			
Reported Health Effect(s):	Musculoskeletal: Gross necropsy of bone with marrow (sternebrae) and skeletal muscle (rectus femoris); Immune/Hematological: Gross necropsy of lymph nodes (mediastinal and tracheobronchial), spleen, and thymus;			
Duration:	Acute (less than or equal to 24 hr) Acute- 4 hours			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	664458			
Domain	Metric	Rating	Comments	
	Metric 16: Outcome Assessment Methodology	Low	Musculoskeletal: Skeletal muscle and bone with marrow were examined grossly. It is unclear whether methods were sensitive for the outcome of interest.; Immune/Hematological: Gross pathological examinations of the lymph nodes, spleen, and thymus were performed. Microscopic examinations of immune tissues and hematology were not evaluated limiting the sensitivity of the assessment methodology.	
	Metric 17: Consistency of Outcome Assessment	High	All Outcomes: Details of outcomes assessment were reported in detail and were consistent.	
	Metric 18: Sampling Adequacy	High	All Outcomes: Sampling was adequate for the measured outcomes.	
	Metric 19: Blinding of Assessors	N/A	All Outcomes: Blinding was not necessary for this study.	
	Metric 20: Negative Control Response	High	All Outcomes: The negative control responses were appropriate.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Low	All Outcomes: Study states decreased respiration was seen in some groups, however, respiratory rates with measures of variability were not reported. Food/water intake was not reported.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	All Outcomes: No information was provided to either to support or dismiss differences in groups in health outcomes or attrition. 5 animals/sex were subjected to serological screening for diseases after the acclimation period, but these were not the animals exposed to the test substance.	
	Metric 23: Data Presentation and Analysis	N/A	Musculoskeletal: Statistical analysis not necessary (clearly negative findings across all groups).; Immune/Hematological: Statistical analysis was not necessary (clearly negative findings across all groups).	
	Metric 24: Reporting of Data	High	Musculoskeletal: Data were reported sufficiently.; Immune/Hematological: All data were adequately reported for all measured outcomes by exposure group and sex.	
Additional Comments:	None			

Overall Quality Determination**High**

Study Citation:	WIL Research, (2001). Acute inhalation toxicity (with histopathology) study of 1,1,2-trichloroethane (1,1,2-TCE) in rats.			
Health Outcome(s):	Hepatic/Liver; Endocrine (Endocrine); Reproductive/Developmental (Endocrine); Neurological/Behavioral;			
Reported Health Effect(s):	Hepatic/Liver: Gross necropsy, histopathology, liver weight; Endocrine (Endocrine): Gross necropsy (adrenals, pituitary, pancreas, thyroid, parathyroid); organ weight (adrenal gland only); histopathology (adrenal gland only); Reproductive/Developmental (Endocrine): Gross necropsy (ovaries with oviducts, uterus with vagina, epididymides, seminal vesicles, prostate and testes), organ weight (ovary, testes); Neurological/Behavioral: Gross necropsy of brain (forebrain, midbrain, hindbrain), spinal cord (cervical, thoracic, lumbar) and peripheral nerve (sciatic), brain weight, clinical observations, response to a novel stimulus;			
Duration:	Acute (less than or equal to 24 hr) Acute- 4 hours			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	664458			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	All Outcomes: Test substance was identified as 1,1,2-Trichloroethane.
	Metric 2:	Test Substance Source	High	Hepatic/Liver: The source of the test substance was Dow Chemical (Freeport, TX). Lot number was provided.; Endocrine (Endocrine): The source of the test substance was Dow Chemical (Freeport, TX). Lot number was provided.; Reproductive/Developmental (Endocrine): The source of the test substance was Dow Chemical (Freeport, TX). Lot number was provided.; Neurological/Behavioral: The source of the test substance was Dow Chemical (Freeport, TX). Lot number was provided.
	Metric 3:	Test Substance Purity	High	All Outcomes: The purity of the test substance was greater than 99.56%.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	High	All Outcomes: Appropriate negative controls were used (clean air).
	Metric 5:	Positive Controls	N/A	All Outcomes: Positive control was not required in this study.
	Metric 6:	Randomized Allocation of Animals	Medium	All Outcomes: Animals were assigned to groups using stratified randomization based on body weight.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	High	All Outcomes: The method and equipment used to generate the test substance vapor were reported and were appropriate for the test substance.
	Metric 8:	Consistency of Exposure Administration	Medium	All Outcomes: Consistent chamber designs were used. Minor discrepancies in administering test substance was reported that is unlikely to substantial impact results. “For the animal exposure at 181 ppm on February 25, 2001, the exposure period was extended 54 minutes to compensate for a syringe pump failure that resulted in a period of low atmosphere concentration.”
	Metric 9:	Reporting of Doses/Concentrations	High	All Outcomes: Target, nominal, and analytical chamber concentrations are reported. Chamber concentrations were measured using an appropriate analytical method (i.e., gas chromatography).
	Metric 10:	Exposure Frequency and Duration	High	All Outcomes: Exposure frequency and duration were reported and appropriate.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	High	All Outcomes: The number of exposure groups and dose spacing was appropriate and sufficient to cover the full range of responses.
	Metric 12:	Exposure Route and Method	Medium	All Outcomes: Animals were exposed to test substance vapor in dynamic whole-body chamber. A nose-only chamber is preferable. 12 +/-1 air changes/hour was reported.
Domain 4: Test Animals				
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Study Citation:	WIL Research, (2001). Acute inhalation toxicity (with histopathology) study of 1,1,2-trichloroethane (1,1,2-TCE) in rats.			
Health Outcome(s):	Hepatic/Liver; Endocrine (Endocrine); Reproductive/Developmental (Endocrine); Neurological/Behavioral;			
Reported Health Effect(s):	Hepatic/Liver: Gross necropsy, histopathology, liver weight; Endocrine (Endocrine): Gross necropsy (adrenals, pituitary, pancreas, thyroid, parathyroid); organ weight (adrenal gland only); histopathology (adrenal gland only); Reproductive/Developmental (Endocrine): Gross necropsy (ovaries with oviducts, uterus with vagina, epididymides, seminal vesicles, prostate and testes), organ weight (ovary, testes); Neurological/Behavioral: Gross necropsy of brain (forebrain, midbrain, hindbrain), spinal cord (cervical, thoracic, lumbar) and peripheral nerve (sciatic), brain weight, clinical observations, response to a novel stimulus;			
Duration:	Acute (less than or equal to 24 hr) Acute- 4 hours			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	664458			
Domain	Metric	Rating	Comments	
	Metric 13: Test Animal Characteristics	High	All Outcomes: All test animal characteristics were reported and the test animal was obtained from a commercial source.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	High	All Outcomes: All husbandry conditions were reported and were adequate and the same for control and exposed populations.	
	Metric 15: Number of Animals per Group	Medium	All Outcomes: The number of animals exposed per group was appropriate (n=5).	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	Medium	Hepatic/Liver: Organ weight, gross pathology, and histology were evaluated. Serum chemistry (e.g., ALT, ALP, AST) was not evaluated.; Endocrine (Endocrine): Gross necropsy (adrenals, pituitary, pancreas, thyroid), organ weight (adrenal gland only), and histopathology (adrenal gland only) was evaluated. Additional endocrine outcomes were not measured.; Reproductive/Developmental (Endocrine): Organ weights and gross necropsy were performed on testis and ovaries, but histology was not evaluated.; Neurological/Behavioral: Gross necropsy and brain weight were evaluated. Histology was not performed on neuro tissues	
	Metric 17: Consistency of Outcome Assessment	High	All Outcomes: Details of outcomes assessment were reported in detail and were consistent.	
	Metric 18: Sampling Adequacy	High	Hepatic/Liver: Sampling was adequate for the measured outcomes.; Endocrine (Endocrine): The negative control responses were appropriate.; Reproductive/Developmental (Endocrine): Sampling was adequate for the measured outcomes.; Neurological/Behavioral: Sampling was adequate for the measured outcomes.	
	Metric 19: Blinding of Assessors	N/A	All Outcomes: Blinding was not necessary for this study.	
	Metric 20: Negative Control Response	High	All Outcomes: The negative control responses were appropriate.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Low	All Outcomes: Study states decreased respiration was seen in some groups, however, respiratory rates with measures of variability were not reported. Food/water intake was not reported.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	All Outcomes: No information was provided to either to support or dismiss differences in groups in health outcomes or attrition. 5 animals/sex were subjected to serological screening for diseases after the acclimation period, but these were not the animals exposed to the test substance.	

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Study Citation:	WIL Research, (2001). Acute inhalation toxicity (with histopathology) study of 1,1,2-trichloroethane (1,1,2-TCE) in rats.
Health Outcome(s):	Hepatic/Liver; Endocrine (Endocrine); Reproductive/Developmental (Endocrine); Neurological/Behavioral;
Reported Health Effect(s):	Hepatic/Liver: Gross necropsy, histopathology, liver weight; Endocrine (Endocrine): Gross necropsy (adrenals, pituitary, pancreas, thyroid, parathyroid); organ weight (adrenal gland only); histopathology (adrenal gland only); Reproductive/Developmental (Endocrine): Gross necropsy (ovaries with oviducts, uterus with vagina, epididymides, seminal vesicles, prostate and testes), organ weight (ovary, testes); Neurological/Behavioral: Gross necropsy of brain (forebrain, midbrain, hindbrain), spinal cord (cervical, thoracic, lumbar) and peripheral nerve (sciatic), brain weight, clinical observations, response to a novel stimulus;
Duration:	Acute (less than or equal to 24 hr) Acute- 4 hours
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	664458

Domain	Metric	Rating	Comments
	Metric 23: Data Presentation and Analysis	High	Hepatic/Liver: Statistical methods were appropriate and were clearly described for organ weight changes. It is unclear if a statistical analysis was performed on histology data, however, sufficient data were provided to conduct an independent analysis.; Endocrine (Endocrine): Statistical analysis performed was appropriate and/or sufficient data were provided to conduct an independent analysis.; Reproductive/Developmental (Endocrine): Statistical analysis performed was appropriate for organ weight data.; Neurological/Behavioral: Statistical analysis performed was appropriate.
	Metric 24: Reporting of Data	High	Hepatic/Liver: All data were adequately reported for all measured outcomes by exposure group and sex.; Endocrine (Endocrine): All data were adequately reported for all measured outcomes by exposure group and sex.; Reproductive/Developmental (Endocrine): Data were reported sufficiently.; Neurological/Behavioral: Data were reported sufficiently.

Additional Comments: None

Overall Quality Determination**High**

Study Citation:	WIL Research, (2001). Acute inhalation toxicity (with histopathology) study of 1,1,2-trichloroethane (1,1,2-TCE) in rats.			
Health Outcome(s):	Cardiovascular; Skin/Connective Tissue; Ocular/Sensory;			
Reported Health Effect(s):	Cardiovascular: Gross necropsy of aorta, heart; Skin/Connective Tissue: Gross necropsy of skin; Ocular/Sensory: Gross necropsy on eyes with optic nerve;			
Duration:	Acute (less than or equal to 24 hr) Acute- 4 hours			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	664458			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	All Outcomes: Test substance was identified as 1,1,2-Trichloroethane.	
	Metric 2: Test Substance Source	High	All Outcomes: The source of the test substance was Dow Chemical (Freeport, TX). Lot number was provided.	
	Metric 3: Test Substance Purity	High	All Outcomes: The purity of the test substance was greater than 99.56%.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	High	All Outcomes: Appropriate negative controls were used (clean air).	
	Metric 5: Positive Controls	N/A	All Outcomes: Positive control was not required in this study.	
	Metric 6: Randomized Allocation of Animals	Medium	All Outcomes: Animals were assigned to groups using stratified randomization based on body weight.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	High	All Outcomes: The method and equipment used to generate the test substance vapor were reported and were appropriate for the test substance.	
	Metric 8: Consistency of Exposure Administration	Medium	All Outcomes: Consistent chamber designs were used. Minor discrepancies in administering test substance was reported that is unlikely to substantial impact results. “For the animal exposure at 181 ppm on February 25, 2001, the exposure period was extended 54 minutes to compensate for a syringe pump failure that resulted in a period of low atmosphere concentration.”	
	Metric 9: Reporting of Doses/Concentrations	High	All Outcomes: Target, nominal, and analytical chamber concentrations are reported. Chamber concentrations were measured using an appropriate analytical method (i.e., gas chromatography).	
	Metric 10: Exposure Frequency and Duration	High	All Outcomes: Exposure frequency and duration were reported and appropriate.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	High	All Outcomes: The number of exposure groups and dose spacing was appropriate and sufficient to cover the full range of responses.	
	Metric 12: Exposure Route and Method	Medium	All Outcomes: Animals were exposed to test substance vapor in dynamic whole-body chamber. A nose-only chamber is preferable. 12 +/-1 air changes/hour was reported.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	High	All Outcomes: All test animal characteristics were reported and the test animal was obtained from a commercial source.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	High	All Outcomes: All husbandry conditions were reported and were adequate and the same for control and exposed populations.	
	Metric 15: Number of Animals per Group	Medium	All Outcomes: The number of animals exposed per group was appropriate (n=5).	
Domain 5: Outcome Assessment				
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Study Citation:	WIL Research, (2001). Acute inhalation toxicity (with histopathology) study of 1,1,2-trichloroethane (1,1,2-TCE) in rats.			
Health Outcome(s):	Cardiovascular; Skin/Connective Tissue; Ocular/Sensory;			
Reported Health Effect(s):	Cardiovascular: Gross necropsy of aorta, heart; Skin/Connective Tissue: Gross necropsy of skin; Ocular/Sensory: Gross necropsy on eyes with optic nerve;			
Duration:	Acute (less than or equal to 24 hr) Acute- 4 hours			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	664458			
Domain	Metric	Rating	Comments	
	Metric 16: Outcome Assessment Methodology	Medium	Cardiovascular: Only gross necropsy was done (heart and aorta), potentially limiting the sensitivity of methodology.; Skin/Connective Tissue: The outcome assessment methodology partially addressed the intended outcomes(s) of interest (e.g., skin was examined grossly), but there are minor uncertainties that are unlikely to have a substantial impact on results.; Ocular/Sensory: Only gross necropsy was done (eyes with optic nerve), potentially limiting the sensitivity of methodology.	
	Metric 17: Consistency of Outcome Assessment	High	All Outcomes: Details of outcomes assessment were reported in detail and were consistent.	
	Metric 18: Sampling Adequacy	High	All Outcomes: Sampling was adequate for the measured outcomes.	
	Metric 19: Blinding of Assessors	N/A	All Outcomes: Blinding was not necessary for this study.	
	Metric 20: Negative Control Response	High	All Outcomes: The negative control responses were appropriate.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Low	All Outcomes: Study states decreased respiration was seen in some groups, however, respiratory rates with measures of variability were not reported. Food/water intake was not reported.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	All Outcomes: No information was provided to either to support or dismiss differences in groups in health outcomes or attrition. 5 animals/sex were subjected to serological screening for diseases after the acclimation period, but these were not the animals exposed to the test substance.	
	Metric 23: Data Presentation and Analysis	N/A	Cardiovascular: Statistical analysis not necessary (Clearly negative findings across all groups).; Skin/Connective Tissue: Statistical analysis was not necessary (clearly negative findings across all groups).; Ocular/Sensory: Statistical analysis not necessary (Clearly negative findings across all groups).	
	Metric 24: Reporting of Data	High	All Outcomes: Data were reported sufficiently.	
Additional Comments:	None			

Overall Quality Determination**High**

Study Citation:	Xia, L., Yu, T. (1992). Study of the relationship between the hepatotoxicity and free radical induced by 1,1,2-trichloroethane and 1,1,1-trichloroethane in rat. Biomedical and Environmental Sciences 5(4):303-313.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: Serum GPT (alanine aminotransferase - ALT), sorbitol dehydrogenase (SDH), and glutamate dehydrogenase (GDH); microscopic examinations of liver			
Duration:	Acute (less than or equal to 24 hr) Single dose			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	659098			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	The test substance was clearly identified by name; the CASRN was not provided.	
	Metric 2: Test Substance Source	High	A commercial test substance source was reported. Batch/lot number was not provided but the chemical structure is identified by the chemical name.	
	Metric 3: Test Substance Purity	Low	The purity was not reported.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	High	A negative vehicle control was included.	
	Metric 5: Positive Controls	Medium	A positive control was utilized for one of the experiments.	
	Metric 6: Randomized Allocation of Animals	Low	The allocation of animals into group was not reported.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	The test substance was dissolved in arachidic oil. Storage details were not provided.	
	Metric 8: Consistency of Exposure Administration	High	Animals were consistently exposed.	
	Metric 9: Reporting of Doses/Concentrations	High	The dose was reported in mmol/kg; the mean body weights of the animals were provided.	
	Metric 10: Exposure Frequency and Duration	High	Animals were administered a single dose with varying sacrifice times.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Medium	Animals were administered just one dose group with varying sacrifice times.	
	Metric 12: Exposure Route and Method	High	The exposure route (gavage) was appropriate for the test material.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	High	The test animal species, strain, sex, body weights, source, and age (adult) were reported. The animals were appropriate for the study.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	High	Temperature, humidity, and photoperiod were reported. Animal diet and water were available ad libitum. All animals were housed similarly and individually.	
	Metric 15: Number of Animals per Group	Low	The number of animals per group was not reported.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	Medium	The study evaluated a specific subset of responses based on previous data in the literature. Histopathology was performed, which is considered to be a sensitive endpoint. Liver weights were not measured.	

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Study Citation:	Xia, L., Yu, T. (1992). Study of the relationship between the hepatotoxicity and free radical induced by 1,1,2-trichloroethane and 1,1,1-trichloroethane in rat. Biomedical and Environmental Sciences 5(4):303-313.
Health Outcome(s):	Hepatic/Liver
Reported Health Effect(s):	Hepatic/Liver: Serum GPT (alanine aminotransferase - ALT), sorbitol dehydrogenase (SDH), and glutamate dehydrogenase (GDH); microscopic examinations of liver
Duration:	Acute (less than or equal to 24 hr) Single dose
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	659098

Domain	Metric	Rating	Comments
	Metric 17: Consistency of Outcome Assessment	High	Outcomes were consistently assessed across study groups.
	Metric 18: Sampling Adequacy	Low	Details regarding sampling of outcomes were not reported and this deficiency is likely to have a substantial impact on results.
	Metric 19: Blinding of Assessors	N/A	Blinding was not necessary for the outcomes of interest.
	Metric 20: Negative Control Response	High	The negative control responses were appropriate.
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	Low	The study did not measure variable such as animal body weight or changes in food or water intake throughout the study.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.
	Metric 23: Data Presentation and Analysis	High	Statistical methods were described and were appropriate for the data sets.
	Metric 24: Reporting of Data	Low	Data were reported graphically over time for all groups. Data points represented means, and no measures of variance were included in the figures. Statistical significance was clearly indicated. Histopathology incidence data were not provided. Results were described in the text without an indication of significance.

Additional Comments: This form is for 1,1,2-Trichloroethane.

Overall Quality Determination**Medium**

Study Citation:	Dow Chemical, (1960). Results of range finding toxicological tests on 1,1,2-trichloroethane.			
Health Outcome(s):	Irritation			
Reported Health Effect(s):	Irritation: Eye and skin irritation			
Duration:	Short-term (>1-30 days) 3-7 applications - Dermal irritation.			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	10699088			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	Medium	The test substance was identified as 1,1,2-trichloroethane.	
	Metric 2: Test Substance Source	Low	The test substance source was not reported and there is no indication that the substance was analytically verified.	
	Metric 3: Test Substance Purity	Low	The test substance purity and/or grade were not reported.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	Uninformative	In skin irritation studies (e.g., OECD TG 404), an untreated skin area typically serves as a control. This study did not specify the use of an untreated skin area as a control and did not report any control responses.	
	Metric 5: Positive Controls	N/A	A positive control is not required for this type of study.	
	Metric 6: Randomized Allocation of Animals	Low	The study did not report how animals were allocated to study groups.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	There was no mention of the preparation or storage of the test substance.	
	Metric 8: Consistency of Exposure Administration	Low	Details of the exposure are not reported.	
	Metric 9: Reporting of Doses/Concentrations	High	Undiluted test substance was applied.	
	Metric 10: Exposure Frequency and Duration	Uninformative	The duration was not reported, only that there were 3-7 applications.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Medium	The study tested a single concentration (undiluted), although the dose volume(s) were not specified. A single undiluted dose is appropriate for an initial in vivo test.	
	Metric 12: Exposure Route and Method	High	The test substance was applied to the skin to assess skin irritation.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Low	The test animal’s strain, sex, age, and body weights were not provided. The only information provided was the species (rabbits), which are routinely used for skin irritation studies.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	The animal husbandry conditions were not provided.	
	Metric 15: Number of Animals per Group	Low	The number of animals was not reported.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	Low	The outcome assessment methodology was not reported.	

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Study Citation:	Dow Chemical, (1960). Results of range finding toxicological tests on 1,1,2-trichloroethane.			
Health Outcome(s):	Irritation			
Reported Health Effect(s):	Irritation: Eye and skin irritation			
Duration:	Short-term (>1-30 days) 3-7 applications - Dermal irritation.			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	10699088			
Domain	Metric	Rating	Comments	
	Metric 17: Consistency of Outcome Assessment	Low	Details regarding the outcome methodology were not reported.	
	Metric 18: Sampling Adequacy	Low	Details regarding sampling (observations) were not reported.	
	Metric 19: Blinding of Assessors	N/A	Blinding was not reported, although irritation is a relatively objective measure, and is not required as per OECD TG 404.	
	Metric 20: Negative Control Response	Low	There is no indication that a negative control was included.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Low	Not enough information was provided to determine if confounders were present.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.	
	Metric 23: Data Presentation and Analysis	N/A	Statistical analysis is not required for irritation data.	
	Metric 24: Reporting of Data	Medium	Qualitative irritation descriptions are provided, with no quantitative scores. There is no information on the timing of the observed irritation.	
Additional Comments:	None			

Overall Quality Determination**Uninformative**

Study Citation:	Plaa, G. L., Larson, R. E. (1965). Relative nephrotoxic properties of chlorinated methane, ethane, and ethylene derivatives in mice. Toxicology and Applied Pharmacology 7(1):37-44.			
Health Outcome(s):	Renal/Kidney			
Reported Health Effect(s):	Renal/Kidney: Urinary glucose and protein; renal histopathology			
Duration:	Short-term (>1-30 days) Short-term- 3 days			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	64411			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Test substance was identified as 1,1,2-trichloroethane.
	Metric 2:	Test Substance Source	Low	The source of the test substance was not reported.
	Metric 3:	Test Substance Purity	Low	The purity of the test substance was not reported.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	Uninformative	Details of negative control are not reported. It appears the data on the negative controls come from historic data. The strain, age, sex of the animals are not provided nor is information on if the animals were sham or untreated.
	Metric 5:	Positive Controls	N/A	Not applicable for this study.
	Metric 6:	Randomized Allocation of Animals	Low	Authors do not report if how study groups were formed.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Low	Preparation and storage conditions were not properly reported given the volatility of the test substance.
	Metric 8:	Consistency of Exposure Administration	Medium	Details of exposure administration are incomplete.
	Metric 9:	Reporting of Doses/Concentrations	High	Exposure doses were reported without ambiguity.
	Metric 10:	Exposure Frequency and Duration	High	Exposure and frequency were appropriate for outcome studied.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Medium	The one dose studied was the highest one that did not cause lethality.
	Metric 12:	Exposure Route and Method	High	Route of exposure was i.p. injection.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	Low	The source and age of mice were not reported.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not reported.
	Metric 15:	Number of Animals per Group	Low	The number of animals/group were not reported.
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	Low	Some details regarding the outcome assessment methodology were lacking (e.g how long urine was collected for, histological evaluations)
	Metric 17:	Consistency of Outcome Assessment	High	Outcomes were assessed consistently across study groups.

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Study Citation:	Plaa, G. L., Larson, R. E. (1965). Relative nephrotoxic properties of chlorinated methane, ethane, and ethylene derivatives in mice. Toxicology and Applied Pharmacology 7(1):37-44.			
Health Outcome(s):	Renal/Kidney			
Reported Health Effect(s):	Renal/Kidney: Urinary glucose and protein; renal histopathology			
Duration:	Short-term (> 1-30 days) Short-term- 3 days			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	64411			
Domain	Metric	Rating	Comments	
	Metric 18: Sampling Adequacy	Uninformative	Histology was not performed on controls.	
	Metric 19: Blinding of Assessors	N/A	Blinding was not necessary for outcomes studied.	
	Metric 20: Negative Control Response	Low	Negative control histology was not reported.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Low	Potential confounding variables were not reported.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.	
	Metric 23: Data Presentation and Analysis	High	Statistical analysis was not performed; independent statistics could be done.	
	Metric 24: Reporting of Data	Low	Combistix analysis data were not presented.	
Additional Comments:	Lack of information on the negative control group makes the study unacceptable.			

Overall Quality Determination**Uninformative**

Study Citation:	Sanders, V. M., White, K. L., Jr, Shopp, G. M., Jr, Munson, A. E. (1985). Humoral and cell-mediated immune status of mice exposed to 1,1,2-trichloroethane. Drug and Chemical Toxicology 8(5):357-372.			
Health Outcome(s):	Nutritional/Metabolic; Immune/Hematological;			
Reported Health Effect(s):	Nutritional/Metabolic: Terminal body weight; Immune/Hematological: Cell-mediated response: delayed-type hypersensitivity and popliteal lymph node proliferationHumoral-mediated response: IgM antibody forming cells against sRBC, Hemagglutination titers, spleen lymphocyte response to LPS or ConASpleen weight;			
Duration:	Short-term (>1-30 days) 14 days			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	64556; Linked HERO ID(s): 64564, 64556			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	All Outcomes: Test substance was identified as 1,1,2-Trichichloroethane.
	Metric 2:	Test Substance Source	High	All Outcomes: The source of the test substance was Aldrich Chemical Co. (Milwaukee, WI). Lots 070177 and 061197 identified. The structure was verified by infrared spectrometry.
	Metric 3:	Test Substance Purity	Medium	All Outcomes: Purity was given as 95% and verified by gas chromatography
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	High	Nutritional/Metabolic: Negative control was appropriate (vehicle control).; Immune/Hematological: Negative control was appropriate.
	Metric 5:	Positive Controls	N/A	All Outcomes: Positive control was not required in this study.
	Metric 6:	Randomized Allocation of Animals	Low	All Outcomes: The study did not report how animals were allocated.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	High	All Outcomes: Preparation and storage are described in detail in cited reference (White et al., 1985)
	Metric 8:	Consistency of Exposure Administration	High	All Outcomes: Details of exposure were reported and appropriate in cited reference (White et al. 1985) with some limitations.
	Metric 9:	Reporting of Doses/Concentrations	High	All Outcomes: Doses are reported without ambiguity and were based on LD50 values.
	Metric 10:	Exposure Frequency and Duration	High	All Outcomes: Exposure frequency and duration were reported and appropriate.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	High	All Outcomes: Number of dose groups and spacing were appropriate.
	Metric 12:	Exposure Route and Method	High	All Outcomes: Exposure route was appropriate.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	Low	Nutritional/Metabolic: Study states details on mice can be found at cited reference (White et al. 1985). The cited reference did not provide and details on source, age, or starting body weight.; Immune/Hematological: Study states details on mice can be found at cited reference (White et al. 1985). The cited reference did not provide and details on source, age, or starting body weight.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	All Outcomes: Husbandry conditions were not reported in cited reference (White et al 1985).

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Study Citation:	Sanders, V. M., White, K. L., Jr, Shopp, G. M., Jr, Munson, A. E. (1985). Humoral and cell-mediated immune status of mice exposed to 1,1,2-trichloroethane. Drug and Chemical Toxicology 8(5):357-372.			
Health Outcome(s):	Nutritional/Metabolic; Immune/Hematological;			
Reported Health Effect(s):	Nutritional/Metabolic: Terminal body weight; Immune/Hematological: Cell-mediated response: delayed-type hypersensitivity and popliteal lymph node proliferationHumoral-mediated response: IgM antibody forming cells against sRBC, Hemagglutination titers, spleen lymphocyte response to LPS or ConASpleen weight;			
Duration:	Short-term (>1-30 days) 14 days			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	64556; Linked HERO ID(s): 64564, 64556			
Domain	Metric	Rating	Comments	
	Metric 15:	Number of Animals per Group	Low	All Outcomes: The number of animals/groups were not reported.
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	High	All Outcomes: Outcome assessment and methodology were appropriate.
	Metric 17:	Consistency of Outcome Assessment	High	All Outcomes: Details of outcome assessment are provided in cited reference (White et al. 1985) and were consistent.
	Metric 18:	Sampling Adequacy	High	All Outcomes: The number of animals sampled was adequate.
	Metric 19:	Blinding of Assessors	N/A	All Outcomes: Blinding was not necessary for this study.
	Metric 20:	Negative Control Response	High	All Outcomes: The negative control response was appropriate.
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Medium	All Outcomes: Study did not report all information to determine confounding, reported information did not identify differences.
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	All Outcomes: No information was provided to either to support or dismiss differences in groups in health outcomes or attrition.
	Metric 23:	Data Presentation and Analysis	High	All Outcomes: Statistical analysis was performed and appropriate.
	Metric 24:	Reporting of Data	High	All Outcomes: All outcome data were reported adequately.
Additional Comments:	Although study states "Details of the methods for the immunotoxicological assays and historical controls have been fully described in the first article of this volume", this reviewer believes they used concurrent negative controls in this study. The cited reference with the historic data contains much larger numbers of mice than in this article and the values are not the same (although similar to historic data).			

Overall Quality Determination**High**

Study Citation:	Wahlberg, J. E. (1984). Edema-inducing effects of solvents following topical administration. <i>Dermatosen in Beruf und Umwelt</i> 32(3):91-94.			
Health Outcome(s):	Irritation			
Reported Health Effect(s):	Irritation: skin-fold thickness, visual scoring (presence of erythema, edema, fissuring and scaling)			
Duration:	Short-term (>1-30 days) 10 days			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	5469150			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Test substance was identified as 1,1,2- trichloroethane.
	Metric 2:	Test Substance Source	Low	The source the test substance was Fluka AG, Buchs SG, Switzerland. Lot/Batch number were not provided.
	Metric 3:	Test Substance Purity	Medium	Purity of test substance was reported purum.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	Low	An unexposed control site was used for comparison, not clear if it was sham-treated. Also included a separate control group, it is unclear if these were sham-treated.
	Metric 5:	Positive Controls	N/A	Positive control was not required in this study.
	Metric 6:	Randomized Allocation of Animals	Low	Study does not report how animals were allocated.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Low	Preparation and storage were not adequately described given the volatility of the test substance.
	Metric 8:	Consistency of Exposure Administration	High	Test substance was delivered consistently across study groups.
	Metric 9:	Reporting of Doses/Concentrations	Low	Body weights were not provided.
	Metric 10:	Exposure Frequency and Duration	High	Exposure frequency and duration were reported and appropriate.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Medium	Only one dose (neat) was studied.
	Metric 12:	Exposure Route and Method	Medium	There are minor uncertainties with the route given the volatility of the test substance.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	Low	Test animal characteristics were not adequately reported. Source and sex of animals were not reported. Materials and methods are cited to be detailed from a previous paper, however the paper cannot be accessed.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not sufficiently reported.
	Metric 15:	Number of Animals per Group	Low	The number of animals/group was not adequately reported.
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	Medium	Histological analysis was not performed on skin.

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Study Citation:	Wahlberg, J. E. (1984). Edema-inducing effects of solvents following topical administration. Dermatosen in Beruf und Umwelt 32(3):91-94.			
Health Outcome(s):	Irritation			
Reported Health Effect(s):	Irritation: skin-fold thickness, visual scoring (presence of erythema, edema, fissuring and scaling)			
Duration:	Short-term (>1-30 days) 10 days			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	5469150			
Domain	Metric	Rating	Comments	
	Metric 17: Consistency of Outcome Assessment	Medium	Details of assessment are cited in previous published paper (Wahlberg 1983). Details describe that the measurement technique was consistent across test groups, but minor details are missing or nebulous (i.e. time of day).	
	Metric 18: Sampling Adequacy	High	The number of animals sampled was adequate.	
	Metric 19: Blinding of Assessors	N/A	Blinding was not necessary for this study.	
	Metric 20: Negative Control Response	High	A negative control group response was adequate.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	Although the study did not report all information to determine confounding, reported information did not identify differences among study groups.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	No information was provided to either to support or dismiss differences in groups in health outcomes or attrition.	
	Metric 23: Data Presentation and Analysis	Uninformative	Statistical analyses were not performed. Presentation of exposure data does not allow for independent analysis.	
	Metric 24: Reporting of Data	Medium	Exposure data are presented, however only the mean values (and not standard deviations) are presented.	
Additional Comments:	Statistical analyses were not performed. Presentation of exposure data does not allow for independent analysis.			
Overall Quality Determination		Uninformative		

Study Citation:	Wahlberg, J. E. (1976). Percutaneous toxicity of solvents: a comparative investigation in the guinea pig with benzene, toluene and 1,1,2-trichloroethane. Annals of Occupational Hygiene 19(2):115-119.			
Health Outcome(s):	Nutritional/Metabolic			
Reported Health Effect(s):	Nutritional/Metabolic: Body weight			
Duration:	Short-term (>1-30 days) 5 to 7 days			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	74541			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was definitively identified (as 1,1,2-trichloroethane).
	Metric 2:	Test Substance Source	Low	The source of the test substance was reported (a manufacturer); no batch/lot number was provided.
	Metric 3:	Test Substance Purity	High	The test substance was reported to be analytical grade.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	High	A distilled water control group was used; pure solvents (undiluted) were used as the experimental condition(s). Both groups were treated similarly except with respect to the substance (and amount) that was applied.
	Metric 5:	Positive Controls	N/A	Not required by study type.
	Metric 6:	Randomized Allocation of Animals	Low	Allocation of animals to study groups was not reported.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Low	Details on test substance storage/preparation were not provided (the test substance is volatile).
	Metric 8:	Consistency of Exposure Administration	Medium	The study report indicates that animals were exposed to 0.25 mL, 0.5 mL, or 2.0 mL of pure solvents (or 2.0 mL distilled water control). There was no indication that volumes were consistent across conditions; however, it is not unusual in dermal studies for undiluted test substances to be applied.
	Metric 9:	Reporting of Doses/Concentrations	High	Administered doses (in mL) were reported without ambiguity.
	Metric 10:	Exposure Frequency and Duration	Low	The exposure frequency and duration were reported (i.e., single application maintained in contact with the skin for 5-7 days/until absorption). This exposure protocol is unusual for dermal toxicity studies (e.g., acute studies with 24 hours exposure).
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Low	3 doses of 1,1,2-trichloroethane were used; all doses caused substantial toxicity. No dose of the test substance was used that did not cause mortality/could be used to establish a NOAEL. Body weight could only be evaluated in the lowest dose group because of complete mortality within 3 days in the highest two groups.
	Metric 12:	Exposure Route and Method	Medium	In the dermal toxicity study, the test substance was injected into a depot through a hole in a cover slip, which was subsequently sealed. Sealing of the test substance presumably mitigated effects associated with volatility of the test substance and/or excluded other routes of administration (licking, inhalation).
Domain 4: Test Animals				
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Study Citation:	Wahlberg, J. E. (1976). Percutaneous toxicity of solvents: a comparative investigation in the guinea pig with benzene, toluene and 1,1,2-trichloroethane. Annals of Occupational Hygiene 19(2):115-119.			
Health Outcome(s):	Nutritional/Metabolic			
Reported Health Effect(s):	Nutritional/Metabolic: Body weight			
Duration:	Short-term (>1-30 days) 5 to 7 days			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	74541			
Domain	Metric	Rating	Comments	
	Metric 13: Test Animal Characteristics	Low	Guinea pigs were used; no strain or source of these animals was indicated. Life-stage was not reported (presumably adults). The study indicated that guinea pigs of both sexes were used. Starting body weights were reported per group.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not reported (temperature, humidity, light/dark cycle). The study report indicated that animals were kept in groups of 5 per cage (presumably during the exposure and observational periods).	
	Metric 15: Number of Animals per Group	Medium	There were 20 animals per group "in the same proportion;" therefore, 10/sex/group for each dose of 1,1,2-trichloroethane.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	High	Body weights were recorded once daily (except on weekends) to evaluate effects on body weight/nutritional status. It was noted that food and water intake were observed.	
	Metric 17: Consistency of Outcome Assessment	High	The study indicated that body weights were recorded daily except on weekends for the 1,1,2-trichloroethane treated group and controls.	
	Metric 18: Sampling Adequacy	Medium	The body weights of all animals used in the study was presumably evaluated.	
	Metric 19: Blinding of Assessors	N/A	Not a subjective outcome; blinding not required.	
	Metric 20: Negative Control Response	Medium	There were uncertainties associated with the response of the control group because information on the weights of animals in this group were not reported (other than they gained weight). This omission is unlikely to impact the study results.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	The study did not report all information to evaluate confounding (e.g., food consumption), but omitted details are unlikely to impact assessment of the outcome (body weight changes).	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information about differences among groups unrelated to exposure.	
	Metric 23: Data Presentation and Analysis	Low	The statistical analysis section of the paper states, "analysis of variance" without further details.	
	Metric 24: Reporting of Data	Low	Data were not reported separately by sex.	
Additional Comments:	None			
Overall Quality Determination		Medium		

Study Citation:	Wahlberg, J. E. (1976). Percutaneous toxicity of solvents: a comparative investigation in the guinea pig with benzene, toluene and 1,1,2-trichloroethane. Annals of Occupational Hygiene 19(2):115-119.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: Death, mean time to death			
Duration:	Short-term (>1-30 days) 5 to 7 days			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	74541			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	The test substance was definitively identified (as 1,1,2-trichloroethane).	
	Metric 2: Test Substance Source	Low	The source of the test substance was reported (a manufacturer); no batch/lot number was provided.	
	Metric 3: Test Substance Purity	High	The test substance was reported to be analytical grade.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	High	A distilled water control group was used; pure solvents (undiluted) were used as the experimental condition(s). Both groups were treated similarly except with respect to the substance (and amount) that was applied.	
	Metric 5: Positive Controls	N/A	Not required by study type.	
	Metric 6: Randomized Allocation of Animals	Low	Allocation of animals to study groups was not reported.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	Details on test substance storage/preparation were not provided (the test substance is volatile).	
	Metric 8: Consistency of Exposure Administration	Medium	The study report indicates that animals were exposed to 0.25 mL, 0.5 mL, or 2.0 mL of pure solvents (or 2.0 mL distilled water control). There was no indication that volumes were consistent across conditions; however, it is not unusual in dermal studies for undiluted test substances to be applied.	
	Metric 9: Reporting of Doses/Concentrations	High	Administered doses (in mL) were reported without ambiguity.	
	Metric 10: Exposure Frequency and Duration	Low	The exposure frequency and duration were reported (i.e., single application maintained in contact with the skin for 5-7 days/until absorption). This exposure protocol is unusual for dermal toxicity studies (e.g., acute studies with 24 hours exposure).	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Medium	3 doses of 1,1,2-trichloroethane were used; all doses caused substantial mortality. No dose of the test substance was used that did not cause mortality/could be used to establish a NOAEL.	
	Metric 12: Exposure Route and Method	Medium	In the dermal toxicity study, the test substance was injected into a depot through a hole in a cover slip, which was subsequently sealed. Sealing of the test substance presumably mitigated effects associated with volatility of the test substance and/or excluded other routes of administration (licking, inhalation).	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Low	Guinea pigs were used; no strain or source of these animals was indicated. Lifestage was not reported (presumably adults). The study indicated that guinea pigs of both sexes were used. A range of starting body weights was reported.	
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Study Citation:	Wahlberg, J. E. (1976). Percutaneous toxicity of solvents: a comparative investigation in the guinea pig with benzene, toluene and 1,1,2-trichloroethane. Annals of Occupational Hygiene 19(2):115-119.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: Death, mean time to death			
Duration:	Short-term (>1-30 days) 5 to 7 days			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	74541			
Domain	Metric	Rating	Comments	
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not reported (temperature, humidity, light/dark cycle). The study report indicated that animals were kept in groups of 5 per cage (presumably during the exposure and observational periods).
	Metric 15:	Number of Animals per Group	Medium	There were 20 animals per group ”in the same proportion;” therefore, 10/sex/group for each dose of 1,1,2-trichloroethane.
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	High	Mortality was evaluated regularly for up to 28 days following exposure.
	Metric 17:	Consistency of Outcome Assessment	Medium	The study indicated that animals were observed for clinical signs (presumably including mortality) without an indication of frequency (e.g., it was unclear if animals were just not weighed or not observed on weekends).
	Metric 18:	Sampling Adequacy	High	The mortality of all animals used in the study was evaluated.
	Metric 19:	Blinding of Assessors	N/A	Not a subjective outcome; blinding not required.
	Metric 20:	Negative Control Response	High	There was no mortality in the control group.
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Medium	The study did not report all information to evaluate confounding (e.g., food consumption), but omitted details are unlikely to impact assessment of the outcome (mortality).
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There was no information about differences among groups unrelated to exposure.
	Metric 23:	Data Presentation and Analysis	N/A	Mortality was not evaluated statistically.
	Metric 24:	Reporting of Data	Low	Data were not reported separately by sex.
Additional Comments:	None			
Overall Quality Determination			Medium	

Study Citation:	White, K. L., Jr, Sanders, V. M., Barnes, D. W., Shopp, G. M., Jr, Munson, A. E. (1985). Toxicology of 1,1,2-trichloroethane in the mouse. Drug and Chemical Toxicology 8(5):333-355.
Health Outcome(s):	Mortality
Reported Health Effect(s):	Mortality: Acute: LD50 for males was 378 mg/kg bw and for females was 491 mg/kg bw 14-Day Study: No test substance-related mortality was observed (not further described)
Duration:	Short-term (>1-30 days) 14 days
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
Metric 1:	Test Substance Identity	Medium	The test substance was identified as 1,1,2-trichloroethane. The chemical structure was verified. The specific form was not identified.
Metric 2:	Test Substance Source	High	The test substance was purchased from Aldrich Chemical Co. in Milwaukee, WI, with lot numbers of 070177 and 061197. The chemical structure was verified using infrared spectrometry.
Metric 3:	Test Substance Purity	Medium	The purity was reported as 95% and was verified by gas chromatography. It was reported that no stabilizers or preservatives were present, but the other constituents were not specified.
Domain 2: Test Design			
Metric 4:	Negative and Vehicle Controls	High	Negative vehicle controls (10% emulphor) were used.
Metric 5:	Positive Controls	N/A	Positive controls are not required for 14-day toxicity tests.
Metric 6:	Randomized Allocation of Animals	Low	The study did not report how animals were allocated to study groups. The study authors cited the methods to White et al. 1985, which is not available on HERO and only the abstract is available online. There is a related reference HERO ID r064563 by White et al 1985, Immunotoxicological Investigations in the Mouse: General Approach and Methods.
Domain 3: Exposure Characterization			
Metric 7:	Preparation and Storage of Test Substance	Medium	The test solutions were prepared fresh daily using a 1:9 (v/v) solution of emulphor in deionized water. Solutions were stored in a dark glass container at 4 deg. C. No other details were provided (sealing of the container, stability, homogeneity, stirring methods, etc.). Note from QCer: White et al noted that all solutions were maintained in dark bottles to alleviate possible photodecomposition.
Metric 8:	Consistency of Exposure Administration	Medium	Details of exposure administration are incompletely reported, but the missing information is unlikely to have a substantial impact on results. Volumes of 0.01 mL/g bw were administered via gavage.
Metric 9:	Reporting of Doses/Concentrations	High	Doses of 0, 3.8 and 38 mg/kg bw were used.
Metric 10:	Exposure Frequency and Duration	High	Doses were administered via oral gavage daily for 14 days.
Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Medium	Doses of 1/100 and 1/10 of the LD50 for males from the acute study were used in the 14-day study. The number of exposure groups used was not justified.

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Study Citation:	White, K. L., Jr, Sanders, V. M., Barnes, D. W., Shopp, G. M., Jr, Munson, A. E. (1985). Toxicology of 1,1,2-trichloroethane in the mouse. Drug and Chemical Toxicology 8(5):333-355.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: Acute: LD50 for males was 378 mg/kg bw and for females was 491 mg/kg bw 14-Day Study: No test substance-related mortality was observed (not further described)			
Duration:	Short-term (>1-30 days) 14 days			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	64564; Linked HERO ID(s): 64564, 64556			
Domain	Metric	Rating	Comments	
	Metric 12: Exposure Route and Method	Medium	Test solutions were administered via gavage. The route of exposure was appropriate for the outcome. It is unclear if the researchers accounted for the volatility of the test substance, but did prepare test solutions daily.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Medium	New text by QCER: Six-week old random-bred male CD-1 mice were used in this study and were likely obtained from Charles River Breeding Laboratories, Wilmington, MA. Body weights were determined and recorded prior to the initiation of exposure, and again one and two weeks after exposure. Information obtained from reference HERO ID r064563 by White et al 1985, Immunotoxicological Investigations in the Mouse: General Approach and Methods. No other details were provided.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	High	Note by QCER: White et al. 1985 reported that upon arrival all animals were housed four per cage in plastic shoe box cages with sawdust bedding and quarantined for 7 days. Mice exposed by gavage were maintained on Purina Lab Chow and water ad libitum. Animal room temperature was maintained between 21 and 24°C and relative humidity between 40-60%. The light-dark cycle was maintained on 12-hr intervals.	
	Metric 15: Number of Animals per Group	Low	The number of mice exposed per dose was not specified. The study only reported the number of animals that were evaluated per group (11-12 male mice/group).	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	Medium	The outcome assessment methodology was not clearly reported for mortality assessment, but animals were observed during the exposure period.	
	Metric 17: Consistency of Outcome Assessment	Low	Details regarding the execution of the study protocol for outcome assessment were not reported.	
	Metric 18: Sampling Adequacy	Low	The number of animals evaluated in each group was not specified.	
	Metric 19: Blinding of Assessors	N/A	Blinding of assessors is not required for mortality assessment.	
	Metric 20: Negative Control Response	Low	The biological response of the negative control group was not specifically reported.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	No significant differences in bodyweight were observed. Food/water consumption were not reported.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.	

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Study Citation:	White, K. L., Jr, Sanders, V. M., Barnes, D. W., Shopp, G. M., Jr, Munson, A. E. (1985). Toxicology of 1,1,2-trichloroethane in the mouse. Drug and Chemical Toxicology 8(5):333-355.
Health Outcome(s):	Mortality
Reported Health Effect(s):	Mortality: Acute: LD50 for males was 378 mg/kg bw and for females was 491 mg/kg bw 14-Day Study: No test substance-related mortality was observed (not further described)
Duration:	Short-term (>1-30 days) 14 days
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
	Metric 23: Data Presentation and Analysis	Low	The study reported "no exposure-related mortality occurred (data not shown)", but provided no additional information. It is not clear if one-way analysis of variance was performed on mortality data, but independent analysis is not possible due to the lack of details reported.
	Metric 24: Reporting of Data	Low	Data for exposure-related findings were not shown for each study group, but results were described in the text.

Additional Comments: None

Overall Quality Determination**Medium**

Study Citation:	White, K. L., Jr, Sanders, V. M., Barnes, D. W., Shopp, G. M., Jr, Munson, A. E. (1985). Toxicology of 1,1,2-trichloroethane in the mouse. Drug and Chemical Toxicology 8(5):333-355.
Health Outcome(s):	Neurological/Behavioral; Nutritional/Metabolic; Immune/Hematological; Reproductive/Developmental; Lung/Respiratory; Hepatic/Liver; Renal/Kidney;
Reported Health Effect(s):	Neurological/Behavioral: 14-Day Study: Significantly increased brain (11%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative brain weights (6%) were significantly decreased in females at 384 mg/kg bw/day.; Nutritional/Metabolic: 14-Day Study: No significant changes in bodyweight.90-Day Study: A dose-dependent decrease in bodyweight gain was observed in males, and was significantly decreased at 305 mg/kg bw/day. Water consumption was significantly decreased (36%) in males at 305 mg/kg bw/day. Water consumption was slightly decreased in males at 4.4 and 46 mg/kg bw/day (9% and 5%, respectively).; Immune/Hematological: 14-Day Study: Significantly increased thymus (25%) weights were observed at 38 mg/kg bw/day. No significant changes in hematology parameters or spleen weight.90-Day Study: A significant increase in the percent of lymphocytes and a decrease in the percent of polymorphonuclear leukocytes were observed in males at 305 mg/kg bw/day. A significant decrease in hematocrit and hemoglobin and a significant increase in leukocytes were observed in females at 384 mg/kg bw/day. Fibrinogen was significantly increased in all dose groups of females. And prothrombin time was significantly decreased in females at and above 44 mg/kg bw/day. Significantly increased absolute spleen (18%) weights were observed in females at 384 mg/kg bw/day. No treatment-related changes in thymus weight. Platelet counts increased in all groups, but not in a dose-dependent fashion.; Reproductive/Developmental: 14-Day Study: Significantly increased testes (18%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative testes weights (11% and 12%, respectively) were significantly increased in males at 46 and 305 mg/kg bw/day.; Lung/Respiratory: Acute: Reddened or hemorrhagic lungs were observed in up to 25% of animals14-Day Study: No significant changes in lung weight. 90-Day Study: No significant changes in lung weight.; Hepatic/Liver: The liver was a target of TCE toxicity in both sexes as demonstrated by dose-dependent alterations in hepatic microsomal enzyme activities and serum enzyme levels.Acute: Pale livers were observed in 50-75% of animals in each dose group14-Day Study: Lactic dehydrogenase activity was significantly decreased in high-dose males (21%). Relative liver weight was significantly increased (10%) at 3.8 mg/kg bw/day, but absolute liver weights were not significantly different from controls and no significant differences were observed in high-dose animals.90-Day Study: Cholesterol and serum alkaline phosphatase (SAP) were significantly increased in males at 305 mg/kg bw/day and glutathione was significantly decreased at and above 46 mg/kg bw/day. Cholesterol, SGPT, and glutathione were significantly increased in females at 384 mg/kg bw/day. SGOT and SAP were significantly increased in all test groups of females. Cytochrome P-450 and aniline hydroxylase were significantly decreased in females at and above 44 mg/kg bw/day. Absolute liver (11% and 12%, respectively) weights were significantly decreased in males at 46 and 305 mg/kg bw/day. Absolute (32%) and relative (26%) liver weights were significantly increased in females at 384 mg/kg bw/day.; Renal/Kidney: 14-Day Study: No significant changes in kidney weights, SGPT or BUN. 90-Day Study: Absolute kidney weights (12% and 16%, respectively) were significantly decreased in males at 46 and 305 mg/kg bw/day. Significantly increased absolute kidney (10%) weights were observed in females at 384 mg/kg bw/day. BUN was significantly decreased in males at 4.4 and 305 mg/kg bw/day, and was decreased, but not significantly, at 46 mg/kg bw/day. No treatment-related changes in creatinine.;
Duration:	Short-term (>1-30 days) 14 days
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
Domain 1: Test Substance	Metric 1: Test Substance Identity	Medium	All Outcomes: The test substance was identified as 1,1,2-trichloroethane. The chemical structure was verified. The specific form was not identified.
	Metric 2: Test Substance Source	High	All Outcomes: The test substance was purchased from Aldrich Chemical Co. in Milwaukee, WI, with lot numbers of 070177 and 061197. The chemical structure was verified using infrared spectrometry.
	Metric 3: Test Substance Purity	Medium	All Outcomes: The purity was reported as 95% and was verified by gas chromatography. It was reported that no stabilizers or preservatives were present, but the other constituents were not specified.

Domain 2: Test Design

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Study Citation:	White, K. L., Jr, Sanders, V. M., Barnes, D. W., Shopp, G. M., Jr, Munson, A. E. (1985). Toxicology of 1,1,2-trichloroethane in the mouse. Drug and Chemical Toxicology 8(5):333-355.
Health Outcome(s):	Neurological/Behavioral; Nutritional/Metabolic; Immune/Hematological; Reproductive/Developmental; Lung/Respiratory; Hepatic/Liver; Renal/Kidney;
Reported Health Effect(s):	Neurological/Behavioral: 14-Day Study: Significantly increased brain (11%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative brain weights (6%) were significantly decreased in females at 384 mg/kg bw/day.; Nutritional/Metabolic: 14-Day Study: No significant changes in bodyweight.90-Day Study: A dose-dependent decrease in bodyweight gain was observed in males, and was significantly decreased at 305 mg/kg bw/day. Water consumption was significantly decreased (36%) in males at 305 mg/kg bw/day. Water consumption was slightly decreased in males at 4.4 and 46 mg/kg bw/day (9% and 5%, respectively).; Immune/Hematological: 14-Day Study: Significantly increased thymus (25%) weights were observed at 38 mg/kg bw/day. No significant changes in hematology parameters or spleen weight.90-Day Study: A significant increase in the percent of lymphocytes and a decrease in the percent of polymorphonuclear leukocytes were observed in males at 305 mg/kg bw/day. A significant decrease in hematocrit and hemoglobin and a significant increase in leukocytes were observed in females at 384 mg/kg bw/day. Fibrinogen was significantly increased in all dose groups of females. And prothrombin time was significantly decreased in females at and above 44 mg/kg bw/day. Significantly increased absolute spleen (18%) weights were observed in females at 384 mg/kg bw/day. No treatment-related changes in thymus weight. Platelet counts increased in all groups, but not in a dose-dependent fashion.; Reproductive/Developmental: 14-Day Study: Significantly increased testes (18%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative testes weights (11% and 12%, respectively) were significantly increased in males at 46 and 305 mg/kg bw/day.; Lung/Respiratory: Acute: Reddened or hemorrhagic lungs were observed in up to 25% of animals14-Day Study: No significant changes in lung weight. 90-Day Study: No significant changes in lung weight.; Hepatic/Liver: The liver was a target of TCE toxicity in both sexes as demonstrated by dose-dependent alterations in hepatic microsomal enzyme activities and serum enzyme levels.Acute: Pale livers were observed in 50-75% of animals in each dose group14-Day Study: Lactic dehydrogenase activity was significantly decreased in high-dose males (21%). Relative liver weight was significantly increased (10%) at 3.8 mg/kg bw/day, but absolute liver weights were not significantly different from controls and no significant differences were observed in high-dose animals.90-Day Study: Cholesterol and serum alkaline phosphatase (SAP) were significantly increased in males at 305 mg/kg bw/day and glutathione was significantly decreased at and above 46 mg/kg bw/day. Cholesterol, SGPT, and glutathione were significantly increased in females at 384 mg/kg bw/day. SGOT and SAP were significantly increased in all test groups of females. Cytochrome P-450 and aniline hydroxylase were significantly decreased in females at and above 44 mg/kg bw/day. Absolute liver (11% and 12%, respectively) weights were significantly decreased in males at 46 and 305 mg/kg bw/day. Absolute (32%) and relative (26%) liver weights were significantly increased in females at 384 mg/kg bw/day.; Renal/Kidney: 14-Day Study: No significant changes in kidney weights, SGPT or BUN. 90-Day Study: Absolute kidney weights (12% and 16%, respectively) were significantly decreased in males at 46 and 305 mg/kg bw/day. Significantly increased absolute kidney (10%) weights were observed in females at 384 mg/kg bw/day. BUN was significantly decreased in males at 4.4 and 305 mg/kg bw/day, and was decreased, but not significantly, at 46 mg/kg bw/day. No treatment-related changes in creatinine.;
Duration:	Short-term (>1-30 days) 14 days
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
Metric 4:	Negative and Vehicle Controls	High	All Outcomes: Negative vehicle controls (10% emulphor) were used.
Metric 5:	Positive Controls	N/A	All Outcomes: Positive controls are not required for 14-day toxicity tests.

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Study Citation:	White, K. L., Jr, Sanders, V. M., Barnes, D. W., Shopp, G. M., Jr, Munson, A. E. (1985). Toxicology of 1,1,2-trichloroethane in the mouse. Drug and Chemical Toxicology 8(5):333-355.
Health Outcome(s):	Neurological/Behavioral; Nutritional/Metabolic; Immune/Hematological; Reproductive/Developmental; Lung/Respiratory; Hepatic/Liver; Renal/Kidney;
Reported Health Effect(s):	Neurological/Behavioral: 14-Day Study: Significantly increased brain (11%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative brain weights (6%) were significantly decreased in females at 384 mg/kg bw/day.; Nutritional/Metabolic: 14-Day Study: No significant changes in bodyweight.90-Day Study: A dose-dependent decrease in bodyweight gain was observed in males, and was significantly decreased at 305 mg/kg bw/day. Water consumption was significantly decreased (36%) in males at 305 mg/kg bw/day. Water consumption was slightly decreased in males at 4.4 and 46 mg/kg bw/day (9% and 5%, respectively).; Immune/Hematological: 14-Day Study: Significantly increased thymus (25%) weights were observed at 38 mg/kg bw/day. No significant changes in hematology parameters or spleen weight.90-Day Study: A significant increase in the percent of lymphocytes and a decrease in the percent of polymorphonuclear leukocytes were observed in males at 305 mg/kg bw/day. A significant decrease in hematocrit and hemoglobin and a significant increase in leukocytes were observed in females at 384 mg/kg bw/day. Fibrinogen was significantly increased in all dose groups of females. And prothrombin time was significantly decreased in females at and above 44 mg/kg bw/day. Significantly increased absolute spleen (18%) weights were observed in females at 384 mg/kg bw/day. No treatment-related changes in thymus weight. Platelet counts increased in all groups, but not in a dose-dependent fashion.; Reproductive/Developmental: 14-Day Study: Significantly increased testes (18%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative testes weights (11% and 12%, respectively) were significantly increased in males at 46 and 305 mg/kg bw/day.; Lung/Respiratory: Acute: Reddened or hemorrhagic lungs were observed in up to 25% of animals14-Day Study: No significant changes in lung weight. 90-Day Study: No significant changes in lung weight.; Hepatic/Liver: The liver was a target of TCE toxicity in both sexes as demonstrated by dose-dependent alterations in hepatic microsomal enzyme activities and serum enzyme levels.Acute: Pale livers were observed in 50-75% of animals in each dose group14-Day Study: Lactic dehydrogenase activity was significantly decreased in high-dose males (21%). Relative liver weight was significantly increased (10%) at 3.8 mg/kg bw/day, but absolute liver weights were not significantly different from controls and no significant differences were observed in high-dose animals.90-Day Study: Cholesterol and serum alkaline phosphatase (SAP) were significantly increased in males at 305 mg/kg bw/day and glutathione was significantly decreased at and above 46 mg/kg bw/day. Cholesterol, SGPT, and glutathione were significantly increased in females at 384 mg/kg bw/day. SGOT and SAP were significantly increased in all test groups of females. Cytochrome P-450 and aniline hydroxylase were significantly decreased in females at and above 44 mg/kg bw/day. Absolute liver (11% and 12%, respectively) weights were significantly decreased in males at 46 and 305 mg/kg bw/day. Absolute (32%) and relative (26%) liver weights were significantly increased in females at 384 mg/kg bw/day.; Renal/Kidney: 14-Day Study: No significant changes in kidney weights, SGPT or BUN. 90-Day Study: Absolute kidney weights (12% and 16%, respectively) were significantly decreased in males at 46 and 305 mg/kg bw/day. Significantly increased absolute kidney (10%) weights were observed in females at 384 mg/kg bw/day. BUN was significantly decreased in males at 4.4 and 305 mg/kg bw/day, and was decreased, but not significantly, at 46 mg/kg bw/day. No treatment-related changes in creatinine.;
Duration:	Short-term (>1-30 days) 14 days
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
Metric 6:	Randomized Allocation of Animals	Low	Neurological/Behavioral: The study did not report how animals were allocated to study groups. The study authors cited the methods to White et al. 1985, which is not available on HERO and only the abstract is available online. Note by QCER: There is a related reference HERO ID r064563 by White et al 1985, Immunotoxicological Investigations in the Mouse: General Approach andMethods.; Nutritional/Metabolic: The study did not report how animals were allocated to study groups. The study authors cited the methods to White et al. 1985, which is not available on HERO and only the abstract is available online. Note by QCER: There is a related reference HERO ID r064563 by White et al 1985, Immunotoxicological Investigations in the Mouse: General Approach and Methods.; Immune/Hematological: The study did not report how animals were allocated to study groups. The study authors cited the methods to White et al. 1985, which is not available on HERO and only the abstract is available online. Note by QCER: There is a related reference HERO ID r064563 by White et al 1985, Immunotoxicological Investigations in the Mouse: General Approach andMethods.; Reproductive/Developmental: The study did not report how animals were allocated to study groups. The study authors cited the methods to White et al. 1985, which is not available on HERO and only the abstract is available online. Note by QCER: There is a related reference HERO ID

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Health Outcome(s):	Neurological/Behavioral; Nutritional/Metabolic; Immune/Hematological; Reproductive/Developmental; Lung/Respiratory; Hepatic/Liver; Renal/Kidney;
Reported Health Effect(s):	Neurological/Behavioral: 14-Day Study: Significantly increased brain (11%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative brain weights (6%) were significantly decreased in females at 384 mg/kg bw/day.; Nutritional/Metabolic: 14-Day Study: No significant changes in bodyweight.90-Day Study: A dose-dependent decrease in bodyweight gain was observed in males, and was significantly decreased at 305 mg/kg bw/day. Water consumption was significantly decreased (36%) in males at 305 mg/kg bw/day. Water consumption was slightly decreased in males at 4.4 and 46 mg/kg bw/day (9% and 5%, respectively).; Immune/Hematological: 14-Day Study: Significantly increased thymus (25%) weights were observed at 38 mg/kg bw/day. No significant changes in hematology parameters or spleen weight.90-Day Study: A significant increase in the percent of lymphocytes and a decrease in the percent of polymorphonuclear leukocytes were observed in males at 305 mg/kg bw/day. A significant decrease in hematocrit and hemoglobin and a significant increase in leukocytes were observed in females at 384 mg/kg bw/day. Fibrinogen was significantly increased in all dose groups of females. And prothrombin time was significantly decreased in females at and above 44 mg/kg bw/day. Significantly increased absolute spleen (18%) weights were observed in females at 384 mg/kg bw/day. No treatment-related changes in thymus weight. Platelet counts increased in all groups, but not in a dose-dependent fashion.; Reproductive/Developmental: 14-Day Study: Significantly increased testes (18%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative testes weights (11% and 12%, respectively) were significantly increased in males at 46 and 305 mg/kg bw/day.; Lung/Respiratory: Acute: Reddened or hemorrhagic lungs were observed in up to 25% of animals14-Day Study: No significant changes in lung weight. 90-Day Study: No significant changes in lung weight.; Hepatic/Liver: The liver was a target of TCE toxicity in both sexes as demonstrated by dose-dependent alterations in hepatic microsomal enzyme activities and serum enzyme levels.Acute: Pale livers were observed in 50-75% of animals in each dose group14-Day Study: Lactic dehydrogenase activity was significantly decreased in high-dose males (21%). Relative liver weight was significantly increased (10%) at 3.8 mg/kg bw/day, but absolute liver weights were not significantly different from controls and no significant differences were observed in high-dose animals.90-Day Study: Cholesterol and serum alkaline phosphatase (SAP) were significantly increased in males at 305 mg/kg bw/day and glutathione was significantly decreased at and above 46 mg/kg bw/day. Cholesterol, SGPT, and glutathione were significantly increased in females at 384 mg/kg bw/day. SGOT and SAP were significantly increased in all test groups of females. Cytochrome P-450 and aniline hydroxylase were significantly decreased in females at and above 44 mg/kg bw/day. Absolute liver (11% and 12%, respectively) weights were significantly decreased in males at 46 and 305 mg/kg bw/day. Absolute (32%) and relative (26%) liver weights were significantly increased in females at 384 mg/kg bw/day.; Renal/Kidney: 14-Day Study: No significant changes in kidney weights, SGPT or BUN. 90-Day Study: Absolute kidney weights (12% and 16%, respectively) were significantly decreased in males at 46 and 305 mg/kg bw/day. Significantly increased absolute kidney (10%) weights were observed in females at 384 mg/kg bw/day. BUN was significantly decreased in males at 4.4 and 305 mg/kg bw/day, and was decreased, but not significantly, at 46 mg/kg bw/day. No treatment-related changes in creatinine.;
Duration:	Short-term (>1-30 days) 14 days
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
Domain 3: Exposure Characterization			
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Health Outcome(s):	Neurological/Behavioral; Nutritional/Metabolic; Immune/Hematological; Reproductive/Developmental; Lung/Respiratory; Hepatic/Liver; Renal/Kidney;
Reported Health Effect(s):	Neurological/Behavioral: 14-Day Study: Significantly increased brain (11%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative brain weights (6%) were significantly decreased in females at 384 mg/kg bw/day.; Nutritional/Metabolic: 14-Day Study: No significant changes in bodyweight.90-Day Study: A dose-dependent decrease in bodyweight gain was observed in males, and was significantly decreased at 305 mg/kg bw/day. Water consumption was significantly decreased (36%) in males at 305 mg/kg bw/day. Water consumption was slightly decreased in males at 4.4 and 46 mg/kg bw/day (9% and 5%, respectively).; Immune/Hematological: 14-Day Study: Significantly increased thymus (25%) weights were observed at 38 mg/kg bw/day. No significant changes in hematology parameters or spleen weight.90-Day Study: A significant increase in the percent of lymphocytes and a decrease in the percent of polymorphonuclear leukocytes were observed in males at 305 mg/kg bw/day. A significant decrease in hematocrit and hemoglobin and a significant increase in leukocytes were observed in females at 384 mg/kg bw/day. Fibrinogen was significantly increased in all dose groups of females. And prothrombin time was significantly decreased in females at and above 44 mg/kg bw/day. Significantly increased absolute spleen (18%) weights were observed in females at 384 mg/kg bw/day. No treatment-related changes in thymus weight. Platelet counts increased in all groups, but not in a dose-dependent fashion.; Reproductive/Developmental: 14-Day Study: Significantly increased testes (18%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative testes weights (11% and 12%, respectively) were significantly increased in males at 46 and 305 mg/kg bw/day.; Lung/Respiratory: Acute: Reddened or hemorrhagic lungs were observed in up to 25% of animals14-Day Study: No significant changes in lung weight. 90-Day Study: No significant changes in lung weight.; Hepatic/Liver: The liver was a target of TCE toxicity in both sexes as demonstrated by dose-dependent alterations in hepatic microsomal enzyme activities and serum enzyme levels.Acute: Pale livers were observed in 50-75% of animals in each dose group14-Day Study: Lactic dehydrogenase activity was significantly decreased in high-dose males (21%). Relative liver weight was significantly increased (10%) at 3.8 mg/kg bw/day, but absolute liver weights were not significantly different from controls and no significant differences were observed in high-dose animals.90-Day Study: Cholesterol and serum alkaline phosphatase (SAP) were significantly increased in males at 305 mg/kg bw/day and glutathione was significantly decreased at and above 46 mg/kg bw/day. Cholesterol, SGPT, and glutathione were significantly increased in females at 384 mg/kg bw/day. SGOT and SAP were significantly increased in all test groups of females. Cytochrome P-450 and aniline hydroxylase were significantly decreased in females at and above 44 mg/kg bw/day. Absolute liver (11% and 12%, respectively) weights were significantly decreased in males at 46 and 305 mg/kg bw/day. Absolute (32%) and relative (26%) liver weights were significantly increased in females at 384 mg/kg bw/day.; Renal/Kidney: 14-Day Study: No significant changes in kidney weights, SGPT or BUN. 90-Day Study: Absolute kidney weights (12% and 16%, respectively) were significantly decreased in males at 46 and 305 mg/kg bw/day. Significantly increased absolute kidney (10%) weights were observed in females at 384 mg/kg bw/day. BUN was significantly decreased in males at 4.4 and 305 mg/kg bw/day, and was decreased, but not significantly, at 46 mg/kg bw/day. No treatment-related changes in creatinine.;
Duration:	Short-term (>1-30 days) 14 days
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
Metric 7:	Preparation and Storage of Test Substance	Medium	Neurological/Behavioral: The test solutions were prepared fresh daily using a 1:9 (v/v) solution of emulphor in deionized water. Solutions were stored in a dark glass container at 4 deg. C. No other details were provided (sealing of the container, stability, homogeneity, stirring methods, etc.). Note from QCer: White et al noted that all solutions were maintained in dark bottles to alleviate possible photodecomposition.; Nutritional/Metabolic: The test solutions were prepared fresh daily using a 1:9 (v/v) solution of emulphor in deionized water. Solutions were stored in a dark glass container at 4 deg. C. No other details were provided (sealing of the container, stability, homogeneity, stirring methods, etc.). Note from QCer: White et al noted that all solutions were maintained in dark bottles to alleviate possible photodecomposition.; Immune/Hematological: The test solutions were prepared fresh daily using a 1:9 (v/v) solution of emulphor in deionized water. Solutions were stored in a dark glass container at 4 deg. C. No other details were provided (sealing of the container, stability, homogeneity, stirring methods, etc.). Note from QCer: White et al noted that all solutions were maintained in dark bottles to alleviate possible photodecomposition.; Reproductive/Developmental: The test solutions were prepared fresh daily using a 1:9 (v/v) solution of emulphor in deionized water. Solutions were stored in a dark glass container at 4 deg. C. No other details

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Health Outcome(s):	Neurological/Behavioral; Nutritional/Metabolic; Immune/Hematological; Reproductive/Developmental; Lung/Respiratory; Hepatic/Liver; Renal/Kidney;
Reported Health Effect(s):	Neurological/Behavioral: 14-Day Study: Significantly increased brain (11%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative brain weights (6%) were significantly decreased in females at 384 mg/kg bw/day.; Nutritional/Metabolic: 14-Day Study: No significant changes in bodyweight.90-Day Study: A dose-dependent decrease in bodyweight gain was observed in males, and was significantly decreased at 305 mg/kg bw/day. Water consumption was significantly decreased (36%) in males at 305 mg/kg bw/day. Water consumption was slightly decreased in males at 4.4 and 46 mg/kg bw/day (9% and 5%, respectively).; Immune/Hematological: 14-Day Study: Significantly increased thymus (25%) weights were observed at 38 mg/kg bw/day. No significant changes in hematology parameters or spleen weight.90-Day Study: A significant increase in the percent of lymphocytes and a decrease in the percent of polymorphonuclear leukocytes were observed in males at 305 mg/kg bw/day. A significant decrease in hematocrit and hemoglobin and a significant increase in leukocytes were observed in females at 384 mg/kg bw/day. Fibrinogen was significantly increased in all dose groups of females. And prothrombin time was significantly decreased in females at and above 44 mg/kg bw/day. Significantly increased absolute spleen (18%) weights were observed in females at 384 mg/kg bw/day. No treatment-related changes in thymus weight. Platelet counts increased in all groups, but not in a dose-dependent fashion.; Reproductive/Developmental: 14-Day Study: Significantly increased testes (18%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative testes weights (11% and 12%, respectively) were significantly increased in males at 46 and 305 mg/kg bw/day.; Lung/Respiratory: Acute: Reddened or hemorrhagic lungs were observed in up to 25% of animals14-Day Study: No significant changes in lung weight. 90-Day Study: No significant changes in lung weight.; Hepatic/Liver: The liver was a target of TCE toxicity in both sexes as demonstrated by dose-dependent alterations in hepatic microsomal enzyme activities and serum enzyme levels.Acute: Pale livers were observed in 50-75% of animals in each dose group14-Day Study: Lactic dehydrogenase activity was significantly decreased in high-dose males (21%). Relative liver weight was significantly increased (10%) at 3.8 mg/kg bw/day, but absolute liver weights were not significantly different from controls and no significant differences were observed in high-dose animals.90-Day Study: Cholesterol and serum alkaline phosphatase (SAP) were significantly increased in males at 305 mg/kg bw/day and glutathione was significantly decreased at and above 46 mg/kg bw/day. Cholesterol, SGPT, and glutathione were significantly increased in females at 384 mg/kg bw/day. SGOT and SAP were significantly increased in all test groups of females. Cytochrome P-450 and aniline hydroxylase were significantly decreased in females at and above 44 mg/kg bw/day. Absolute liver (11% and 12%, respectively) weights were significantly decreased in males at 46 and 305 mg/kg bw/day. Absolute (32%) and relative (26%) liver weights were significantly increased in females at 384 mg/kg bw/day.; Renal/Kidney: 14-Day Study: No significant changes in kidney weights, SGPT or BUN. 90-Day Study: Absolute kidney weights (12% and 16%, respectively) were significantly decreased in males at 46 and 305 mg/kg bw/day. Significantly increased absolute kidney (10%) weights were observed in females at 384 mg/kg bw/day. BUN was significantly decreased in males at 4.4 and 305 mg/kg bw/day, and was decreased, but not significantly, at 46 mg/kg bw/day. No treatment-related changes in creatinine.;
Duration:	Short-term (>1-30 days) 14 days
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
Metric 8:	Consistency of Exposure Administration	Medium	All Outcomes: Details of exposure administration are incompletely reported, but the missing information is unlikely to have a substantial impact on results. Volumes of 0.01 mL/g bw were administered via gavage.
Metric 9:	Reporting of Doses/Concentrations	High	All Outcomes: Doses of 0, 3.8 and 38 mg/kg bw were used.
Metric 10:	Exposure Frequency and Duration	High	All Outcomes: Doses were administered via oral gavage daily for 14 days.
Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Medium	All Outcomes: Doses of 1/100 and 1/10 of the LD50 for males from the acute study were used in the 14-day study. The number of exposure groups used was not justified.
Metric 12:	Exposure Route and Method	Medium	All Outcomes: Test solutions were administered via gavage. The route of exposure was appropriate for the outcome. It is unclear if the researchers accounted for the volatility of the test substance, but did prepare test solutions daily.

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Health Outcome(s):	Neurological/Behavioral; Nutritional/Metabolic; Immune/Hematological; Reproductive/Developmental; Lung/Respiratory; Hepatic/Liver; Renal/Kidney;
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Duration:	Short-term (>1-30 days) 14 days
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
Domain 4: Test Animals			

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Health Outcome(s):	Neurological/Behavioral; Nutritional/Metabolic; Immune/Hematological; Reproductive/Developmental; Lung/Respiratory; Hepatic/Liver; Renal/Kidney;
Reported Health Effect(s):	Neurological/Behavioral: 14-Day Study: Significantly increased brain (11%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative brain weights (6%) were significantly decreased in females at 384 mg/kg bw/day.; Nutritional/Metabolic: 14-Day Study: No significant changes in bodyweight.90-Day Study: A dose-dependent decrease in bodyweight gain was observed in males, and was significantly decreased at 305 mg/kg bw/day. Water consumption was significantly decreased (36%) in males at 305 mg/kg bw/day. Water consumption was slightly decreased in males at 4.4 and 46 mg/kg bw/day (9% and 5%, respectively).; Immune/Hematological: 14-Day Study: Significantly increased thymus (25%) weights were observed at 38 mg/kg bw/day. No significant changes in hematology parameters or spleen weight.90-Day Study: A significant increase in the percent of lymphocytes and a decrease in the percent of polymorphonuclear leukocytes were observed in males at 305 mg/kg bw/day. A significant decrease in hematocrit and hemoglobin and a significant increase in leukocytes were observed in females at 384 mg/kg bw/day. Fibrinogen was significantly increased in all dose groups of females. And prothrombin time was significantly decreased in females at and above 44 mg/kg bw/day. Significantly increased absolute spleen (18%) weights were observed in females at 384 mg/kg bw/day. No treatment-related changes in thymus weight. Platelet counts increased in all groups, but not in a dose-dependent fashion.; Reproductive/Developmental: 14-Day Study: Significantly increased testes (18%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative testes weights (11% and 12%, respectively) were significantly increased in males at 46 and 305 mg/kg bw/day.; Lung/Respiratory: Acute: Reddened or hemorrhagic lungs were observed in up to 25% of animals14-Day Study: No significant changes in lung weight. 90-Day Study: No significant changes in lung weight.; Hepatic/Liver: The liver was a target of TCE toxicity in both sexes as demonstrated by dose-dependent alterations in hepatic microsomal enzyme activities and serum enzyme levels.Acute: Pale livers were observed in 50-75% of animals in each dose group14-Day Study: Lactic dehydrogenase activity was significantly decreased in high-dose males (21%). Relative liver weight was significantly increased (10%) at 3.8 mg/kg bw/day, but absolute liver weights were not significantly different from controls and no significant differences were observed in high-dose animals.90-Day Study: Cholesterol and serum alkaline phosphatase (SAP) were significantly increased in males at 305 mg/kg bw/day and glutathione was significantly decreased at and above 46 mg/kg bw/day. Cholesterol, SGPT, and glutathione were significantly increased in females at 384 mg/kg bw/day. SGOT and SAP were significantly increased in all test groups of females. Cytochrome P-450 and aniline hydroxylase were significantly decreased in females at and above 44 mg/kg bw/day. Absolute liver (11% and 12%, respectively) weights were significantly decreased in males at 46 and 305 mg/kg bw/day. Absolute (32%) and relative (26%) liver weights were significantly increased in females at 384 mg/kg bw/day.; Renal/Kidney: 14-Day Study: No significant changes in kidney weights, SGPT or BUN. 90-Day Study: Absolute kidney weights (12% and 16%, respectively) were significantly decreased in males at 46 and 305 mg/kg bw/day. Significantly increased absolute kidney (10%) weights were observed in females at 384 mg/kg bw/day. BUN was significantly decreased in males at 4.4 and 305 mg/kg bw/day, and was decreased, but not significantly, at 46 mg/kg bw/day. No treatment-related changes in creatinine.;
Duration:	Short-term (>1-30 days) 14 days
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
Metric 13:	Test Animal Characteristics	Medium	Neurological/Behavioral: New text by QCER: Six-week old random-bred male CD-1 mice were used in this study and were likely obtained from Charles River Breeding Laboratories, Wilmington, MA. Body weights weredetermined and recorded prior to the initiation of exposure,and again one and two weeks after exposure. Information obtained from reference HERO ID r064563 by White et al 1985, Immunotoxicological Investigations in the Mouse: General Approach and Methods. No other details were provided.; Nutritional/Metabolic: New text by QCER: Six-week old random-bred male CD-1 mice were used in this study and were likely obtained from Charles River Breeding Laboratories, Wilmington, MA. Body weights weredetermined and recorded prior to the initiation of exposure,and again one and two weeks after exposure. Information obtained from reference HERO ID r064563 by White et al 1985, Immunotoxicological Investigations in the Mouse: General Approach and Methods. No other details were provided.; Immune/Hematological: New text by QCER: Six-week old random-bred male CD-1 mice were used in this study and were likely obtained from Charles River Breeding Laboratories, Wilmington, MA. Body weights were determined and recorded prior to the initiation of exposure,and again one and two weeks after exposure. Information obtained from reference HERO ID r064563 by White et al 1985, Immunotoxicological

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Study Citation:	White, K. L., Jr, Sanders, V. M., Barnes, D. W., Shopp, G. M., Jr, Munson, A. E. (1985). Toxicology of 1,1,2-trichloroethane in the mouse. Drug and Chemical Toxicology 8(5):333-355.
Health Outcome(s):	Neurological/Behavioral; Nutritional/Metabolic; Immune/Hematological; Reproductive/Developmental; Lung/Respiratory; Hepatic/Liver; Renal/Kidney;
Reported Health Effect(s):	Neurological/Behavioral: 14-Day Study: Significantly increased brain (11%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative brain weights (6%) were significantly decreased in females at 384 mg/kg bw/day.; Nutritional/Metabolic: 14-Day Study: No significant changes in bodyweight.90-Day Study: A dose-dependent decrease in bodyweight gain was observed in males, and was significantly decreased at 305 mg/kg bw/day. Water consumption was significantly decreased (36%) in males at 305 mg/kg bw/day. Water consumption was slightly decreased in males at 4.4 and 46 mg/kg bw/day (9% and 5%, respectively).; Immune/Hematological: 14-Day Study: Significantly increased thymus (25%) weights were observed at 38 mg/kg bw/day. No significant changes in hematology parameters or spleen weight.90-Day Study: A significant increase in the percent of lymphocytes and a decrease in the percent of polymorphonuclear leukocytes were observed in males at 305 mg/kg bw/day. A significant decrease in hematocrit and hemoglobin and a significant increase in leukocytes were observed in females at 384 mg/kg bw/day. Fibrinogen was significantly increased in all dose groups of females. And prothrombin time was significantly decreased in females at and above 44 mg/kg bw/day. Significantly increased absolute spleen (18%) weights were observed in females at 384 mg/kg bw/day. No treatment-related changes in thymus weight. Platelet counts increased in all groups, but not in a dose-dependent fashion.; Reproductive/Developmental: 14-Day Study: Significantly increased testes (18%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative testes weights (11% and 12%, respectively) were significantly increased in males at 46 and 305 mg/kg bw/day.; Lung/Respiratory: Acute: Reddened or hemorrhagic lungs were observed in up to 25% of animals14-Day Study: No significant changes in lung weight. 90-Day Study: No significant changes in lung weight.; Hepatic/Liver: The liver was a target of TCE toxicity in both sexes as demonstrated by dose-dependent alterations in hepatic microsomal enzyme activities and serum enzyme levels.Acute: Pale livers were observed in 50-75% of animals in each dose group14-Day Study: Lactic dehydrogenase activity was significantly decreased in high-dose males (21%). Relative liver weight was significantly increased (10%) at 3.8 mg/kg bw/day, but absolute liver weights were not significantly different from controls and no significant differences were observed in high-dose animals.90-Day Study: Cholesterol and serum alkaline phosphatase (SAP) were significantly increased in males at 305 mg/kg bw/day and glutathione was significantly decreased at and above 46 mg/kg bw/day. Cholesterol, SGPT, and glutathione were significantly increased in females at 384 mg/kg bw/day. SGOT and SAP were significantly increased in all test groups of females. Cytochrome P-450 and aniline hydroxylase were significantly decreased in females at and above 44 mg/kg bw/day. Absolute liver (11% and 12%, respectively) weights were significantly decreased in males at 46 and 305 mg/kg bw/day. Absolute (32%) and relative (26%) liver weights were significantly increased in females at 384 mg/kg bw/day.; Renal/Kidney: 14-Day Study: No significant changes in kidney weights, SGPT or BUN. 90-Day Study: Absolute kidney weights (12% and 16%, respectively) were significantly decreased in males at 46 and 305 mg/kg bw/day. Significantly increased absolute kidney (10%) weights were observed in females at 384 mg/kg bw/day. BUN was significantly decreased in males at 4.4 and 305 mg/kg bw/day, and was decreased, but not significantly, at 46 mg/kg bw/day. No treatment-related changes in creatinine.;
Duration:	Short-term (>1-30 days) 14 days
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	High	All Outcomes: Note by QCER: White et al. 1985 reported that upon arrival all animals were housed four per cage in plastic shoe box cages with sawdust bedding and quarantined for 7 days. Mice exposed by gavage were maintained on Purina Lab Chow and water ad libitum. Animal room temperature was maintained between 21 and 24°C and relative humidity between 40-60%. The light-dark cycle was maintained on 12-hr intervals.
	Metric 15: Number of Animals per Group	Low	All Outcomes: The number of mice exposed per dose was not specified. The study only reported the number of animals that were evaluated per group (11-12 male mice/group).

Domain 5: Outcome Assessment

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Health Outcome(s):	Neurological/Behavioral; Nutritional/Metabolic; Immune/Hematological; Reproductive/Developmental; Lung/Respiratory; Hepatic/Liver; Renal/Kidney;
Reported Health Effect(s):	Neurological/Behavioral: 14-Day Study: Significantly increased brain (11%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative brain weights (6%) were significantly decreased in females at 384 mg/kg bw/day.; Nutritional/Metabolic: 14-Day Study: No significant changes in bodyweight.90-Day Study: A dose-dependent decrease in bodyweight gain was observed in males, and was significantly decreased at 305 mg/kg bw/day. Water consumption was significantly decreased (36%) in males at 305 mg/kg bw/day. Water consumption was slightly decreased in males at 4.4 and 46 mg/kg bw/day (9% and 5%, respectively).; Immune/Hematological: 14-Day Study: Significantly increased thymus (25%) weights were observed at 38 mg/kg bw/day. No significant changes in hematology parameters or spleen weight.90-Day Study: A significant increase in the percent of lymphocytes and a decrease in the percent of polymorphonuclear leukocytes were observed in males at 305 mg/kg bw/day. A significant decrease in hematocrit and hemoglobin and a significant increase in leukocytes were observed in females at 384 mg/kg bw/day. Fibrinogen was significantly increased in all dose groups of females. And prothrombin time was significantly decreased in females at and above 44 mg/kg bw/day. Significantly increased absolute spleen (18%) weights were observed in females at 384 mg/kg bw/day. No treatment-related changes in thymus weight. Platelet counts increased in all groups, but not in a dose-dependent fashion.; Reproductive/Developmental: 14-Day Study: Significantly increased testes (18%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative testes weights (11% and 12%, respectively) were significantly increased in males at 46 and 305 mg/kg bw/day.; Lung/Respiratory: Acute: Reddened or hemorrhagic lungs were observed in up to 25% of animals14-Day Study: No significant changes in lung weight. 90-Day Study: No significant changes in lung weight.; Hepatic/Liver: The liver was a target of TCE toxicity in both sexes as demonstrated by dose-dependent alterations in hepatic microsomal enzyme activities and serum enzyme levels.Acute: Pale livers were observed in 50-75% of animals in each dose group14-Day Study: Lactic dehydrogenase activity was significantly decreased in high-dose males (21%). Relative liver weight was significantly increased (10%) at 3.8 mg/kg bw/day, but absolute liver weights were not significantly different from controls and no significant differences were observed in high-dose animals.90-Day Study: Cholesterol and serum alkaline phosphatase (SAP) were significantly increased in males at 305 mg/kg bw/day and glutathione was significantly decreased at and above 46 mg/kg bw/day. Cholesterol, SGPT, and glutathione were significantly increased in females at 384 mg/kg bw/day. SGOT and SAP were significantly increased in all test groups of females. Cytochrome P-450 and aniline hydroxylase were significantly decreased in females at and above 44 mg/kg bw/day. Absolute liver (11% and 12%, respectively) weights were significantly decreased in males at 46 and 305 mg/kg bw/day. Absolute (32%) and relative (26%) liver weights were significantly increased in females at 384 mg/kg bw/day.; Renal/Kidney: 14-Day Study: No significant changes in kidney weights, SGPT or BUN. 90-Day Study: Absolute kidney weights (12% and 16%, respectively) were significantly decreased in males at 46 and 305 mg/kg bw/day. Significantly increased absolute kidney (10%) weights were observed in females at 384 mg/kg bw/day. BUN was significantly decreased in males at 4.4 and 305 mg/kg bw/day, and was decreased, but not significantly, at 46 mg/kg bw/day. No treatment-related changes in creatinine.;
Duration:	Short-term (>1-30 days) 14 days
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
Metric 16:	Outcome Assessment Methodology	Medium	Neurological/Behavioral: The outcome assessment methodology was not clearly reported for brain weight assessment, but brain weights for each group were reported. Brain weights were evaluated in the absence of brain histopathology or other neurological endpoint evaluations.; Nutritional/Metabolic: The outcome assessment methodology was not clearly reported for bodyweight assessment, but bodyweights for each group were reported.; Immune/Hematological: The outcome assessment methodology was not clearly reported for thymic and spleen weight assessments or hematology evaluations, but thymic and spleen weights and hematology results for each group were reported. Thymic and spleen weights were evaluated in the absence of histopathology or other immunotox evaluations.; Reproductive/Developmental: The outcome assessment methodology was not clearly reported for testes weight assessment, but testes weights for each group were reported. Testes weights were evaluated in the absence of histopathology or other reproductive endpoint evaluations.; Lung/Respiratory: The outcome assessment methodology was not clearly reported for lung weight assessment, but lung weights for each group were reported. Lung weights were evaluated in the absence of lung histopathology or other respiratory endpoint evaluations.; Hepatic/Liver: The outcome assessment methodology was not clearly reported for liver weight assessment

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Health Outcome(s):	Neurological/Behavioral; Nutritional/Metabolic; Immune/Hematological; Reproductive/Developmental; Lung/Respiratory; Hepatic/Liver; Renal/Kidney;
Reported Health Effect(s):	Neurological/Behavioral: 14-Day Study: Significantly increased brain (11%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative brain weights (6%) were significantly decreased in females at 384 mg/kg bw/day.; Nutritional/Metabolic: 14-Day Study: No significant changes in bodyweight.90-Day Study: A dose-dependent decrease in bodyweight gain was observed in males, and was significantly decreased at 305 mg/kg bw/day. Water consumption was significantly decreased (36%) in males at 305 mg/kg bw/day. Water consumption was slightly decreased in males at 4.4 and 46 mg/kg bw/day (9% and 5%, respectively).; Immune/Hematological: 14-Day Study: Significantly increased thymus (25%) weights were observed at 38 mg/kg bw/day. No significant changes in hematology parameters or spleen weight.90-Day Study: A significant increase in the percent of lymphocytes and a decrease in the percent of polymorphonuclear leukocytes were observed in males at 305 mg/kg bw/day. A significant decrease in hematocrit and hemoglobin and a significant increase in leukocytes were observed in females at 384 mg/kg bw/day. Fibrinogen was significantly increased in all dose groups of females. And prothrombin time was significantly decreased in females at and above 44 mg/kg bw/day. Significantly increased absolute spleen (18%) weights were observed in females at 384 mg/kg bw/day. No treatment-related changes in thymus weight. Platelet counts increased in all groups, but not in a dose-dependent fashion.; Reproductive/Developmental: 14-Day Study: Significantly increased testes (18%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative testes weights (11% and 12%, respectively) were significantly increased in males at 46 and 305 mg/kg bw/day.; Lung/Respiratory: Acute: Reddened or hemorrhagic lungs were observed in up to 25% of animals14-Day Study: No significant changes in lung weight. 90-Day Study: No significant changes in lung weight.; Hepatic/Liver: The liver was a target of TCE toxicity in both sexes as demonstrated by dose-dependent alterations in hepatic microsomal enzyme activities and serum enzyme levels.Acute: Pale livers were observed in 50-75% of animals in each dose group14-Day Study: Lactic dehydrogenase activity was significantly decreased in high-dose males (21%). Relative liver weight was significantly increased (10%) at 3.8 mg/kg bw/day, but absolute liver weights were not significantly different from controls and no significant differences were observed in high-dose animals.90-Day Study: Cholesterol and serum alkaline phosphatase (SAP) were significantly increased in males at 305 mg/kg bw/day and glutathione was significantly decreased at and above 46 mg/kg bw/day. Cholesterol, SGPT, and glutathione were significantly increased in females at 384 mg/kg bw/day. SGOT and SAP were significantly increased in all test groups of females. Cytochrome P-450 and aniline hydroxylase were significantly decreased in females at and above 44 mg/kg bw/day. Absolute liver (11% and 12%, respectively) weights were significantly decreased in males at 46 and 305 mg/kg bw/day. Absolute (32%) and relative (26%) liver weights were significantly increased in females at 384 mg/kg bw/day.; Renal/Kidney: 14-Day Study: No significant changes in kidney weights, SGPT or BUN. 90-Day Study: Absolute kidney weights (12% and 16%, respectively) were significantly decreased in males at 46 and 305 mg/kg bw/day. Significantly increased absolute kidney (10%) weights were observed in females at 384 mg/kg bw/day. BUN was significantly decreased in males at 4.4 and 305 mg/kg bw/day, and was decreased, but not significantly, at 46 mg/kg bw/day. No treatment-related changes in creatinine.;
Duration:	Short-term (>1-30 days) 14 days
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
Metric 17:	Consistency of Outcome Assessment	Low	All Outcomes: Details regarding the execution of the study protocol for outcome assessment were not reported.

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Health Outcome(s):	Neurological/Behavioral; Nutritional/Metabolic; Immune/Hematological; Reproductive/Developmental; Lung/Respiratory; Hepatic/Liver; Renal/Kidney;
Reported Health Effect(s):	Neurological/Behavioral: 14-Day Study: Significantly increased brain (11%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative brain weights (6%) were significantly decreased in females at 384 mg/kg bw/day.; Nutritional/Metabolic: 14-Day Study: No significant changes in bodyweight.90-Day Study: A dose-dependent decrease in bodyweight gain was observed in males, and was significantly decreased at 305 mg/kg bw/day. Water consumption was significantly decreased (36%) in males at 305 mg/kg bw/day. Water consumption was slightly decreased in males at 4.4 and 46 mg/kg bw/day (9% and 5%, respectively).; Immune/Hematological: 14-Day Study: Significantly increased thymus (25%) weights were observed at 38 mg/kg bw/day. No significant changes in hematology parameters or spleen weight.90-Day Study: A significant increase in the percent of lymphocytes and a decrease in the percent of polymorphonuclear leukocytes were observed in males at 305 mg/kg bw/day. A significant decrease in hematocrit and hemoglobin and a significant increase in leukocytes were observed in females at 384 mg/kg bw/day. Fibrinogen was significantly increased in all dose groups of females. And prothrombin time was significantly decreased in females at and above 44 mg/kg bw/day. Significantly increased absolute spleen (18%) weights were observed in females at 384 mg/kg bw/day. No treatment-related changes in thymus weight. Platelet counts increased in all groups, but not in a dose-dependent fashion.; Reproductive/Developmental: 14-Day Study: Significantly increased testes (18%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative testes weights (11% and 12%, respectively) were significantly increased in males at 46 and 305 mg/kg bw/day.; Lung/Respiratory: Acute: Reddened or hemorrhagic lungs were observed in up to 25% of animals14-Day Study: No significant changes in lung weight. 90-Day Study: No significant changes in lung weight.; Hepatic/Liver: The liver was a target of TCE toxicity in both sexes as demonstrated by dose-dependent alterations in hepatic microsomal enzyme activities and serum enzyme levels.Acute: Pale livers were observed in 50-75% of animals in each dose group14-Day Study: Lactic dehydrogenase activity was significantly decreased in high-dose males (21%). Relative liver weight was significantly increased (10%) at 3.8 mg/kg bw/day, but absolute liver weights were not significantly different from controls and no significant differences were observed in high-dose animals.90-Day Study: Cholesterol and serum alkaline phosphatase (SAP) were significantly increased in males at 305 mg/kg bw/day and glutathione was significantly decreased at and above 46 mg/kg bw/day. Cholesterol, SGPT, and glutathione were significantly increased in females at 384 mg/kg bw/day. SGOT and SAP were significantly increased in all test groups of females. Cytochrome P-450 and aniline hydroxylase were significantly decreased in females at and above 44 mg/kg bw/day. Absolute liver (11% and 12%, respectively) weights were significantly decreased in males at 46 and 305 mg/kg bw/day. Absolute (32%) and relative (26%) liver weights were significantly increased in females at 384 mg/kg bw/day.; Renal/Kidney: 14-Day Study: No significant changes in kidney weights, SGPT or BUN. 90-Day Study: Absolute kidney weights (12% and 16%, respectively) were significantly decreased in males at 46 and 305 mg/kg bw/day. Significantly increased absolute kidney (10%) weights were observed in females at 384 mg/kg bw/day. BUN was significantly decreased in males at 4.4 and 305 mg/kg bw/day, and was decreased, but not significantly, at 46 mg/kg bw/day. No treatment-related changes in creatinine.;
Duration:	Short-term (>1-30 days) 14 days
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
Metric 18:	Sampling Adequacy	Medium	Neurological/Behavioral: The number of animals evaluated in each group was reported under Table 2 (12 mice/group).; Nutritional/Metabolic: The number of animals evaluated in each group was reported under Table 2 (12 mice/group).; Immune/Hematological: The number of animals evaluated in each group was reported under Table 2 (12 mice/group) and Table 3 (11-12 mice/group). The exact number of mice examined for each hematology parameter was not specified.; Reproductive/Developmental: The number of animals evaluated in each group was reported under Table 2 (12 mice/group).; Lung/Respiratory: The number of animals evaluated in each group was reported under Table 2 (12 mice/group).; Hepatic/Liver: The number of animals evaluated in each group was reported under Table 2 (12 mice/group) and Table 3 (11-12 mice/group). The exact number of mice examined for LDH and SGPT was not specified.; Renal/Kidney: The number of animals evaluated in each group was reported under Table 2 (12 mice/group) and Table 3 (11-12 mice/group). The exact number of mice examined for BUN was not specified.

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Health Outcome(s):	Neurological/Behavioral; Nutritional/Metabolic; Immune/Hematological; Reproductive/Developmental; Lung/Respiratory; Hepatic/Liver; Renal/Kidney;
Reported Health Effect(s):	Neurological/Behavioral: 14-Day Study: Significantly increased brain (11%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative brain weights (6%) were significantly decreased in females at 384 mg/kg bw/day.; Nutritional/Metabolic: 14-Day Study: No significant changes in bodyweight.90-Day Study: A dose-dependent decrease in bodyweight gain was observed in males, and was significantly decreased at 305 mg/kg bw/day. Water consumption was significantly decreased (36%) in males at 305 mg/kg bw/day. Water consumption was slightly decreased in males at 4.4 and 46 mg/kg bw/day (9% and 5%, respectively).; Immune/Hematological: 14-Day Study: Significantly increased thymus (25%) weights were observed at 38 mg/kg bw/day. No significant changes in hematology parameters or spleen weight.90-Day Study: A significant increase in the percent of lymphocytes and a decrease in the percent of polymorphonuclear leukocytes were observed in males at 305 mg/kg bw/day. A significant decrease in hematocrit and hemoglobin and a significant increase in leukocytes were observed in females at 384 mg/kg bw/day. Fibrinogen was significantly increased in all dose groups of females. And prothrombin time was significantly decreased in females at and above 44 mg/kg bw/day. Significantly increased absolute spleen (18%) weights were observed in females at 384 mg/kg bw/day. No treatment-related changes in thymus weight. Platelet counts increased in all groups, but not in a dose-dependent fashion.; Reproductive/Developmental: 14-Day Study: Significantly increased testes (18%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative testes weights (11% and 12%, respectively) were significantly increased in males at 46 and 305 mg/kg bw/day.; Lung/Respiratory: Acute: Reddened or hemorrhagic lungs were observed in up to 25% of animals14-Day Study: No significant changes in lung weight. 90-Day Study: No significant changes in lung weight.; Hepatic/Liver: The liver was a target of TCE toxicity in both sexes as demonstrated by dose-dependent alterations in hepatic microsomal enzyme activities and serum enzyme levels.Acute: Pale livers were observed in 50-75% of animals in each dose group14-Day Study: Lactic dehydrogenase activity was significantly decreased in high-dose males (21%). Relative liver weight was significantly increased (10%) at 3.8 mg/kg bw/day, but absolute liver weights were not significantly different from controls and no significant differences were observed in high-dose animals.90-Day Study: Cholesterol and serum alkaline phosphatase (SAP) were significantly increased in males at 305 mg/kg bw/day and glutathione was significantly decreased at and above 46 mg/kg bw/day. Cholesterol, SGPT, and glutathione were significantly increased in females at 384 mg/kg bw/day. SGOT and SAP were significantly increased in all test groups of females. Cytochrome P-450 and aniline hydroxylase were significantly decreased in females at and above 44 mg/kg bw/day. Absolute liver (11% and 12%, respectively) weights were significantly decreased in males at 46 and 305 mg/kg bw/day. Absolute (32%) and relative (26%) liver weights were significantly increased in females at 384 mg/kg bw/day.; Renal/Kidney: 14-Day Study: No significant changes in kidney weights, SGPT or BUN. 90-Day Study: Absolute kidney weights (12% and 16%, respectively) were significantly decreased in males at 46 and 305 mg/kg bw/day. Significantly increased absolute kidney (10%) weights were observed in females at 384 mg/kg bw/day. BUN was significantly decreased in males at 4.4 and 305 mg/kg bw/day, and was decreased, but not significantly, at 46 mg/kg bw/day. No treatment-related changes in creatinine.;
Duration:	Short-term (>1-30 days) 14 days
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
Metric 19:	Blinding of Assessors	N/A	Neurological/Behavioral: Blinding of assessors is not required for organ weight assessment.; Nutritional/Metabolic: Blinding of assessors is not required for bodyweight assessment.; Immune/Hematological: Blinding of assessors is not required for organ weight assessment or hematology.; Reproductive/Developmental: Blinding of assessors is not required for organ weight assessment.; Lung/Respiratory: Blinding of assessors is not required for organ weight assessment.; Hepatic/Liver: Blinding of assessors is not required for organ weight assessment or serum chemistry evaluations.; Renal/Kidney: Blinding of assessors is not required for organ weight assessment or serum chemistry evaluations.

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Health Outcome(s):	Neurological/Behavioral; Nutritional/Metabolic; Immune/Hematological; Reproductive/Developmental; Lung/Respiratory; Hepatic/Liver; Renal/Kidney;
Reported Health Effect(s):	Neurological/Behavioral: 14-Day Study: Significantly increased brain (11%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative brain weights (6%) were significantly decreased in females at 384 mg/kg bw/day.; Nutritional/Metabolic: 14-Day Study: No significant changes in bodyweight.90-Day Study: A dose-dependent decrease in bodyweight gain was observed in males, and was significantly decreased at 305 mg/kg bw/day. Water consumption was significantly decreased (36%) in males at 305 mg/kg bw/day. Water consumption was slightly decreased in males at 4.4 and 46 mg/kg bw/day (9% and 5%, respectively).; Immune/Hematological: 14-Day Study: Significantly increased thymus (25%) weights were observed at 38 mg/kg bw/day. No significant changes in hematology parameters or spleen weight.90-Day Study: A significant increase in the percent of lymphocytes and a decrease in the percent of polymorphonuclear leukocytes were observed in males at 305 mg/kg bw/day. A significant decrease in hematocrit and hemoglobin and a significant increase in leukocytes were observed in females at 384 mg/kg bw/day. Fibrinogen was significantly increased in all dose groups of females. And prothrombin time was significantly decreased in females at and above 44 mg/kg bw/day. Significantly increased absolute spleen (18%) weights were observed in females at 384 mg/kg bw/day. No treatment-related changes in thymus weight. Platelet counts increased in all groups, but not in a dose-dependent fashion.; Reproductive/Developmental: 14-Day Study: Significantly increased testes (18%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative testes weights (11% and 12%, respectively) were significantly increased in males at 46 and 305 mg/kg bw/day.; Lung/Respiratory: Acute: Reddened or hemorrhagic lungs were observed in up to 25% of animals14-Day Study: No significant changes in lung weight. 90-Day Study: No significant changes in lung weight.; Hepatic/Liver: The liver was a target of TCE toxicity in both sexes as demonstrated by dose-dependent alterations in hepatic microsomal enzyme activities and serum enzyme levels.Acute: Pale livers were observed in 50-75% of animals in each dose group14-Day Study: Lactic dehydrogenase activity was significantly decreased in high-dose males (21%). Relative liver weight was significantly increased (10%) at 3.8 mg/kg bw/day, but absolute liver weights were not significantly different from controls and no significant differences were observed in high-dose animals.90-Day Study: Cholesterol and serum alkaline phosphatase (SAP) were significantly increased in males at 305 mg/kg bw/day and glutathione was significantly decreased at and above 46 mg/kg bw/day. Cholesterol, SGPT, and glutathione were significantly increased in females at 384 mg/kg bw/day. SGOT and SAP were significantly increased in all test groups of females. Cytochrome P-450 and aniline hydroxylase were significantly decreased in females at and above 44 mg/kg bw/day. Absolute liver (11% and 12%, respectively) weights were significantly decreased in males at 46 and 305 mg/kg bw/day. Absolute (32%) and relative (26%) liver weights were significantly increased in females at 384 mg/kg bw/day.; Renal/Kidney: 14-Day Study: No significant changes in kidney weights, SGPT or BUN. 90-Day Study: Absolute kidney weights (12% and 16%, respectively) were significantly decreased in males at 46 and 305 mg/kg bw/day. Significantly increased absolute kidney (10%) weights were observed in females at 384 mg/kg bw/day. BUN was significantly decreased in males at 4.4 and 305 mg/kg bw/day, and was decreased, but not significantly, at 46 mg/kg bw/day. No treatment-related changes in creatinine.;
Duration:	Short-term (>1-30 days) 14 days
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
Metric 20:	Negative Control Response	Medium	Neurological/Behavioral: The biological response of the negative control group was reported in Table 2.; Nutritional/Metabolic: The biological response of the negative control group was reported in Table 2.; Immune/Hematological: The biological response of the negative control group was reported in Table 2 and 3.; Reproductive/Developmental: The biological response of the negative control group was reported in Table 2.; Lung/Respiratory: The biological response of the negative control group was reported in Table 2.; Hepatic/Liver: The biological response of the negative control group was reported in Table 2 and Table 3.; Renal/Kidney: The biological response of the negative control group was reported in Table 2 and Table 3.

Domain 6: Confounding / Variable Control

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Study Citation:	White, K. L., Jr, Sanders, V. M., Barnes, D. W., Shopp, G. M., Jr, Munson, A. E. (1985). Toxicology of 1,1,2-trichloroethane in the mouse. Drug and Chemical Toxicology 8(5):333-355.
Health Outcome(s):	Neurological/Behavioral; Nutritional/Metabolic; Immune/Hematological; Reproductive/Developmental; Lung/Respiratory; Hepatic/Liver; Renal/Kidney;
Reported Health Effect(s):	Neurological/Behavioral: 14-Day Study: Significantly increased brain (11%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative brain weights (6%) were significantly decreased in females at 384 mg/kg bw/day.; Nutritional/Metabolic: 14-Day Study: No significant changes in bodyweight.90-Day Study: A dose-dependent decrease in bodyweight gain was observed in males, and was significantly decreased at 305 mg/kg bw/day. Water consumption was significantly decreased (36%) in males at 305 mg/kg bw/day. Water consumption was slightly decreased in males at 4.4 and 46 mg/kg bw/day (9% and 5%, respectively).; Immune/Hematological: 14-Day Study: Significantly increased thymus (25%) weights were observed at 38 mg/kg bw/day. No significant changes in hematology parameters or spleen weight.90-Day Study: A significant increase in the percent of lymphocytes and a decrease in the percent of polymorphonuclear leukocytes were observed in males at 305 mg/kg bw/day. A significant decrease in hematocrit and hemoglobin and a significant increase in leukocytes were observed in females at 384 mg/kg bw/day. Fibrinogen was significantly increased in all dose groups of females. And prothrombin time was significantly decreased in females at and above 44 mg/kg bw/day. Significantly increased absolute spleen (18%) weights were observed in females at 384 mg/kg bw/day. No treatment-related changes in thymus weight. Platelet counts increased in all groups, but not in a dose-dependent fashion.; Reproductive/Developmental: 14-Day Study: Significantly increased testes (18%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative testes weights (11% and 12%, respectively) were significantly increased in males at 46 and 305 mg/kg bw/day.; Lung/Respiratory: Acute: Reddened or hemorrhagic lungs were observed in up to 25% of animals14-Day Study: No significant changes in lung weight. 90-Day Study: No significant changes in lung weight.; Hepatic/Liver: The liver was a target of TCE toxicity in both sexes as demonstrated by dose-dependent alterations in hepatic microsomal enzyme activities and serum enzyme levels.Acute: Pale livers were observed in 50-75% of animals in each dose group14-Day Study: Lactic dehydrogenase activity was significantly decreased in high-dose males (21%). Relative liver weight was significantly increased (10%) at 3.8 mg/kg bw/day, but absolute liver weights were not significantly different from controls and no significant differences were observed in high-dose animals.90-Day Study: Cholesterol and serum alkaline phosphatase (SAP) were significantly increased in males at 305 mg/kg bw/day and glutathione was significantly decreased at and above 46 mg/kg bw/day. Cholesterol, SGPT, and glutathione were significantly increased in females at 384 mg/kg bw/day. SGOT and SAP were significantly increased in all test groups of females. Cytochrome P-450 and aniline hydroxylase were significantly decreased in females at and above 44 mg/kg bw/day. Absolute liver (11% and 12%, respectively) weights were significantly decreased in males at 46 and 305 mg/kg bw/day. Absolute (32%) and relative (26%) liver weights were significantly increased in females at 384 mg/kg bw/day.; Renal/Kidney: 14-Day Study: No significant changes in kidney weights, SGPT or BUN. 90-Day Study: Absolute kidney weights (12% and 16%, respectively) were significantly decreased in males at 46 and 305 mg/kg bw/day. Significantly increased absolute kidney (10%) weights were observed in females at 384 mg/kg bw/day. BUN was significantly decreased in males at 4.4 and 305 mg/kg bw/day, and was decreased, but not significantly, at 46 mg/kg bw/day. No treatment-related changes in creatinine.;
Duration:	Short-term (>1-30 days) 14 days
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	All Outcomes: No significant differences in bodyweight were observed. Food/water consumption were not reported.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	All Outcomes: There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.

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Study Citation:	White, K. L., Jr, Sanders, V. M., Barnes, D. W., Shopp, G. M., Jr, Munson, A. E. (1985). Toxicology of 1,1,2-trichloroethane in the mouse. Drug and Chemical Toxicology 8(5):333-355.
Health Outcome(s):	Neurological/Behavioral; Nutritional/Metabolic; Immune/Hematological; Reproductive/Developmental; Lung/Respiratory; Hepatic/Liver; Renal/Kidney;
Reported Health Effect(s):	Neurological/Behavioral: 14-Day Study: Significantly increased brain (11%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative brain weights (6%) were significantly decreased in females at 384 mg/kg bw/day.; Nutritional/Metabolic: 14-Day Study: No significant changes in bodyweight.90-Day Study: A dose-dependent decrease in bodyweight gain was observed in males, and was significantly decreased at 305 mg/kg bw/day. Water consumption was significantly decreased (36%) in males at 305 mg/kg bw/day. Water consumption was slightly decreased in males at 4.4 and 46 mg/kg bw/day (9% and 5%, respectively).; Immune/Hematological: 14-Day Study: Significantly increased thymus (25%) weights were observed at 38 mg/kg bw/day. No significant changes in hematology parameters or spleen weight.90-Day Study: A significant increase in the percent of lymphocytes and a decrease in the percent of polymorphonuclear leukocytes were observed in males at 305 mg/kg bw/day. A significant decrease in hematocrit and hemoglobin and a significant increase in leukocytes were observed in females at 384 mg/kg bw/day. Fibrinogen was significantly increased in all dose groups of females. And prothrombin time was significantly decreased in females at and above 44 mg/kg bw/day. Significantly increased absolute spleen (18%) weights were observed in females at 384 mg/kg bw/day. No treatment-related changes in thymus weight. Platelet counts increased in all groups, but not in a dose-dependent fashion.; Reproductive/Developmental: 14-Day Study: Significantly increased testes (18%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative testes weights (11% and 12%, respectively) were significantly increased in males at 46 and 305 mg/kg bw/day.; Lung/Respiratory: Acute: Reddened or hemorrhagic lungs were observed in up to 25% of animals14-Day Study: No significant changes in lung weight. 90-Day Study: No significant changes in lung weight.; Hepatic/Liver: The liver was a target of TCE toxicity in both sexes as demonstrated by dose-dependent alterations in hepatic microsomal enzyme activities and serum enzyme levels.Acute: Pale livers were observed in 50-75% of animals in each dose group14-Day Study: Lactic dehydrogenase activity was significantly decreased in high-dose males (21%). Relative liver weight was significantly increased (10%) at 3.8 mg/kg bw/day, but absolute liver weights were not significantly different from controls and no significant differences were observed in high-dose animals.90-Day Study: Cholesterol and serum alkaline phosphatase (SAP) were significantly increased in males at 305 mg/kg bw/day and glutathione was significantly decreased at and above 46 mg/kg bw/day. Cholesterol, SGPT, and glutathione were significantly increased in females at 384 mg/kg bw/day. SGOT and SAP were significantly increased in all test groups of females. Cytochrome P-450 and aniline hydroxylase were significantly decreased in females at and above 44 mg/kg bw/day. Absolute liver (11% and 12%, respectively) weights were significantly decreased in males at 46 and 305 mg/kg bw/day. Absolute (32%) and relative (26%) liver weights were significantly increased in females at 384 mg/kg bw/day.; Renal/Kidney: 14-Day Study: No significant changes in kidney weights, SGPT or BUN. 90-Day Study: Absolute kidney weights (12% and 16%, respectively) were significantly decreased in males at 46 and 305 mg/kg bw/day. Significantly increased absolute kidney (10%) weights were observed in females at 384 mg/kg bw/day. BUN was significantly decreased in males at 4.4 and 305 mg/kg bw/day, and was decreased, but not significantly, at 46 mg/kg bw/day. No treatment-related changes in creatinine.;
Duration:	Short-term (>1-30 days) 14 days
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
Metric 23:	Data Presentation and Analysis	High	Neurological/Behavioral: One-way analysis of variance of organ weight means were performed with p<0.05. Independent statistical analysis is possible for the mean organ weights of each group.; Nutritional/Metabolic: One-way analysis of variance of body-weight means were performed with p<0.05. Independent statistical analysis is possible for the mean bodyweights of each group.; Immune/Hematological: One-way analysis of variance was performed with p<0.05. Independent statistical analysis is possible for the mean organ weights and hematology for each group.; Reproductive/Developmental: One-way analysis of variance of organ weight means were performed with p<0.05. Independent statistical analysis is possible for the mean organ weights of each group.; Lung/Respiratory: One-way analysis of variance of organ weight means were performed with p<0.05. Independent statistical analysis is possible for the mean organ weights of each group.; Hepatic/Liver: One-way analysis of variance was performed with p<0.05. Independent statistical analysis is possible for the mean organ weights and LDH and SGPT levels for each group.; Renal/Kidney: One-way analysis of variance was performed with p<0.05. Independent statistical analysis is possible for the mean organ weights and BUN levels for each group.

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Health Outcome(s):	Neurological/Behavioral; Nutritional/Metabolic; Immune/Hematological; Reproductive/Developmental; Lung/Respiratory; Hepatic/Liver; Renal/Kidney;
Reported Health Effect(s):	Neurological/Behavioral: 14-Day Study: Significantly increased brain (11%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative brain weights (6%) were significantly decreased in females at 384 mg/kg bw/day.; Nutritional/Metabolic: 14-Day Study: No significant changes in bodyweight.90-Day Study: A dose-dependent decrease in bodyweight gain was observed in males, and was significantly decreased at 305 mg/kg bw/day. Water consumption was significantly decreased (36%) in males at 305 mg/kg bw/day. Water consumption was slightly decreased in males at 4.4 and 46 mg/kg bw/day (9% and 5%, respectively).; Immune/Hematological: 14-Day Study: Significantly increased thymus (25%) weights were observed at 38 mg/kg bw/day. No significant changes in hematology parameters or spleen weight.90-Day Study: A significant increase in the percent of lymphocytes and a decrease in the percent of polymorphonuclear leukocytes were observed in males at 305 mg/kg bw/day. A significant decrease in hematocrit and hemoglobin and a significant increase in leukocytes were observed in females at 384 mg/kg bw/day. Fibrinogen was significantly increased in all dose groups of females. And prothrombin time was significantly decreased in females at and above 44 mg/kg bw/day. Significantly increased absolute spleen (18%) weights were observed in females at 384 mg/kg bw/day. No treatment-related changes in thymus weight. Platelet counts increased in all groups, but not in a dose-dependent fashion.; Reproductive/Developmental: 14-Day Study: Significantly increased testes (18%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative testes weights (11% and 12%, respectively) were significantly increased in males at 46 and 305 mg/kg bw/day.; Lung/Respiratory: Acute: Reddened or hemorrhagic lungs were observed in up to 25% of animals14-Day Study: No significant changes in lung weight. 90-Day Study: No significant changes in lung weight.; Hepatic/Liver: The liver was a target of TCE toxicity in both sexes as demonstrated by dose-dependent alterations in hepatic microsomal enzyme activities and serum enzyme levels.Acute: Pale livers were observed in 50-75% of animals in each dose group14-Day Study: Lactic dehydrogenase activity was significantly decreased in high-dose males (21%). Relative liver weight was significantly increased (10%) at 3.8 mg/kg bw/day, but absolute liver weights were not significantly different from controls and no significant differences were observed in high-dose animals.90-Day Study: Cholesterol and serum alkaline phosphatase (SAP) were significantly increased in males at 305 mg/kg bw/day and glutathione was significantly decreased at and above 46 mg/kg bw/day. Cholesterol, SGPT, and glutathione were significantly increased in females at 384 mg/kg bw/day. SGOT and SAP were significantly increased in all test groups of females. Cytochrome P-450 and aniline hydroxylase were significantly decreased in females at and above 44 mg/kg bw/day. Absolute liver (11% and 12%, respectively) weights were significantly decreased in males at 46 and 305 mg/kg bw/day. Absolute (32%) and relative (26%) liver weights were significantly increased in females at 384 mg/kg bw/day.; Renal/Kidney: 14-Day Study: No significant changes in kidney weights, SGPT or BUN. 90-Day Study: Absolute kidney weights (12% and 16%, respectively) were significantly decreased in males at 46 and 305 mg/kg bw/day. Significantly increased absolute kidney (10%) weights were observed in females at 384 mg/kg bw/day. BUN was significantly decreased in males at 4.4 and 305 mg/kg bw/day, and was decreased, but not significantly, at 46 mg/kg bw/day. No treatment-related changes in creatinine.;
Duration:	Short-term (>1-30 days) 14 days
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
Metric 24:	Reporting of Data	Medium	Neurological/Behavioral: Data for exposure-related findings were reported in Table 2 and in the text.; Nutritional/Metabolic: Data for exposure-related findings were reported in Table 2 and in the text.; Immune/Hematological: Data for exposure-related findings were reported in Table 2 and 3 and in the text.; Reproductive/Developmental: Data for exposure-related findings were reported in Table 2 and in the text.; Lung/Respiratory: Data for exposure-related findings were reported in Table 2.; Hepatic/Liver: Data for exposure-related findings were reported in Table 2 and 3 and in the text.; Renal/Kidney: Data for exposure-related findings were reported in Table 2 and 3 and in the text.

Additional Comments: None

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Health Outcome(s):	Neurological/Behavioral; Nutritional/Metabolic; Immune/Hematological; Reproductive/Developmental; Lung/Respiratory; Hepatic/Liver; Renal/Kidney;
Reported Health Effect(s):	Neurological/Behavioral: 14-Day Study: Significantly increased brain (11%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative brain weights (6%) were significantly decreased in females at 384 mg/kg bw/day.; Nutritional/Metabolic: 14-Day Study: No significant changes in bodyweight.90-Day Study: A dose-dependent decrease in bodyweight gain was observed in males, and was significantly decreased at 305 mg/kg bw/day. Water consumption was significantly decreased (36%) in males at 305 mg/kg bw/day. Water consumption was slightly decreased in males at 4.4 and 46 mg/kg bw/day (9% and 5%, respectively).; Immune/Hematological: 14-Day Study: Significantly increased thymus (25%) weights were observed at 38 mg/kg bw/day. No significant changes in hematology parameters or spleen weight.90-Day Study: A significant increase in the percent of lymphocytes and a decrease in the percent of polymorphonuclear leukocytes were observed in males at 305 mg/kg bw/day. A significant decrease in hematocrit and hemoglobin and a significant increase in leukocytes were observed in females at 384 mg/kg bw/day. Fibrinogen was significantly increased in all dose groups of females. And prothrombin time was significantly decreased in females at and above 44 mg/kg bw/day. Significantly increased absolute spleen (18%) weights were observed in females at 384 mg/kg bw/day. No treatment-related changes in thymus weight. Platelet counts increased in all groups, but not in a dose-dependent fashion.; Reproductive/Developmental: 14-Day Study: Significantly increased testes (18%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative testes weights (11% and 12%, respectively) were significantly increased in males at 46 and 305 mg/kg bw/day.; Lung/Respiratory: Acute: Reddened or hemorrhagic lungs were observed in up to 25% of animals14-Day Study: No significant changes in lung weight. 90-Day Study: No significant changes in lung weight.; Hepatic/Liver: The liver was a target of TCE toxicity in both sexes as demonstrated by dose-dependent alterations in hepatic microsomal enzyme activities and serum enzyme levels.Acute: Pale livers were observed in 50-75% of animals in each dose group14-Day Study: Lactic dehydrogenase activity was significantly decreased in high-dose males (21%). Relative liver weight was significantly increased (10%) at 3.8 mg/kg bw/day, but absolute liver weights were not significantly different from controls and no significant differences were observed in high-dose animals.90-Day Study: Cholesterol and serum alkaline phosphatase (SAP) were significantly increased in males at 305 mg/kg bw/day and glutathione was significantly decreased at and above 46 mg/kg bw/day. Cholesterol, SGPT, and glutathione were significantly increased in females at 384 mg/kg bw/day. SGOT and SAP were significantly increased in all test groups of females. Cytochrome P-450 and aniline hydroxylase were significantly decreased in females at and above 44 mg/kg bw/day. Absolute liver (11% and 12%, respectively) weights were significantly decreased in males at 46 and 305 mg/kg bw/day. Absolute (32%) and relative (26%) liver weights were significantly increased in females at 384 mg/kg bw/day.; Renal/Kidney: 14-Day Study: No significant changes in kidney weights, SGPT or BUN. 90-Day Study: Absolute kidney weights (12% and 16%, respectively) were significantly decreased in males at 46 and 305 mg/kg bw/day. Significantly increased absolute kidney (10%) weights were observed in females at 384 mg/kg bw/day. BUN was significantly decreased in males at 4.4 and 305 mg/kg bw/day, and was decreased, but not significantly, at 46 mg/kg bw/day. No treatment-related changes in creatinine.;
Duration:	Short-term (>1-30 days) 14 days
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
Overall Quality Determination		Medium	

Study Citation:	Dow Chemical, (2005). 1,1,2-Trichloroethane: Subchronic neurotoxicity study in F344/DUCRL rats.		
Health Outcome(s):	Mortality; Ocular/Sensory; Ocular/Sensory;		
Reported Health Effect(s):	Mortality; Mortality and morbidity; Ocular/Sensory; Ophthalmology examination; Ocular/Sensory; Ophthalmology examination;		
Duration:	Subchronic (>30-91 days) 13 weeks		
Chemical:	1,1,2-Trichloroethane- Parent compound		
HERO ID:	6547037		
Domain	Metric	Rating	Comments
Domain 1: Test Substance			
Metric 1:	Test Substance Identity	High	All Outcomes: The test material was identified by name as 1,1,2-trichloroethane; a CASRN was not reported, but molecular formula, weight, and structure were provided.
Metric 2:	Test Substance Source	High	All Outcomes: The source was Dow chemical company; gas chromatography was performed to assess purity.
Metric 3:	Test Substance Purity	High	All Outcomes: The purity was 99.92%
Domain 2: Test Design			
Metric 4:	Negative and Vehicle Controls	High	All Outcomes: Untreated drinking water served as the negative control.
Metric 5:	Positive Controls	Medium	All Outcomes: Positive control data demonstrating the laboratories ability to perform the procedures were provided in appendices in the report.
Metric 6:	Randomized Allocation of Animals	Medium	All Outcomes: Animals were stratified by body weight and randomly assigned into treatment groups using a computer program.
Domain 3: Exposure Characterization			
Metric 7:	Preparation and Storage of Test Substance	High	All Outcomes: Drinking water solutions were prepared weekly. Analysis of doses and test for homogeneity were performed three times, prior to exposure, and then at the middle and the end of the study. Stability analysis was performed.
Metric 8:	Consistency of Exposure	High	All Outcomes: Animals were given access to drinking water ad libitum.
Metric 9:	Administration Reporting of Doses/Concentrations	Low	All Outcomes: Concentrations in water were reported in mg/L. Calculations were performed by the study authors using animal body weights and water intake and mean doses in mg/kg-day for each sex were provided. There is ambiguity about the mean high dose. High dose intake ranged from 117.3 - 69.8 mg/kg-day in males and from 162.5-52.9 mg/kg-day in females.
Metric 10:	Exposure Frequency and Duration	High	All Outcomes: The exposure frequency and duration of exposure were reported and appropriate for this study type and/or outcome(s) of interest
Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	High	All Outcomes: The concentrations were carefully selected based on preliminary PBPK studies and a previous acute neurotoxicity study.
Metric 12:	Exposure Route and Method	Medium	All Outcomes: The exposure route was justified by the study authors as a likely means of human exposure; however, due to palatability issues in the test animals, it is unclear whether this was the most appropriate method of exposure.
Domain 4: Test Animals			
Metric 13:	Test Animal Characteristics	High	All Outcomes: Test animal species, strain, age, source, and starting body weights were reported. Justification was provided for use of the strain selected.
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Study Citation:	Dow Chemical, (2005). 1,1,2-Trichloroethane: Subchronic neurotoxicity study in F344/DUCRL rats.			
Health Outcome(s):	Mortality; Ocular/Sensory; Ocular/Sensory;			
Reported Health Effect(s):	Mortality: Mortality and morbidity; Ocular/Sensory: Ophthalmology examination; Ocular/Sensory: Ophthalmology examination;			
Duration:	Subchronic (>30-91 days) 13 weeks			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	6547037			
Domain	Metric	Rating	Comments	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	High	All Outcomes: All animal husbandry conditions were reported and were adequate.	
	Metric 15: Number of Animals per Group	Medium	All Outcomes: The number of animals per group (10/sex/group) was consistent with the USEPA OPPTS 870.6200 TG	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	High	All Outcomes: The outcome assessment was performed as specified in the USEPA OPPTS 870.6200 TG	
	Metric 17: Consistency of Outcome Assessment	High	All Outcomes: Details of the outcome assessment protocol were reported and outcomes were assessed consistently across study groups (e.g., at the same time after initial exposure) using the same protocol in all study groups.	
	Metric 18: Sampling Adequacy	High	All Outcomes: The study used adequate sampling for the outcome(s) of interest.	
	Metric 19: Blinding of Assessors	High	All Outcomes: Observers were blinded for subjective observations (i.e., FOB). Blinding was not needed for other endpoints.	
	Metric 20: Negative Control Response	High	All Outcomes: The biological responses of the negative control group(s) were adequate	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Low	All Outcomes: Dose-related issues with palatability were noted resulting in up to 25.3% and 26.1% reductions in drinking water intake in males and females, respectively at the high dose. These reductions did not correlate with body weight changes in males (increases rather than decreases were observed). A slight decrease in female body weights was observed; however, bodyweight changes in both sexes were more reflective of mild differences in food consumption. Reductions in water intake did not affect mortality; no animals died.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	All Outcomes: There were no health outcomes un-related to exposure reported.	
	Metric 23: Data Presentation and Analysis	High	All Outcomes: Detailed statistical methods were provided and were appropriate for the outcomes of interest.	
	Metric 24: Reporting of Data	High	Mortality: Data for exposure-related findings were presented for all outcomes by exposure group and sex (if applicable) with quantal and/or continuous presentation and description of severity scores if applicable. Negative findings were reported qualitatively or quantitatively.; Ocular/Sensory: Incidence data were clearly reported including data for individual animals.; Ocular/Sensory: Incidence data were clearly reported including data for individual animals.	
Additional Comments:	Decreased water intake did not affect mortality (no deaths or morbidity were observed)			

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Study Citation:	Dow Chemical, (2005). 1,1,2-Trichloroethane: Subchronic neurotoxicity study in F344/DUCRL rats.		
Health Outcome(s):	Mortality; Ocular/Sensory; Ocular/Sensory;		
Reported Health Effect(s):	Mortality: Mortality and morbidity; Ocular/Sensory: Ophthalmology examination; Ocular/Sensory: Ophthalmology examination;		
Duration:	Subchronic (>30-91 days) 13 weeks		
Chemical:	1,1,2-Trichloroethane- Parent compound		
HERO ID:	6547037		
Domain	Metric	Rating	Comments
Overall Quality Determination		Low	

Study Citation:	Dow Chemical, (2005). 1,1,2-Trichloroethane: Subchronic neurotoxicity study in F344/DUCRL rats.			
Health Outcome(s):	Neurological/Behavioral			
Reported Health Effect(s):	Neurological/Behavioral: FOB (hand-held and open field observations, rectal temperature, grip performance, landing foot splay, motor activity); neuropathology (necropsy and perfusion, and histopathology)			
Duration:	Subchronic (>30-91 days) 13 weeks			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	6547037			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	The test material was identified by name as 1,1,2-trichloroethane; a CASRN was not reported, but molecular formula, weight, and structure were provided.	
	Metric 2: Test Substance Source	High	The source was Dow chemical company; gas chromatography was performed to assess purity.	
	Metric 3: Test Substance Purity	High	The purity was 99.92%	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	High	Untreated drinking water served as the negative control.	
	Metric 5: Positive Controls	Medium	Positive control data demonstrating the laboratories ability to perform the procedures were provided in appendices in the report.	
	Metric 6: Randomized Allocation of Animals	Medium	Animals were stratified by body weight and randomly assigned into treatment groups using a computer program.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	High	Drinking water solutions were prepared weekly. Analysis of doses and test for homogeneity were performed three times, prior to exposure, and then at the middle and the end of the study. Stability analysis was performed.	
	Metric 8: Consistency of Exposure Administration	High	Animals were given access to drinking water ad libitum.	
	Metric 9: Reporting of Doses/Concentrations	Low	Concentrations in water were reported in mg/L. Calculations were performed by the study authors using animal body weights and water intake and mean doses in mg/kg-day for each sex were provided. There is ambiguity about the mean high dose. High dose intake ranged from 117.3 - 69.8 mg/kg-day in males and from 162.5-52.9 mg/kg-day in females.	
	Metric 10: Exposure Frequency and Duration	High	The exposure frequency and duration of exposure were reported and appropriate for this study type and/or outcome(s) of interest	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	High	The concentrations were carefully selected based on preliminary PBPK studies and a previous acute neurotoxicity study.	
	Metric 12: Exposure Route and Method	Medium	The exposure route was justified by the study authors as a likely means of human exposure; however, due to palatability issues in the test animals, it is unclear whether this was the most appropriate method of exposure.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	High	Test animal species, strain, age, source, and starting body weights were reported. Justification was provided for use of the strain selected.	
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Study Citation:	Dow Chemical, (2005). 1,1,2-Trichloroethane: Subchronic neurotoxicity study in F344/DUCRL rats.			
Health Outcome(s):	Neurological/Behavioral			
Reported Health Effect(s):	Neurological/Behavioral: FOB (hand-held and open field observations, rectal temperature, grip performance, landing foot splay, motor activity); neuropathology (necropsy and perfusion, and histopathology)			
Duration:	Subchronic (>30-91 days) 13 weeks			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	6547037			
Domain	Metric	Rating	Comments	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	High	All animal husbandry conditions were reported and were adequate.	
	Metric 15: Number of Animals per Group	Medium	The number of animals per group (10/sex/group) was consistent with the USEPA OPPTS 870.6200 TG	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	High	The outcome assessment was performed as specified in the USEPA OPPTS 870.6200 TG	
	Metric 17: Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported and outcomes were assessed consistently across study groups (e.g., at the same time after initial exposure) using the same protocol in all study groups.	
	Metric 18: Sampling Adequacy	High	The study used adequate sampling for the outcome(s) of interest.	
	Metric 19: Blinding of Assessors	High	Observers were blinded for subjective observations (i.e., FOB). Blinding was not needed for other endpoints.	
	Metric 20: Negative Control Response	High	The biological responses of the negative control group(s) were adequate	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Uninformative	Dose-related issues with palatability were noted resulting in up to 25.3% and 26.1% reductions in drinking water intake in males and females, respectively at the high dose. It is unclear whether body weight changes had an impact on animal body weights. However, water intake reductions did not correlate with body weight changes in males (increases rather than decreases were observed). A slight decrease in female body weights was observed. Body weight changes in both sexes were more reflective of mild differences in food consumption.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There were no health outcomes un-related to exposure reported.	
	Metric 23: Data Presentation and Analysis	High	Detailed statistical methods were provided and were appropriate for the outcomes of interest.	
	Metric 24: Reporting of Data	High	Data for exposure-related findings were presented for all outcomes by exposure group and sex (if applicable) with quantal and/or continuous presentation and description of severity scores if applicable. Negative findings were reported qualitatively or quantitatively.	

Additional Comments: There is uncertainty as to whether reduced water intake had an effect neurological endpoints.

Overall Quality Determination**Uninformative**

Study Citation:	Dow Chemical, (2005). 1,1,2-Trichloroethane: Subchronic neurotoxicity study in F344/DUCRL rats.			
Health Outcome(s):	Nutritional/Metabolic			
Reported Health Effect(s):	Nutritional/Metabolic: Body weights, food and water consumption			
Duration:	Subchronic (>30-91 days) 13 weeks			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	6547037			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
Metric 1:	Test Substance Identity	High	The test material was identified by name as 1,1,2-trichloroethane; a CASRN was not reported, but molecular formula, weight, and structure were provided.	
Metric 2:	Test Substance Source	High	The source was Dow chemical company; gas chromatography was performed to assess purity.	
Metric 3:	Test Substance Purity	High	The purity was 99.92%	
Domain 2: Test Design				
Metric 4:	Negative and Vehicle Controls	High	Untreated drinking water served as the negative control.	
Metric 5:	Positive Controls	Medium	Positive control data demonstrating the laboratories ability to perform the procedures were provided in appendices in the report.	
Metric 6:	Randomized Allocation of Animals	Medium	Animals were stratified by body weight and randomly assigned into treatment groups using a computer program.	
Domain 3: Exposure Characterization				
Metric 7:	Preparation and Storage of Test Substance	High	Drinking water solutions were prepared weekly. Analysis of doses and test for homogeneity were performed three times, prior to exposure, and then at the middle and the end of the study. Stability analysis was performed.	
Metric 8:	Consistency of Exposure Administration	High	Animals were given access to drinking water ad libitum.	
Metric 9:	Reporting of Doses/Concentrations	Low	Concentrations in water were reported in mg/L. Calculations were performed by the study authors using animal body weights and water intake and mean doses in mg/kg-day for each sex were provided. There is ambiguity about the mean high dose. High dose intake ranged from 117.3 - 69.8 mg/kg-day in males and from 162.5-52.9 mg/kg-day in females.	
Metric 10:	Exposure Frequency and Duration	High	The exposure frequency and duration of exposure were reported and appropriate for this study type and/or outcome(s) of interest	
Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	High	The concentrations were carefully selected based on preliminary PBPK studies and a previous acute neurotoxicity study.	
Metric 12:	Exposure Route and Method	Medium	The exposure route was justified by the study authors as a likely means of human exposure; however, due to palatability issues in the test animals, it is unclear whether this was the most appropriate method of exposure.	
Domain 4: Test Animals				
Metric 13:	Test Animal Characteristics	High	Test animal species, strain, age, source, and starting body weights were reported. Justification was provided for use of the strain selected.	
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Study Citation:	Dow Chemical, (2005). 1,1,2-Trichloroethane: Subchronic neurotoxicity study in F344/DUCRL rats.			
Health Outcome(s):	Nutritional/Metabolic			
Reported Health Effect(s):	Nutritional/Metabolic: Body weights, food and water consumption			
Duration:	Subchronic (>30-91 days) 13 weeks			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	6547037			
Domain	Metric	Rating	Comments	
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	High	All animal husbandry conditions were reported and were adequate.
	Metric 15:	Number of Animals per Group	Medium	The number of animals per group (10/sex/group) was consistent with the USEPA OPPTS 870.6200 TG
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	High	The outcome assessment was performed as specified in the USEPA OPPTS 870.6200 TG
	Metric 17:	Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported and outcomes were assessed consistently across study groups (e.g., at the same time after initial exposure) using the same protocol in all study groups.
	Metric 18:	Sampling Adequacy	High	The study used adequate sampling for the outcome(s) of interest.
	Metric 19:	Blinding of Assessors	High	Observers were blinded for subjective observations (i.e., FOB). Blinding was not needed for other endpoints.
	Metric 20:	Negative Control Response	High	The biological responses of the negative control group(s) were adequate
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Uninformative	Dose-related issues with palatability were noted resulting in up to 25.3% and 26.1% reductions in drinking water intake in males and females, respectively at the high dose. It is unclear whether body weight changes had an impact on animal body weights. However, water intake reductions did not correlate with body weight changes in males (increases rather than decreases were observed). A slight decrease in female body weights was observed. Body weight changes in both sexes were more reflective of mild differences in food consumption.
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There were no health outcomes un-related to exposure reported.
	Metric 23:	Data Presentation and Analysis	High	Detailed statistical methods were provided and were appropriate for the outcomes of interest.
	Metric 24:	Reporting of Data	Medium	Only body weights measured prior to FOB observations were statistically analyzed, but individual body weights throughout the study period are available for review.
Additional Comments:	There is uncertainty as to whether reduced water intake had an effect on animal body weights.			

Overall Quality Determination**Uninformative**

Study Citation:	Milman, H. A., Story, D. L., Riccio, E. S., Sivak, A., Tu, A. S., Williams, G. M., Tong, C., Tyson, C. A. (1988). Rat liver foci and in vitro assays to detect initiating and promoting effects of chlorinated ethanes and ethylenes. Annals of the New York Academy of Sciences 534:521-530.			
Health Outcome(s):	Cancer/Carcinogenesis			
Reported Health Effect(s):	Cancer/Carcinogenesis: Increased incidence of GGT-positive liver foci in rats dosed during promotion phase (1,1,2-TCE only)			
Duration:	Subchronic (>30-91 days) 7 Weeks (promotion protocol)			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	200479; Linked HERO ID(s): 200479, 200616			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Source	Low	The source was reported as Aldrich, but a batch or lot number was not provided.
	Metric 3:	Test Substance Purity	Medium	Purity was reported as 97 to 99%.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	High	A concurrent negative control group received vehicle (corn oil) only.
	Metric 5:	Positive Controls	Medium	Phenobarbital was used as a positive control for the tumor promotion protocol.
	Metric 6:	Randomized Allocation of Animals	Medium	The study reports randomization of animals.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Low	The study does not report test substance storage and preparation conditions, and the test substance is volatile.
	Metric 8:	Consistency of Exposure Administration	Low	Gavage volume is not reported for treated animals.
	Metric 9:	Reporting of Doses/Concentrations	High	Doses were reported without ambiguity in mg/kg.
	Metric 10:	Exposure Frequency and Duration	High	The exposure period (5 days/week for 7 weeks) appears sufficient for determination of tumor promotion potential based on the positive control response.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Medium	Only a single dose level was used, but it was justified as the MTD.
	Metric 12:	Exposure Route and Method	High	The exposure route (gavage) was appropriate for the test substance.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	Low	Species, sex, strain, and starting body weight were reported. Age and source were not reported.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	Temperature, humidity, and light-dark cycle were not reported and it is not possible to determine whether differences occurred between control and exposed populations.
	Metric 15:	Number of Animals per Group	Medium	The number of animals per study group (10) was appropriate for the study type and outcome analysis.
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	High	The outcome assessment was appropriate and sensitive for tumor promotion potential.
	Metric 17:	Consistency of Outcome Assessment	High	Timing of necropsy was consistent across groups.

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Study Citation:	Milman, H. A., Story, D. L., Riccio, E. S., Sivak, A., Tu, A. S., Williams, G. M., Tong, C., Tyson, C. A. (1988). Rat liver foci and in vitro assays to detect initiating and promoting effects of chlorinated ethanes and ethylenes. Annals of the New York Academy of Sciences 534:521-530.
Health Outcome(s):	Cancer/Carcinogenesis
Reported Health Effect(s):	Cancer/Carcinogenesis: Increased incidence of GGT-positive liver foci in rats dosed during promotion phase (1,1,2-TCE only)
Duration:	Subchronic (>30-91 days) 7 Weeks (promotion protocol)
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	200479; Linked HERO ID(s): 200479, 200616

Domain	Metric	Rating	Comments
	Metric 18: Sampling Adequacy	High	Sample size (n = 8-10) was adequate for assessment of tumor promotion potential.
	Metric 19: Blinding of Assessors	N/A	Blinding is not required for initial histopathology review.
	Metric 20: Negative Control Response	High	The biological response (incidence of GGT-positive foci) of the negative control group appeared adequate.
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	High	There is no evidence of confounding variables in test design and procedures that would affect tumor promotion.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	A low amount of attrition (0-2/10 animals) occurred in this experiment. However, there was no information provided either to support or dismiss the suggestion that differences among groups in health outcomes unrelated to exposure could influence the outcome assessment.
	Metric 23: Data Presentation and Analysis	Low	Statistical analysis was performed, but the methods were not described.
	Metric 24: Reporting of Data	High	Incidence data, with standard errors, are reported for each group in Table 4.

Additional Comments: The primary purpose of this study was to evaluate the tumor initiation and promotion potential of the chemical.

Overall Quality Determination

High

Study Citation:	Milman, H. A., Story, D. L., Riccio, E. S., Sivak, A., Tu, A. S., Williams, G. M., Tong, C., Tyson, C. A. (1988). Rat liver foci and in vitro assays to detect initiating and promoting effects of chlorinated ethanes and ethylenes. Annals of the New York Academy of Sciences 534:521-530.			
Health Outcome(s):	Nutritional/Metabolic			
Reported Health Effect(s):	Nutritional/Metabolic: Decreased body weight gain (1,1,2-TCE only)			
Duration:	Subchronic (>30-91 days) 7 Weeks (promotion protocol)			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	200479; Linked HERO ID(s): 200479, 200616			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	The test substance was identified by name.	
	Metric 2: Test Substance Source	Low	The source was reported as Aldrich, but a batch or lot number was not provided.	
	Metric 3: Test Substance Purity	Medium	Purity was reported as 97 to 99%.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	High	A concurrent negative control group received vehicle (corn oil) only.	
	Metric 5: Positive Controls	N/A	A positive control is not required for the endpoint of body weight.	
	Metric 6: Randomized Allocation of Animals	Medium	The study reports randomization of animals.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	The study does not report test substance storage and preparation conditions, and the test substance is volatile.	
	Metric 8: Consistency of Exposure Administration	Low	Gavage volume is not reported for treated animals.	
	Metric 9: Reporting of Doses/Concentrations	High	Doses were reported without ambiguity in mg/kg.	
	Metric 10: Exposure Frequency and Duration	High	Animals received the test substance by gavage 5 days/week for 7 weeks, which is appropriate for determining subchronic effects.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Medium	Only a single dose level was used, but it was justified as the MTD.	
	Metric 12: Exposure Route and Method	High	The exposure route (gavage) was appropriate for the test substance.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Low	Species, sex, strain, and starting body weight were reported. Age and source were not reported.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Temperature, humidity, and light-dark cycle were not reported and it is not possible to determine whether differences occurred between control and exposed populations.	
	Metric 15: Number of Animals per Group	Medium	The number of animals per study group (10) was appropriate for the study type and outcome analysis.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	High	The outcome assessment methodology was appropriate. Body weight and body weight gain were measured.	
	Metric 17: Consistency of Outcome Assessment	Low	The timing of body weight measurements was not reported.	
	Metric 18: Sampling Adequacy	Low	Sample size for body weight and body weight gain was not reported.	

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Study Citation:	Milman, H. A., Story, D. L., Riccio, E. S., Sivak, A., Tu, A. S., Williams, G. M., Tong, C., Tyson, C. A. (1988). Rat liver foci and in vitro assays to detect initiating and promoting effects of chlorinated ethanes and ethylenes. Annals of the New York Academy of Sciences 534:521-530.			
Health Outcome(s):	Nutritional/Metabolic			
Reported Health Effect(s):	Nutritional/Metabolic: Decreased body weight gain (1,1,2-TCE only)			
Duration:	Subchronic (>30-91 days) 7 Weeks (promotion protocol)			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	200479; Linked HERO ID(s): 200479, 200616			
Domain	Metric	Rating	Comments	
	Metric 19: Blinding of Assessors	N/A	The outcome (body weight) is not subjective.	
	Metric 20: Negative Control Response	Low	The biological response (body weight) of the negative control group was not reported.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	High	Food and water were provided ad libitum. There is no evidence of confounding variables in test design and procedures that would affect the endpoint of body weight.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	A low amount of attrition (0-2/10 animals) occurred in this experiment. However, there was no information provided either to support or dismiss the suggestion that differences among groups in health outcomes unrelated to exposure could influence the outcome assessment.	
	Metric 23: Data Presentation and Analysis	Low	Statistical analysis was performed, but the methods were not described.	
	Metric 24: Reporting of Data	Low	Results were described only in the text. Numerical values (i.e., body weight, body weight gain) were not provided.	
Additional Comments:	The primary purpose of this study was to evaluate the tumor initiation and promotion potential of the chemical. Effects on body weight and body weight gain were not the primary purpose of the study, and only minimal details are provided for these endpoints.			

Overall Quality Determination**Medium**

Study Citation:	Milman, H. A., Story, D. L., Riccio, E. S., Sivak, A., Tu, A. S., Williams, G. M., Tong, C., Tyson, C. A. (1988). Rat liver foci and in vitro assays to detect initiating and promoting effects of chlorinated ethanes and ethylenes. Annals of the New York Academy of Sciences 534:521-530.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: Decreased absolute liver weight (1,1,2-TCE only)			
Duration:	Subchronic (>30-91 days) 7 Weeks (promotion protocol)			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	200479; Linked HERO ID(s): 200479, 200616			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	The test substance was identified by name.	
	Metric 2: Test Substance Source	Low	The source was reported as Aldrich, but a batch or lot number was not provided.	
	Metric 3: Test Substance Purity	Medium	Purity was reported as 97 to 99%.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	High	A concurrent negative control group received vehicle (corn oil) only.	
	Metric 5: Positive Controls	N/A	A positive control is not required for the endpoint of liver weight.	
	Metric 6: Randomized Allocation of Animals	Medium	The study reports randomization of animals.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	The study does not report test substance storage and preparation conditions, and the test substance is volatile.	
	Metric 8: Consistency of Exposure Administration	Low	Gavage volume is not reported for treated animals.	
	Metric 9: Reporting of Doses/Concentrations	High	Doses were reported without ambiguity in mg/kg.	
	Metric 10: Exposure Frequency and Duration	High	Animals received the test substance by gavage 5 days/week for 7 weeks, which is appropriate for determining subchronic effects.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Medium	Only a single dose level was used, but it was justified as the MTD.	
	Metric 12: Exposure Route and Method	High	The exposure route (gavage) was appropriate for the test substance.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Low	Species, sex, strain, and starting body weight were reported. Age and source were not reported.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Temperature, humidity, and light-dark cycle were not reported and it is not possible to determine whether differences occurred between control and exposed populations.	
	Metric 15: Number of Animals per Group	Medium	The number of animals per study group (10) was appropriate for the study type and outcome analysis.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	Low	The outcome assessment for liver was very limited (liver weight only).	
	Metric 17: Consistency of Outcome Assessment	High	Timing of necropsy was consistent across groups.	
	Metric 18: Sampling Adequacy	Low	Sample size for liver weight measurements was not reported.	
	Metric 19: Blinding of Assessors	N/A	The outcome (liver weight) is not subjective.	

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Study Citation:	Milman, H. A., Story, D. L., Riccio, E. S., Sivak, A., Tu, A. S., Williams, G. M., Tong, C., Tyson, C. A. (1988). Rat liver foci and in vitro assays to detect initiating and promoting effects of chlorinated ethanes and ethylenes. Annals of the New York Academy of Sciences 534:521-530.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: Decreased absolute liver weight (1,1,2-TCE only)			
Duration:	Subchronic (>30-91 days) 7 Weeks (promotion protocol)			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	200479; Linked HERO ID(s): 200479, 200616			
Domain	Metric	Rating	Comments	
	Metric 20: Negative Control Response	Low	The biological response (liver weight) of the negative control group was not reported.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	High	Food and water were provided ad libitum. There is no evidence of confounding variables in test design and procedures that would affect the endpoint of liver weight.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	A low amount of attrition (0-2/10 animals) occurred in this experiment. However, there was no information provided either to support or dismiss the suggestion that differences among groups in health outcomes unrelated to exposure could influence the outcome assessment.	
	Metric 23: Data Presentation and Analysis	Low	Statistical analysis was performed, but the methods were not described.	
	Metric 24: Reporting of Data	Low	Results were described only in the text. Numerical values (i.e., absolute and relative liver weights) were not provided.	
Additional Comments:	The primary purpose of this study was to evaluate the tumor initiation and promotion potential of the chemical. Effects on liver weight were not the primary purpose of the study, and only minimal details are provided for this endpoint.			

Overall Quality Determination**Medium**

Study Citation:	Sanders, V. M., White, K. L., Jr, Shopp, G. M., Jr, Munson, A. E. (1985). Humoral and cell-mediated immune status of mice exposed to 1,1,2-trichloroethane. Drug and Chemical Toxicology 8(5):357-372.			
Health Outcome(s):	Immune/Hematological; Nutritional/Metabolic;			
Reported Health Effect(s):	Immune/Hematological: Cell-mediated response: delayed-type hypersensitivity and popliteal lymph node proliferationHumoral-mediated response: IgM antibody forming cells against sRBC, Hemagglutination titers, spleen lymphocyte response to LPS or ConASpleen weight; Nutritional/Metabolic: Terminal body weight;			
Duration:	Subchronic (>30-91 days) 90 days			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	64556; Linked HERO ID(s): 64564, 64556			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	All Outcomes: Test substance was identified as 1,1,2-Trichichloroethane.
	Metric 2:	Test Substance Source	High	All Outcomes: The source of the test substance was Aldrich Chemical Co. (Milwaukee, WI). Lots 070177 and 061197 identified. The structure was verified by infrared spectrometry.
	Metric 3:	Test Substance Purity	Medium	All Outcomes: Purity was given as 95% and verified by gas chromatography
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	High	Immune/Hematological: Negative control was appropriate (vehicle control).; Nutritional/Metabolic: Negative control was appropriate.
	Metric 5:	Positive Controls	N/A	All Outcomes: Positive control was not required in this study.
	Metric 6:	Randomized Allocation of Animals	Low	All Outcomes: The study did not report how animals were allocated.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	High	All Outcomes: Preparation and storage are described in detail in cited reference (White et al., 1985)
	Metric 8:	Consistency of Exposure Administration	High	All Outcomes: Details of exposure were reported and appropriate in cited reference (White et al. 1985) with some limitations.
	Metric 9:	Reporting of Doses/Concentrations	High	All Outcomes: Doses are reported without ambiguity and were based on LD50 values.
	Metric 10:	Exposure Frequency and Duration	High	All Outcomes: Exposure frequency and duration were reported and appropriate.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	High	All Outcomes: Number of dose groups and spacing were appropriate.
	Metric 12:	Exposure Route and Method	High	All Outcomes: Exposure route was appropriate.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	Low	Immune/Hematological: Study states details on mice can be found at cited reference (White et al. 1985). The cited reference did not provide any details on source, age, or starting body weight.; Nutritional/Metabolic: Study states details on mice can be found at cited reference (White et al. 1985). The cited reference did not provide and details on source, age, or starting body weight.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	All Outcomes: Husbandry conditions were not reported in cited reference (White et al 1985).

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Study Citation:	Sanders, V. M., White, K. L., Jr, Shopp, G. M., Jr, Munson, A. E. (1985). Humoral and cell-mediated immune status of mice exposed to 1,1,2-trichloroethane. Drug and Chemical Toxicology 8(5):357-372.			
Health Outcome(s):	Immune/Hematological; Nutritional/Metabolic;			
Reported Health Effect(s):	Immune/Hematological: Cell-mediated response: delayed-type hypersensitivity and popliteal lymph node proliferationHumoral-mediated response: IgM antibody forming cells against sRBC, Hemagglutination titers, spleen lymphocyte response to LPS or ConASpleen weight; Nutritional/Metabolic: Terminal body weight;			
Duration:	Subchronic (>30-91 days) 90 days			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	64556; Linked HERO ID(s): 64564, 64556			
Domain	Metric	Rating	Comments	
	Metric 15: Number of Animals per Group	Low	All Outcomes: The number of animals/groups were not reported.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	High	All Outcomes: Outcome assessment and methodology were appropriate.	
	Metric 17: Consistency of Outcome Assessment	High	All Outcomes: Details of outcome assessment are provided in cited reference (White et al. 1985) and were consistent.	
	Metric 18: Sampling Adequacy	High	All Outcomes: The number of animals sampled was adequate.	
	Metric 19: Blinding of Assessors	N/A	All Outcomes: Blinding was not necessary for this study.	
	Metric 20: Negative Control Response	High	All Outcomes: The negative control response was appropriate.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	All Outcomes: Study did not report all information to determine confounding, reported information did not identify differences.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	All Outcomes: No information was provided to either to support or dismiss differences in groups in health outcomes or attrition.	
	Metric 23: Data Presentation and Analysis	High	All Outcomes: Statistical analysis was performed and appropriate.	
	Metric 24: Reporting of Data	High	All Outcomes: All outcome data were reported adequately.	
Additional Comments:	Although study states "Details of the methods for the immunotoxicological assays and historical controls have been fully described in the first article of this volume", this reviewer believes they used concurrent negative controls in this study. The cited reference with the historic data contains much larger numbers of mice than in this article and the values are not the same (although similar to historic data).The QC reviewer added a statement to form 2d summary regarding PESS considerations for sex differences.			

Overall Quality Determination**High**

Study Citation:	White, K. L., Jr, Sanders, V. M., Barnes, D. W., Shopp, G. M., Jr, Munson, A. E. (1985). Toxicology of 1,1,2-trichloroethane in the mouse. Drug and Chemical Toxicology 8(5):333-355.
Health Outcome(s):	Serum chemistry (Serum chemistry); Reproductive/Developmental; Immune/Hematological; Neurological/Behavioral; Lung/Respiratory; Renal/Kidney; Hepatic/Liver;
Reported Health Effect(s):	Serum chemistry (Serum chemistry): 90-Day Study: In males, calcium levels were significantly increased at and above 46 mg/kg bw/day and potassium levels were significantly increased at 4.4 mg/kg bw/day and significantly decreased at and above 46 mg/kg bw/day. Chloride levels were significantly increased in males at 305 mg/kg bw/day. No treatment-related changes in females.; Reproductive/Developmental: 14-Day Study: Significantly increased testes (18%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative testes weights (11% and 12%, respectively) were significantly increased in males at 46 and 305 mg/kg bw/day.; Immune/Hematological: 14-Day Study: Significantly increased thymus (25%) weights were observed at 38 mg/kg bw/day. No significant changes in hematology parameters or spleen weight.90-Day Study: A significant increase in the percent of lymphocytes and a decrease in the percent of polymorphonuclear leukocytes were observed in males at 305 mg/kg bw/day. A significant decrease in hematocrit and hemoglobin and a significant increase in leukocytes were observed in females at 384 mg/kg bw/day. Fibrinogen was significantly increased in all dose groups of females. And prothrombin time was significantly decreased in females at and above 44 mg/kg bw/day. Significantly increased absolute spleen (18%) weights were observed in females at 384 mg/kg bw/day. No treatment-related changes in thymus weight. Platelet counts increased in all groups, but not in a dose-dependent fashion.; Neurological/Behavioral: 14-Day Study: Significantly increased brain (11%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative brain weights (6%) were significantly decreased in females at 384 mg/kg bw/day.; Lung/Respiratory: Acute: Reddened or hemorrhagic lungs were observed in up to 25% of animals14-Day Study: No significant changes in lung weight. 90-Day Study: No significant changes in lung weight.; Renal/Kidney: 14-Day Study: No significant changes in kidney weights, SGPT or BUN. 90-Day Study: Absolute kidney weights (12% and 16%, respectively) were significantly decreased in males at 46 and 305 mg/kg bw/day. Significantly increased absolute kidney (10%) weights were observed in females at 384 mg/kg bw/day. BUN was significantly decreased in males at 4.4 and 305 mg/kg bw/day, and was decreased, but not significantly, at 46 mg/kg bw/day. No treatment-related changes in creatinine.; Hepatic/Liver: The liver was a target of TCE toxicity in both sexes as demonstrated by dose-dependent alterations in hepatic microsomal enzyme activities and serum enzyme levels.Acute: Pale livers were observed in 50-75% of animals in each dose group14-Day Study: Lactic dehydrogenase activity was significantly decreased in high-dose males (21%). Relative liver weight was significantly increased (10%) at 3.8 mg/kg bw/day, but absolute liver weights were not significantly different from controls and no significant differences were observed in high-dose animals.90-Day Study: Cholesterol and serum alkaline phosphatase (SAP) were significantly increased in males at 305 mg/kg bw/day and glutathione was significantly decreased at and above 46 mg/kg bw/day. Cholesterol, SGPT, and glutathione were significantly increased in females at 384 mg/kg bw/day. SGOT and SAP were significantly increased in all test groups of females. Cytochrome P-450 and aniline hydroxylase were significantly decreased in females at and above 44 mg/kg bw/day. Absolute liver (11% and 12%, respectively) weights were significantly decreased in males at 46 and 305 mg/kg bw/day. Absolute (32%) and relative (26%) liver weights were significantly increased in females at 384 mg/kg bw/day.;
Duration:	Subchronic (>30-91 days) 90 days
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
Metric 1:	Test Substance Identity	Medium	All Outcomes: The test substance was identified as 1,1,2-trichloroethane. The chemical structure was verified. The specific form was not identified.
Metric 2:	Test Substance Source	High	All Outcomes: The test substance was purchased from Aldrich Chemical Co. in Milwaukee, WI, with lot numbers of 070177 and 061197. The chemical structure was verified using infrared spectrometry.
Metric 3:	Test Substance Purity	Medium	All Outcomes: The purity was reported as 95% and was verified by gas chromatography. It was reported that no stabilizers or preservatives were present, but the other constituents were not specified.

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Domain	Metric	Rating	Comments
Domain 2: Test Design	Metric 4: Negative and Vehicle Controls	High	All Outcomes: Negative vehicle controls (deionized water) were used.
	Metric 5: Positive Controls	N/A	All Outcomes: Positive controls are not required for 90-day toxicity tests.

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Domain	Metric	Rating	Comments
	Metric 6: Randomized Allocation of Animals	Medium	Serum chemistry (Serum chemistry): The study reported animals were randomized at the beginning of the exposure, but did not provide any other details.; Reproductive/Developmental: The study reported animals were randomized at the beginning of the exposure, but did not provide any other details. Note by QCER: There is a related reference HERO ID r064563 by White et al 1985, Immunotoxicological Investigations in the Mouse: General Approach and Methods.; Immune/Hematological: The study reported animals were randomized at the beginning of the exposure, but did not provide any other details. Note by QCER: There is a related reference HERO ID r064563 by White et al 1985, Immunotoxicological Investigations in the Mouse: General Approach and Methods.; Neurological/Behavioral: The study reported animals were randomized at the beginning of the exposure, but did not provide any other details. Note by QCER: There is a related reference HERO ID r064563 by White et al 1985, Immunotoxicological Investigations in the Mouse: General Approach and Methods.; Lung/Respiratory: The study reported animals were randomized at the beginning of the exposure, but did not provide any other details.; Renal/Kidney: The study reported animals were randomized at the beginning of the exposure, but did not provide any other details.; Hepatic/Liver: The study reported animals were randomized at the beginning of the exposure, but did not provide any other details.

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Duration:	Subchronic (>30-91 days) 90 days
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Domain	Metric	Rating	Comments

Domain 3: Exposure Characterization

Continued on next page ...

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Duration:	Subchronic (>30-91 days) 90 days
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HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
	Metric 7: Preparation and Storage of Test Substance	Medium	Serum chemistry (Serum chemistry): The test solutions in drinking water were changed twice per week. The solutions in drinking water were stored in amber-colored bottles with cork stoppers and stainless steel spouts, and was maintained at room temperature. During the 3-4 days between water bottle changes, <10% of the test substance was lost (measured by GLC with head space analysis). No other details were provided (stability, homogeneity, stirring methods, etc.). Note from QCer: White et al noted that all solutions were maintained in dark bottles to alleviate possible photodecomposition.; Reproductive/Developmental: The test solutions in drinking water were changed twice per week. The solutions in drinking water were stored in amber-colored bottles with cork stoppers and stainless steel spouts, and was maintained at room temperature. During the 3-4 days between water bottle changes, <10% of the test substance was lost (measured by GLC with head space analysis). No other details were provided (stability, homogeneity, stirring methods, etc.). Note from QCer: White et al noted that all solutions were maintained in dark bottles to alleviate possible photodecomposition.; Immune/Hematological: The test solutions in drinking water were changed twice per week. The solutions in drinking water were stored in amber-colored bottles with cork stoppers and stainless steel spouts, and was maintained at room temperature. During the 3-4 days between water bottle changes, <10% of the test substance was lost (measured by GLC

...continued from previous page

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Domain	Metric	Rating	Comments
	Metric 8: Consistency of Exposure Administration	Medium	Serum chemistry (Serum chemistry): Drinking water consumption was reported for each sex and each dose group. It was not reported if all water bottles were replaced on the same day of the week. Males in the highest dose group consumed significantly less water than control males (153 mL/kg bw/day compared with 240 mL/kg bw/day in controls), resulting in decreased consumption of the test substance.; Reproductive/Developmental: Drinking water consumption was reported for each sex and dose group. It was not reported if all water bottles were replaced on the same day of the week. Males in the highest dose group consumed significantly less water than control males (153 mL/kg bw/day compared with 240 mL/kg bw/day in controls), resulting in decreased consumption of the test substance.; Immune/Hematological: Drinking water consumption was reported for each sex and each dose group. It was not reported if all water bottles were replaced on the same day of the week. Males in the highest dose group consumed significantly less water than control males (153 mL/kg bw/day compared with 240 mL/kg bw/day in controls), resulting in decreased consumption of the test substance.; Neurological/Behavioral: Drinking water consumption was reported for each sex and each dose group. It was not reported if all water bottles were replaced on the same day of the week. Males in the highest dose group consumed significantly less water than control males (153 mL/kg bw/day compared with 240 mL/kg bw/day in controls), resulting in decreased consumption of the test substance.

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Reported Health Effect(s):	Serum chemistry (Serum chemistry): 90-Day Study: In males, calcium levels were significantly increased at and above 46 mg/kg bw/day and potassium levels were significantly increased at 4.4 mg/kg bw/day and significantly decreased at and above 46 mg/kg bw/day. Chloride levels were significantly increased in males at 305 mg/kg bw/day. No treatment-related changes in females.; Reproductive/Developmental: 14-Day Study: Significantly increased testes (18%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative testes weights (11% and 12%, respectively) were significantly increased in males at 46 and 305 mg/kg bw/day.; Immune/Hematological: 14-Day Study: Significantly increased thymus (25%) weights were observed at 38 mg/kg bw/day. No significant changes in hematology parameters or spleen weight.90-Day Study: A significant increase in the percent of lymphocytes and a decrease in the percent of polymorphonuclear leukocytes were observed in males at 305 mg/kg bw/day. A significant decrease in hematocrit and hemoglobin and a significant increase in leukocytes were observed in females at 384 mg/kg bw/day. Fibrinogen was significantly increased in all dose groups of females. And prothrombin time was significantly decreased in females at and above 44 mg/kg bw/day. Significantly increased absolute spleen (18%) weights were observed in females at 384 mg/kg bw/day. No treatment-related changes in thymus weight. Platelet counts increased in all groups, but not in a dose-dependent fashion.; Neurological/Behavioral: 14-Day Study: Significantly increased brain (11%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative brain weights (6%) were significantly decreased in females at 384 mg/kg bw/day.; Lung/Respiratory: Acute: Reddened or hemorrhagic lungs were observed in up to 25% of animals14-Day Study: No significant changes in lung weight. 90-Day Study: No significant changes in lung weight.; Renal/Kidney: 14-Day Study: No significant changes in kidney weights, SGPT or BUN. 90-Day Study: Absolute kidney weights (12% and 16%, respectively) were significantly decreased in males at 46 and 305 mg/kg bw/day. Significantly increased absolute kidney (10%) weights were observed in females at 384 mg/kg bw/day. BUN was significantly decreased in males at 4.4 and 305 mg/kg bw/day, and was decreased, but not significantly, at 46 mg/kg bw/day. No treatment-related changes in creatinine.; Hepatic/Liver: The liver was a target of TCE toxicity in both sexes as demonstrated by dose-dependent alterations in hepatic microsomal enzyme activities and serum enzyme levels.Acute: Pale livers were observed in 50-75% of animals in each dose group14-Day Study: Lactic dehydrogenase activity was significantly decreased in high-dose males (21%). Relative liver weight was significantly increased (10%) at 3.8 mg/kg bw/day, but absolute liver weights were not significantly different from controls and no significant differences were observed in high-dose animals.90-Day Study: Cholesterol and serum alkaline phosphatase (SAP) were significantly increased in males at 305 mg/kg bw/day and glutathione was significantly decreased at and above 46 mg/kg bw/day. Cholesterol, SGPT, and glutathione were significantly increased in females at 384 mg/kg bw/day. SGOT and SAP were significantly increased in all test groups of females. Cytochrome P-450 and aniline hydroxylase were significantly decreased in females at and above 44 mg/kg bw/day. Absolute liver (11% and 12%, respectively) weights were significantly decreased in males at 46 and 305 mg/kg bw/day. Absolute (32%) and relative (26%) liver weights were significantly increased in females at 384 mg/kg bw/day.;
Duration:	Subchronic (>30-91 days) 90 days
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
	Metric 9: Reporting of Doses/Concentrations	High	All Outcomes: Target doses of 0, 3.8, 38, and 380 mg/kg bw/day were used, and based on concentrations in the drinking water of 0.02, 0.2, and 2.0 mg/mL, respectively. Doses based on actual water consumption were reported for each dose group and each sex.
	Metric 10: Exposure Frequency and Duration	High	All Outcomes: Doses were administered via drinking water for 90 days.
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	High	All Outcomes: Doses of 1/100, 1/10, and 1/1 of the LD50 for males from the acute study were used in the 90-day study. The acute and 14-day studies conducted prior to the 90-day study used gavage as the exposure route, but the 90 day study used drinking water as the exposure route. The study noted target doses for this study were selected to deliver equivalent or higher doses than those administered via gavage.
	Metric 12: Exposure Route and Method	Medium	All Outcomes: Test solutions were administered via drinking water. The route of exposure was appropriate for the outcome. It was not reported if actions were taken to try to minimize headspace for the volatile substance, but authors did report that <10% of the test substance was lost during the 3-4 days between drinking water replacement.

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Domain	Metric	Rating	Comments
Domain 4: Test Animals			

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Duration:	Subchronic (>30-91 days) 90 days
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
Metric 13:	Test Animal Characteristics	Medium	Serum chemistry (Serum chemistry): Revised text by QCer: Four week old male and female CD-1 mice were used in this study and were likely obtained from Charles River Breeding Laboratories, Wilmington, MA. Growth charts (indicating bodyweights) were provided for both sexes of animals in each test group. Information obtained from reference HERO ID r064563 by White et al 1985, Immunotoxicological Investigations in the Mouse: General Approach and Methods. No other details were provided.; Reproductive/Developmental: Revised text by QCer: Four week old male and female CD-1 mice were used in this study and were likely obtained from Charles River Breeding Laboratories, Wilmington, MA. Growth charts (indicating bodyweights) were provided for both sexes of animals in each test group. Information obtained from reference HERO ID r064563 by White et al 1985, Immunotoxicological Investigations in the Mouse: General Approach and Methods. No other details were provided; Immune/Hematological: Revised text by QCer: Four week old male and female CD-1 mice were used in this study and were likely obtained from Charles River Breeding Laboratories, Wilmington, MA. Growth charts (indicating bodyweights) were provided for both sexes of animals in each test group. Information obtained from reference HERO ID r064563 by White et al 1985, Immunotoxicological Investigations in the Mouse: General Approach and Methods. No other details were provided.; Neurological/Behavioral: Revised text by QCer:

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Health Outcome(s):	Serum chemistry (Serum chemistry); Reproductive/Developmental; Immune/Hematological; Neurological/Behavioral; Lung/Respiratory; Renal/Kidney; Hepatic/Liver;
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Duration:	Subchronic (>30-91 days) 90 days
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	High	Serum chemistry (Serum chemistry): Note by QCER: White et al. 1985 reported that upon arrival all animals were housed four per cage in plastic shoe box cages with sawdust bedding and quarantined for 7 days. Mice exposed by gavage were maintained on Pu r i n a Lab Chow and water ad l i b i tum. Animal room temperature was maintained between 21 and 24°C and r e l a t i v e humidity between 40-60%. The light-dark cycle was maintained on 12-hr i n t e r v a l s .; Reproductive/Developmental: Note by QCER: White et al. 1985 reported that upon arrival all animals were housed four per cage in plastic shoe box cages with sawdust bedding and quarantined for 7 days. Mice exposed by gavage were maintained on Pu r i n a Lab Chow and water ad l i b i tum. Animal room temperature was maintained between 21 and 24°C and r e l a t i v e humidity between 40-60%. The light-dark cycle was maintained on 12-hr i n t e r v a l s .; Immune/Hematological: Note by QCER: White et al. 1985 reported that upon arrival all animals were housed four per cage in plastic shoe box cages with sawdust bedding and quarantined for 7 days. Mice exposed by gavage were maintained on Pu r i n a Lab Chow and water ad l i b i tum. Animal room temperature was maintained between 21 and 24C and r e l a t i v e humidity between 40-60%. The light-dark cycle was maintained on 12-hr i n t e r v a l s .; Neurological/Behavioral: White et al. 1985 reported that upon arrival all animals were housed four per cage in plastic shoe box

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Health Outcome(s):	Serum chemistry (Serum chemistry); Reproductive/Developmental; Immune/Hematological; Neurological/Behavioral; Lung/Respiratory; Renal/Kidney; Hepatic/Liver;
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Duration:	Subchronic (>30-91 days) 90 days
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HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
	Metric 15: Number of Animals per Group	Low	All Outcomes: The number of animals exposed per group was not reported. The study only reported the number of animals that were evaluated per group (up to 32 mice/sex/group in the test groups and 48 mice/sex in the control group).

Domain 5: Outcome Assessment

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Domain	Metric	Rating	Comments
	Metric 16: Outcome Assessment Methodology	Medium	Serum chemistry (Serum chemistry): The outcome assessment methodology was not clearly reported for serum chemistry evaluations, but mean serum chemistry results were provided in Tables 10 and 11.; Reproductive/Developmental: The outcome assessment methodology was not clearly reported for testes weight assessment, but mean testes weights for each group were reported in Table 5. No other reproductive endpoints were evaluated (sperm parameters, etc.) for males, and no reproductive parameters were evaluated for females.; Immune/Hematological: The outcome assessment methodology was not clearly reported for organ weight assessment or hematology evaluations, but mean organ weights (thymic and spleen) for each group were reported in Tables 5 and 6 and hematology results were provided in Tables 7-9.; Neurological/Behavioral: The outcome assessment methodology was not clearly reported for brain weight assessment, but mean brain weights for each group were reported in Tables 5 and 6. No other neurological endpoints were evaluated (brain histopathology, FOB, motor activity, etc.); Lung/Respiratory: The outcome assessment methodology was not clearly reported for lung weight assessment, but mean lung weights for each group were reported in Tables 5 and 6. No other respiratory endpoints were evaluated (lung histopathology, respiratory rates, etc.); Renal/Kidney: The outcome assessment methodology was not clearly reported for organ weight assessment or serum chemistry evaluations, but mean organ

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Health Outcome(s):	Serum chemistry (Serum chemistry); Reproductive/Developmental; Immune/Hematological; Neurological/Behavioral; Lung/Respiratory; Renal/Kidney; Hepatic/Liver;
Reported Health Effect(s):	Serum chemistry (Serum chemistry): 90-Day Study: In males, calcium levels were significantly increased at and above 46 mg/kg bw/day and potassium levels were significantly increased at 4.4 mg/kg bw/day and significantly decreased at and above 46 mg/kg bw/day. Chloride levels were significantly increased in males at 305 mg/kg bw/day. No treatment-related changes in females.; Reproductive/Developmental: 14-Day Study: Significantly increased testes (18%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative testes weights (11% and 12%, respectively) were significantly increased in males at 46 and 305 mg/kg bw/day.; Immune/Hematological: 14-Day Study: Significantly increased thymus (25%) weights were observed at 38 mg/kg bw/day. No significant changes in hematology parameters or spleen weight.90-Day Study: A significant increase in the percent of lymphocytes and a decrease in the percent of polymorphonuclear leukocytes were observed in males at 305 mg/kg bw/day. A significant decrease in hematocrit and hemoglobin and a significant increase in leukocytes were observed in females at 384 mg/kg bw/day. Fibrinogen was significantly increased in all dose groups of females. And prothrombin time was significantly decreased in females at and above 44 mg/kg bw/day. Significantly increased absolute spleen (18%) weights were observed in females at 384 mg/kg bw/day. No treatment-related changes in thymus weight. Platelet counts increased in all groups, but not in a dose-dependent fashion.; Neurological/Behavioral: 14-Day Study: Significantly increased brain (11%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative brain weights (6%) were significantly decreased in females at 384 mg/kg bw/day.; Lung/Respiratory: Acute: Reddened or hemorrhagic lungs were observed in up to 25% of animals14-Day Study: No significant changes in lung weight. 90-Day Study: No significant changes in lung weight.; Renal/Kidney: 14-Day Study: No significant changes in kidney weights, SGPT or BUN. 90-Day Study: Absolute kidney weights (12% and 16%, respectively) were significantly decreased in males at 46 and 305 mg/kg bw/day. Significantly increased absolute kidney (10%) weights were observed in females at 384 mg/kg bw/day. BUN was significantly decreased in males at 4.4 and 305 mg/kg bw/day, and was decreased, but not significantly, at 46 mg/kg bw/day. No treatment-related changes in creatinine.; Hepatic/Liver: The liver was a target of TCE toxicity in both sexes as demonstrated by dose-dependent alterations in hepatic microsomal enzyme activities and serum enzyme levels.Acute: Pale livers were observed in 50-75% of animals in each dose group14-Day Study: Lactic dehydrogenase activity was significantly decreased in high-dose males (21%). Relative liver weight was significantly increased (10%) at 3.8 mg/kg bw/day, but absolute liver weights were not significantly different from controls and no significant differences were observed in high-dose animals.90-Day Study: Cholesterol and serum alkaline phosphatase (SAP) were significantly increased in males at 305 mg/kg bw/day and glutathione was significantly decreased at and above 46 mg/kg bw/day. Cholesterol, SGPT, and glutathione were significantly increased in females at 384 mg/kg bw/day. SGOT and SAP were significantly increased in all test groups of females. Cytochrome P-450 and aniline hydroxylase were significantly decreased in females at and above 44 mg/kg bw/day. Absolute liver (11% and 12%, respectively) weights were significantly decreased in males at 46 and 305 mg/kg bw/day. Absolute (32%) and relative (26%) liver weights were significantly increased in females at 384 mg/kg bw/day.;
Duration:	Subchronic (>30-91 days) 90 days
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
	Metric 17: Consistency of Outcome Assessment	Low	Serum chemistry (Serum chemistry): Timing of each serum chemistry evaluation was not specified. No other details on the consistency of outcome assessment were provided.; Reproductive/Developmental: Timing of each testes weight assessment was not specified. No other details on the consistency of outcome assessment were provided.; Immune/Hematological: Timing of each organ weight assessment or hematology evaluations were not specified. No other details on the consistency of outcome assessment were provided.; Neurological/Behavioral: Timing of each brain weight assessment was not specified. No other details on the consistency of outcome assessment were provided.; Lung/Respiratory: Timing of each lung weight assessment was not specified. No other details on the consistency of outcome assessment were provided.; Renal/Kidney: Timing of each organ weight assessment or serum chemistry evaluations were not specified. No other details on the consistency of outcome assessment were provided.; Hepatic/Liver: Timing of each organ weight assessment, serum chemistry evaluations, or microsomal activity assessment were not specified. No other details on the consistency of outcome assessment were provided.

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Duration:	Subchronic (>30-91 days) 90 days
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
Metric 18:	Sampling Adequacy	Medium	Serum chemistry (Serum chemistry): The number of animals evaluated in each group for serum chemistry evaluations were provided under Tables 10 and 11. Only about half of the animals/sex/group were included in the analysis presented in each of the tables.; Reproductive/Developmental: The number of animals evaluated in each group for organ weights was reported under Table 5. Only about half of the animals/group were included in the analysis presented in Table 5 for testes weight.; Immune/Hematological: The number of animals evaluated in each group for organ weights was reported under Tables 5 and 6 and for hematology evaluations were provided under Tables 7-9. Only about half of the animals/sex/group were included in the analysis presented in each of the tables.; Neurological/Behavioral: The number of animals evaluated in each group for organ weights was reported under Tables 5 and 6. Only about half of the animals/sex/group were included in the analysis presented in Tables 5 and 6.; Lung/Respiratory: The number of animals evaluated in each group for organ weights was reported under Tables 5 and 6. Only about half of the animals/sex/group were included in the analysis presented in Tables 5 and 6.; Renal/Kidney: The number of animals evaluated in each group for organ weights was reported under Tables 5 and 6 and for serum chemistry evaluations were provided under Tables 10 and 11. Only about half of the animals/sex/group were included in the analysis presented in each of the tables.; Hepatic/Liver: The number of

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Duration:	Subchronic (>30-91 days) 90 days
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
Metric 19:	Blinding of Assessors	N/A	Serum chemistry (Serum chemistry): Blinding of assessors is not required for serum chemistry evaluations.; Reproductive/Developmental: Blinding of assessors is not required for organ weight assessments.; Immune/Hematological: Blinding of assessors is not required for organ weight assessments or hematology evaluations.; Neurological/Behavioral: Blinding of assessors is not required for organ weight assessments.; Lung/Respiratory: Blinding of assessors is not required for organ weight assessments.; Renal/Kidney: Blinding of assessors is not required for organ weight assessments or serum chemistry evaluations.; Hepatic/Liver: Blinding of assessors is not required for organ weight assessments, serum chemistry evaluations, or hepatic microsomal activity assessment.

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Health Outcome(s):	Serum chemistry (Serum chemistry); Reproductive/Developmental; Immune/Hematological; Neurological/Behavioral; Lung/Respiratory; Renal/Kidney; Hepatic/Liver;
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Duration:	Subchronic (>30-91 days) 90 days
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
Metric 20:	Negative Control Response	Medium	Serum chemistry (Serum chemistry): The biological response of the negative control group was reported in the tables for serum chemistry.; Reproductive/Developmental: The biological response of the negative control group was reported in Table 5 for organ weight assessment.; Immune/Hematological: The biological response of the negative control group was reported in the tables for organ weight assessment and hematology.; Neurological/Behavioral: The biological response of the negative control group was reported in the tables for organ weight assessment.; Lung/Respiratory: The biological response of the negative control group was reported in the tables for organ weight assessment.; Renal/Kidney: The biological response of the negative control group was reported in the tables for organ weight assessment and serum chemistry.; Hepatic/Liver: The biological response of the negative control group was reported in the tables for organ weight assessment, serum chemistry, and hepatic microsomal activity.

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Health Outcome(s):	Serum chemistry (Serum chemistry); Reproductive/Developmental; Immune/Hematological; Neurological/Behavioral; Lung/Respiratory; Renal/Kidney; Hepatic/Liver;
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Domain	Metric	Rating	Comments
Domain 6: Confounding / Variable Control			

Continued on next page ...

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Domain	Metric	Rating	Comments
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	Serum chemistry (Serum chemistry): Water consumption was significantly decreased in high-dose males (36%, but this was reported as 30% in the text). Water consumption in the other test groups of males (9% and 5%, respectively) was not significantly different from controls. Water consumption was non-significantly increased in females in the low- and mid-dose groups (1% and 15%, respectively) and slightly decreased in the high-dose group (0.5%). Bodyweight gain was significantly decreased in high-dose males (10%), but was not significantly different from controls in other groups of males and in the females.While the overall study is medium for this metric, the high-dose male results are considered uninformative due to the greatly reduced drinking water consumption, which affects the received dose and may also result in dehydration. There were no issues with dosing in females or low-med dose males.; Reproductive/Developmental: Water consumption was significantly decreased in high-dose males (36%, but this was reported as 30% in the text). Water consumption in the other test groups of males (9% and 5%, respectively) was not significantly different from controls. Bodyweight gain was significantly decreased in high-dose males (10%), but was not significantly different from controls in other groups of males.While the overall study is medium for this metric, the high-dose male results are considered uninformative due to the greatly reduced drinking water consumption, which affects the received dose and may also result

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Health Outcome(s):	Serum chemistry (Serum chemistry); Reproductive/Developmental; Immune/Hematological; Neurological/Behavioral; Lung/Respiratory; Renal/Kidney; Hepatic/Liver;
Reported Health Effect(s):	Serum chemistry (Serum chemistry): 90-Day Study: In males, calcium levels were significantly increased at and above 46 mg/kg bw/day and potassium levels were significantly increased at 4.4 mg/kg bw/day and significantly decreased at and above 46 mg/kg bw/day. Chloride levels were significantly increased in males at 305 mg/kg bw/day. No treatment-related changes in females.; Reproductive/Developmental: 14-Day Study: Significantly increased testes (18%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative testes weights (11% and 12%, respectively) were significantly increased in males at 46 and 305 mg/kg bw/day.; Immune/Hematological: 14-Day Study: Significantly increased thymus (25%) weights were observed at 38 mg/kg bw/day. No significant changes in hematology parameters or spleen weight.90-Day Study: A significant increase in the percent of lymphocytes and a decrease in the percent of polymorphonuclear leukocytes were observed in males at 305 mg/kg bw/day. A significant decrease in hematocrit and hemoglobin and a significant increase in leukocytes were observed in females at 384 mg/kg bw/day. Fibrinogen was significantly increased in all dose groups of females. And prothrombin time was significantly decreased in females at and above 44 mg/kg bw/day. Significantly increased absolute spleen (18%) weights were observed in females at 384 mg/kg bw/day. No treatment-related changes in thymus weight. Platelet counts increased in all groups, but not in a dose-dependent fashion.; Neurological/Behavioral: 14-Day Study: Significantly increased brain (11%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative brain weights (6%) were significantly decreased in females at 384 mg/kg bw/day.; Lung/Respiratory: Acute: Reddened or hemorrhagic lungs were observed in up to 25% of animals14-Day Study: No significant changes in lung weight. 90-Day Study: No significant changes in lung weight.; Renal/Kidney: 14-Day Study: No significant changes in kidney weights, SGPT or BUN. 90-Day Study: Absolute kidney weights (12% and 16%, respectively) were significantly decreased in males at 46 and 305 mg/kg bw/day. Significantly increased absolute kidney (10%) weights were observed in females at 384 mg/kg bw/day. BUN was significantly decreased in males at 4.4 and 305 mg/kg bw/day, and was decreased, but not significantly, at 46 mg/kg bw/day. No treatment-related changes in creatinine.; Hepatic/Liver: The liver was a target of TCE toxicity in both sexes as demonstrated by dose-dependent alterations in hepatic microsomal enzyme activities and serum enzyme levels.Acute: Pale livers were observed in 50-75% of animals in each dose group14-Day Study: Lactic dehydrogenase activity was significantly decreased in high-dose males (21%). Relative liver weight was significantly increased (10%) at 3.8 mg/kg bw/day, but absolute liver weights were not significantly different from controls and no significant differences were observed in high-dose animals.90-Day Study: Cholesterol and serum alkaline phosphatase (SAP) were significantly increased in males at 305 mg/kg bw/day and glutathione was significantly decreased at and above 46 mg/kg bw/day. Cholesterol, SGPT, and glutathione were significantly increased in females at 384 mg/kg bw/day. SGOT and SAP were significantly increased in all test groups of females. Cytochrome P-450 and aniline hydroxylase were significantly decreased in females at and above 44 mg/kg bw/day. Absolute liver (11% and 12%, respectively) weights were significantly decreased in males at 46 and 305 mg/kg bw/day. Absolute (32%) and relative (26%) liver weights were significantly increased in females at 384 mg/kg bw/day.;
Duration:	Subchronic (>30-91 days) 90 days
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	All Outcomes: There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.

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Health Outcome(s):	Serum chemistry (Serum chemistry); Reproductive/Developmental; Immune/Hematological; Neurological/Behavioral; Lung/Respiratory; Renal/Kidney; Hepatic/Liver;
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Duration:	Subchronic (>30-91 days) 90 days
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
Metric 23:	Data Presentation and Analysis	High	Serum chemistry (Serum chemistry): One-way analysis of variance of serum chemistry parameters were performed with $p < 0.05$. If significant effects were observed, Duncan's Multiple Range Test was performed. Independent statistical analysis is possible for the mean serum chemistry results for each group and each sex.; Reproductive/Developmental: One-way analysis of variance of organ weight means were performed with $p < 0.05$. If significant effects were observed, Duncan's Multiple Range Test was performed. Independent statistical analysis is possible for the mean organ weights for each group.; Immune/Hematological: One-way analysis of variance of organ weight means and hematology parameters were performed with $p < 0.05$. If significant effects were observed, Duncan's Multiple Range Test was performed. Independent statistical analysis is possible for the mean organ weights and hematology parameters for each group and each sex.; Neurological/Behavioral: One-way analysis of variance of organ weight means were performed with $p < 0.05$. If significant effects were observed, Duncan's Multiple Range Test was performed. Independent statistical analysis is possible for the mean organ weights of each group for each sex.; Lung/Respiratory: One-way analysis of variance of organ weight means were performed with $p < 0.05$. If significant effects were observed, Duncan's Multiple Range Test was performed. Independent statistical analysis is possible for the mean organ weights for each group and each sex.;

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Study Citation:	White, K. L., Jr, Sanders, V. M., Barnes, D. W., Shopp, G. M., Jr, Munson, A. E. (1985). Toxicology of 1,1,2-trichloroethane in the mouse. Drug and Chemical Toxicology 8(5):333-355.
Health Outcome(s):	Serum chemistry (Serum chemistry); Reproductive/Developmental; Immune/Hematological; Neurological/Behavioral; Lung/Respiratory; Renal/Kidney; Hepatic/Liver;
Reported Health Effect(s):	Serum chemistry (Serum chemistry): 90-Day Study: In males, calcium levels were significantly increased at and above 46 mg/kg bw/day and potassium levels were significantly increased at 4.4 mg/kg bw/day and significantly decreased at and above 46 mg/kg bw/day. Chloride levels were significantly increased in males at 305 mg/kg bw/day. No treatment-related changes in females.; Reproductive/Developmental: 14-Day Study: Significantly increased testes (18%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative testes weights (11% and 12%, respectively) were significantly increased in males at 46 and 305 mg/kg bw/day.; Immune/Hematological: 14-Day Study: Significantly increased thymus (25%) weights were observed at 38 mg/kg bw/day. No significant changes in hematology parameters or spleen weight.90-Day Study: A significant increase in the percent of lymphocytes and a decrease in the percent of polymorphonuclear leukocytes were observed in males at 305 mg/kg bw/day. A significant decrease in hematocrit and hemoglobin and a significant increase in leukocytes were observed in females at 384 mg/kg bw/day. Fibrinogen was significantly increased in all dose groups of females. And prothrombin time was significantly decreased in females at and above 44 mg/kg bw/day. Significantly increased absolute spleen (18%) weights were observed in females at 384 mg/kg bw/day. No treatment-related changes in thymus weight. Platelet counts increased in all groups, but not in a dose-dependent fashion.; Neurological/Behavioral: 14-Day Study: Significantly increased brain (11%) weights were observed at 38 mg/kg bw/day. 90-Day Study: Relative brain weights (6%) were significantly decreased in females at 384 mg/kg bw/day.; Lung/Respiratory: Acute: Reddened or hemorrhagic lungs were observed in up to 25% of animals14-Day Study: No significant changes in lung weight. 90-Day Study: No significant changes in lung weight.; Renal/Kidney: 14-Day Study: No significant changes in kidney weights, SGPT or BUN. 90-Day Study: Absolute kidney weights (12% and 16%, respectively) were significantly decreased in males at 46 and 305 mg/kg bw/day. Significantly increased absolute kidney (10%) weights were observed in females at 384 mg/kg bw/day. BUN was significantly decreased in males at 4.4 and 305 mg/kg bw/day, and was decreased, but not significantly, at 46 mg/kg bw/day. No treatment-related changes in creatinine.; Hepatic/Liver: The liver was a target of TCE toxicity in both sexes as demonstrated by dose-dependent alterations in hepatic microsomal enzyme activities and serum enzyme levels.Acute: Pale livers were observed in 50-75% of animals in each dose group14-Day Study: Lactic dehydrogenase activity was significantly decreased in high-dose males (21%). Relative liver weight was significantly increased (10%) at 3.8 mg/kg bw/day, but absolute liver weights were not significantly different from controls and no significant differences were observed in high-dose animals.90-Day Study: Cholesterol and serum alkaline phosphatase (SAP) were significantly increased in males at 305 mg/kg bw/day and glutathione was significantly decreased at and above 46 mg/kg bw/day. Cholesterol, SGPT, and glutathione were significantly increased in females at 384 mg/kg bw/day. SGOT and SAP were significantly increased in all test groups of females. Cytochrome P-450 and aniline hydroxylase were significantly decreased in females at and above 44 mg/kg bw/day. Absolute liver (11% and 12%, respectively) weights were significantly decreased in males at 46 and 305 mg/kg bw/day. Absolute (32%) and relative (26%) liver weights were significantly increased in females at 384 mg/kg bw/day.;
Duration:	Subchronic (>30-91 days) 90 days
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
Metric 24:	Reporting of Data	High	Serum chemistry (Serum chemistry): Data for exposure-related findings were reported in Tables 10 and 11, and in the text. Results for about half of the animals/sex/group were included in the tables.; Reproductive/Developmental: Data for exposure-related findings were reported in Table 5 and in the text. Results for about half of the animals/sex/group were included in Table 5.; Immune/Hematological: Data for exposure-related findings were reported in Tables 5-9 and in the text. Results for about half of the animals/sex/group were included in the tables.; Neurological/Behavioral: Data for exposure-related findings were reported in Tables 5 and 6 and in the text. Results for about half of the animals/sex/group were included in Tables 5 and 6.; Lung/Respiratory: Data for exposure-related findings were reported in Tables 5 and 6 and in the text. Results for about half of the animals/sex/group were included in Tables 5 and 6.; Renal/Kidney: Data for exposure-related findings were reported in Tables 5, 6, 10, and 11, and in the text. Results for about half of the animals/sex/group were included in the tables.; Hepatic/Liver: Data for exposure-related findings were reported in Tables 5, 6, and 10-13, and in the text. Results for about half of the animals/sex/group were included in Tables 5, 6, 10, and 11 and only 8 animals/sex/dose were included in the results in Tables 12 and 13.

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Health Outcome(s):	Serum chemistry (Serum chemistry); Reproductive/Developmental; Immune/Hematological; Neurological/Behavioral; Lung/Respiratory; Renal/Kidney; Hepatic/Liver;
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Duration:	Subchronic (>30-91 days) 90 days
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
Additional Comments:	While the overall study is high quality, it is noted that there are serious concerns for confounding in high dose males due to at least a 30% reduction in drinking water consumption that was associated with a 10% reduction in body weight. Results from that dose group are uninformative for dose-response, but all other dose groups (low-med-high female and low-med male) are reliable.		

Overall Quality Determination**High**

Study Citation:	White, K. L., Jr, Sanders, V. M., Barnes, D. W., Shopp, G. M., Jr, Munson, A. E. (1985). Toxicology of 1,1,2-trichloroethane in the mouse. Drug and Chemical Toxicology 8(5):333-355.		
Health Outcome(s):	Nutritional/Metabolic		
Reported Health Effect(s):	Nutritional/Metabolic: 14-Day Study: No significant changes in bodyweight.90-Day Study: A dose-dependent decrease in bodyweight gain was observed in males, and was significantly decreased at 305 mg/kg bw/day. Water consumption was significantly decreased (36%) in males at 305 mg/kg bw/day. Water consumption was slightly decreased in males at 4.4 and 46 mg/kg bw/day (9% and 5%, respectively).		
Duration:	Subchronic (>30-91 days) 90 days		
Chemical:	1,1,2-Trichloroethane- Parent compound		
HERO ID:	64564; Linked HERO ID(s): 64564, 64556		
Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	Medium	The test substance was identified as 1,1,2-trichloroethane. The chemical structure was verified. The specific form was not identified.
	Metric 2: Test Substance Source	High	The test substance was purchased from Aldrich Chemical Co. in Milwaukee, WI, with lot numbers of 070177 and 061197. The chemical structure was verified using infrared spectrometry.
	Metric 3: Test Substance Purity	Medium	The purity was reported as 95% and was verified by gas chromatography. It was reported that no stabilizers or preservatives were present, but the other constituents were not specified.
Domain 2: Test Design			
	Metric 4: Negative and Vehicle Controls	High	Negative vehicle controls (deionized water) were used.
	Metric 5: Positive Controls	N/A	Positive controls are not required for 90-day toxicity tests.
	Metric 6: Randomized Allocation of Animals	Medium	The study reported animals were randomized at the beginning of the exposure, but did not provide any other details. Note by QCER: There is a related reference HERO ID r064563 by White et al 1985, Immunotoxicological Investigations in the Mouse: General Approach and Methods.
Domain 3: Exposure Characterization			
	Metric 7: Preparation and Storage of Test Substance	Medium	The test solutions in drinking water were changed twice per week. The solutions in drinking water were stored in amber-colored bottles with cork stoppers and stainless steel spouts, and was maintained at room temperature. During the 3-4 days between water bottle changes, <10% of the test substance was lost (measured by GLC with head space analysis). No other details were provided (stability, homogeneity, stirring methods, etc.).
	Metric 8: Consistency of Exposure Administration	Medium	Drinking water consumption was reported for each sex and each dose group. It was not reported if all water bottles were replaced on the same day of the week. Males in the highest dose group consumed significantly less water than control males (153 mL/kg bw/day compared with 240 mL/kg bw/day in controls).
	Metric 9: Reporting of Doses/Concentrations	High	Target doses of 0, 3.8, 38, and 380 mg/kg bw/day were used, and based on concentrations in the drinking water of 0.02, 0.2, and 2.0 mg/mL, respectively. Doses based on actual water consumption were reported for each dose group and each sex.
	Metric 10: Exposure Frequency and Duration	High	Doses were administered via drinking water for 90 days.
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Health Outcome(s):	Nutritional/Metabolic
Reported Health Effect(s):	Nutritional/Metabolic: 14-Day Study: No significant changes in bodyweight. 90-Day Study: A dose-dependent decrease in bodyweight gain was observed in males, and was significantly decreased at 305 mg/kg bw/day. Water consumption was significantly decreased (36%) in males at 305 mg/kg bw/day. Water consumption was slightly decreased in males at 4.4 and 46 mg/kg bw/day (9% and 5%, respectively).
Duration:	Subchronic (>30-91 days) 90 days
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64564; Linked HERO ID(s): 64564, 64556

Domain	Metric	Rating	Comments
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	High	Doses of 1/100, 1/10, and 1/1 of the LD50 for males from the acute study were used in the 90-day study. The acute and 14-day studies conducted prior to the 90-day study used gavage as the exposure route, but the 90 day study used drinking water as the exposure route. The study noted target doses for this study were selected to deliver equivalent or higher doses than those administered via gavage.
	Metric 12: Exposure Route and Method	Medium	Test solutions were administered via drinking water. The route of exposure was appropriate for the outcome. It was not reported if actions were taken to try to minimize headspace for the volatile substance, but authors did report that <10% of the test substance was lost during the 3-4 days between drinking water replacement.

Domain 4: Test Animals

	Metric 13: Test Animal Characteristics	Medium	Revised text by QCer: Four week old male and female CD-1 mice were used in this study and were likely obtained from Charles River Breeding Laboratories, Wilmington, MA. Growth charts (indicating bodyweights) were provided for both sexes of animals in each test group. Information obtained from reference HERO ID r064563 by White et al 1985, Immunotoxicological Investigations in the Mouse: General Approach and Methods. No other details were provided
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	High	Note by QCER: White et al. 1985 reported that upon arrival all animals were housed four per cage in plastic shoe box cages with sawdust bedding and quarantined for 7 days. Mice exposed by gavage were maintained on Purina Lab Chow and water ad libitum. Animal room temperature was maintained between 21 and 24°C and relative humidity between 40-60%. The light-dark cycle was maintained on 12-hr intervals.
	Metric 15: Number of Animals per Group	Low	The number of animals exposed per group was not reported. The study only reported the number of animals that were evaluated per group (up to 32 mice/sex/group in the test groups and 48 mice/sex in the control group).

Domain 5: Outcome Assessment

	Metric 16: Outcome Assessment Methodology	Medium	The outcome assessment methodology was not clearly reported for bodyweight assessment, but bodyweights for each group were reported in growth charts and in Tables 5 and 6. The method of calculating water consumption was reported. Food consumption was not evaluated.
	Metric 17: Consistency of Outcome Assessment	Medium	The growth charts indicate the approximate timing of bodyweight assessments. Timing of each water consumption assessment/water bottle change was not reported. No other details on the consistency of outcome assessment were provided.

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Health Outcome(s):	Nutritional/Metabolic			
Reported Health Effect(s):	Nutritional/Metabolic: 14-Day Study: No significant changes in bodyweight.90-Day Study: A dose-dependent decrease in bodyweight gain was observed in males, and was significantly decreased at 305 mg/kg bw/day. Water consumption was significantly decreased (36%) in males at 305 mg/kg bw/day. Water consumption was slightly decreased in males at 4.4 and 46 mg/kg bw/day (9% and 5%, respectively).			
Duration:	Subchronic (>30-91 days) 90 days			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	64564; Linked HERO ID(s): 64564, 64556			
Domain	Metric	Rating	Comments	
	Metric 18: Sampling Adequacy	Medium	The number of animals evaluated in each group was reported under the charts depicting growth (bodyweight) and Tables 4, 5 and 6 for water consumption and bodyweight. Only about half of the animals/sex/group were included in the analysis presented in Tables 5 and 6.	
	Metric 19: Blinding of Assessors	N/A	Blinding of assessors is not required for bodyweight assessment or water consumption evaluation.	
	Metric 20: Negative Control Response	Medium	The biological response of the negative control group was reported in the tables and charts for bodyweight and water consumption.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	Water consumption was significantly decreased in high-dose males (36%, but this was reported as 30% in the text). Water consumption in the other test groups of males (9% and 5%, respectively) was not significantly different from controls. Water consumption was non-significantly increased in females in the low- and mid-dose groups (1% and 15%, respectively) and slightly decreased in the high-dose group (0.5%). Bodyweight gain was significantly decreased in high-dose males (10%), but was not significantly different from controls in other groups of males and in the females.While the overall study is medium for this metric, the high-dose male results are considered uninformative due to the greatly reduced drinking water consumption, which affects the received dose and may also result in dehydration. There were no issues with dosing in females or low-med dose males.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.	
	Metric 23: Data Presentation and Analysis	High	One-way analysis of variance of bodyweight means and water consumption were performed with p<0.05. If significant effects were observed, Duncan's Multiple Range Test was performed. Independent statistical analysis is possible for the mean bodyweights and water consumption of each group for each sex.	
	Metric 24: Reporting of Data	High	Data for exposure-related findings were reported in Tables 4-6, Figures 1 and 2, and in the text. Results for about half of the animals/sex/group were included in Tables 5 and 6.	
Additional Comments:	While the overall study is high quality, it is noted that there are serious concerns for confounding in high dose males due to at least a 30% reduction in drinking water consumption that was associated with a 10% reduction in body weight. Results from that dose group are uninformative for dose-response, but all other dose groups (low-med-high female and low-med male) are reliable.			

Overall Quality Determination**High**

Study Citation:	WIL Research, (2002). A 90-day inhalation study of 1,1,2-trichloroethane (1,1,2-TCE) in rats (with satellite groups for pharmacokinetic evaluations in rats and mice)..		
Health Outcome(s):	Nutritional/Metabolic; Immune/Hematological; Musculoskeletal; Hepatic/Liver; Lung/Respiratory; Reproductive/Developmental; Neurological/Behavioral; Endocrine; Ocular/Sensory; Skin/Connective Tissue; Cardiovascular;		
Reported Health Effect(s):	Nutritional/Metabolic: Body weights, food consumption.; Immune/Hematological: Hematology (leukocyte and erythrocyte counts, hemoglobin, hematocrit, MCV, MCH, MCHC, platelet count, prothrombin time, APTT), spleen organ weights, spleen, bone marrow, mediastinal and tracheobronchial lymph node and thymus gross necropsy and histopathology.; Musculoskeletal: Bone (sternum) and skeletal muscle (rectus femoris) histopathology.; Hepatic/Liver: Liver organ weights, gross necropsy and histopathology, serum chemistry (mean total serum cholesterol and triglycerides, albumin, glucose, total protein, globulin, albumin/globulin ratio, total bilirubin, alkaline phosphatase, alanine aminotransferase, aspartate aminotransferase, gamma glutamyltransferase, glucose, total cholesterol, triglycerides); Lung/Respiratory: Lung organ weights, lung, bronchi, trachea, larynx and nasal tissue necropsy and histopathology.; Reproductive/Developmental: Epididymides, testes and ovary organ weights, epididymides, mammary gland, ovaries, oviducts prostate, seminal vesicles, testes and uterus gross necropsy and histopathology.; Neurological/Behavioral: Brain organ weights, brain peripheral nerve and spinal cord histopathology, gross necropsy; Endocrine: Adrenal, thyroid and parathyroid organ weights, gross necropsy, and adrenal, thyroid, parathyroid, pancreas and pituitary histopathology.; Ocular/Sensory: Gross necropsy, Eye, optic nerve, exorbital lacrimal gland and harderian gland histopathology. Pupillary dilation and ophthalmic examination limited to before and upon study termination.; Skin/Connective Tissue: Skin histopathology and gross legions.; Cardiovascular: Heart organ weights, aorta and heart gross necropsy and histopathology.;		
Duration:	Subchronic (>30-91 days) 90-day inhalation toxicity		
Chemical:	1,1,2-Trichloroethane- Parent compound		
HERO ID:	6324088		
Domain	Metric	Rating	Comments
Domain 1: Test Substance			
Metric 1:	Test Substance Identity	High	All Outcomes: The authors definitively identify the test substance as 1,1,2-Trichloroethane via nomenclature.
Metric 2:	Test Substance Source	High	All Outcomes: The test substance source was reported, and the authors provide the lot number for the batch they received. Additionally, the authors performed an analytical verification of the test substance identity and stability.
Metric 3:	Test Substance Purity	High	All Outcomes: The authors report the purity of the test substance and perform their own analytical verification of the test substance purity. The reported purity is analytical grade at 99.55%.
Domain 2: Test Design			
Metric 4:	Negative and Vehicle Controls	High	All Outcomes: The authors report that a control group was exposed to clean, filtered air under conditions that were otherwise identical to the test article-treated groups.
Metric 5:	Positive Controls	N/A	All Outcomes: This study design normally does not require a positive control.
Metric 6:	Randomized Allocation of Animals	Medium	All Outcomes: The authors indicate that animals were randomized to groups via stratification in a block design and that individual body weights were within 20% of the mean of each sex in each group.
Domain 3: Exposure Characterization			
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Domain	Metric	Rating	Comments
	Metric 7: Preparation and Storage of Test Substance	High	Nutritional/Metabolic: The authors provide full details on test substance storage, preparation and generation of the test substance vapors. The method of vapor generation (glass-bead vaporization system) is appropriate and fully described. The test substance is considered stable at room temperature, and there were no concerns for volatility.; Immune/Hematological: The authors provide full detail on test substance storage, preparation and generation of the test substance vapors. The method of vapor generation (glass-bead vaporization system) is appropriate and fully described. The test substance is considered stable at room temperature and there were no concerns for volatility.; Musculoskeletal: The authors provide full detail on test substance storage, preparation and generation of the test substance vapors. The method of vapor generation (glass-bead vaporization system) is appropriate and fully described. The test substance is considered stable at room temperature and there were no concerns for volatility.; Hepatic/Liver: The authors provide full detail on test substance storage, preparation and generation of the test substance vapors. The method of vapor generation (glass-bead vaporization system) is appropriate and fully described. The test substance is considered stable at room temperature and there were no concerns for volatility.; Lung/Respiratory: The authors provide full detail on test substance storage, preparation and generation of the test substance vapors. The method of vapor generation (glass-bead vaporization system) is appropriate and fully described. The test substance is considered stable at room temperature and there were no concerns for volatility.; Reproductive/Developmental: The authors provide full detail on test substance storage, preparation and generation of the test substance vapors. The method of vapor generation (glass-bead vaporization system) is appropriate and fully described. The test substance is considered stable at room temperature and there were no concerns for volatility.; Neurological/Behavioral: The authors provide full detail on test substance storage, preparation and generation of the test substance vapors. The method of vapor generation (glass-bead vaporization system) is appropriate and fully described. The test substance is considered stable at room temperature and there were no concerns for volatility.; Endocrine: The authors provide full detail on test substance storage, preparation and generation of the test substance vapors. The method of vapor generation (glass-bead vaporization system) is appropriate and fully described. The test substance is considered stable at room temperature and there were no concerns for volatility.; Ocular/Sensory: The authors provide full detail on test substance storage, preparation and generation of the test substance vapors. The method of vapor generation (glass-bead vaporization system) is appropriate and fully described. The test substance is considered stable at room temperature and there were no concerns for volatility.;

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Reported Health Effect(s):	Nutritional/Metabolic: Body weights, food consumption.; Immune/Hematological: Hematology (leukocyte and erythrocyte counts, hemoglobin, hematocrit, MCV, MCH, MCHC, platelet count, prothrombin time, APTT), spleen organ weights, spleen, bone marrow, mediastinal and tracheobronchial lymph node and thymus gross necropsy and histopathology.; Musculoskeletal: Bone (sternum) and skeletal muscle (rectus femoris) histopathology.; Hepatic/Liver: Liver organ weights, gross necropsy and histopathology, serum chemistry (mean total serum cholesterol and triglycerides, albumin, glucose, total protein, globulin, albumin/globulin ratio, total bilirubin, alkaline phosphatase, alanine aminotransferase, aspartate aminotransferase, gamma glutamyltransferase, glucose, total cholesterol, triglycerides); Lung/Respiratory: Lung organ weights, lung, bronchi, trachea, larynx and nasal tissue necropsy and histopathology.; Reproductive/Developmental: Epididymides, testes and ovary organ weights, epididymides, mammary gland, ovaries, oviducts prostate, seminal vesicles, testes and uterus gross necropsy and histopathology.; Neurological/Behavioral: Brain organ weights, brain peripheral nerve and spinal cord histopathology, gross necropsy; Endocrine: Adrenal, thyroid and parathyroid organ weights, gross necropsy, and adrenal, thyroid, parathyroid, pancreas and pituitary histopathology.; Ocular/Sensory: Gross necropsy, Eye, optic nerve, exorbital lacrimal gland and harderian gland histopathology. Pupillary dilation and ophthalmic examination limited to before and upon study termination.; Skin/Connective Tissue: Skin histopathology and gross lesions.; Cardiovascular: Heart organ weights, aorta and heart gross necropsy and histopathology.;
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Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	6324088

Domain	Metric	Rating	Comments
	Metric 8: Consistency of Exposure Administration	Medium	Nutritional/Metabolic: The authors identify a small mistake in dosing in which control animals were accidentally exposed to 15 ppm (and animals intended to be exposed to 15 ppm were exposed to filtered air) for 6 hours on one day, but this error is unlikely to have a major impact on the results. Other than this mistake, animals were consistently exposed to the same treatments, and there were no differences in exposure chamber design, time of day of the exposure or temperature and humidity in the exposure chamber between different groups. Animal cage batteries were rotated on a daily basis to reduce any potential differences in exposure from residual non-homogeneity in chamber concentrations.; Immune/Hematological: The authors identify a small mistake in dosing in which control animals were accidentally exposed to 15 ppm (and animals intended to be exposed to 15 ppm were exposed to filtered air) for 6 hours on one day, but this error is unlikely to have a major impact on the results. Other than this mistake, animals were consistently exposed to the same treatments and there were no differences in exposure chamber design, time of day of the exposure or temperature and humidity in the exposure chamber between different groups. Animal cage batteries were rotated on a daily basis to reduce any potential differences in exposure from residual non-homogeneity in chamber concentrations.; Musculoskeletal: The authors identify a small mistake in dosing in which control animals were accidentally exposed to 15 ppm (and animals intended to be exposed to 15 ppm were exposed to filtered air) for 6 hours on one day, but this error is unlikely to have a major impact on the results. Other than this mistake, animals were consistently exposed to the same treatments and there were no differences in exposure chamber design, time of day of the exposure or temperature and humidity in the exposure chamber between different groups. Animal cage batteries were rotated on a daily basis to reduce any potential differences in exposure from residual non-homogeneity in chamber concentrations.; Hepatic/Liver: The authors identify a small mistake in dosing in which control animals were accidentally exposed to 15 ppm (and animals intended to be exposed to 15 ppm were exposed to filtered air) for 6 hours on one day, but this error is unlikely to have a major impact on the results. Other than this mistake, animals were consistently exposed to the same treatments and there were no differences in exposure chamber design, time of day of the exposure or temperature and humidity in the exposure chamber between different groups. Animal cage batteries were rotated on a daily basis to reduce any potential differences in exposure from residual non-homogeneity in chamber concentrations.; Lung/Respiratory: The authors identify a

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Health Outcome(s):	Nutritional/Metabolic; Immune/Hematological; Musculoskeletal; Hepatic/Liver; Lung/Respiratory; Reproductive/Developmental; Neurological/Behavioral; Endocrine; Ocular/Sensory; Skin/Connective Tissue; Cardiovascular;			
Reported Health Effect(s):	Nutritional/Metabolic: Body weights, food consumption.; Immune/Hematological: Hematology (leukocyte and erythrocyte counts, hemoglobin, hematocrit, MCV, MCH, MCHC, platelet count, prothrombin time, APTT), spleen organ weights, spleen, bone marrow, mediastinal and tracheobronchial lymph node and thymus gross necropsy and histopathology.; Musculoskeletal: Bone (sternum) and skeletal muscle (rectus femoris) histopathology.; Hepatic/Liver: Liver organ weights, gross necropsy and histopathology, serum chemistry (mean total serum cholesterol and triglycerides, albumin, glucose, total protein, globulin, albumin/globulin ratio, total bilirubin, alkaline phosphatase, alanine aminotransferase, aspartate aminotransferase, gamma glutamyltransferase, glucose, total cholesterol, triglycerides); Lung/Respiratory: Lung organ weights, lung, bronchi, trachea, larynx and nasal tissue necropsy and histopathology.; Reproductive/Developmental: Epididymides, testes and ovary organ weights, epididymides, mammary gland, ovaries, oviducts prostate, seminal vesicles, testes and uterus gross necropsy and histopathology.; Neurological/Behavioral: Brain organ weights, brain peripheral nerve and spinal cord histopathology, gross necropsy; Endocrine: Adrenal, thyroid and parathyroid organ weights, gross necropsy, and adrenal, thyroid, parathyroid, pancreas and pituitary histopathology.; Ocular/Sensory: Gross necropsy, Eye, optic nerve, exorbital lacrimal gland and harderian gland histopathology. Pupillary dilation and ophthalmic examination limited to before and upon study termination.; Skin/Connective Tissue: Skin histopathology and gross legions.; Cardiovascular: Heart organ weights, aorta and heart gross necropsy and histopathology.;			
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Domain	Metric	Rating	Comments	
	Metric 9: Reporting of Doses/Concentrations	High	All Outcomes: The target, nominal and analytical concentrations for all dose groups are reported. The measured concentrations varied by less than 10% of the target concentration. Gas chromatography was used to measure analytical concentrations from each chamber at 35-minute intervals.	
	Metric 10: Exposure Frequency and Duration	High	All Outcomes: The frequency of exposure is reported as 6 hours/day, 5 days/week for 13 weeks, which is appropriate for this type of study.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	High	All Outcomes: The number of exposure groups (n = 3 plus control) and dose concentration spacing was appropriate. The authors report that chosen exposure concentrations were selected based on results from a prior dose range-finding study. Spacing was sufficient for identifying a dose response and for the determination of study-wide NOAEL and LOAEL values.	
	Metric 12: Exposure Route and Method	Medium	All Outcomes: A dynamic whole-body chamber was used for exposure to the 1,1,2-trichlorethane vapor with 12-15 air changes per hour.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	High	All Outcomes: Test animal species, strain, sex, age and commercial source were reported. The test animal species is appropriate for sub-chronic inhalation studies.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	High	All Outcomes: All husbandry conditions (including temperature, humidity, light-dark cycle, diet and water availability) were all reported and the same between groups.	
	Metric 15: Number of Animals per Group	Medium	All Outcomes: The authors use 10 animals per sex and group for this study, which is in line with what is typically recommended for sub-chronic inhalation studies with rodents.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	High	All Outcomes: The outcome assessment methodology was very thorough, sensitive and appropriate for all endpoints of interest.	
	Metric 17: Consistency of Outcome Assessment	High	All Outcomes: The outcome assessment protocol was identical between different groups and was carried out at the same time post-exposure in all study groups.	

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Domain	Metric	Rating	Comments	
	Metric 18: Sampling Adequacy	High	All Outcomes: Outcome assessment was performed on animals in all study groups, and an equal number of animals from each group were sampled for the endpoint of interest.	
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Domain	Metric	Rating	Comments
Metric 19:	Blinding of Assessors	Medium	Nutritional/Metabolic: Blinding was not reported; however, lack of blinding is unlikely to influence the results as most endpoints were objective in nature. Only clinical observations were likely to be subject to observational bias, but only one animal was reported to have significant test-substance related signs of toxicity.; Immune/Hematological: Blinding was not reported; however, lack of blinding is unlikely to influence the results as most endpoints were objective in nature. Only clinical observations were likely to be subject to observational bias, but only one animal was reported to have significant test-substance related signs of toxicity.; Musculoskeletal: Blinding was not reported; however, lack of blinding is unlikely to influence the results as most endpoints were objective in nature. Only clinical observations were likely to be subject to observational bias, but only one animal was reported to have significant test-substance related signs of toxicity.; Hepatic/Liver: Blinding was not reported; however, lack of blinding is unlikely to influence the results as most endpoints were objective in nature. Only clinical observations were likely to be subject to observational bias, but only one animal was reported to have significant test-substance related signs of toxicity.; Lung/Respiratory: Blinding was not reported; however, lack of blinding is unlikely to influence the results as most endpoints were objective in nature. Only clinical observations were likely to be subject to observational bias, but only one animal was reported to have significant test-substance related signs of toxicity.; Reproductive/Developmental: Blinding was not reported; however, lack of blinding is unlikely to influence the results as most endpoints were objective in nature. Only clinical observations were likely to be subject to observational bias, but only one animal was reported to have significant test-substance related signs of toxicity.; Neurological/Behavioral: Blinding was not reported; however, lack of blinding is unlikely to influence the results as most endpoints were objective in nature. Only clinical observations were likely to be subject to observational bias, but only one animal was reported to have significant test-substance related signs of toxicity.; Endocrine: Blinding was not reported; however, lack of blinding is unlikely to influence the results as most endpoints were objective in nature. Only clinical observations were likely to be subject to observational bias, but only one animal was reported to have significant test-substance related signs of toxicity.; Ocular/Sensory: Blinding was not reported; however, lack of blinding is unlikely to influence the results as most endpoints were objective in nature. Only clinical observations were likely to be subject to observational bias, but only one animal was reported to have significant test-substance related signs of toxicity.;

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Domain	Metric	Rating	Comments
	Metric 20: Negative Control Response	High	All Outcomes: The biological responses of negative control groups were adequate and there was low variation in response for the control group.
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	Low	All Outcomes: The authors did not report respiratory rate, but they did look for unusual respiratory patterns during weekly physical examinations to measure clinical signs. As 1,1,2-Trichlorethane is a respiratory irritant, this could significantly impact the results. Other potential confounders, such as body weight, food and water consumption were reported and did not act as confounders in this study.

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Duration:	Subchronic (>30-91 days) 90-day inhalation toxicity
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	6324088

Domain	Metric	Rating	Comments
	Metric 22: Health Outcomes Unrelated to Exposure	High	Nutritional/Metabolic: The study provided all information to identify potential health outcomes unrelated to exposure (i.e., clinical signs, hematology, clinical chemistry, and histopathology). No test article deaths occurred during the study. One 15 ppm female was sacrificed moribund due to a back injury.; Immune/Hematological: The study provided all information to identify potential health outcomes unrelated to exposure (i.e., clinical signs, hematology, clinical chemistry, and histopathology). No test article deaths occurred during the study. One 15 ppm female was sacrificed moribund due to a back injury.; Musculoskeletal: The study provided all information to identify potential health outcomes unrelated to exposure (i.e., clinical signs, hematology, clinical chemistry, and histopathology). No test article deaths occurred during the study. One 15 ppm female was sacrificed moribund due to a back injury.; Hepatic/Liver: The study provided all information to identify potential health outcomes unrelated to exposure (i.e., clinical signs, hematology, clinical chemistry, and histopathology). No test article deaths occurred during the study. One 15 ppm female was sacrificed moribund due to a back injury.; Lung/Respiratory: The number of exposure groups (n = 3 plus control) and dose concentration spacing was appropriate. The authors report that chosen exposure concentrations were selected based on results from a prior dose range-finding study. Spacing was sufficient for identifying a dose response and for the determination of study-wide NOAEL and LOAEL values.; Reproductive/Developmental: The study provided all information to identify potential health outcomes unrelated to exposure (i.e., clinical signs, hematology, clinical chemistry, and histopathology). No test article deaths occurred during the study. One 15 ppm female was sacrificed moribund due to a back injury.; Neurological/Behavioral: The study provided all information to identify potential health outcomes unrelated to exposure (i.e., clinical signs, hematology, clinical chemistry, and histopathology). No test article deaths occurred during the study. One 15 ppm female was sacrificed moribund due to a back injury.; Endocrine: The study provided all information to identify potential health outcomes unrelated to exposure (i.e., clinical signs, hematology, clinical chemistry, and histopathology). No test article deaths occurred during the study. One 15 ppm female was sacrificed moribund due to a back injury.; Ocular/Sensory: The study provided all information to identify potential health outcomes unrelated to exposure (i.e., clinical signs, hematology, clinical chemistry, and histopathology). No test article deaths occurred during the study. One 15 ppm female was sacrificed moribund due to a back injury.; Skin/Connective Tissue: The study provided all information to identify potential health outcomes unrelated to exposure (i.e., clinical signs, hematology, clinical chemistry, and histopathology). No test article deaths occurred during the study. One 15 ppm female was sacrificed moribund due to a back injury.;

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Study Citation:	WIL Research, (2002). A 90-day inhalation study of 1,1,2-trichloroethane (1,1,2-TCE) in rats (with satellite groups for pharmacokinetic evaluations in rats and mice)..
Health Outcome(s):	Nutritional/Metabolic; Immune/Hematological; Musculoskeletal; Hepatic/Liver; Lung/Respiratory; Reproductive/Developmental; Neurological/Behavioral; Endocrine; Ocular/Sensory; Skin/Connective Tissue; Cardiovascular;
Reported Health Effect(s):	Nutritional/Metabolic: Body weights, food consumption.; Immune/Hematological: Hematology (leukocyte and erythrocyte counts, hemoglobin, hematocrit, MCV, MCH, MCHC, platelet count, prothrombin time, APTT), spleen organ weights, spleen, bone marrow, mediastinal and tracheobronchial lymph node and thymus gross necropsy and histopathology.; Musculoskeletal: Bone (sternum) and skeletal muscle (rectus femoris) histopathology.; Hepatic/Liver: Liver organ weights, gross necropsy and histopathology, serum chemistry (mean total serum cholesterol and triglycerides, albumin, glucose, total protein, globulin, albumin/globulin ratio, total bilirubin, alkaline phosphatase, alanine aminotransferase, aspartate aminotransferase, gamma glutamyltransferase, glucose, total cholesterol, triglycerides); Lung/Respiratory: Lung organ weights, lung, bronchi, trachea, larynx and nasal tissue necropsy and histopathology.; Reproductive/Developmental: Epididymides, testes and ovary organ weights, epididymides, mammary gland, ovaries, oviducts prostate, seminal vesicles, testes and uterus gross necropsy and histopathology.; Neurological/Behavioral: Brain organ weights, brain peripheral nerve and spinal cord histopathology, gross necropsy; Endocrine: Adrenal, thyroid and parathyroid organ weights, gross necropsy, and adrenal, thyroid, parathyroid, pancreas and pituitary histopathology.; Ocular/Sensory: Gross necropsy, Eye, optic nerve, exorbital lacrimal gland and harderian gland histopathology. Pupillary dilation and ophthalmic examination limited to before and upon study termination.; Skin/Connective Tissue: Skin histopathology and gross legions.; Cardiovascular: Heart organ weights, aorta and heart gross necropsy and histopathology.;
Duration:	Subchronic (>30-91 days) 90-day inhalation toxicity
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	6324088

Domain	Metric	Rating	Comments
	Metric 23: Data Presentation and Analysis	High	All Outcomes: Statistical analysis was performed and described adequately. Selected statistical methods are appropriate for each data set.
	Metric 24: Reporting of Data	High	All Outcomes: Data for all exposure related outcomes are presented quantitatively and relevant severity scores are described adequately.

Additional Comments: None

Overall Quality Determination**High**

Study Citation:	WIL Research, (2002). A 90-day inhalation study of 1,1,2-trichloroethane (1,1,2-TCE) in rats (with satellite groups for pharmacokinetic evaluations in rats and mice)..
Health Outcome(s):	Mortality; Renal/Kidney;
Reported Health Effect(s):	Mortality: Death/survival.; Renal/Kidney: Kidney organ weights, gross necropsy, kidney and urinary bladder histopathology, serum chemistry (urea nitrogen, creatinine, calcium, chloride, phosphorus, potassium, sodium);
Duration:	Subchronic (>30-91 days) 90-day inhalation toxicity
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	6324088

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	High	All Outcomes: The authors definitively identify the test substance as 1,1,2-Trichloroethane via nomenclature.
	Metric 2: Test Substance Source	High	All Outcomes: The test substance source was reported, and the authors provide the lot number for the batch they received. Additionally, the authors performed an analytical verification of the test substance identity and stability.
	Metric 3: Test Substance Purity	High	All Outcomes: The authors report the purity of the test substance and perform their own analytical verification of the test substance purity. The reported purity is analytical grade at 99.55%.
Domain 2: Test Design			
	Metric 4: Negative and Vehicle Controls	High	All Outcomes: The authors report that a control group was exposed to clean, filtered air under conditions that were otherwise identical to the test article-treated groups.
	Metric 5: Positive Controls	N/A	All Outcomes: This study design normally does not require a positive control.
	Metric 6: Randomized Allocation of Animals	Medium	All Outcomes: The authors indicate that animals were randomized to groups via stratification in a block design and that individual body weights were within 20% of the mean of each sex in each group.
Domain 3: Exposure Characterization			
	Metric 7: Preparation and Storage of Test Substance	High	All Outcomes: The authors provide full detail on test substance storage, preparation and generation of the test substance vapors. The method of vapor generation (glass-bead vaporization system) is appropriate and fully described. The test substance is considered stable at room temperature and there were no concerns for volatility.
	Metric 8: Consistency of Exposure Administration	Medium	All Outcomes: The authors identify a small mistake in dosing in which control animals were accidentally exposed to 15 ppm (and animals intended to be exposed to 15 ppm were exposed to filtered air) for 6 hours on one day, but this error is unlikely to have a major impact on the results. Other than this mistake, animals were consistently exposed to the same treatments and there were no differences in exposure chamber design, time of day of the exposure or temperature and humidity in the exposure chamber between different groups. Animal cage batteries were rotated on a daily basis to reduce any potential differences in exposure from residual non-homogeneity in chamber concentrations.
	Metric 9: Reporting of Doses/Concentrations	High	All Outcomes: The target, nominal and analytical concentrations for all dose groups are reported. The measured concentrations varied by less than 10% of the target concentration. Gas chromatography was used to measure analytical concentrations from each chamber at 35-minute intervals.
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Study Citation:	WIL Research, (2002). A 90-day inhalation study of 1,1,2-trichloroethane (1,1,2-TCE) in rats (with satellite groups for pharmacokinetic evaluations in rats and mice)..			
Health Outcome(s):	Mortality; Renal/Kidney;			
Reported Health Effect(s):	Mortality: Death/survival.; Renal/Kidney: Kidney organ weights, gross necropsy, kidney and urinary bladder histopathology, serum chemistry (urea nitrogen, creatinine, calcium, chloride, phosphorus, potassium, sodium);			
Duration:	Subchronic (>30-91 days) 90-day inhalation toxicity			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	6324088			
Domain	Metric	Rating	Comments	
	Metric 10:	Exposure Frequency and Duration	High	All Outcomes: The frequency of exposure is reported as 6 hours/day, 5 days/week for 13 weeks, which is appropriate for this type of study.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	High	All Outcomes: The number of exposure groups (n = 3 plus control) and dose concentration spacing was appropriate. The authors report that chosen exposure concentrations were selected based on results from a prior dose range-finding study. Spacing was sufficient for identifying a dose response and for the determination of study-wide NOAEL and LOAEL values.
	Metric 12:	Exposure Route and Method	Medium	All Outcomes: A dynamic whole-body chamber was used for exposure to the 1,1,2-trichlorethane vapor with 12-15 air changes per hour.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	High	All Outcomes: Test animal species, strain, sex, age and commercial source were reported. The test animal species is appropriate for sub-chronic inhalation studies.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	High	All Outcomes: All husbandry conditions (including temperature, humidity, light-dark cycle, diet and water availability) were all reported and the same between groups.
	Metric 15:	Number of Animals per Group	Medium	All Outcomes: The authors use 10 animals per sex and group for this study, which is in line with what is typically recommended for sub-chronic inhalation studies with rodents.
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	High	All Outcomes: The outcome assessment methodology was very thorough, sensitive and appropriate for all endpoints of interest.
	Metric 17:	Consistency of Outcome Assessment	High	All Outcomes: The outcome assessment protocol was identical between different groups and was carried out at the same time post-exposure in all study groups.
	Metric 18:	Sampling Adequacy	High	All Outcomes: Outcome assessment was performed on animals in all study groups, and an equal number of animals from each group were sampled for the endpoint of interest.
	Metric 19:	Blinding of Assessors	Medium	All Outcomes: Blinding was not reported; however, lack of blinding is unlikely to influence the results as most endpoints were objective in nature. Only clinical observations were likely to be subject to observational bias, but only one animal was reported to have significant test-substance related signs of toxicity.
	Metric 20:	Negative Control Response	High	All Outcomes: The biological responses of negative control groups were adequate and there was low variation in response for the control group.
Domain 6: Confounding / Variable Control				
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Study Citation:	WIL Research, (2002). A 90-day inhalation study of 1,1,2-trichloroethane (1,1,2-TCE) in rats (with satellite groups for pharmacokinetic evaluations in rats and mice)..
Health Outcome(s):	Mortality; Renal/Kidney;
Reported Health Effect(s):	Mortality: Death/survival.; Renal/Kidney: Kidney organ weights, gross necropsy, kidney and urinary bladder histopathology, serum chemistry (urea nitrogen, creatinine, calcium, chloride, phosphorus, potassium, sodium);
Duration:	Subchronic (>30-91 days) 90-day inhalation toxicity
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	6324088

Domain	Metric	Rating	Comments
	Metric 21: Confounding Variables in Test Design and Procedures	Low	All Outcomes: The authors did not report respiratory rate, but they did look for unusual respiratory patterns during weekly physical examinations to measure clinical signs. As 1,1,2-Trichlorethane is a respiratory irritant, this could significantly impact the results. Other potential confounders, such as body weight, food and water consumption were reported and did not act as confounders in this study.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	All Outcomes: The study provided all information to identify potential health outcomes unrelated to exposure (i.e., clinical signs, hematology, clinical chemistry, and histopathology). No test article deaths occurred during the study. One 15 ppm female was sacrificed moribund due to a back injury.
	Metric 23: Data Presentation and Analysis	High	All Outcomes: Statistical analysis was performed and described adequately. Selected statistical methods are appropriate for each data set.
	Metric 24: Reporting of Data	High	All Outcomes: Data for all exposure related outcomes are presented quantitatively and relevant severity scores are described adequately.

Additional Comments: None

Overall Quality Determination**High**

Study Citation:	WIL Research, (2002). A 90-day inhalation study of 1,1,2-trichloroethane (1,1,2-TCE) in rats (with satellite groups for pharmacokinetic evaluations in rats and mice)..			
Health Outcome(s):	Gastrointestinal			
Reported Health Effect(s):	Gastrointestinal: Esophagus, stomach, duodenum, jejunum, ileum, cecum, colon, rectum and salivary gland necropsy and histopathology.			
Duration:	Subchronic (>30-91 days) 90-day inhalation toxicity			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	6324088			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	The authors definitively identify the test substance as 1,1,2-Trichloroethane via nomenclature.	
	Metric 2: Test Substance Source	High	The test substance source was reported, and the authors provide the lot number for the batch they received. Additionally, the authors performed an analytical verification of the test substance identity and stability.	
	Metric 3: Test Substance Purity	High	The authors report the purity of the test substance and perform their own analytical verification of the test substance purity. The reported purity is analytical grade at 99.55%.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	High	The authors report that a control group was exposed to clean, filtered air under conditions that were otherwise identical to the test article-treated groups.	
	Metric 5: Positive Controls	N/A	This study design normally does not require a positive control.	
	Metric 6: Randomized Allocation of Animals	Medium	The authors indicate that animals were randomized to groups via stratification in a block design and that individual body weights were within 20% of the mean of each sex in each group.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	High	The authors provide full detail on test substance storage, preparation and generation of the test substance vapors. The method of vapor generation (glass-bead vaporization system) is appropriate and fully described. The test substance is considered stable at room temperature and there were no concerns for volatility.	
	Metric 8: Consistency of Exposure Administration	Medium	The authors identify a small mistake in dosing in which control animals were accidentally exposed to 15 ppm (and animals intended to be exposed to 15 ppm were exposed to filtered air) for 6 hours on one day, but this error is unlikely to have a major impact on the results. Other than this mistake, animals were consistently exposed to the same treatments and there were no differences in exposure chamber design, time of day of the exposure or temperature and humidity in the exposure chamber between different groups. Animal cage batteries were rotated on a daily basis to reduce any potential differences in exposure from residual non-homogeneity in chamber concentrations.	
	Metric 9: Reporting of Doses/Concentrations	High	The target, nominal and analytical concentrations for all dose groups are reported. The measured concentrations varied by less than 10% of the target concentration. Gas chromatography was used to measure analytical concentrations from each chamber at 35-minute intervals.	
	Metric 10: Exposure Frequency and Duration	High	The frequency of exposure is reported as 6 hours/day, 5 days/week for 13 weeks, which is appropriate for this type of study.	
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Study Citation:	WIL Research, (2002). A 90-day inhalation study of 1,1,2-trichloroethane (1,1,2-TCE) in rats (with satellite groups for pharmacokinetic evaluations in rats and mice)..			
Health Outcome(s):	Gastrointestinal			
Reported Health Effect(s):	Gastrointestinal: Esophagus, stomach, duodenum, jejunum, ileum, cecum, colon, rectum and salivary gland necropsy and histopathology.			
Duration:	Subchronic (>30-91 days) 90-day inhalation toxicity			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	6324088			
Domain	Metric	Rating	Comments	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Medium	The number of exposure groups (n = 3 plus control) and dose concentration spacing was appropriate. The authors report that chosen exposure concentrations were selected based on results from a prior dose range-finding study. Spacing was sufficient for identifying a dose response and for the determination of study-wide NOAEL and LOAEL values.	
	Metric 12: Exposure Route and Method	Medium	A dynamic whole-body chamber was used for exposure to the 1,1,2-trichlorethane vapor with 12-15 air changes per hour.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	High	Test animal species, strain, sex, age and commercial source were reported. The test animal species is appropriate for sub-chronic inhalation studies.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	High	All husbandry conditions (including temperature, humidity, light-dark cycle, diet and water availability) were all reported and the same between groups.	
	Metric 15: Number of Animals per Group	Medium	The authors use 10 animals per sex and group for this study, which is in line with what is typically recommended for sub-chronic inhalation studies with rodents.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	High	The outcome assessment methodology was very thorough, sensitive and appropriate for all endpoints of interest.	
	Metric 17: Consistency of Outcome Assessment	High	The outcome assessment protocol was identical between different groups and was carried out at the same time post-exposure in all study groups.	
	Metric 18: Sampling Adequacy	High	Outcome assessment was performed on animals in all study groups, and an equal number of animals from each group were sampled for the endpoint of interest.	
	Metric 19: Blinding of Assessors	Medium	Blinding was not reported; however, lack of blinding is unlikely to influence the results as most endpoints were objective in nature. Only clinical observations were likely to be subject to observational bias, but only one animal was reported to have significant test-substance related signs of toxicity.	
	Metric 20: Negative Control Response	High	The biological responses of negative control groups were adequate and there was low variation in response for the control group.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Low	The authors did not report respiratory rate, but they did look for unusual respiratory patterns during weekly physical examinations to measure clinical signs. As 1,1,2-Trichlorethane is a respiratory irritant, this could significantly impact the results. Other potential confounders, such as body weight, food and water consumption were reported and did not act as confounders in this study.	
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Study Citation:	WIL Research, (2002). A 90-day inhalation study of 1,1,2-trichloroethane (1,1,2-TCE) in rats (with satellite groups for pharmacokinetic evaluations in rats and mice)..
Health Outcome(s):	Gastrointestinal
Reported Health Effect(s):	Gastrointestinal: Esophagus, stomach, duodenum, jejunum, ileum, cecum, colon, rectum and salivary gland necropsy and histopathology.
Duration:	Subchronic (>30-91 days) 90-day inhalation toxicity
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	6324088

Domain	Metric	Rating	Comments
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	The study provided all information to identify potential health outcomes unrelated to exposure (i.e., clinical signs, hematology, clinical chemistry, and histopathology). No test article deaths occurred during the study. One 15 ppm female was sacrificed moribund due to a back injury.
	Metric 23: Data Presentation and Analysis	High	Statistical analysis was performed and described adequately. Selected statistical methods are appropriate for each data set.
	Metric 24: Reporting of Data	High	Data for all exposure related outcomes are presented quantitatively and relevant severity scores are described adequately.

Additional Comments: None

Overall Quality Determination**High**

Study Citation:	Mellon Institute, (1947). Repeated exposure of rats and dogs to vapors of eight chlorinated hydrocarbons.			
Health Outcome(s):	Nutritional/Metabolic			
Reported Health Effect(s):	Nutritional/Metabolic: Body weights; body length			
Duration:	Chronic (>91 days) 6 months; dogs			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	1973131			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	The test substance was identified definitively using standard nomenclature; CASRN was not provided.	
	Metric 2: Test Substance Source	Low	A commercial source was identified; batch and lot numbers were not provided.	
	Metric 3: Test Substance Purity	Low	Reported to be commercial grade, but purity was not provided.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	High	The document indicates there was an exposed control group; animals were exposed to the same conditions as exposed animals without the vapors.	
	Metric 5: Positive Controls	N/A	Not necessary for the study type	
	Metric 6: Randomized Allocation of Animals	Low	Animals were "distributed by randomization"; the method of randomization was not indicated.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	The study includes a limited description of the method of vapor generation, but storage of the test substance was not reported.	
	Metric 8: Consistency of Exposure Administration	Medium	The study consisted of only a single exposure group (per chemical). Two chamber sizes were used; it is unclear which chamber size the air-only controls were in. However, the text indicates that all chambers had an equivalent rate of air change.	
	Metric 9: Reporting of Doses/Concentrations	High	Target and analytical vapor concentrations were reported. Vapor concentrations were monitored daily using a Zeiss interferometer. The sensitivity values for the interferometer based on thermal decomposition methods were repoted.	
	Metric 10: Exposure Frequency and Duration	Low	Reported as 7hrs/day for 6 months on alternate days (75 days total); this frequency is less than guideline recommendations.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Low	A single exposure group was used for a chronic repeat exposure, this is less than guideline recommendations and precludes the ability to evaluate a dose-response.	
	Metric 12: Exposure Route and Method	Low	A whole-body dynamic air chamber was used for an inhalation study, the airflow rate (only reported to be "comfortable") and rate of air change were not reported.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Low	Species, sex, and age were reported. Mongrel dogs were used, which makes comparisons between the control and exposure groups difficult. Initial body weights were not explicitly reported, but are indicated in a graph at 0 weeks of exposure.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Insufficient information on animal husbandry conditions was reported (only the type of food was provided)	
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Study Citation:	Mellon Institute, (1947). Repeated exposure of rats and dogs to vapors of eight chlorinated hydrocarbons.			
Health Outcome(s):	Nutritional/Metabolic			
Reported Health Effect(s):	Nutritional/Metabolic: Body weights; body length			
Duration:	Chronic (>91 days) 6 months; dogs			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	1973131			
Domain	Metric	Rating	Comments	
	Metric 15:	Number of Animals per Group	Low	Only a single male dog/group was used; the low number decreases the ability to characterize or observe a toxic effect.
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	High	It was reported that weights were followed weekly.
	Metric 17:	Consistency of Outcome Assessment	Medium	Details of outcome assessment were not clearly reported. However, control and exposed dogs were evaluated after the same duration of exposure.
	Metric 18:	Sampling Adequacy	Low	Single animals were used for all endpoints.
	Metric 19:	Blinding of Assessors	N/A	Not necessary for the endpoint evaluated
	Metric 20:	Negative Control Response	Medium	The study authors did not indicate whether or not the control dog responses were unexpected.
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Low	The study did not report confounding variables related to test design and procedures. Respiratory rates were not monitored
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.
	Metric 23:	Data Presentation and Analysis	N/A	Statistical analysis could not be performed due to an n of 1
	Metric 24:	Reporting of Data	High	Growth results were displayed graphically and were appropriate given the limitations in sample size. Body weights and pathology results were adequately reported.
Additional Comments:	The study author indicated that single animal exposures to each vapor ”makes it unwise to base any definite conclusions on their response.” and that ”This study therefore cannot be recommended for publication. Single dogs were used due to limitations in the facilities available.			

Overall Quality Determination**Medium**

Study Citation:	Mellon Institute, (1947). Repeated exposure of rats and dogs to vapors of eight chlorinated hydrocarbons.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: Survival			
Duration:	Chronic (>91 days) 6 months; dogs			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	1973131			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
Metric 1:	Test Substance Identity	High	The test substance was identified definitively using standard nomenclature; CASRN was not provided.	
Metric 2:	Test Substance Source	Low	A commercial source was identified; batch and lot numbers were not provided.	
Metric 3:	Test Substance Purity	Low	Reported to be commercial grade, but purity was not provided.	
Domain 2: Test Design				
Metric 4:	Negative and Vehicle Controls	High	The document indicates there was an exposed control group; animals were exposed to the same conditions as exposed animals without the vapors.	
Metric 5:	Positive Controls	N/A	Not necessary for the study type	
Metric 6:	Randomized Allocation of Animals	Low	Animals were "distributed by randomization"; the method of randomization was not indicated.	
Domain 3: Exposure Characterization				
Metric 7:	Preparation and Storage of Test Substance	Low	The study includes a limited description of the method of vapor generation, but storage of the test substance was not reported.	
Metric 8:	Consistency of Exposure Administration	Medium	The study consisted of only a single exposure group (per chemical). Two chamber sizes were used; it is unclear which chamber size the air-only controls were in. However, the text indicates that all chambers had an equivalent rate of air change.	
Metric 9:	Reporting of Doses/Concentrations	High	Target and analytical vapor concentrations were reported. Vapor concentrations were monitored daily using a Zeiss interferometer. The sensitivity values for the interferometer based on thermal decomposition methods were reported.	
Metric 10:	Exposure Frequency and Duration	Low	Reported as 7hrs/day for 6 months on alternate days (75 days total); this frequency is less than guideline recommendations.	
Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Low	A single exposure group was used for a chronic repeat exposure, this is less than guideline recommendations and precludes the ability to evaluate a dose-response.	
Metric 12:	Exposure Route and Method	Low	A whole-body dynamic air chamber was used for an inhalation study, the airflow rate (only reported to be "comfortable") and the rate of air change were not reported.	
Domain 4: Test Animals				
Metric 13:	Test Animal Characteristics	Low	Species, sex, and age were reported. Mongrel dogs were used, which makes comparisons between the control and exposure groups difficult. Initial body weights were not explicitly reported, but are indicated in a graph at 0 weeks of exposure.	
Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	Insufficient information on animal husbandry conditions were reported (type of food was reported)	
Metric 15:	Number of Animals per Group	Low	Only a single male dog/group was used; this is considered to be low, but may be considered acceptable for dogs	
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Study Citation:	Mellon Institute, (1947). Repeated exposure of rats and dogs to vapors of eight chlorinated hydrocarbons.		
Health Outcome(s):	Mortality		
Reported Health Effect(s):	Mortality: Survival		
Duration:	Chronic (>91 days) 6 months; dogs		
Chemical:	1,1,2-Trichloroethane- Parent compound		
HERO ID:	1973131		
Domain	Metric	Rating	Comments
Domain 5: Outcome Assessment			
Metric 16:	Outcome Assessment Methodology	Low	Beyond a list of what outcomes were evaluated, minimal details of the methods of outcome assessment were described. The frequency of animal observation was not reported.
Metric 17:	Consistency of Outcome Assessment	Medium	Details of outcome assessment were not clearly reported. However, control and exposed dogs were evaluated after the same duration of exposure.
Metric 18:	Sampling Adequacy	Low	All animals were observed for mortality.
Metric 19:	Blinding of Assessors	N/A	Not necessary for the endpoint evaluated
Metric 20:	Negative Control Response	High	Results for the control dog were as expected (no death)
Domain 6: Confounding / Variable Control			
Metric 21:	Confounding Variables in Test Design and Procedures	Low	The study did not report confounding variables related to test design and procedures. Respiratory rates were not monitored
Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.
Metric 23:	Data Presentation and Analysis	N/A	Statistical analysis could not be performed due to an n of 1
Metric 24:	Reporting of Data	Low	Results were reported in the text as a negative outcome (no mortalities)
Additional Comments:	The study author indicated that single animal exposures to each vapor "makes it unwise to base any definite conclusions on their response." and that "This study therefore cannot be recommended for publication. Single dogs were used due to limitations in the facilities available.		

Overall Quality Determination**Low**

Study Citation:	Mellon Institute, (1947). Repeated exposure of rats and dogs to vapors of eight chlorinated hydrocarbons.			
Health Outcome(s):	Hepatic/Liver; Renal/Kidney; Lung/Respiratory; Cardiovascular; Immune/Hematological; Endocrine (Endocrine (thyroid, parathyroid, Pancreas, Adrenal); Reproductive/Developmental (Endocrine (thyroid, parathyroid, Pancreas, Adrenal);			
Reported Health Effect(s):	Hepatic/Liver: Live weights, histopathology; Renal/Kidney: Kidney weights and histopathology; serum BUN; Lung/Respiratory: Histopathology; Cardiovascular: Histology; Immune/Hematological: Blood cell counts and hemoglobin determinations; Spleen histopathology; Endocrine (Endocrine (thyroid, parathyroid, Pancreas, Adrenal): Adrenal histopathology; Reproductive/Developmental (Endocrine (thyroid, parathyroid, Pancreas, Adrenal): Testis histopathology;			
Duration:	Chronic (>91 days) 6 months; dogs			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	1973131			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Hepatic/Liver: The test substance was identified definitively using standard nomenclature; CASRN was not provided.; Renal/Kidney: The test substance was identified definitively using standard nomenclature; CASRN was not provided.; Lung/Respiratory: The test substance was identified definitively using standard nomenclature; CASRN was not provided.; Cardiovascular: The test substance was identified definitively using standard nomenclature; CASRN was not provided.; Immune/Hematological: The test substance was identified definitively using standard nomenclature; CASRN was not provided.; Endocrine (Endocrine (thyroid, parathyroid, Pancreas, Adrenal): Identified as propylene dichloride (1,2-dichloropropane); CASRN not provided; Reproductive/Developmental (Endocrine (thyroid, parathyroid, Pancreas, Adrenal): The test substance was identified definitively using standard nomenclature; CASRN was not provided.
	Metric 2:	Test Substance Source	Low	All Outcomes: A commercial source was identified; batch and lot numbers were not provided.
	Metric 3:	Test Substance Purity	Low	All Outcomes: Reported to be commercial grade, but purity was not provided.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	High	All Outcomes: The document indicates there was an exposed control group; animals were exposed to the same conditions as exposed animals without the vapors.
	Metric 5:	Positive Controls	N/A	All Outcomes: Not necessary for the study type
	Metric 6:	Randomized Allocation of Animals	Low	All Outcomes: Animals were "distributed by randomization"; the method of randomization was not indicated.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Low	All Outcomes: The study includes a limited description of the method of vapor generation, but storage of the test substance was not reported.
	Metric 8:	Consistency of Exposure Administration	Medium	All Outcomes: The study consisted of only a single exposure group (per chemical). Two chamber sizes were used; it is unclear which chamber size the air-only controls were in. However, the text indicates that all chambers had an equivalent rate of air change.
	Metric 9:	Reporting of Doses/Concentrations	High	All Outcomes: Target and analytical vapor concentrations were reported. Vapor concentrations were monitored daily using a Zeiss interferometer. The sensitivity values for the interferometer based on thermal decomposition methods were reported.
	Metric 10:	Exposure Frequency and Duration	Low	All Outcomes: Reported as 7hrs/day for 6 months on alternate days (75 days total); this frequency is less than guideline recommendations.
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Study Citation:	Mellon Institute, (1947). Repeated exposure of rats and dogs to vapors of eight chlorinated hydrocarbons.			
Health Outcome(s):	Hepatic/Liver; Renal/Kidney; Lung/Respiratory; Cardiovascular; Immune/Hematological; Endocrine (Endocrine (thyroid, parathyroid, Pancreas, Adrenal); Reproductive/Developmental (Endocrine (thyroid, parathyroid, Pancreas, Adrenal);			
Reported Health Effect(s):	Hepatic/Liver: Live weights, histopathology; Renal/Kidney: Kidney weights and histopathology; serum BUN; Lung/Respiratory: Histopathology; Cardiovascular: Histology; Immune/Hematological: Blood cell counts and hemoglobin determinations; Spleen histopathology; Endocrine (Endocrine (thyroid, parathyroid, Pancreas, Adrenal): Adrenal histopathology; Reproductive/Developmental (Endocrine (thyroid, parathyroid, Pancreas, Adrenal): Testis histopathology;			
Duration:	Chronic (>91 days) 6 months; dogs			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	1973131			
Domain	Metric	Rating	Comments	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Low	All Outcomes: A single exposure group was used for a chronic repeat exposure, this is less than guideline recommendations and precludes the ability to evaluate a dose-response.	
	Metric 12: Exposure Route and Method	Low	All Outcomes: A whole-body dynamic air chamber was used for an inhalation study, the airflow rate (only reported to be "comfortable") and rate of air change were not reported.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Low	All Outcomes: Species, sex, and age were reported. Mongrel dogs were used, which makes comparisons between the control and exposure groups difficult. Initial body weights were not explicitly reported, but are indicated in a graph at 0 weeks of exposure.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	All Outcomes: Insufficient information on animal husbandry conditions was reported (only the type of food was provided)	
	Metric 15: Number of Animals per Group	Low	All Outcomes: Only a single male dog/group was used; the low number decreases the ability to characterize or observe a toxic effect.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	Medium	Hepatic/Liver: The outcome assessment methodology was appropriate, (e.g., organ weights, histopathology, serum chemistry/hematology), however, some details were limited (e.g., for histology, no information regarding the number of slides or staining used). Methods for the thymol-barbital test was cited to another publication. Limited to no details of methods of the brom sulfalein retention test were provided.; Renal/Kidney: The outcome assessment methodology was appropriate, (e.g., organ weights, histopathology, serum chemistry/hematology), however, some details were limited (e.g., for histology, no information regarding the number of slides or staining used).; Lung/Respiratory: Only histology for this endpoint was performed; information regarding the number of slides or staining used.; Cardiovascular: The outcome assessment methodology was appropriate, (e.g., organ weights, histopathology, serum chemistry/hematology), however, some details were limited (e.g., for histology, no information regarding the number of slides or staining used).; Immune/Hematological: The outcome assessment methodology was appropriate, (e.g., organ weights, histopathology, serum chemistry/hematology), however, some details were limited (e.g., for histology, no information regarding the number of slides or staining used).; Endocrine (Endocrine (thyroid, parathyroid, Pancreas, Adrenal): Only histology for this endpoint was performed; information regarding the number of slides or staining used.; Reproductive/Developmental (Endocrine (thyroid, parathyroid, Pancreas, Adrenal): Only histology for this endpoint was performed; information regarding the number of slides or staining used.	

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Study Citation:	Mellon Institute, (1947). Repeated exposure of rats and dogs to vapors of eight chlorinated hydrocarbons.			
Health Outcome(s):	Hepatic/Liver; Renal/Kidney; Lung/Respiratory; Cardiovascular; Immune/Hematological; Endocrine (thyroid, parathyroid, Pancreas, Adrenal); Reproductive/Developmental (Endocrine (thyroid, parathyroid, Pancreas, Adrenal);			
Reported Health Effect(s):	Hepatic/Liver: Live weights, histopathology; Renal/Kidney: Kidney weights and histopathology; serum BUN; Lung/Respiratory: Histopathology; Cardiovascular: Histology; Immune/Hematological: Blood cell counts and hemoglobin determinations; Spleen histopathology; Endocrine (thyroid, parathyroid, Pancreas, Adrenal): Adrenal histopathology; Reproductive/Developmental (Endocrine (thyroid, parathyroid, Pancreas, Adrenal): Testis histopathology;			
Duration:	Chronic (>91 days) 6 months; dogs			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	1973131			
Domain	Metric	Rating	Comments	
	Metric 17: Consistency of Outcome Assessment	Medium	Hepatic/Liver: Details of outcome assessment were not clearly reported for some outcomes (e.g., bromsulfalein, although dates of the collections between exposed and control dogs were equivalent, and thymol-barbital test). For other relevant outcomes, data for control and exposed dogs were consistently collected.; Renal/Kidney: Details of outcome assessment were not clearly reported, but collections dates were provided in data tables for some outcomes and data for control and exposed dogs were consistently collected.; Lung/Respiratory: Details of outcome assessment were not clearly reported, but collections dates were provided in data tables for some outcomes and data for control and exposed dogs were consistently collected.; Cardiovascular: Details of outcome assessment were not clearly reported, but collections dates were provided in data tables for some outcomes and data for control and exposed dogs were consistently collected.; Immune/Hematological: Details of outcome assessment were not clearly reported, but collections dates were provided in data tables for some outcomes and data for control and exposed dogs were consistently collected.; Endocrine (thyroid, parathyroid, Pancreas, Adrenal): Details of outcome assessment were not clearly reported, but collections dates were provided in data tables for some outcomes and data for control and exposed dogs were consistently collected.; Reproductive/Developmental (Endocrine (thyroid, parathyroid, Pancreas, Adrenal): Details of outcome assessment were not clearly reported, but collections dates were provided in data tables for some outcomes and data for control and exposed dogs were consistently collected.	
	Metric 18: Sampling Adequacy	Low	All Outcomes: Single animals were used for all endpoints.	
	Metric 19: Blinding of Assessors	N/A	All Outcomes: Not necessary for the endpoint evaluated	
	Metric 20: Negative Control Response	Medium	All Outcomes: The study authors did not indicate whether or not the control dog responses were unexpected.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Low	All Outcomes: The study did not report confounding variables related to test design and procedures. Respiratory rates were not monitored	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	All Outcomes: There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.	
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Study Citation:	Mellon Institute, (1947). Repeated exposure of rats and dogs to vapors of eight chlorinated hydrocarbons.
Health Outcome(s):	Hepatic/Liver; Renal/Kidney; Lung/Respiratory; Cardiovascular; Immune/Hematological; Endocrine (Endocrine (thyroid, parathyroid, Pancreas, Adrenal); Reproductive/Developmental (Endocrine (thyroid, parathyroid, Pancreas, Adrenal);
Reported Health Effect(s):	Hepatic/Liver: Live weights, histopathology; Renal/Kidney: Kidney weights and histopathology; serum BUN; Lung/Respiratory: Histopathology; Cardiovascular: Histology; Immune/Hematological: Blood cell counts and hemoglobin determinations; Spleen histopathology; Endocrine (Endocrine (thyroid, parathyroid, Pancreas, Adrenal): Adrenal histopathology; Reproductive/Developmental (Endocrine (thyroid, parathyroid, Pancreas, Adrenal): Testis histopathology;
Duration:	Chronic (>91 days) 6 months; dogs
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	1973131

Domain	Metric	Rating	Comments
	Metric 23: Data Presentation and Analysis	N/A	Hepatic/Liver: Statistical analysis was not possible for most endpoints (n=1), however, the study Authors applied statistical analysis in some cases (e.g., means of urea nitrogen and phosphate units derived from multiple collection times were compared to controls by the "t" test). Although this allows for some comparison even with use of single animals, it could dilute or mask changes occurring after longer exposure times and therefore may not be appropriate.; Renal/Kidney: Statistical analysis was not possible for most endpoints (n=1); Lung/Respiratory: Statistical analysis was not possible for most endpoints (n=1); Cardiovascular: Statistical analysis was not possible for most endpoints (n=1); Immune/Hematological: Statistical analysis was not possible for most endpoints (n=1); Endocrine (Endocrine (thyroid, parathyroid, Pancreas, Adrenal): Statistical analysis was not possible for most endpoints (n=1); Reproductive/Developmental (Endocrine (thyroid, parathyroid, Pancreas, Adrenal): Statistical analysis was not possible for most endpoints (n=1)
	Metric 24: Reporting of Data	High	All Outcomes: Individual animal data were provided for all endpoints.

Additional Comments: The study author indicated that single animal exposures to each vapor "makes it unwise to base any definite conclusions on their response." and that "This study therefore cannot be recommended for publication. Single dogs were used due to limitations in the facilities available.

Overall Quality Determination

Medium

Study Citation:	Mellon Institute, (1947). Repeated exposure of rats and dogs to vapors of eight chlorinated hydrocarbons.			
Health Outcome(s):	Nutritional/Metabolic			
Reported Health Effect(s):	Nutritional/Metabolic: Body weights; body length			
Duration:	Chronic (>91 days) 6 months; rats			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	1973131			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Identified as trichloroethane (Beta or 1,1,2-trichloroethane); CASRN not provided
	Metric 2:	Test Substance Source	Low	A commercial source was identified; batch and lot numbers were not provided.
	Metric 3:	Test Substance Purity	Low	Reported to be commercial grade, but purity was not provided.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	High	The document indicates there was an exposed control group; animals were exposed to the same conditions as exposed animals without the vapors.
	Metric 5:	Positive Controls	N/A	Not necessary for the study type
	Metric 6:	Randomized Allocation of Animals	Low	Animals were "distributed by randomization"; the method of randomization was not indicated.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Low	The study includes a limited description of the method of vapor generation, but storage of the test substance was not reported.
	Metric 8:	Consistency of Exposure Administration	Medium	The study consisted of only a single exposure group. Two chamber sizes were used, and it is unclear if the air-only controls were in the same chamber size. However, the text indicates that all chambers had an equivalent rate of air change.
	Metric 9:	Reporting of Doses/Concentrations	High	Target and analytical vapor concentrations were reported. Vapor concentrations were monitored daily using a Zeiss interferometer. The sensitivity values for the interferometer based on thermal decomposition methods were repoted.
	Metric 10:	Exposure Frequency and Duration	Low	Reported as 7hrs/day for 6 months; the frequency of exposure was not clearly stated. The text indicated that 75 exposure days had been completed. 75, 7-hr exposures over a span of 6 months (24 weeks) would be ~2 exposure days/week?
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Low	A single exposure group was used for chronic repeat exposure, this is less than guideline recommendations and precludes the ability to evaluate a dose-response.
	Metric 12:	Exposure Route and Method	Medium	A whole body dynamic air chamber was used for an inhalation study, the air flow rate (reported to be "comfortable") and rate of air change were not reported.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	Medium	Species, strain, sex, and age were reported. Initial body weights were not explicitly reported, but are indicated in a graph at 0 weeks of exposure.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	Information included # animals/cage (n=6), food and water. No other animal husbandry details were provided. It is unclear if housing conditions were appropriate given problems with animal infections,
	Metric 15:	Number of Animals per Group	Low	The number of animals (12/sex) is lower than guideline recommendations for a chronic study in rats

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Study Citation:	Mellon Institute, (1947). Repeated exposure of rats and dogs to vapors of eight chlorinated hydrocarbons.		
Health Outcome(s):	Nutritional/Metabolic		
Reported Health Effect(s):	Nutritional/Metabolic: Body weights; body length		
Duration:	Chronic (>91 days) 6 months; rats		
Chemical:	1,1,2-Trichloroethane- Parent compound		
HERO ID:	1973131		
Domain	Metric	Rating	Comments
Domain 5: Outcome Assessment			
Metric 16:	Outcome Assessment Methodology	High	Body weights were followed weekly
Metric 17:	Consistency of Outcome Assessment	Low	Details of outcome assessment were not clearly reported (i.e, it is unclear what animals were included in the dataset, and whether the animals added after 30 days were pooled with the original group of animals that survived, as was indicated for some other end-points).
Metric 18:	Sampling Adequacy	Low	The number of animals contributing to the measurements are not reported.
Metric 19:	Blinding of Assessors	N/A	Not necessary for the endpoint evaluated
Metric 20:	Negative Control Response	Medium	Growth curves were provided. There is no indication the growth of the negative control animals was atypical although, this was not explicitly discussed.
Domain 6: Confounding / Variable Control			
Metric 21:	Confounding Variables in Test Design and Procedures	Low	The study did not report confounding variables related to test design and procedures. Respiratory rates were not monitored
Metric 22:	Health Outcomes Unrelated to Exposure	Uninformative	A significant number of animals died to due apparent lung infections unrelated to exposure.
Metric 23:	Data Presentation and Analysis	Low	Statistical analysis was performed on some endpoints, but the methods were not described.
Metric 24:	Reporting of Data	Medium	Summary tables did not include measures of variance and the summary table for pathology data was ambiguously reported. Samples were described as "sets of tissues examined" and "sets with major pathology" without distinguishing between males and females, or if data were from animals exposed for 45 days (e.g., animals added mid-study), or 75 days. However, individual animal data were adequately presented in tables at the end of the study.
Additional Comments:	The study authors indicated that endemic lung infection of the rat colony minimizes the value or the results produced by this study, and therefore could not recommend this study for publication.		

Overall Quality Determination**Uninformative**

Study Citation:	Mellon Institute, (1947). Repeated exposure of rats and dogs to vapors of eight chlorinated hydrocarbons.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: Survival			
Duration:	Chronic (>91 days) 6 months; rats			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	1973131			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Identified as trichloroethane (Beta or 1,1,2-trichloroethane); CASRN not provided
	Metric 2:	Test Substance Source	Low	A commercial source was identified; batch and lot numbers were not provided.
	Metric 3:	Test Substance Purity	Low	Reported to be commercial grade, but purity was not provided.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	High	The document indicates there was an exposed control group; animals were exposed to the same conditions as exposed animals without the vapors.
	Metric 5:	Positive Controls	N/A	Not necessary for the study type
	Metric 6:	Randomized Allocation of Animals	Low	Animals were "distributed by randomization"; the method of randomization was not indicated.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Low	The study includes a limited description of the method of vapor generation, but storage of the test substance was not reported.
	Metric 8:	Consistency of Exposure Administration	Medium	The study consisted of only a single exposure group. Two chamber sizes were used, and it is unclear if the air-only controls were in the same chamber size. However, the text indicates that all chambers had an equivalent rate of air change.
	Metric 9:	Reporting of Doses/Concentrations	High	Target and analytical vapor concentrations were reported. Vapor concentrations were monitored daily using a Zeiss interferometer. The sensitivity values for the interferometer based on thermal decomposition methods were repoted.
	Metric 10:	Exposure Frequency and Duration	Low	Reported as 7hrs/day for 6 months; the frequency of exposure was not clearly stated. The text indicated that 75 exposure days had been completed. 75, 7-hr exposures over a span of 6 months (24 weeks) would be ~2 exposure days/week?
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Low	A single exposure group was used for chronic repeat exposure, this is less than guideline recommendations and precludes the ability to evaluate a dose-response. =
	Metric 12:	Exposure Route and Method	Medium	A whole body dynamic air chamber was used for an inhalation study, the air flow rate (reported to be "comfortable") and rate of air change were not reported.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	Medium	Species, strain, sex, and age were reported. Initial body weights were not explicitly reported, but are indicated in a graph at 0 weeks of exposure.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	Information included # animals/cage (n=6), food and water. No other animal husbandry details were provided. It is unclear if housing conditions were appropriate given problems with animal infections,
	Metric 15:	Number of Animals per Group	Low	The number of animals (12/sex) is lower than guideline recommendations for a chronic study in rats

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Study Citation:	Mellon Institute, (1947). Repeated exposure of rats and dogs to vapors of eight chlorinated hydrocarbons.		
Health Outcome(s):	Mortality		
Reported Health Effect(s):	Mortality: Survival		
Duration:	Chronic (>91 days) 6 months; rats		
Chemical:	1,1,2-Trichloroethane- Parent compound		
HERO ID:	1973131		
Domain	Metric	Rating	Comments
Domain 5: Outcome Assessment			
Metric 16:	Outcome Assessment Methodology	Low	Beyond a list of what outcomes were evaluated, minimal details of the methods of outcome assessment were described. The frequency of animal observation was not reported.
Metric 17:	Consistency of Outcome Assessment	Low	Details of outcome assessment were not clearly reported.
Metric 18:	Sampling Adequacy	High	All animals were observed for mortality
Metric 19:	Blinding of Assessors	N/A	Not necessary for the endpoint evaluated
Metric 20:	Negative Control Response	Uninformative	The mortality rate of the control group was reported to be 57% (due to the presence of lung infections)
Domain 6: Confounding / Variable Control			
Metric 21:	Confounding Variables in Test Design and Procedures	Low	The study did not report confounding variables related to test design and procedures. Respiratory rates were not monitored
Metric 22:	Health Outcomes Unrelated to Exposure	Uninformative	A significant number of animals died in all groups to due apparent lung infections unrelated to exposure. This significantly impacted the usefulness of this study.
Metric 23:	Data Presentation and Analysis	N/A	Statistical analysis was likely not performed due to the significant deaths resulting from lung infections in all groups (including the controls)
Metric 24:	Reporting of Data	Medium	No direct comparisons were made with controls, but mortality rates for both controls and the exposed group was reported.
Additional Comments:	The study authors indicated that endemic lung infection of the rat colony minimizes the value or the results produced by this study, and therefore could not recommend this study for publication.		

Overall Quality Determination**Uninformative**

Study Citation:	Mellon Institute, (1947). Repeated exposure of rats and dogs to vapors of eight chlorinated hydrocarbons.			
Health Outcome(s):	Reproductive/Developmental; Renal/Kidney; Hepatic/Liver; Cardiovascular; Lung/Respiratory; Immune/Hematological; Endocrine;			
Reported Health Effect(s):	Reproductive/Developmental: Testis histopathology; Renal/Kidney: Kidney weights and histopathology; serum BUN; Hepatic/Liver: Live weights, histopathology; Cardiovascular: Histology; Lung/Respiratory: Histopathology; Immune/Hematological: Blood cell counts and hemoglobin determinations; Spleen histopathology; Endocrine: Adrenal histopathology;			
Duration:	Chronic (>91 days) 6 months; rats			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	1973131			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
Metric 1:	Test Substance Identity	High	Reproductive/Developmental: Identified as trichloroethane (Beta or 1,1,2-trichloroethane); CASRN not provided; Renal/Kidney: Identified as trichloroethane (Beta or 1,1,2-trichloroethane); CASRN not provided; Hepatic/Liver: Identified as trichloroethane (Beta or 1,1,2-trichloroethane); CASRN not provided; Cardiovascular: The test substance was identified definitively using standard nomenclature; CASRN was not provided.; Lung/Respiratory: Identified as propylene dichloride (1,2-dichloropropane); CASRN not provided; Immune/Hematological: The test substance was identified definitively using standard nomenclature; CASRN was not provided.; Endocrine: The test substance was identified definitively using standard nomenclature; CASRN was not provided.	
Metric 2:	Test Substance Source	Low	All Outcomes: A commercial source was identified; batch and lot numbers were not provided.	
Metric 3:	Test Substance Purity	Low	All Outcomes: Reported to be commercial grade, but purity was not provided.	
Domain 2: Test Design				
Metric 4:	Negative and Vehicle Controls	High	All Outcomes: The document indicates there was an exposed control group; animals were exposed to the same conditions as exposed animals without the vapors.	
Metric 5:	Positive Controls	N/A	All Outcomes: Not necessary for the study type	
Metric 6:	Randomized Allocation of Animals	Low	All Outcomes: Animals were "distributed by randomization"; the method of randomization was not indicated.	
Domain 3: Exposure Characterization				
Metric 7:	Preparation and Storage of Test Substance	Low	All Outcomes: The study includes a limited description of the method of vapor generation, but storage of the test substance was not reported.	
Metric 8:	Consistency of Exposure Administration	Medium	All Outcomes: The study consisted of only a single exposure group. Two chamber sizes were used, and it is unclear if the air-only controls were in the same chamber size. However, the text indicates that all chambers had an equivalent rate of air change.	
Metric 9:	Reporting of Doses/Concentrations	High	All Outcomes: Target and analytical vapor concentrations were reported. Vapor concentrations were monitored daily using a Zeiss interferometer. The sensitivity values for the interferometer based on thermal decomposition methods were reproted.	
Metric 10:	Exposure Frequency and Duration	Low	All Outcomes: Reported as 7hrs/day for 6 months; the frequency of exposure was not clearly stated. The text indicated that 75 exposure days had been completed. 75, 7-hr exposures over a span of 6 months (24 weeks) would be ~2 exposure days/week?	

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Study Citation:	Mellon Institute, (1947). Repeated exposure of rats and dogs to vapors of eight chlorinated hydrocarbons.			
Health Outcome(s):	Reproductive/Developmental; Renal/Kidney; Hepatic/Liver; Cardiovascular; Lung/Respiratory; Immune/Hematological; Endocrine;			
Reported Health Effect(s):	Reproductive/Developmental: Testis histopathology; Renal/Kidney: Kidney weights and histopathology; serum BUN; Hepatic/Liver: Live weights, histopathology; Cardiovascular: Histology; Lung/Respiratory: Histopathology; Immune/Hematological: Blood cell counts and hemoglobin determinations; Spleen histopathology; Endocrine: Adrenal histopathology;			
Duration:	Chronic (>91 days) 6 months; rats			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	1973131			
Domain	Metric	Rating	Comments	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Low	Reproductive/Developmental: A single exposure group was used for a chronic repeat exposure, this is less than guideline recommendations and precludes the ability to evaluate a dose-response.; Renal/Kidney: A single exposure group was used for chronic repeat exposure, this is less than guideline recommendations and precludes the ability to evaluate a dose-response.; Hepatic/Liver: A single exposure group was used for a chronic repeat exposure, this is less than guideline recommendations and precludes the ability to evaluate a dose-response.; Cardiovascular: A single exposure group was used for a chronic repeat exposure, this is less than guideline recommendations and precludes the ability to evaluate a dose-response.; Lung/Respiratory: A single exposure group was used for a chronic repeat exposure, this is less than guideline recommendations and precludes the ability to evaluate a dose-response.; Immune/Hematological: A single exposure group was used for a chronic repeat exposure, this is less than guideline recommendations and precludes the ability to evaluate a dose-response.; Endocrine: A single exposure group was used for a chronic repeat exposure, this is less than guideline recommendations and precludes the ability to evaluate a dose-response.	
	Metric 12: Exposure Route and Method	Medium	All Outcomes: A whole body dynamic air chamber was used for an inhalation study, the air flow rate (reported to be "comfortable") and rate of air change were not reported.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Medium	All Outcomes: Species, strain, sex, and age were reported. Initial body weights were not explicitly reported, but are indicated in a graph at 0 weeks of exposure.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	All Outcomes: Information included # animals/cage (n=6), food and water. No other animal husbandry details were provided. It is unclear if housing conditions were appropriate given problems with animal infections,	
	Metric 15: Number of Animals per Group	Low	All Outcomes: The number of animals (12/sex) is lower than guideline recommendations for a chronic study in rats	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	Medium	All Outcomes: Outcome assessment methods were appropriate, but were poorly described (e.g., no details on tissue collection, histology methods used, etc..)	
	Metric 17: Consistency of Outcome Assessment	Low	All Outcomes: Details of outcome assessment were not clearly reported (i.e, it is unclear what animals were included in the dataset, and whether the animals added after 30 days were pooled with the original group of animals that survived, as was indicated for some other endpoints).	
	Metric 18: Sampling Adequacy	Low	All Outcomes: The number of animals contributing to the measurements are not reported.	
	Metric 19: Blinding of Assessors	N/A	All Outcomes: Not necessary for the endpoint evaluated	

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Study Citation:	Mellon Institute, (1947). Repeated exposure of rats and dogs to vapors of eight chlorinated hydrocarbons.			
Health Outcome(s):	Reproductive/Developmental; Renal/Kidney; Hepatic/Liver; Cardiovascular; Lung/Respiratory; Immune/Hematological; Endocrine;			
Reported Health Effect(s):	Reproductive/Developmental: Testis histopathology; Renal/Kidney: Kidney weights and histopathology; serum BUN; Hepatic/Liver: Live weights, histopathology; Cardiovascular: Histology; Lung/Respiratory: Histopathology; Immune/Hematological: Blood cell counts and hemoglobin determinations; Spleen histopathology; Endocrine: Adrenal histopathology;			
Duration:	Chronic (>91 days) 6 months; rats			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	1973131			
Domain	Metric	Rating	Comments	
	Metric 20: Negative Control Response	Uninformative	All Outcomes: 57% of control animals died; Roughly 50% of control animals evaluated had major pathology of the kidney (25%), liver (30%), or lung (29%).	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Low	All Outcomes: The study did not report confounding variables related to test design and procedures. Respiratory rates were not monitored	
	Metric 22: Health Outcomes Unrelated to Exposure	Uninformative	All Outcomes: Animals from all groups were reported to have a virus, or pleurpneumonia like organism/infection. This significantly affected the reliability of this study	
	Metric 23: Data Presentation and Analysis	Low	All Outcomes: Statistical analysis was not performed; it is presumed this is due to the poor health of the control animals. Statistical analysis was performed for organ weights; however, the methods were not adequately described.	
	Metric 24: Reporting of Data	Medium	All Outcomes: Summary tables did not include measures of variance and the summary table for pathology data was ambiguously reported. Samples were described as "sets of tissues examined" and "sets with major pathology" without distinguishing between males and females, or if data were from animals exposed for 45 days (e.g., animals added mid-study), or 75 days. However, individual animal data were adequately presented in tables at the end of the study.	
Additional Comments:	The study authors indicated that endemic lung infection of the rat colony minimizes the value or the results produced by this study, and therefore could not recommend this study for publication. The authors specifically indicate that the pathology results must be discounted to a large extent when compared to that of the controls.			

Overall Quality Determination**Uninformative**

Study Citation:	NCI, (1978). Bioassay of 1,1,2-trichloroethane for possible carcinogenicity. National Cancer Institute Carcinogenesis Technical Report Series 74:1-104.			
Health Outcome(s):	Cancer/Carcinogenesis			
Reported Health Effect(s):	Cancer/Carcinogenesis: Incidence of neoplastic lesions			
Duration:	Chronic (>91 days) 78 weeks in rats			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	64554			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Chemical name with CASRN were provided.
	Metric 2:	Test Substance Source	High	Chemical source was reported as Aldrich Chemical Company.
	Metric 3:	Test Substance Purity	Medium	Purity was reported by GLC. The initial purity determination was 99.2%. Any impurities, if present in the remaining 0.8%, were not reported so selected medium.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	High	This study had both a negative control group and a vehicle control group.
	Metric 5:	Positive Controls	N/A	Positive controls are not required for this study type.
	Metric 6:	Randomized Allocation of Animals	Low	Study did not report how animals were allocated to study groups
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Low	Test substance was prepared weekly, rather than daily (fresh solutions were prepared weekly in corn oil and stored in dark bottles at 1 deg C), and no indication was given whether the bottles had lids and/or were tightly closed to prevent volatilization.
	Metric 8:	Consistency of Exposure Administration	Low	Dosing volumes were not reported, so it is unknown if dosing was consistent across groups.
	Metric 9:	Reporting of Doses/Concentrations	High	Administered doses were reported without ambiguity.
	Metric 10:	Exposure Frequency and Duration	Medium	Exposure frequency and duration of exposure deviated from cancer bioassay guidelines. For example, OECD TG 451 recommends that for oral administration "animals are dosed with the test chemical daily (7 days per week), normally for a period of 24 months". In this study, animals received gavage exposures 5 days/week for 78 weeks and no clear, test substance-related effects were observed for cancer. Observed signs of toxicity were limited to clinical signs in test substance exposed animals, which increased in incidence as the study progressed. The incidence and frequency of these signs were similar in low-and high-dose groups, except that the high-dose females showed an elevated incidence of abdominal urine staining from week 26 until intubation ceased in week 78. There was no indication that the maximum tolerated dose was achieved in this study.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Low	Doses were based on range-finding studies. There were only two dose groups in the main study and dose levels appear to be relatively close. Dose levels were increased after 20 weeks due to tolerance. OECD TG 451 recommends "at least three dose levels" for a cancer bioassay. Due to these limitations, this metric was rated as low for the outcome of cancer.
	Metric 12:	Exposure Route and Method	High	The route and method of exposure were reported and were suited to the test substance.

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Study Citation:	NCI, (1978). Bioassay of 1,1,2-trichloroethane for possible carcinogenicity. National Cancer Institute Carcinogenesis Technical Report Series 74:1-104.			
Health Outcome(s):	Cancer/Carcinogenesis			
Reported Health Effect(s):	Cancer/Carcinogenesis: Incidence of neoplastic lesions			
Duration:	Chronic (>91 days) 78 weeks in rats			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	64554			
Domain	Metric	Rating	Comments	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	High	The test animal species, strain, sex, age, and starting body weight were reported.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were reported as ranges. Rats in different test substance-exposed groups were housed in the same room as untreated control rats; however, vehicle control rats were housed in another room.	
	Metric 15: Number of Animals per Group	Low	Only 20 animals/sex/group were included in the untreated and vehicle control groups, so selected low; 50/sex/group were included in the test substance-exposed groups, which is acceptable.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	High	The outcome assessment methodology addressed the intended outcome of interest.	
	Metric 17: Consistency of Outcome Assessment	Low	There was incomplete reporting of minor details of outcome assessment protocol execution, such as recording of body weights at the same time/day and timing of sacrifice of groups at the end of the study.	
	Metric 18: Sampling Adequacy	Low	Details regarding sampling of outcomes were not completely reported and this deficiency may have a substantial impact on results.	
	Metric 19: Blinding of Assessors	N/A	No subjective endpoints were assessed.	
	Metric 20: Negative Control Response	Low	Authors report that in rats, "the vehicle control groups had unexpectedly poor survival with only 5% of the males and 20% of the females surviving until termination of the study." The study only presents comparisons with untreated control groups. Due to the response of the negative control group, this metric was rated as low.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	High	There were no reported differences among the study groups.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no reporting to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure	
	Metric 23: Data Presentation and Analysis	High	Statistical methods were clearly described.	
	Metric 24: Reporting of Data	High	Negative findings were reported qualitatively or quantitatively (no positive findings for rats for the outcome of cancer) and summary incidence of neoplasms was reported; therefore, this metric was rated as high.	
Additional Comments:	None			

Overall Quality Determination**Medium**

Study Citation:	NCI, (1978). Bioassay of 1,1,2-trichloroethane for possible carcinogenicity. National Cancer Institute Carcinogenesis Technical Report Series 74:1-104.			
Health Outcome(s):	Neurological/Behavioral; Mortality; Nutritional/Metabolic;			
Reported Health Effect(s):	Neurological/Behavioral: Clinical signs were reported. Nerves and brain tissues were examined for histopathological changes. Incidences of non-neoplastic lesions in nervous system (e.g., brain/meninges) were reported.; Mortality: Survival; Nutritional/Metabolic: Mean body weights were reported.;			
Duration:	Chronic (>91 days) 78 weeks in rats			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	64554			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	All Outcomes: Chemical name with CASRN were provided.	
	Metric 2: Test Substance Source	High	All Outcomes: Chemical source was reported as Aldrich Chemical Company.	
	Metric 3: Test Substance Purity	Medium	All Outcomes: Purity was reported by GLC. The initial purity determination was 99.2%. Any impurities, if present in the remaining 0.8%, were not reported so selected medium.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	High	All Outcomes: This study had both a negative control group and a vehicle control group.	
	Metric 5: Positive Controls	N/A	All Outcomes: Positive controls are not required for this study type.	
	Metric 6: Randomized Allocation of Animals	Low	All Outcomes: Study did not report how animals were allocated to study groups	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	All Outcomes: Test substance was prepared weekly, rather than daily (fresh solutions were prepared weekly in corn oil and stored in dark bottles at 1 deg C), and no indication was given whether the bottles had lids and/or were tightly closed to prevent volatilization.	
	Metric 8: Consistency of Exposure Administration	Low	All Outcomes: Dosing volumes were not reported, so it is unknown if dosing was consistent across groups.	
	Metric 9: Reporting of Doses/Concentrations	High	All Outcomes: Administered doses were reported without ambiguity.	
	Metric 10: Exposure Frequency and Duration	Medium	All Outcomes: Exposure frequency and duration of exposure deviated from cancer bioassay guidelines. For example, OECD TG 451 recommends that for oral administration "animals are dosed with the test chemical daily (7 days per week), normally for a period of 24 months". In this study, animals received gavage exposures 5 days/week for only 78 weeks.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Low	All Outcomes: Doses were based on range-finding studies. There were only two dose groups in the main study and dose levels appear to be relatively close. Dose levels were increased after 20 weeks due to tolerance. It was unclear if the highest dose was high enough for rats.	
	Metric 12: Exposure Route and Method	High	All Outcomes: The route and method of exposure were reported and were suited to the test substance.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	High	All Outcomes: The test animal species, strain, sex, age, and starting body weight were reported.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	All Outcomes: Husbandry conditions were reported as ranges. Rats in different test substance-exposed groups were housed in the same room as untreated control rats; however, vehicle control rats were housed in another room.	
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Study Citation:	NCI, (1978). Bioassay of 1,1,2-trichloroethane for possible carcinogenicity. National Cancer Institute Carcinogenesis Technical Report Series 74:1-104.
Health Outcome(s):	Neurological/Behavioral; Mortality; Nutritional/Metabolic;
Reported Health Effect(s):	Neurological/Behavioral: Clinical signs were reported. Nerves and brain tissues were examined for histopathological changes. Incidences of non-neoplastic lesions in nervous system (e.g., brain/meninges) were reported.; Mortality: Survival; Nutritional/Metabolic: Mean body weights were reported.;
Duration:	Chronic (>91 days) 78 weeks in rats
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64554

Domain	Metric	Rating	Comments
	Metric 15: Number of Animals per Group	Low	All Outcomes: Only 20 animals/sex/group were included in the untreated and vehicle control groups, so selected low; 50/sex/group were included in the test substance-exposed groups, which is acceptable.
Domain 5: Outcome Assessment			
	Metric 16: Outcome Assessment Methodology	High	All Outcomes: The outcome assessment methodology addressed the intended outcome of interest.
	Metric 17: Consistency of Outcome Assessment	Low	All Outcomes: There was incomplete reporting of minor details of outcome assessment protocol execution, such as recording of body weights at the same time/day and timing of sacrifice of groups at the end of the study.
	Metric 18: Sampling Adequacy	Low	All Outcomes: Details regarding sampling of outcomes were not completely reported and this deficiency may have a substantial impact on results.
	Metric 19: Blinding of Assessors	N/A	All Outcomes: No subjective endpoints were assessed.
	Metric 20: Negative Control Response	Low	All Outcomes: Authors report that in rats, "the vehicle control groups had unexpectedly poor survival with only 5% of the males and 20% of the females surviving until termination of the study." The study only presents comparisons with untreated control groups. Due to the response of the negative control group, this metric was rated as low.
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	High	All Outcomes: There were no reported differences among the study groups.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	All Outcomes: There was no reporting to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure
	Metric 23: Data Presentation and Analysis	High	All Outcomes: Statistical methods were clearly described.
	Metric 24: Reporting of Data	Low	Neurological/Behavioral: Incidence was not reported for the clinical effects observed; therefore, this metric was rated as low for this outcome.; Mortality: Numerical values were not provided for survival data although data were included in graphs. Due to this limitation, this metric was rated as low.; Nutritional/Metabolic: Numerical values were not provided for body weights, although data were included in graphs. Due to this limitation, this metric was rated as low.

Additional Comments: None

Overall Quality Determination**Medium**

Study Citation:	NCI, (1978). Bioassay of 1,1,2-trichloroethane for possible carcinogenicity. National Cancer Institute Carcinogenesis Technical Report Series 74:1-104.
Health Outcome(s):	Cardiovascular; Thyroid; Reproductive/Developmental; Gastrointestinal; Musculoskeletal; Immune/Hematological; Hepatic/Liver; Ocular/Sensory; Renal/Kidney; Lung/Respiratory; Skin/Connective Tissue; Urinary (Urinary); Endocrine (Endocrine);
Reported Health Effect(s):	Cardiovascular: Heart tissues were examined for histopathological changes. Incidence of non-neoplastic lesions in circulatory system (heart, myocardium, endocardium, aorta) was reported.; Thyroid: Thyroid and parathyroid tissues were examined for histopathological changes and incidences of non-neoplastic lesions in these tissues were reported.; Reproductive/Developmental: Testis, prostate, vagina, uterus, mammary gland, and ovarian tissues were examined for histopathological changes. Incidences of non-neoplastic lesions in reproductive tissues were reported.; Gastrointestinal: Salivary gland, esophagus, stomach, small intestine, and large intestine tissues were examined for histopathological changes. Incidences of non-neoplastic lesions in the digestive system (e.g., salivary glands, stomach, and esophagus) were reported.; Musculoskeletal: Incidence of non-neoplastic lesions in musculoskeletal system; Immune/Hematological: Spleen, lymph nodes, and thymus tissues were examined for histopathological changes and incidences of non-neoplastic lesions in these tissues were reported.; Hepatic/Liver: Incidence of non-neoplastic lesions in liver; Ocular/Sensory: Incidence of non-neoplastic lesions in special sense organs, including eyes, were reported.; Renal/Kidney: Kidney was examined for histopathological changes and incidence of non-neoplastic lesions was reported.; Lung/Respiratory: Lungs, bronchi, and trachea tissues were examined for histopathological changes. Incidences of non-neoplastic lesions in respiratory system were reported.; Skin/Connective Tissue: Skin and subcutaneous tissues were examined for histopathological changes. Incidences of non-neoplastic lesions in skin and subcutaneous tissue were reported.; Urinary (Urinary): Urinary bladder was examined for histopathological changes and incidence of non-neoplastic lesions was reported.; Endocrine (Endocrine): Pituitary gland and adrenal gland were examined for histopathological changes. Incidences of non-neoplastic lesions in pituitary gland and adrenal were reported.;
Duration:	Chronic (>91 days) 78 weeks in rats
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64554

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	High	All Outcomes: Chemical name with CASRN were provided.
	Metric 2: Test Substance Source	High	All Outcomes: Chemical source was reported as Aldrich Chemical Company.
	Metric 3: Test Substance Purity	Medium	All Outcomes: Purity was reported by GLC. The initial purity determination was 99.2%. Any impurities, if present in the remaining 0.8%, were not reported so selected medium.
Domain 2: Test Design			
	Metric 4: Negative and Vehicle Controls	High	All Outcomes: This study had both a negative control group and a vehicle control group.
	Metric 5: Positive Controls	N/A	All Outcomes: Positive controls are not required for this study type.
	Metric 6: Randomized Allocation of Animals	Low	All Outcomes: Study did not report how animals were allocated to study groups
Domain 3: Exposure Characterization			
	Metric 7: Preparation and Storage of Test Substance	Low	All Outcomes: Test substance was prepared weekly, rather than daily (fresh solutions were prepared weekly in corn oil and stored in dark bottles at 1 deg C), and no indication was given whether the bottles had lids and/or were tightly closed to prevent volatilization.
	Metric 8: Consistency of Exposure Administration	Low	All Outcomes: Dosing volumes were not reported, so it is unknown if dosing was consistent across groups.
	Metric 9: Reporting of Doses/Concentrations	High	All Outcomes: Administered doses were reported without ambiguity.
	Metric 10: Exposure Frequency and Duration	Medium	All Outcomes: Exposure frequency and duration of exposure deviated from cancer bioassay guidelines. For example, OECD TG 451 recommends that for oral administration "animals are dosed with the test chemical daily (7 days per week), normally for a period of 24 months". In this study, animals received gavage exposures 5 days/week for only 78 weeks.

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Study Citation:	NCI, (1978). Bioassay of 1,1,2-trichloroethane for possible carcinogenicity. National Cancer Institute Carcinogenesis Technical Report Series 74:1-104.				
Health Outcome(s):	Cardiovascular; Thyroid; Reproductive/Developmental; Gastrointestinal; Musculoskeletal; Immune/Hematological; Hepatic/Liver; Ocular/Sensory; Renal/Kidney; Lung/Respiratory; Skin/Connective Tissue; Urinary (Urinary); Endocrine (Endocrine);				
Reported Health Effect(s):	Cardiovascular: Heart tissues were examined for histopathological changes. Incidence of non-neoplastic lesions in circulatory system (heart, myocardium, endocardium, aorta) was reported.; Thyroid: Thyroid and parathyroid tissues were examined for histopathological changes and incidences of non-neoplastic lesions in these tissues were reported.; Reproductive/Developmental: Testis, prostate, vagina, uterus, mammary gland, and ovarian tissues were examined for histopathological changes. Incidences of non-neoplastic lesions in reproductive tissues were reported.; Gastrointestinal: Salivary gland, esophagus, stomach, small intestine, and large intestine tissues were examined for histopathological changes. Incidences of non-neoplastic lesions in the digestive system (e.g., salivary glands, stomach, and esophagus) were reported.; Musculoskeletal: Incidence of non-neoplastic lesions in musculoskeletal system; Immune/Hematological: Spleen, lymph nodes, and thymus tissues were examined for histopathological changes and incidences of non-neoplastic lesions in these tissues were reported.; Hepatic/Liver: Incidence of non-neoplastic lesions in liver; Ocular/Sensory: Incidence of non-neoplastic lesions in special sense organs, including eyes, were reported.; Renal/Kidney: Kidney was examined for histopathological changes and incidence of non-neoplastic lesions was reported.; Lung/Respiratory: Lungs, bronchi, and trachea tissues were examined for histopathological changes. Incidences of non-neoplastic lesions in respiratory system were reported.; Skin/Connective Tissue: Skin and subcutaneous tissues were examined for histopathological changes. Incidences of non-neoplastic lesions in skin and subcutaneous tissue were reported.; Urinary (Urinary): Urinary bladder was examined for histopathological changes and incidence of non-neoplastic lesions was reported.; Endocrine (Endocrine): Pituitary gland and adrenal gland were examined for histopathological changes. Incidences of non-neoplastic lesions in pituitary gland and adrenal were reported.;				
Duration:	Chronic (>91 days) 78 weeks in rats				
Chemical:	1,1,2-Trichloroethane- Parent compound				
HERO ID:	64554				
Domain		Metric	Rating	Comments	
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Low	All Outcomes: Doses were based on range-finding studies. There were only two dose groups in the main study and dose levels appear to be relatively close. Dose levels were increased after 20 weeks due to tolerance. It was unclear if the highest dose was high enough for rats.	
	Metric 12:	Exposure Route and Method	High	All Outcomes: The route and method of exposure were reported and were suited to the test substance.	
Domain 4: Test Animals					
	Metric 13:	Test Animal Characteristics	High	All Outcomes: The test animal species, strain, sex, age, and starting body weight were reported.	
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	All Outcomes: Husbandry conditions were reported as ranges. Rats in different test substance-exposed groups were housed in the same room as untreated control rats; however, vehicle control rats were housed in another room.	
	Metric 15:	Number of Animals per Group	Low	All Outcomes: Only 20 animals/sex/group were included in the untreated and vehicle control groups, so selected low; 50/sex/group were included in the test substance-exposed groups, which is acceptable.	
Domain 5: Outcome Assessment					
	Metric 16:	Outcome Assessment Methodology	Medium	All Outcomes: Assessments were limited for this outcome (only histopathology).	
	Metric 17:	Consistency of Outcome Assessment	Low	All Outcomes: There was incomplete reporting of minor details of outcome assessment protocol execution, such as recording of body weights at the same time/day and timing of sacrifice of groups at the end of the study.	
	Metric 18:	Sampling Adequacy	Low	All Outcomes: Details regarding sampling of outcomes were not completely reported and this deficiency may have a substantial impact on results.	
	Metric 19:	Blinding of Assessors	N/A	All Outcomes: No subjective endpoints were assessed.	

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Study Citation:	NCI, (1978). Bioassay of 1,1,2-trichloroethane for possible carcinogenicity. National Cancer Institute Carcinogenesis Technical Report Series 74:1-104.			
Health Outcome(s):	Cardiovascular; Thyroid; Reproductive/Developmental; Gastrointestinal; Musculoskeletal; Immune/Hematological; Hepatic/Liver; Ocular/Sensory; Renal/Kidney; Lung/Respiratory; Skin/Connective Tissue; Urinary (Urinary); Endocrine (Endocrine);			
Reported Health Effect(s):	Cardiovascular: Heart tissues were examined for histopathological changes. Incidence of non-neoplastic lesions in circulatory system (heart, myocardium, endocardium, aorta) was reported.; Thyroid: Thyroid and parathyroid tissues were examined for histopathological changes and incidences of non-neoplastic lesions in these tissues were reported.; Reproductive/Developmental: Testis, prostate, vagina, uterus, mammary gland, and ovarian tissues were examined for histopathological changes. Incidences of non-neoplastic lesions in reproductive tissues were reported.; Gastrointestinal: Salivary gland, esophagus, stomach, small intestine, and large intestine tissues were examined for histopathological changes. Incidences of non-neoplastic lesions in the digestive system (e.g., salivary glands, stomach, and esophagus) were reported.; Musculoskeletal: Incidence of non-neoplastic lesions in musculoskeletal system; Immune/Hematological: Spleen, lymph nodes, and thymus tissues were examined for histopathological changes and incidences of non-neoplastic lesions in these tissues were reported.; Hepatic/Liver: Incidence of non-neoplastic lesions in liver; Ocular/Sensory: Incidence of non-neoplastic lesions in special sense organs, including eyes, were reported.; Renal/Kidney: Kidney was examined for histopathological changes and incidence of non-neoplastic lesions was reported.; Lung/Respiratory: Lungs, bronchi, and trachea tissues were examined for histopathological changes. Incidences of non-neoplastic lesions in respiratory system were reported.; Skin/Connective Tissue: Skin and subcutaneous tissues were examined for histopathological changes. Incidences of non-neoplastic lesions in skin and subcutaneous tissue were reported.; Urinary (Urinary): Urinary bladder was examined for histopathological changes and incidence of non-neoplastic lesions was reported.; Endocrine (Endocrine): Pituitary gland and adrenal gland were examined for histopathological changes. Incidences of non-neoplastic lesions in pituitary gland and adrenal were reported.;			
Duration:	Chronic (>91 days) 78 weeks in rats			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	64554			
Domain	Metric		Rating	Comments
	Metric 20:	Negative Control Response	Low	All Outcomes: Authors report that in rats, "the vehicle control groups had unexpectedly poor survival with only 5% of the males and 20% of the females surviving until termination of the study." The study only presents comparisons with untreated control groups. Due to the response of the negative control group, this metric was rated as low.
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	High	All Outcomes: There were no reported differences among the study groups.
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	All Outcomes: There was no reporting to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure
	Metric 23:	Data Presentation and Analysis	N/A	All Outcomes: Statistical analysis was not necessary.
	Metric 24:	Reporting of Data	High	All Outcomes: Negative findings were reported qualitatively or quantitatively.
Additional Comments: None				

Overall Quality Determination**Medium**

Study Citation:	NCI, (1978). Bioassay of 1,1,2-trichloroethane for possible carcinogenicity. National Cancer Institute Carcinogenesis Technical Report Series 74:1-104.			
Health Outcome(s):	Cancer/Carcinogenesis; Neurological/Behavioral; Mortality; Nutritional/Metabolic;			
Reported Health Effect(s):	Cancer/Carcinogenesis: Incidence of neoplastic lesions; Neurological/Behavioral: Clinical signs were reported. Nerves and brain tissues were examined for histopathological changes. Incidences of non-neoplastic lesions in nervous system (e.g., brain/meninges) were reported.; Mortality: Survival; Nutritional/Metabolic: Mean body weights were reported.;			
Duration:	Chronic (>91 days) 78 weeks in mice			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	64554			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	All Outcomes: Chemical name with CASRN were provided.
	Metric 2:	Test Substance Source	High	All Outcomes: Chemical source was reported as Aldrich Chemical Company.
	Metric 3:	Test Substance Purity	Medium	All Outcomes: Purity was reported by GLC. The initial purity determination was 99.2%. Any impurities, if present in the remaining 0.8%, were not reported so selected medium.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	High	All Outcomes: This study had both a negative control group and a vehicle control group.
	Metric 5:	Positive Controls	N/A	All Outcomes: Positive controls are not required for this study type.
	Metric 6:	Randomized Allocation of Animals	Low	All Outcomes: Study did not report how animals were allocated to study groups
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Low	All Outcomes: Test substance was prepared weekly, rather than daily (fresh solutions were prepared weekly in corn oil and stored in dark bottles at 1 deg C), and no indication was given whether the bottles had lids and/or were tightly closed to prevent volatilization.
	Metric 8:	Consistency of Exposure Administration	Low	All Outcomes: Dosing volumes were not reported, so it is unknown if dosing was consistent across groups.
	Metric 9:	Reporting of Doses/Concentrations	High	All Outcomes: Administered doses were reported without ambiguity.
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Study Citation:	NCI, (1978). Bioassay of 1,1,2-trichloroethane for possible carcinogenicity. National Cancer Institute Carcinogenesis Technical Report Series 74:1-104.			
Health Outcome(s):	Cancer/Carcinogenesis; Neurological/Behavioral; Mortality; Nutritional/Metabolic;			
Reported Health Effect(s):	Cancer/Carcinogenesis: Incidence of neoplastic lesions; Neurological/Behavioral: Clinical signs were reported. Nerves and brain tissues were examined for histopathological changes. Incidences of non-neoplastic lesions in nervous system (e.g., brain/meninges) were reported.; Mortality: Survival; Nutritional/Metabolic: Mean body weights were reported.;			
Duration:	Chronic (>91 days) 78 weeks in mice			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	64554			
Domain	Metric		Rating	Comments
	Metric 10:	Exposure Frequency and Duration	Medium	Cancer/Carcinogenesis: Exposure frequency and duration of exposure deviated from cancer bioassay guidelines. For example, OECD TG 451 recommends that for oral administration "animals are dosed with the test chemical daily (7 days per week), normally for a period of 24 months". In this study, animals received gavage exposures 5 days/week for only 78 weeks. However, a treatment-related effect was observed for the intended outcome (cancer) in mice so this metric was rated as medium for this outcome.; Neurological/Behavioral: Exposure frequency and duration of exposure deviated from cancer bioassay guidelines. For example, OECD TG 451 recommends that for oral administration "animals are dosed with the test chemical daily (7 days per week), normally for a period of 24 months". In this study, animals received gavage exposures 5 days/week for only 78 weeks. However, a treatment-related effect was observed for the intended outcome (cancer) in mice so this metric was rated as medium.; Mortality: Exposure frequency and duration of exposure deviated from cancer bioassay guidelines. For example, OECD TG 451 recommends that for oral administration "animals are dosed with the test chemical daily (7 days per week), normally for a period of 24 months". In this study, animals received gavage exposures 5 days/week for only 78 weeks. However, a treatment-related effect was observed for the intended outcome (cancer) in mice so this metric was rated as medium.; Nutritional/Metabolic: Exposure frequency and duration of exposure deviated from cancer bioassay guidelines. For example, OECD TG 451 recommends that for oral administration "animals are dosed with the test chemical daily (7 days per week), normally for a period of 24 months". In this study, animals received gavage exposures 5 days/week for only 78 weeks. However, a treatment-related effect was observed for the intended outcome (cancer) in mice so this metric was rated as medium.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Low	Cancer/Carcinogenesis: Doses were based on range-finding studies. There were only two dose groups in the main study and dose levels appear to be relatively close. Dose levels were increased after 20 weeks due to tolerance. OECD TG 451 recommends "at least three dose levels" for a cancer bioassay. Due to these limitations, this metric was rated as low for the outcome of cancer.; Neurological/Behavioral: Doses were based on range-finding studies. There were only two dose groups in the main study and dose levels appear to be relatively close. Dose levels were increased after 20 weeks due to tolerance.; Mortality: Doses were based on range-finding studies. There were only two dose groups in the main study and dose levels appear to be relatively close. Dose levels were increased after 20 weeks due to tolerance.
	Metric 12:	Exposure Route and Method	High	All Outcomes: The route and method of exposure were reported and were suited to the test substance.

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Study Citation:	NCI, (1978). Bioassay of 1,1,2-trichloroethane for possible carcinogenicity. National Cancer Institute Carcinogenesis Technical Report Series 74:1-104.			
Health Outcome(s):	Cancer/Carcinogenesis; Neurological/Behavioral; Mortality; Nutritional/Metabolic;			
Reported Health Effect(s):	Cancer/Carcinogenesis: Incidence of neoplastic lesions; Neurological/Behavioral: Clinical signs were reported. Nerves and brain tissues were examined for histopathological changes. Incidences of non-neoplastic lesions in nervous system (e.g., brain/meninges) were reported.; Mortality: Survival; Nutritional/Metabolic: Mean body weights were reported.;			
Duration:	Chronic (>91 days) 78 weeks in mice			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	64554			
Domain	Metric	Rating	Comments	
Domain 4: Test Animals				
Metric 13:	Test Animal Characteristics	High	All Outcomes: The test animal species, strain, sex, age, and starting body weight were reported.	
Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Medium	All Outcomes: Husbandry conditions were reported as ranges. Mice were all housed in the same room. Since animals were housed in temperature- and humidity-controlled rooms and under the same conditions, kept rating as medium.	
Metric 15:	Number of Animals per Group	Low	All Outcomes: Only 20 animals/sex/group were included in the untreated and vehicle control groups, so selected low; 50/sex/group were included in the test substance-exposed groups, which is acceptable.	
Domain 5: Outcome Assessment				
Metric 16:	Outcome Assessment Methodology	High	All Outcomes: The outcome assessment methodology addressed the intended outcome of interest.	
Metric 17:	Consistency of Outcome Assessment	Low	All Outcomes: There was incomplete reporting of minor details of outcome assessment protocol execution, such as recording of body weights at the same time/day and timing of sacrifice of groups at the end of the study.	
Metric 18:	Sampling Adequacy	Low	All Outcomes: Details regarding sampling of outcomes were not completely reported and this deficiency may have a substantial impact on results.	
Metric 19:	Blinding of Assessors	N/A	All Outcomes: No subjective endpoints were assessed.	
Metric 20:	Negative Control Response	High	All Outcomes: The negative control response was appropriate in mice.	
Domain 6: Confounding / Variable Control				
Metric 21:	Confounding Variables in Test Design and Procedures	High	All Outcomes: There were no reported differences among the study groups.	
Metric 22:	Health Outcomes Unrelated to Exposure	Medium	All Outcomes: There was no reporting to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure	
Metric 23:	Data Presentation and Analysis	High	All Outcomes: Statistical methods were clearly described.	
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Study Citation:	NCI, (1978). Bioassay of 1,1,2-trichloroethane for possible carcinogenicity. National Cancer Institute Carcinogenesis Technical Report Series 74:1-104.
Health Outcome(s):	Cancer/Carcinogenesis; Neurological/Behavioral; Mortality; Nutritional/Metabolic;
Reported Health Effect(s):	Cancer/Carcinogenesis: Incidence of neoplastic lesions; Neurological/Behavioral: Clinical signs were reported. Nerves and brain tissues were examined for histopathological changes. Incidences of non-neoplastic lesions in nervous system (e.g., brain/meninges) were reported.; Mortality: Survival; Nutritional/Metabolic: Mean body weights were reported.;
Duration:	Chronic (>91 days) 78 weeks in mice
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64554

Domain	Metric	Rating	Comments
	Metric 24: Reporting of Data	Low	Cancer/Carcinogenesis: Incidence data are presented for all tumor-related outcomes, but no information on severity is provided (recommended in OECD 451); therefore, this metric was rated as low for the outcome of cancer.; Neurological/Behavioral: Incidence was not reported for the clinical effects observed; therefore, this metric was rated as low for this outcome.; Mortality: Numerical values were not provided for survival data although data were included in graphs. Due to this limitation, this metric was rated as low.; Nutritional/Metabolic: Numerical values were not provided for body weights, although data were included in graphs. Due to this limitation, this metric was rated as low.

Additional Comments: None

Overall Quality Determination**Medium**

Study Citation:	NCI, (1978). Bioassay of 1,1,2-trichloroethane for possible carcinogenicity. National Cancer Institute Carcinogenesis Technical Report Series 74:1-104.
Health Outcome(s):	Cardiovascular; Thyroid; Reproductive/Developmental; Gastrointestinal; Immune/Hematological; Hepatic/Liver; Musculoskeletal; Ocular/Sensory; Renal/Kidney; Lung/Respiratory; Skin/Connective Tissue; Urinary (Urinary); Endocrine (Endocrine);
Reported Health Effect(s):	Cardiovascular: Heart tissues were examined for histopathological changes. Incidence of non-neoplastic lesions in circulatory system (heart, myocardium, endocardium, aorta) was reported.; Thyroid: Thyroid and parathyroid tissues were examined for histopathological changes and incidences of non-neoplastic lesions in these tissues were reported.; Reproductive/Developmental: Testis, prostate, vagina, uterus, mammary gland, and ovarian tissues were examined for histopathological changes. Incidences of non-neoplastic lesions in reproductive tissues were reported.; Gastrointestinal: Salivary gland, esophagus, stomach, small intestine, and large intestine tissues were examined for histopathological changes. Incidences of non-neoplastic lesions in the digestive system (e.g., salivary glands, stomach, and esophagus) were reported.; Immune/Hematological: Spleen, lymph nodes, and thymus tissues were examined for histopathological changes and incidences of non-neoplastic lesions in these tissues were reported.; Hepatic/Liver: Incidence of non-neoplastic lesions in liver; Musculoskeletal: Incidence of non-neoplastic lesions in musculoskeletal system; Ocular/Sensory: Incidence of non-neoplastic lesions in special sense organs, including eyes, were reported.; Renal/Kidney: Kidney was examined for histopathological changes and incidence of non-neoplastic lesions was reported.; Lung/Respiratory: Lungs, bronchi, and trachea tissues were examined for histopathological changes. Incidences of non-neoplastic lesions in respiratory system were reported.; Skin/Connective Tissue: Skin and subcutaneous tissues were examined for histopathological changes. Incidences of non-neoplastic lesions in skin and subcutaneous tissue were reported.; Urinary (Urinary): Urinary bladder was examined for histopathological changes and incidence of non-neoplastic lesions was reported.; Endocrine (Endocrine): Pituitary gland and adrenal gland were examined for histopathological changes. Incidences of non-neoplastic lesions in pituitary gland and adrenal were reported.;
Duration:	Chronic (>91 days) 78 weeks in mice
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64554

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	High	All Outcomes: Chemical name with CASRN were provided.
	Metric 2: Test Substance Source	High	All Outcomes: Chemical source was reported as Aldrich Chemical Company.
	Metric 3: Test Substance Purity	Medium	All Outcomes: Purity was reported by GLC. The initial purity determination was 99.2%. Any impurities, if present in the remaining 0.8%, were not reported so selected medium.
Domain 2: Test Design			
	Metric 4: Negative and Vehicle Controls	High	All Outcomes: This study had both a negative control group and a vehicle control group.
	Metric 5: Positive Controls	N/A	All Outcomes: Positive controls are not required for this study type.
	Metric 6: Randomized Allocation of Animals	Low	All Outcomes: Study did not report how animals were allocated to study groups
Domain 3: Exposure Characterization			
	Metric 7: Preparation and Storage of Test Substance	Low	All Outcomes: Test substance was prepared weekly, rather than daily (fresh solutions were prepared weekly in corn oil and stored in dark bottles at 1 deg C), and no indication was given whether the bottles had lids and/or were tightly closed to prevent volatilization.
	Metric 8: Consistency of Exposure Administration	Low	All Outcomes: Dosing volumes were not reported, so it is unknown if dosing was consistent across groups.
	Metric 9: Reporting of Doses/Concentrations	High	All Outcomes: Administered doses were reported without ambiguity.
	Metric 10: Exposure Frequency and Duration	Medium	All Outcomes: Exposure frequency and duration of exposure deviated from cancer bioassay guidelines. For example, OECD TG 451 recommends that for oral administration "animals are dosed with the test chemical daily (7 days per week), normally for a period of 24 months". In this study, animals received gavage exposures 5 days/week for only 78 weeks. However, a treatment-related effect was observed for the intended outcome (cancer) in mice so this metric was rated as medium.

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Study Citation:	NCI, (1978). Bioassay of 1,1,2-trichloroethane for possible carcinogenicity. National Cancer Institute Carcinogenesis Technical Report Series 74:1-104.				
Health Outcome(s):	Cardiovascular; Thyroid; Reproductive/Developmental; Gastrointestinal; Immune/Hematological; Hepatic/Liver; Musculoskeletal; Ocular/Sensory; Renal/Kidney; Lung/Respiratory; Skin/Connective Tissue; Urinary (Urinary); Endocrine (Endocrine);				
Reported Health Effect(s):	Cardiovascular: Heart tissues were examined for histopathological changes. Incidence of non-neoplastic lesions in circulatory system (heart, myocardium, endocardium, aorta) was reported.; Thyroid: Thyroid and parathyroid tissues were examined for histopathological changes and incidences of non-neoplastic lesions in these tissues were reported.; Reproductive/Developmental: Testis, prostate, vagina, uterus, mammary gland, and ovarian tissues were examined for histopathological changes. Incidences of non-neoplastic lesions in reproductive tissues were reported.; Gastrointestinal: Salivary gland, esophagus, stomach, small intestine, and large intestine tissues were examined for histopathological changes. Incidences of non-neoplastic lesions in the digestive system (e.g., salivary glands, stomach, and esophagus) were reported.; Immune/Hematological: Spleen, lymph nodes, and thymus tissues were examined for histopathological changes and incidences of non-neoplastic lesions in these tissues were reported.; Hepatic/Liver: Incidence of non-neoplastic lesions in liver; Musculoskeletal: Incidence of non-neoplastic lesions in musculoskeletal system; Ocular/Sensory: Incidence of non-neoplastic lesions in special sense organs, including eyes, were reported.; Renal/Kidney: Kidney was examined for histopathological changes and incidence of non-neoplastic lesions was reported.; Lung/Respiratory: Lungs, bronchi, and trachea tissues were examined for histopathological changes. Incidences of non-neoplastic lesions in respiratory system were reported.; Skin/Connective Tissue: Skin and subcutaneous tissues were examined for histopathological changes. Incidences of non-neoplastic lesions in skin and subcutaneous tissue were reported.; Urinary (Urinary): Urinary bladder was examined for histopathological changes and incidence of non-neoplastic lesions was reported.; Endocrine (Endocrine): Pituitary gland and adrenal gland were examined for histopathological changes. Incidences of non-neoplastic lesions in pituitary gland and adrenal were reported.;				
Duration:	Chronic (>91 days) 78 weeks in mice				
Chemical:	1,1,2-Trichloroethane- Parent compound				
HERO ID:	64554				
Domain		Metric	Rating	Comments	
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Low	All Outcomes: Doses were based on range-finding studies. There were only two dose groups in the main study and dose levels appear to be relatively close. Dose levels were increased after 20 weeks due to tolerance.	
	Metric 12:	Exposure Route and Method	High	All Outcomes: The route and method of exposure were reported and were suited to the test substance.	
Domain 4: Test Animals					
	Metric 13:	Test Animal Characteristics	High	All Outcomes: The test animal species, strain, sex, age, and starting body weight were reported.	
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Medium	All Outcomes: Husbandry conditions were reported as ranges. Mice were all housed in the same room. Since animals were housed in temperature- and humidity-controlled rooms and under the same conditions, kept rating as medium.	
	Metric 15:	Number of Animals per Group	Low	All Outcomes: Only 20 animals/sex/group were included in the untreated and vehicle control groups, so selected low; 50/sex/group were included in the test substance-exposed groups, which is acceptable.	
Domain 5: Outcome Assessment					
	Metric 16:	Outcome Assessment Methodology	Medium	All Outcomes: Assessments were limited for this outcome (only histopathology).	
	Metric 17:	Consistency of Outcome Assessment	Low	All Outcomes: There was incomplete reporting of minor details of outcome assessment protocol execution, such as recording of body weights at the same time/day and timing of sacrifice of groups at the end of the study.	
	Metric 18:	Sampling Adequacy	Low	All Outcomes: Details regarding sampling of outcomes were not completely reported and this deficiency may have a substantial impact on results.	
	Metric 19:	Blinding of Assessors	N/A	All Outcomes: No subjective endpoints were assessed.	
	Metric 20:	Negative Control Response	High	All Outcomes: The negative control response was appropriate in mice.	

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Study Citation:	NCI, (1978). Bioassay of 1,1,2-trichloroethane for possible carcinogenicity. National Cancer Institute Carcinogenesis Technical Report Series 74:1-104.			
Health Outcome(s):	Cardiovascular; Thyroid; Reproductive/Developmental; Gastrointestinal; Immune/Hematological; Hepatic/Liver; Musculoskeletal; Ocular/Sensory; Renal/Kidney; Lung/Respiratory; Skin/Connective Tissue; Urinary (Urinary); Endocrine (Endocrine);			
Reported Health Effect(s):	Cardiovascular: Heart tissues were examined for histopathological changes. Incidence of non-neoplastic lesions in circulatory system (heart, myocardium, endocardium, aorta) was reported.; Thyroid: Thyroid and parathyroid tissues were examined for histopathological changes and incidences of non-neoplastic lesions in these tissues were reported.; Reproductive/Developmental: Testis, prostate, vagina, uterus, mammary gland, and ovarian tissues were examined for histopathological changes. Incidences of non-neoplastic lesions in reproductive tissues were reported.; Gastrointestinal: Salivary gland, esophagus, stomach, small intestine, and large intestine tissues were examined for histopathological changes. Incidences of non-neoplastic lesions in the digestive system (e.g., salivary glands, stomach, and esophagus) were reported.; Immune/Hematological: Spleen, lymph nodes, and thymus tissues were examined for histopathological changes and incidences of non-neoplastic lesions in these tissues were reported.; Hepatic/Liver: Incidence of non-neoplastic lesions in liver; Musculoskeletal: Incidence of non-neoplastic lesions in musculoskeletal system; Ocular/Sensory: Incidence of non-neoplastic lesions in special sense organs, including eyes, were reported.; Renal/Kidney: Kidney was examined for histopathological changes and incidence of non-neoplastic lesions was reported.; Lung/Respiratory: Lungs, bronchi, and trachea tissues were examined for histopathological changes. Incidences of non-neoplastic lesions in respiratory system were reported.; Skin/Connective Tissue: Skin and subcutaneous tissues were examined for histopathological changes. Incidences of non-neoplastic lesions in skin and subcutaneous tissue were reported.; Urinary (Urinary): Urinary bladder was examined for histopathological changes and incidence of non-neoplastic lesions was reported.; Endocrine (Endocrine): Pituitary gland and adrenal gland were examined for histopathological changes. Incidences of non-neoplastic lesions in pituitary gland and adrenal were reported.;			
Duration:	Chronic (>91 days) 78 weeks in mice			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	64554			
Domain		Metric	Rating	Comments
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	High	All Outcomes: There were no reported differences among the study groups.
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	All Outcomes: There was no reporting to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure
	Metric 23:	Data Presentation and Analysis	N/A	All Outcomes: Statistical analysis was not necessary.
	Metric 24:	Reporting of Data	High	All Outcomes: Negative findings were reported qualitatively or quantitatively.
Additional Comments:		None		

Overall Quality Determination**Medium**

Study Citation:	Norpoth, K., Heger, M., Muller, G., Mohtashamipur, E., Kemena, A., Witting, C. (1988). Investigations on metabolism and carcinogenicity of 1,1,2-trichloroethane. Journal of Cancer Research and Clinical Oncology 114(2):158-162.			
Health Outcome(s):	Cancer/Carcinogenesis			
Reported Health Effect(s):	Cancer/Carcinogenesis: Incidence of tumor formation, characteristics of tumors (malignancy, location)			
Duration:	Chronic (>91 days) 2 years			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	659081			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified by definitive nomenclature ("1,1,2-trichloroethane").
	Metric 2:	Test Substance Source	High	The test substance was obtained from a commercial source.
	Metric 3:	Test Substance Purity	High	The test substance purity was reported to be 99%.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	High	Two negative control groups were utilized. One group was untreated (no injections) and the other was treated with the same volume vehicle (0.25 mL DMSO) as the test substance was administered in the treated animals.
	Metric 5:	Positive Controls	N/A	Positive controls are not required for this study type.
	Metric 6:	Randomized Allocation of Animals	Medium	It was reported that groups of animals were "chosen randomly" at study initiation. The method for randomization was not described.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Low	Test substance preparation frequency was not reported, which is a deficiency that could have substantially impacted results considering that the test substance is volatile. The test substance was dissolved in DMSO.
	Metric 8:	Consistency of Exposure Administration	High	The test substance appears to have been administered consistently across groups.
	Metric 9:	Reporting of Doses/Concentrations	Uninformative	The doses administered were not adjusted for body weight. The doses were 15.37 umol or 46.77 umol. This is a serious deficiency, as female rats would have received a substantially higher dose per unit body weight than male rats and furthermore, the doses in mg/kg/day cannot be determined. Starting body weights are provided as a range that included both males and females, and with the study duration of 2 years, starting body weights are not informative for dose conversion. This study may still contribute to a weight-of-evidence.
	Metric 10:	Exposure Frequency and Duration	Low	The frequency of exposure (1 injection/week) differs significantly from typical study design. The study duration of 2 years is appropriate for a carcinogenicity study.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Medium	It was unclear whether the highest dose was high enough and there were only two doses. However, the dose spacing was adequate (roughly 2-fold difference) and the study authors justified the highest dose as being below the "toxic level" based on previous toxicity tests.
	Metric 12:	Exposure Route and Method	High	The route and method of exposure were acceptable.
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Study Citation:	Norpoth, K., Heger, M., Muller, G., Mohtashamipur, E., Kemena, A., Witting, C. (1988). Investigations on metabolism and carcinogenicity of 1,1,2-trichloroethane. Journal of Cancer Research and Clinical Oncology 114(2):158-162.			
Health Outcome(s):	Cancer/Carcinogenesis			
Reported Health Effect(s):	Cancer/Carcinogenesis: Incidence of tumor formation, characteristics of tumors (malignancy, location)			
Duration:	Chronic (>91 days) 2 years			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	659081			
Domain	Metric	Rating	Comments	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Medium	The test animal age was not reported. This is not expected to have substantially impacted results because this was a 2-year study and there was not excessive attrition; therefore, the animals were likely of an appropriate age for the study type. The remaining test animal characteristics were reported.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not sufficiently reported. Temperature, humidity, and light-dark cycle were not reported.	
	Metric 15: Number of Animals per Group	Medium	The number of animals in each treated group and the female control groups was acceptable at 50 animals/sex/group. The male control groups (separate vehicle and untreated groups) were lacking at 35 males/sex/group. However, this is not expected to have impacted results because the sample size was still valid for statistical analysis and the smaller group size was limited to the male controls.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	Low	The outcome assessment methodology for determining tumor characteristics (i.e., malignancy) was not reported.	
	Metric 17: Consistency of Outcome Assessment	Low	Because outcome assessment methodology was not reported, it is not possible to determine whether it was consistent across groups; no protocol is provided.	
	Metric 18: Sampling Adequacy	High	All exposed animals were assessed for the outcome of interest.	
	Metric 19: Blinding of Assessors	N/A	No subjective endpoints were assessed.	
	Metric 20: Negative Control Response	Medium	DMSO-treated controls had higher tumor incidence than untreated controls.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	No confounding variables were reported or identified.	
	Metric 22: Health Outcomes Unrelated to Exposure	High	No health outcomes unrelated to exposure were identified. There were no statistically significant differences in attrition even between treated and control groups, according to study author statistical analysis.	
	Metric 23: Data Presentation and Analysis	High	Statistical methods are not reported; however, raw data are provided per group and therefore an independent statistical analysis is possible.	
	Metric 24: Reporting of Data	High	All data are reported adequately.	
Additional Comments:	None			

Overall Quality Determination**Uninformative**

Study Citation:	Norpoth, K., Heger, M., Muller, G., Mohtashamipur, E., Kemena, A., Witting, C. (1988). Investigations on metabolism and carcinogenicity of 1,1,2-trichloroethane. Journal of Cancer Research and Clinical Oncology 114(2):158-162.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: Mean survival time			
Duration:	Chronic (>91 days) 2 years			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	659081			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified by definitive nomenclature ("1,1,2-trichloroethane").
	Metric 2:	Test Substance Source	High	The test substance was obtained from a commercial source.
	Metric 3:	Test Substance Purity	High	The test substance purity was reported to be 99%.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	High	Two negative control groups were utilized. One group was untreated (no injections) and the other was treated with the same volume vehicle (0.25 mL DMSO) as the test substance was administered in the treated animals.
	Metric 5:	Positive Controls	N/A	Positive controls are not required for this study type.
	Metric 6:	Randomized Allocation of Animals	Medium	It was reported that groups of animals were "chosen randomly" at study initiation. The method for randomization was not described.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Low	Test substance preparation frequency was not reported, which is a deficiency that could have substantially impacted results considering that the test substance is volatile. The test substance was dissolved in DMSO.
	Metric 8:	Consistency of Exposure Administration	High	The test substance appears to have been administered consistently across groups.
	Metric 9:	Reporting of Doses/Concentrations	Uninformative	The doses administered were not adjusted for body weight. The doses were 15.37 umol or 46.77 umol. This is a serious deficiency, as female rats would have received a substantially higher dose per unit body weight than male rats and furthermore, the doses in mg/kg/day cannot be determined. Starting body weights are provided as a range that included both males and females, and with the study duration of 2 years, starting body weights are not informative for dose conversion. This study may still contribute to a weight-of-evidence.
	Metric 10:	Exposure Frequency and Duration	Low	The frequency of exposure (1 injection/week) differs significantly from typical study design. The study duration of 2 years is appropriate for a carcinogenicity study.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Medium	It was unclear whether the highest dose was high enough and there were only two doses. However, the dose spacing was adequate (roughly 2-fold difference) and the study authors justified the highest dose as being below the "toxic level" based on previous toxicity tests.
	Metric 12:	Exposure Route and Method	High	The route and method of exposure were acceptable.
Domain 4: Test Animals				
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Study Citation:	Norpoth, K., Heger, M., Muller, G., Mohtashamipur, E., Kemena, A., Witting, C. (1988). Investigations on metabolism and carcinogenicity of 1,1,2-trichloroethane. Journal of Cancer Research and Clinical Oncology 114(2):158-162.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: Mean survival time			
Duration:	Chronic (>91 days) 2 years			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	659081			
Domain		Metric	Rating	Comments
	Metric 13:	Test Animal Characteristics	Medium	The test animal age was not reported. This is not expected to have substantially impacted results because this was a 2-year study and there was not excessive attrition; therefore, the animals were likely of an appropriate age for the study type. The remaining test animal characteristics were reported.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not sufficiently reported. Temperature, humidity, and light-dark cycle were not reported.
	Metric 15:	Number of Animals per Group	Medium	The number of animals in each treated group and the female control groups was acceptable at 50 animals/sex/group. The male control groups (separate vehicle and untreated groups) were lacking at 35 males/sex/group. However, this is not expected to have impacted results because the sample size was still valid for statistical analysis and the smaller group size was limited to the male controls.
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	Medium	The outcome assessment methodology for assessing mortality was not specifically stated (e.g. daily cageside observation), but this is not expected to have substantially impacted results.
	Metric 17:	Consistency of Outcome Assessment	Low	Because outcome assessment methodology was not reported, it is not possible to determine whether it was consistent across groups; no protocol is provided.
	Metric 18:	Sampling Adequacy	High	All exposed animals were assessed for the outcome of interest.
	Metric 19:	Blinding of Assessors	N/A	No subjective endpoints were assessed.
	Metric 20:	Negative Control Response	High	The negative control response was appropriate.
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Medium	No confounding variables were reported or identified.
	Metric 22:	Health Outcomes Unrelated to Exposure	High	No health outcomes unrelated to exposure were identified. There were no statistically significant differences in attrition even between treated and control groups, according to study author statistical analysis.
	Metric 23:	Data Presentation and Analysis	High	It was reported that mean survival time was statistically analyzed via t-test. It seems likely that multiple t-tests were conducted (two dose groups, two sexes, two negative control groups), which is inappropriate due to the increased rate of Type I error; however, sufficient data are provided to enable an independent statistical analysis.
	Metric 24:	Reporting of Data	High	All data are reported adequately.
Additional Comments:	None			

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Study Citation:	Norpoth, K., Heger, M., Muller, G., Mohtashamipur, E., Kemena, A., Witting, C. (1988). Investigations on metabolism and carcinogenicity of 1,1,2-trichloroethane. Journal of Cancer Research and Clinical Oncology 114(2):158-162.
Health Outcome(s):	Mortality
Reported Health Effect(s):	Mortality: Mean survival time
Duration:	Chronic (>91 days) 2 years
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	659081

Domain	Metric	Rating	Comments
Overall Quality Determination		Uninformative	

Study Citation:	DuPont, (2006). 1,1,2-Trichloroethane: Multigeneration reproduction study in rats.			
Health Outcome(s):	Hepatic/Liver; Immune/Hematological; Renal/Kidney; Nutritional/Metabolic; Endocrine; Reproductive/Developmental; Neurological/Behavioral;			
Reported Health Effect(s):	Hepatic/Liver: Liver weight and histological examination of the liver of parental animals (P1 and F1); Immune/Hematological: Spleen weight of parental animals (P1 and F1); Renal/Kidney: Kidney weights of parental animals (P1 and F1); Nutritional/Metabolic: Body weight, body weight gain, food consumption, food efficiency, and water consumption of parental animals (P1 and F1); Endocrine: Adrenal gland weight, pituitary gland weight, and histological examination of the pituitary gland of parental animals (P1 and F1); Reproductive/Developmental: Reproductive: Mating index (%), fertility index (%), gestation index (%), implantation efficiency (%); precoital interval; number of implantation sites; sperm parameters (percentage of motile cells, sperm morphology, sperm counts in cauda epididymis, spermatid count in testis); estrous cycle evaluation; testes, epididymides, right cauda epididymis, seminal vesicles (with coagulating glands and their fluids), prostate, ovaries (with oviducts), and uterus (with cervix) weights; and histological examination of the right testis and epididymis, prostate, seminal vesicles (with coagulating glands), pituitary, ovaries, oviducts, uterus, vagina, and cervix of parental animals (P1 and F1). Developmental: Pups born alive (%); viability index (%), lactation index (%), litter survival (%); number of pups per litter; pup body weight; postnatal survival; sex ratio; pup behavior and appearance; developmental landmarks (age at preputial separation, vaginal patency, anogenital distance), postmortem examination; weights of brain, spleen, and thymus of F1 and F2 weanlings; histological examination of the right testis and epididymis, prostate, seminal vesicles (with coagulating glands), pituitary, ovaries, oviducts, uterus, vagina, cervix, brain, liver, and any gross lesions for F1 weanlings (high-dose level only).; Neurological/Behavioral: Clinical observations, brain weight, and histological examination of the brain of parental animals (P1 and F1);			
Duration:	Reproductive/Developmental Two-generation			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	6547034			
Domain		Metric	Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	All Outcomes: The test substance was identified by name and CASRN.
	Metric 2:	Test Substance Source	High	All Outcomes: The test substance source was reported and the lot number was provided. The chemical identity was certified by the source (a Certificate of Analysis is provided in Appendix A).
	Metric 3:	Test Substance Purity	High	All Outcomes: The test substance purity (99.87%) and composition were reported and were such that any effects observed in the study were likely to be due to the test substance.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	High	All Outcomes: The study authors reported using an appropriate, concurrent negative control group and all conditions were equal for the negative control group and treated groups except the chemical exposure.
	Metric 5:	Positive Controls	N/A	All Outcomes: Positive controls are not required for this study type.
	Metric 6:	Randomized Allocation of Animals	Medium	All Outcomes: Animals in the study were randomly allocated into study groups, including the control group.
Domain 3: Exposure Characterization				
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Study Citation: DuPont, (2006). 1,1,2-Trichloroethane: Multigeneration reproduction study in rats.				
Health Outcome(s): Hepatic/Liver; Immune/Hematological; Renal/Kidney; Nutritional/Metabolic; Endocrine; Reproductive/Developmental; Neurological/Behavioral;				
Reported Health Effect(s): Hepatic/Liver: Liver weight and histological examination of the liver of parental animals (P1 and F1); Immune/Hematological: Spleen weight of parental animals (P1 and F1); Renal/Kidney: Kidney weights of parental animals (P1 and F1); Nutritional/Metabolic: Body weight, body weight gain, food consumption, food efficiency, and water consumption of parental animals (P1 and F1); Endocrine: Adrenal gland weight, pituitary gland weight, and histological examination of the pituitary gland of parental animals (P1 and F1); Reproductive/Developmental: Reproductive: Mating index (%), fertility index (%), gestation index (%), implantation efficiency (%); precoital interval; number of implantation sites; sperm parameters (percentage of motile cells, sperm morphology, sperm counts in cauda epididymis, spermatid count in testis); estrous cycle evaluation; testes, epididymides, right cauda epididymis, seminal vesicles (with coagulating glands and their fluids), prostate, ovaries (with oviducts), and uterus (with cervix) weights; and histological examination of the right testis and epididymis, prostate, seminal vesicles (with coagulating glands), pituitary, ovaries, oviducts, uterus, vagina, and cervix of parental animals (P1 and F1). Developmental: Pups born alive (%); viability index (%), lactation index (%), litter survival (%); number of pups per litter; pup body weight; postnatal survival; sex ratio; pup behavior and appearance; developmental landmarks (age at preputial separation, vaginal patency, anogenital distance), postmortem examination; weights of brain, spleen, and thymus of F1 and F2 weanlings; histological examination of the right testis and epididymis, prostate, seminal vesicles (with coagulating glands), pituitary, ovaries, oviducts, uterus, vagina, cervix, brain, liver, and any gross lesions for F1 weanlings (high-dose level only).; Neurological/Behavioral: Clinical observations, brain weight, and histological examination of the brain of parental animals (P1 and F1);				
Duration: Reproductive/Developmental Two-generation				
Chemical: 1,1,2-Trichloroethane- Parent compound				
HERO ID: 6547034				
Domain	Metric		Rating	Comments
	Metric 7:	Preparation and Storage of Test Substance	Medium	All Outcomes: There is an omission of details on preparation and storage of test substance that is unlikely to have a substantial impact on the results. Storage methods of stock test material as received were not reported. Some details on the preparation of test substance in drinking water were also omitted (e.g., temperature of mixing of test substance solutions in carboys overnight; e.g., whether mixtures were on stir plate at room temperature or at 4 deg C). Measurements of homogeneity, stability, and concentration verification of drinking water solutions were conducted during the study and reported.
	Metric 8:	Consistency of Exposure Administration	High	All Outcomes: Details of exposure administration were reported and exposures were administered consistently across study groups.
	Metric 9:	Reporting of Doses/Concentrations	High	All Outcomes: Administered concentrations were reported (ppm) and corresponding average daily intakes were determined based on body weight and water consumption.
	Metric 10:	Exposure Frequency and Duration	High	All Outcomes: The exposure frequency and duration of exposure were reported and appropriate for this study type and outcome of interest.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Medium	All Outcomes: No justification was provided for the selection of doses. Although both a NOAEL and LOAEL were identified, the top dose was the LOAEL, rather than at least one dose being above the LOAEL (For High, there should be "at least one dose above the LOAEL").
	Metric 12:	Exposure Route and Method	Low	All Outcomes: The route and method of exposure were reported; however, the test substance has high volatility, which suggests that test substance could have been lost into air in any headspace of water bottles (e.g., headspace increased and water volume decreased during the course of daily exposures) for exposure in drinking water. The concentration verification tests do not address the issue of potential headspace changes in the water bottles during the animal exposures and whether similar headspace was present in the samples evaluated for test concentration verification, which reduces overall confidence in the reported dose levels.
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Study Citation:	DuPont, (2006). 1,1,2-Trichloroethane: Multigeneration reproduction study in rats.			
Health Outcome(s):	Hepatic/Liver; Immune/Hematological; Renal/Kidney; Nutritional/Metabolic; Endocrine; Reproductive/Developmental; Neurological/Behavioral;			
Reported Health Effect(s):	Hepatic/Liver: Liver weight and histological examination of the liver of parental animals (P1 and F1); Immune/Hematological: Spleen weight of parental animals (P1 and F1); Renal/Kidney: Kidney weights of parental animals (P1 and F1); Nutritional/Metabolic: Body weight, body weight gain, food consumption, food efficiency, and water consumption of parental animals (P1 and F1); Endocrine: Adrenal gland weight, pituitary gland weight, and histological examination of the pituitary gland of parental animals (P1 and F1); Reproductive/Developmental: Reproductive: Mating index (%), fertility index (%), gestation index (%), implantation efficiency (%); precoital interval; number of implantation sites; sperm parameters (percentage of motile cells, sperm morphology, sperm counts in cauda epididymis, spermatid count in testis); estrous cycle evaluation; testes, epididymides, right cauda epididymis, seminal vesicles (with coagulating glands and their fluids), prostate, ovaries (with oviducts), and uterus (with cervix) weights; and histological examination of the right testis and epididymis, prostate, seminal vesicles (with coagulating glands), pituitary, ovaries, oviducts, uterus, vagina, and cervix of parental animals (P1 and F1). Developmental: Pups born alive (%); viability index (%), lactation index (%), litter survival (%); number of pups per litter; pup body weight; postnatal survival; sex ratio; pup behavior and appearance; developmental landmarks (age at preputial separation, vaginal patency, anogenital distance), postmortem examination; weights of brain, spleen, and thymus of F1 and F2 weanlings; histological examination of the right testis and epididymis, prostate, seminal vesicles (with coagulating glands), pituitary, ovaries, oviducts, uterus, vagina, cervix, brain, liver, and any gross lesions for F1 weanlings (high-dose level only).; Neurological/Behavioral: Clinical observations, brain weight, and histological examination of the brain of parental animals (P1 and F1);			
Duration:	Reproductive/Developmental Two-generation			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	6547034			
Domain	Metric	Rating	Comments	
Domain 4: Test Animals				
Metric 13:	Test Animal Characteristics	High	All Outcomes: The test animal species, strain, sex, age, and starting body weight were reported, and the test animal was obtained from a commercial source. The test species and strain were an appropriate animal model for the evaluation of the outcome of interest (e.g., routinely used for similar study types).	
Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	High	All Outcomes: All husbandry conditions were reported (e.g., temperature, humidity, light- dark cycle, diet, food and water availability) and were adequate and the same for control and exposed populations.	
Metric 15:	Number of Animals per Group	Medium	All Outcomes: The number of animals per study group was reported and was appropriate for the study type and outcome analysis.	
Domain 5: Outcome Assessment				
Metric 16:	Outcome Assessment Methodology	High	All Outcomes: The outcome assessment methodology addressed the intended outcome of interest and the assessment methodology was sensitive and appropriate for the outcome of interest.	
Metric 17:	Consistency of Outcome Assessment	Medium	All Outcomes: There was incomplete reporting of minor details of outcome assessment protocol execution (e.g., time of assessment across animals within and between groups), but these uncertainties are unlikely to have a substantial impact on the results.	
Metric 18:	Sampling Adequacy	High	All Outcomes: The reported information indicates the study used adequate sampling for the outcome of interest.	
Metric 19:	Blinding of Assessors	N/A	All Outcomes: Blinding is not required for this study type.	
Metric 20:	Negative Control Response	High	All Outcomes: The biological responses of the negative control groups were adequate.	
Domain 6: Confounding / Variable Control				
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Study Citation:	DuPont, (2006). 1,1,2-Trichloroethane: Multigeneration reproduction study in rats.			
Health Outcome(s):	Hepatic/Liver; Immune/Hematological; Renal/Kidney; Nutritional/Metabolic; Endocrine; Reproductive/Developmental; Neurological/Behavioral;			
Reported Health Effect(s):	Hepatic/Liver: Liver weight and histological examination of the liver of parental animals (P1 and F1); Immune/Hematological: Spleen weight of parental animals (P1 and F1); Renal/Kidney: Kidney weights of parental animals (P1 and F1); Nutritional/Metabolic: Body weight, body weight gain, food consumption, food efficiency, and water consumption of parental animals (P1 and F1); Endocrine: Adrenal gland weight, pituitary gland weight, and histological examination of the pituitary gland of parental animals (P1 and F1); Reproductive/Developmental: Reproductive: Mating index (%), fertility index (%), gestation index (%), implantation efficiency (%); precoital interval; number of implantation sites; sperm parameters (percentage of motile cells, sperm morphology, sperm counts in cauda epididymis, spermatid count in testis); estrous cycle evaluation; testes, epididymides, right cauda epididymis, seminal vesicles (with coagulating glands and their fluids), prostate, ovaries (with oviducts), and uterus (with cervix) weights; and histological examination of the right testis and epididymis, prostate, seminal vesicles (with coagulating glands), pituitary, ovaries, oviducts, uterus, vagina, and cervix of parental animals (P1 and F1). Developmental: Pups born alive (%); viability index (%), lactation index (%), litter survival (%); number of pups per litter; pup body weight; postnatal survival; sex ratio; pup behavior and appearance; developmental landmarks (age at preputial separation, vaginal patency, anogenital distance), postmortem examination; weights of brain, spleen, and thymus of F1 and F2 weanlings; histological examination of the right testis and epididymis, prostate, seminal vesicles (with coagulating glands), pituitary, ovaries, oviducts, uterus, vagina, cervix, brain, liver, and any gross lesions for F1 weanlings (high-dose level only).; Neurological/Behavioral: Clinical observations, brain weight, and histological examination of the brain of parental animals (P1 and F1);			
Duration:	Reproductive/Developmental Two-generation			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	6547034			
Domain	Metric	Rating	Comments	
	Metric 21: Confounding Variables in Test Design and Procedures	Uninformative	All Outcomes: The study reports significant reductions in water consumption in the high dose group relative to controls (including a 18-28% reduction in water intake during gestation and a 24%-32% reduction in water intake during lactation in the P1 dams). Dehydration could contribute to both developmental and adult health outcomes. This is a major source of potential confounding in the high dose group.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	All Outcomes: There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure that could influence the outcome assessment.	
	Metric 23: Data Presentation and Analysis	High	All Outcomes: Statistical methods were clearly described and sufficient data were provided to conduct an independent statistical analysis.	
	Metric 24: Reporting of Data	High	All Outcomes: Data for exposure-related findings were presented for all outcomes by exposure group and sex (if applicable) with quantal or continuous presentation. Negative findings were reported qualitatively or quantitatively.	

Additional Comments: None

Overall Quality Determination**Uninformative**

Study Citation:	Seidenberg, J. M., Anderson, D. G., Becker, R. A. (1986). Validation of an in vivo developmental toxicity screen in the mouse. Teratogenesis, Carcinogenesis, and Mutagenesis 6(5):361-374.
Health Outcome(s):	Reproductive/Developmental
Reported Health Effect(s):	Reproductive/Developmental: Number of litters born, number of litters resorbed, number of neonates/litter (live day 1, dead day 1, live day 3), % survival days 1-3, neonatal body weights (day 1, day 3, 2-day gain), external examination of neonates (including those born and those found dead)
Duration:	Reproductive/Developmental 18 days
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64557

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	High	The test substance was identified as 1,1,2-trichloroethane.
	Metric 2: Test Substance Source	Low	The source was not reported and the test substance identity was not reported to have been analytically verified by the laboratory.
	Metric 3: Test Substance Purity	Low	Purity and grade of the test substance were not reported.
Domain 2: Test Design			
	Metric 4: Negative and Vehicle Controls	High	An appropriate vehicle (corn oil) negative control group was tested concurrently.
	Metric 5: Positive Controls	N/A	A positive control is not required for the endpoints evaluated in the study.
	Metric 6: Randomized Allocation of Animals	Low	The study did not report the method of animal allocation to groups.
Domain 3: Exposure Characterization			
	Metric 7: Preparation and Storage of Test Substance	Low	Information on the preparation and storage of test substance were not reported and lack of these details could substantially impact the results because the test substance is volatile.
	Metric 8: Consistency of Exposure Administration	Low	Details on exposure administration were insufficiently reported (e.g., time of day of administration, and whether this was the same for control and treated groups). The exact dosing volume used for this test substance and the concurrent control was not stated, but rather a range of 1 to 1.4 mL/100 g bw was reported for all substances tested in the study. This range indicates that potentially excessive volumes were administered if the group treated with this test substance and the concurrent controls (corn oil) were administered volumes above 0.1 mL/10 g bw (1 mL/100 g bw).
	Metric 9: Reporting of Doses/Concentrations	High	The administered dose was reported to be 350 mg/kg/day.
	Metric 10: Exposure Frequency and Duration	Low	The exposure duration (gestation days 8-12) was substantially shorter than typical study designs for developmental studies; however, the study was designed to be a developmental screening test.
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Low	There was only one dose group and no effects were observed for this outcome.
	Metric 12: Exposure Route and Method	High	Gavage exposure is a suitable administration method for volatile substances.
Domain 4: Test Animals			

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Study Citation:	Seidenberg, J. M., Anderson, D. G., Becker, R. A. (1986). Validation of an in vivo developmental toxicity screen in the mouse. Teratogenesis, Carcinogenesis, and Mutagenesis 6(5):361-374.			
Health Outcome(s):	Reproductive/Developmental			
Reported Health Effect(s):	Reproductive/Developmental: Number of litters born, number of litters resorbed, number of neonates/litter (live day 1, dead day 1, live day 3), % survival days 1-3, neonatal body weights (day 1, day 3, 2-day gain), external examination of neonates (including those born and those found dead)			
Duration:	Reproductive/Developmental 18 days			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	64557			
Domain	Metric	Rating	Comments	
	Metric 13: Test Animal Characteristics	Low	Species, strain, sex, and source (Simonsen Laboratories) were reported; age and weight at study initiation were not reported and this information is likely to have a substantial impact on the results. Differences among animals in these parameters may have impacted the results.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Medium	Temperature, light-dark cycle, and diet/water availability were reported; however, humidity was not reported. The paper states that the animals were kept in air-conditioned animal rooms, but does not indicate whether the entire group of treated and concurrent controls were maintained under the same conditions and/or in the same room.	
	Metric 15: Number of Animals per Group	Medium	The number of animals per group (30 animals/group in each treated and control groups) was appropriate for the study type.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	Low	The outcome assessment methodology was not clearly reported and it was unclear whether methods were sensitive for this outcome. The paper reported that neonates were examined, counted, and weighed on days 1 and 3, but the neonatal examinations appear to have been limited to external examination. Other neonatal endpoints evaluated in this study included litter size and neonatal weight.	
	Metric 17: Consistency of Outcome Assessment	Low	Details regarding the execution of the study protocol for this outcome were not reported and these deficiencies are likely to have a substantial impact on results. The paper does not indicate whether body weights of neonates were determined in a consistent manner.	
	Metric 18: Sampling Adequacy	Low	Details regarding sampling were not fully reported and this deficiency is likely to have a substantial impact on results. The paper does not indicate how many animals in each group are included in the results for body weights/body weight gain.	
	Metric 19: Blinding of Assessors	Low	The study did not report whether assessors were blinded to treatment group for subjective outcomes (e.g., external examinations of neonates), and this deficiency is likely to have a substantial impact on results.	
	Metric 20: Negative Control Response	High	The negative control response was acceptable for this outcome.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	The study did not report all information to determine confounding, but the reported information did not identify differences among the groups.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups with respect to animal attrition or health outcomes unrelated to exposure that could influence the outcome assessment.	
	Metric 23: Data Presentation and Analysis	High	Statistical methods were clearly described.	
	Metric 24: Reporting of Data	High	Data were presented quantitatively for most outcomes, or qualitatively in the text, which is acceptable, as no effects were observed for this outcome.	
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1,1,2-Trichloroethane

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Study Citation:	Seidenberg, J. M., Anderson, D. G., Becker, R. A. (1986). Validation of an in vivo developmental toxicity screen in the mouse. Teratogenesis, Carcinogenesis, and Mutagenesis 6(5):361-374.
Health Outcome(s):	Reproductive/Developmental
Reported Health Effect(s):	Reproductive/Developmental: Number of litters born, number of litters resorbed, number of neonates/litter (live day 1, dead day 1, live day 3), % survival days 1-3, neonatal body weights (day 1, day 3, 2-day gain), external examination of neonates (including those born and those found dead)
Duration:	Reproductive/Developmental 18 days
Chemical:	1,1,2-Trichloroethane- Parent compound
HERO ID:	64557

Domain	Metric	Rating	Comments
Additional Comments: None			

Overall Quality Determination	Medium

Study Citation:	Seidenberg, J. M., Anderson, D. G., Becker, R. A. (1986). Validation of an in vivo developmental toxicity screen in the mouse. Teratogenesis, Carcinogenesis, and Mutagenesis 6(5):361-374.			
Health Outcome(s):	Nutritional/Metabolic			
Reported Health Effect(s):	Nutritional/Metabolic: Maternal body weight gain during the treatment period			
Duration:	Reproductive/Developmental 18 days			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	64557			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	The test substance was identified as 1,1,2-trichloroethane.	
	Metric 2: Test Substance Source	Low	The source was not reported and the test substance identity was not reported to have been analytically verified by the laboratory.	
	Metric 3: Test Substance Purity	Low	Purity and grade of the test substance were not reported.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	High	An appropriate vehicle (corn oil) negative control group was tested concurrently.	
	Metric 5: Positive Controls	N/A	A positive control is not required for the endpoints evaluated in the study.	
	Metric 6: Randomized Allocation of Animals	Low	The study did not report the method of animal allocation to groups.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	Information on the preparation and storage of test substance were not reported and lack of these details could substantially impact the results because the test substance is volatile.	
	Metric 8: Consistency of Exposure Administration	Low	Details on exposure administration were insufficiently reported (e.g., time of day of administration, and whether this was the same for control and treated groups). The exact dosing volume used for this test substance and the concurrent control was not stated, but rather a range of 1 to 1.4 mL/100 g bw was reported for all substances tested in the study. This range indicates that potentially excessive volumes were administered if the group treated with this test substance and the concurrent controls (corn oil) were administered volumes above 0.1 mL/10 g bw (1 mL/100 g bw).	
	Metric 9: Reporting of Doses/Concentrations	High	The administered dose was reported to be 350 mg/kg/day.	
	Metric 10: Exposure Frequency and Duration	Low	The exposure duration (gestation days 8-12) was substantially shorter than typical study designs for developmental studies; however, this was designed as a developmental screening test.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Low	There was only one dose group; no effects were observed for this outcome.	
	Metric 12: Exposure Route and Method	High	Gavage exposure is a suitable administration method for volatile substances.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Low	Species, strain, sex, and source (Simonsen Laboratories) were reported; age and weight at study initiation were not reported and this information is likely to have a substantial impact on the results. Differences among animals in these parameters may have impacted the results.	
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Study Citation:	Seidenberg, J. M., Anderson, D. G., Becker, R. A. (1986). Validation of an in vivo developmental toxicity screen in the mouse. Teratogenesis, Carcinogenesis, and Mutagenesis 6(5):361-374.			
Health Outcome(s):	Nutritional/Metabolic			
Reported Health Effect(s):	Nutritional/Metabolic: Maternal body weight gain during the treatment period			
Duration:	Reproductive/Developmental 18 days			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	64557			
Domain	Metric	Rating	Comments	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Medium	Temperature, light-dark cycle, and diet/water availability were reported; however, humidity was not reported. The paper states that the animals were kept in air-conditioned animal rooms, but does not indicate whether the entire group of treated and concurrent controls were maintained under the same conditions and/or in the same room.	
	Metric 15: Number of Animals per Group	Medium	The number of animals per group (30 animals/group in each treated and control groups) was appropriate for the study type.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	Low	The outcome assessment methodology was not clearly reported and it was unclear whether methods were sensitive for this outcome. The paper reported average body weight gain during the treatment period in Table I; however, the duration for this measure is not reported. Additionally, the initial and final body weights are not reported. Due to these uncertainties, it is unclear whether the methods were sensitive for the outcome/endpoint (body weight gain).	
	Metric 17: Consistency of Outcome Assessment	Low	Details regarding the execution of the study protocol for this outcome were not reported and these deficiencies are likely to have a substantial impact on results. The paper does not indicate whether body weights were determined in a consistent manner for the treated and control groups.	
	Metric 18: Sampling Adequacy	Low	Details regarding sampling were not fully reported and this deficiency is likely to have a substantial impact on results. The paper does not indicate how many animals in each group were evaluated for body weights.	
	Metric 19: Blinding of Assessors	N/A	Blinding is not required for this outcome.	
	Metric 20: Negative Control Response	High	The negative control response was acceptable for this outcome.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	The study did not report all information to determine confounding, but the reported information did not identify differences among the groups.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups with respect to animal attrition or health outcomes unrelated to exposure that could influence the outcome assessment.	
	Metric 23: Data Presentation and Analysis	High	Statistical methods were clearly described.	
	Metric 24: Reporting of Data	High	Data were presented quantitatively for this outcome.	
Additional Comments:	None			

Overall Quality Determination**Medium**

Study Citation:	Seidenberg, J. M., Anderson, D. G., Becker, R. A. (1986). Validation of an in vivo developmental toxicity screen in the mouse. Teratogenesis, Carcinogenesis, and Mutagenesis 6(5):361-374.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: Maternal mortality			
Duration:	Reproductive/Developmental 18 days			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	64557			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	The test substance was identified as 1,1,2-trichloroethane.	
	Metric 2: Test Substance Source	Low	The source was not reported and the test substance identity was not reported to have been analytically verified by the laboratory.	
	Metric 3: Test Substance Purity	Low	Purity and grade of the test substance were not reported.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	High	An appropriate vehicle (corn oil) negative control group was tested concurrently.	
	Metric 5: Positive Controls	N/A	A positive control is not required for the endpoints evaluated in the study.	
	Metric 6: Randomized Allocation of Animals	Low	The study did not report the method of animal allocation to groups.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	Information on the preparation and storage of test substance were not reported and lack of these details could substantially impact the results because the test substance is volatile.	
	Metric 8: Consistency of Exposure Administration	Low	Details on exposure administration were insufficiently reported (e.g., time of day of administration, and whether this was the same for control and treated groups). The exact dosing volume used for this test substance and the concurrent control was not stated, but rather a range of 1 to 1.4 mL/100 g bw was reported for all substances tested in the study. This range indicates that potentially excessive volumes were administered if the group treated with this test substance and the concurrent controls (corn oil) were administered volumes above 0.1 mL/10 g bw (1 mL/100 g bw).	
	Metric 9: Reporting of Doses/Concentrations	High	The administered dose was reported to be 350 mg/kg/day.	
	Metric 10: Exposure Frequency and Duration	Medium	The exposure duration (gestation days 8-12) was substantially shorter than typical study designs for developmental studies but was acceptable for this outcome (mortality).	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Low	There was only one dose group and effects were observed on this outcome (mortality in maternal animals).	
	Metric 12: Exposure Route and Method	High	Gavage exposure is a suitable administration method for volatile substances.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Low	Species, strain, sex, and source (Simonsen Laboratories) were reported; age and weight at study initiation were not reported and this information is likely to have a substantial impact on the results. Differences among animals in these parameters may have impacted the results.	

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Study Citation:	Seidenberg, J. M., Anderson, D. G., Becker, R. A. (1986). Validation of an in vivo developmental toxicity screen in the mouse. Teratogenesis, Carcinogenesis, and Mutagenesis 6(5):361-374.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: Maternal mortality			
Duration:	Reproductive/Developmental 18 days			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	64557			
Domain	Metric	Rating	Comments	
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Medium	Temperature, light-dark cycle, and diet/water availability were reported; however, humidity was not reported. The paper states that the animals were kept in air-conditioned animal rooms, but does not indicate whether the entire group of treated and concurrent controls were maintained under the same conditions and/or in the same room.
	Metric 15:	Number of Animals per Group	Medium	The number of animals per group (30 animals/group in each treated and control groups) was appropriate for the study type.
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed the intended outcome (mortality) and the assessment methodology was sensitive and appropriate for the outcome.
	Metric 17:	Consistency of Outcome Assessment	Low	Details regarding the execution of the study protocol for this outcome were not fully reported and these deficiencies are likely to have a substantial impact on the results.
	Metric 18:	Sampling Adequacy	Low	Details regarding sampling were not fully reported and this deficiency is likely to have a substantial impact on results.
	Metric 19:	Blinding of Assessors	N/A	Blinding is not required for this outcome.
	Metric 20:	Negative Control Response	High	The negative control response was acceptable for this outcome.
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Medium	The study did not report all information to determine confounding, but the reported information did not identify differences among the groups.
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups with respect to animal attrition or health outcomes unrelated to exposure that could influence the outcome assessment.
	Metric 23:	Data Presentation and Analysis	High	Statistical methods were not required for this outcome (mortality), but sufficient information was provided (number of deaths per animals in the group) to allow an independent analysis.
	Metric 24:	Reporting of Data	High	Data for exposure-related findings were presented quantitatively for this outcome for each group.
Additional Comments: None				
Overall Quality Determination			Medium	

Study Citation:	WIL Research, (2005). A prenatal developmental toxicity study of 1,1,2-trichloroethane via drinking water rats.		
Health Outcome(s):	Mortality; Reproductive/Developmental;		
Reported Health Effect(s):	Mortality: Dam survival; Reproductive/Developmental: Reproductive: Gravid uterine weight, length of gestationDevelopmental: Number of fetuses, early and late resorptions, total implantations, corpora lutea, Fetal body weights, external, visceral, and skeletal examinations, sex.;		
Duration:	Reproductive/Developmental GD 6-20		
Chemical:	1,1,2-Trichloroethane- Parent compound		
HERO ID:	6547035; Linked HERO ID(s): 6547035, 10325277		
Domain	Metric	Rating	Comments
Domain 1: Test Substance			
Metric 1:	Test Substance Identity	High	All Outcomes: Identified as 1,1,2-trichloroethane; CASRN 79-00-5
Metric 2:	Test Substance Source	High	All Outcomes: Source: Dow Chemical company. A certificate of analysis was included.
Metric 3:	Test Substance Purity	High	All Outcomes: Purity 99.89%
Domain 2: Test Design			
Metric 4:	Negative and Vehicle Controls	High	All Outcomes: Negative controls were given untreated water.
Metric 5:	Positive Controls	N/A	All Outcomes: Not necessary for the study type.
Metric 6:	Randomized Allocation of Animals	Medium	All Outcomes: "bred females were assigned to groups using a WIL Toxicology Data Management System computer program which randomized the animals based on stratification of the gestation body weights in a block design."
Domain 3: Exposure Characterization			
Metric 7:	Preparation and Storage of Test Substance	High	All Outcomes: A detailed description of preparation assuring homogeneity and storage was provided. Stability was tested.
Metric 8:	Consistency of Exposure Administration	High	All Outcomes: All animals were given access to water ad libitum.
Metric 9:	Reporting of Doses/Concentrations	High	All Outcomes: Concentrations were reported as ppm in water. The doses in mg/kg-day were provided in the study, based on water consumption data. Analytical concentrations in water remained within 85-115% of the target.
Metric 10:	Exposure Frequency and Duration	Low	All Outcomes: The study exposed animals from GD 6-20. Although this may have been consistent with OECD guidelines at the time of the study, it is now recommended that exposure begin on GD 5 to fully capture stages of organogenesis.
Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	High	All Outcomes: The exposure levels/spacing were selected based on results of previous studies.
Metric 12:	Exposure Route and Method	Medium	All Outcomes: The study authors indicated the route of exposure (drinking water) was selected because it is a potential route of human exposure. However, palatability issues were reported indicating that an alternative exposure route may have been more appropriate.
Domain 4: Test Animals			
Metric 13:	Test Animal Characteristics	High	All Outcomes: Species, strain, sex, age, source, and starting body weights were reported. Justification for the animal model and strain used was provided by the study authors.
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Study Citation:	WIL Research, (2005). A prenatal developmental toxicity study of 1,1,2-trichloroethane via drinking water rats.			
Health Outcome(s):	Mortality; Reproductive/Developmental;			
Reported Health Effect(s):	Mortality: Dam survival; Reproductive/Developmental: Reproductive: Gravid uterine weight, length of gestationDevelopmental: Number of fetuses, early and late resorptions, total implantations, corpora lutea, Fetal body weights, external, visceral, and skeletal examinations, sex.;			
Duration:	Reproductive/Developmental GD 6-20			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	6547035; Linked HERO ID(s): 6547035, 10325277			
Domain	Metric	Rating	Comments	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	High	All Outcomes: Information on cages and bedding were reported. Temperature, humidity, and photoperiods were reported.	
	Metric 15: Number of Animals per Group	Medium	All Outcomes: The number of animals (25 dams/group) was consistent with numbers recommended in OECD TG 414.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	High	Mortality: Animals were observed twice daily for mortality; Reproductive/Developmental: The outcome assessment methodology addressed the intended outcome(s) of interest AND the assessment methodology was sensitive and appropriate for the outcomes(s) of interest.	
	Metric 17: Consistency of Outcome Assessment	High	All Outcomes: Animals from all groups were consistently assessed for the outcome of interest.	
	Metric 18: Sampling Adequacy	High	Mortality: Sampling was adequate for the outcomes of interest.; Reproductive/Developmental: Sampling was adequate for the outcomes of interest and samples per litter were provided.	
	Metric 19: Blinding of Assessors	N/A	All Outcomes: Blinding is not required for any of the outcomes of interest.	
	Metric 20: Negative Control Response	High	All Outcomes: The biological responses of the negative control group(s) were adequate (e.g., no/low incidence of outcomes of interest in the study).	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Low	Mortality: Palatability issues were noted and mean water intake was decreased by ~24% in the high-dose group resulting in slight changes in body weight gain, and in net body weight and net body weight gain. There were no mortality or clinical signs consistent with dehydration.; Reproductive/Developmental: Palatability issues were noted and mean water intake was decreased by ~24% in the high-dose group resulting in slight changes in body weight gain and in net body weight and net body weight gain. However, there were no effects on fetuses or litters (developmental NOEL is the high-dose).	
	Metric 22: Health Outcomes Unrelated to Exposure	High	All Outcomes: There is no indication in the data provided that animal attrition or health outcomes unrelated to exposure were observed.	
	Metric 23: Data Presentation and Analysis	High	All Outcomes: Statistical methods were adequately described and applied to all endpoints. The litter was used as the experimental unit when applicable.	
	Metric 24: Reporting of Data	High	All Outcomes: All data were adequately reported for each group; including individual animal data.	
Additional Comments:	None			

Overall Quality Determination**High**

Study Citation:	WIL Research, (2005). A prenatal developmental toxicity study of 1,1,2-trichloroethane via drinking water rats.			
Health Outcome(s):	Nutritional/Metabolic			
Reported Health Effect(s):	Nutritional/Metabolic: Dam body weights, body weight gain, food consumption, water consumption.			
Duration:	Reproductive/Developmental GD 6-20			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	6547035; Linked HERO ID(s): 6547035, 10325277			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Identified as 1,1,2-trichloroethane; CASRN 79-00-5
	Metric 2:	Test Substance Source	High	Source: Dow Chemical company. A certificate of analysis was included.
	Metric 3:	Test Substance Purity	High	Purity 99.89%
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	High	Negative controls were given untreated water.
	Metric 5:	Positive Controls	N/A	Not necessary for the study type.
	Metric 6:	Randomized Allocation of Animals	Medium	"bred females were assigned to groups using a WIL Toxicology Data Management System computer program which randomized the animals based on stratification of the gestation body weights in a block design."
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	High	A detailed description of preparation assuring homogeneity and storage was provided. Stability was tested.
	Metric 8:	Consistency of Exposure Administration	High	All animals were given access to water ad libitum.
	Metric 9:	Reporting of Doses/Concentrations	High	Concentrations were reported as ppm in water. The doses in mg/kg-day were provided in the study, based on water consumption data. Analytical concentrations in water remained within 85-115% of the target.
	Metric 10:	Exposure Frequency and Duration	Low	The study exposed animals from GD 6-20. Although this may have been consistent with OECD guidelines at the time of the study, it is now recommended that exposure begin on GD 5 to fully capture stages of organogenesis.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	High	The exposure levels/spacing were selected based on results of previous studies.
	Metric 12:	Exposure Route and Method	Medium	The study authors indicated the route of exposure (drinking water) was selected because it is a potential route of human exposure. However, palatability issues were reported indicating that an alternative exposure route may have been more appropriate.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	High	Species, strain, sex, age, source, and starting body weights were reported. Justification for the animal model and strain used was provided by the study authors.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	High	Information on cages and bedding were reported. Temperature, humidity, and photoperiods were reported.
	Metric 15:	Number of Animals per Group	Medium	The number of animals (25 dams/group) was consistent with numbers recommended in OECD TG 414.

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Study Citation:	WIL Research, (2005). A prenatal developmental toxicity study of 1,1,2-trichloroethane via drinking water rats.		
Health Outcome(s):	Nutritional/Metabolic		
Reported Health Effect(s):	Nutritional/Metabolic: Dam body weights, body weight gain, food consumption, water consumption.		
Duration:	Reproductive/Developmental GD 6-20		
Chemical:	1,1,2-Trichloroethane- Parent compound		
HERO ID:	6547035; Linked HERO ID(s): 6547035, 10325277		
Domain	Metric	Rating	Comments
Domain 5: Outcome Assessment			
Metric 16:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed the intended outcome(s) of interest AND the assessment methodology was sensitive and appropriate for the outcomes(s) of interest.
Metric 17:	Consistency of Outcome Assessment	High	Animals from all groups were consistently assessed for the outcome of interest.
Metric 18:	Sampling Adequacy	High	Sampling was adequate for the outcomes of interest.
Metric 19:	Blinding of Assessors	N/A	Blinding is not required for any of the outcomes of interest.
Metric 20:	Negative Control Response	High	The biological responses of the negative control group(s) were adequate (e.g., no/low incidence of outcomes of interest in the study).
Domain 6: Confounding / Variable Control			
Metric 21:	Confounding Variables in Test Design and Procedures	Uninformative	Palatability issues were noted and mean water intake was decreased by ~24% in the high-dose group resulting in slight changes in body weight gain, and in net body weight and net body weight gain. It is likely the body weight changes were influenced by the decrease in water consumption.
Metric 22:	Health Outcomes Unrelated to Exposure	High	There is no indication in the data provided that animal attrition or health outcomes unrelated to exposure were observed.
Metric 23:	Data Presentation and Analysis	High	Statistical methods were adequately described and applied to all endpoints. The litter was used as the experimental unit when applicable.
Metric 24:	Reporting of Data	High	All data were adequately reported for each group; including individual animal data.
Additional Comments: None			

Overall Quality Determination**Uninformative**

Study Citation:	WIL Research, (2005). A prenatal developmental toxicity study of 1,1,2-trichloroethane via drinking water rats.			
Health Outcome(s):	Adrenal glands (Adrenals); Renal/Kidney (Adrenals); Clinical observations (Clinical observations);			
Reported Health Effect(s):	Adrenal glands (Adrenals): Macroscopic observations; Renal/Kidney (Adrenals): Macroscopic observations of kidney and urinary bladder; Clinical observations (Clinical observations): No significant clinical observations. Isolated incidences of hair loss, scabbing, soft stool were reported.;			
Duration:	Reproductive/Developmental GD 6-20			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	6547035; Linked HERO ID(s): 6547035, 10325277			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	All Outcomes: Identified as 1,1,2-trichloroethane; CASRN 79-00-5	
	Metric 2: Test Substance Source	High	All Outcomes: Source: Dow Chemical company. A certificate of analysis was included.	
	Metric 3: Test Substance Purity	High	All Outcomes: Purity 99.89%	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	High	All Outcomes: Negative controls were given untreated water.	
	Metric 5: Positive Controls	N/A	All Outcomes: Not necessary for the study type.	
	Metric 6: Randomized Allocation of Animals	Medium	All Outcomes: "bred females were assigned to groups using a WIL Toxicology Data Management System computer program which randomized the animals based on stratification of the gestation body weights in a block design."	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	High	All Outcomes: A detailed description of preparation assuring homogeneity and storage was provided. Stability was tested.	
	Metric 8: Consistency of Exposure Administration	High	All Outcomes: All animals were given access to water ad libitum.	
	Metric 9: Reporting of Doses/Concentrations	High	All Outcomes: Concentrations were reported as ppm in water. The doses in mg/kg-day were provided in the study, based on water consumption data. Analytical concentrations in water remained within 85-115% of the target.	
	Metric 10: Exposure Frequency and Duration	Low	All Outcomes: The study exposed animals from GD 6-20. Although this may have been consistent with OECD guidelines at the time of the study, it is now recommended that exposure begin on GD 5 to fully capture stages of organogenesis.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	High	All Outcomes: The exposure levels/spacing were selected based on results of previous studies.	
	Metric 12: Exposure Route and Method	Medium	All Outcomes: The study authors indicated the route of exposure (drinking water) was selected because it is a potential route of human exposure. However, palatability issues were reported indicating that an alternative exposure route may have been more appropriate.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	High	All Outcomes: Species, strain, sex, age, source, and starting body weights were reported. Justification for the animal model and strain used was provided by the study authors.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	High	All Outcomes: Information on cages and bedding were reported. Temperature, humidity, and photoperiods were reported.	
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Study Citation:	WIL Research, (2005). A prenatal developmental toxicity study of 1,1,2-trichloroethane via drinking water rats.			
Health Outcome(s):	Adrenal glands (Adrenals); Renal/Kidney (Adrenals); Clinical observations (Clinical observations);			
Reported Health Effect(s):	Adrenal glands (Adrenals): Macroscopic observations; Renal/Kidney (Adrenals): Macroscopic observations of kidney and urinary bladder; Clinical observations (Clinical observations): No significant clinical observations. Isolated incidences of hair loss, scabbing, soft stool were reported.;			
Duration:	Reproductive/Developmental GD 6-20			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	6547035; Linked HERO ID(s): 6547035, 10325277			
Domain	Metric	Rating	Comments	
	Metric 15:	Number of Animals per Group	Medium	All Outcomes: The number of animals (25 dams/group) was consistent with numbers recommended in OECD TG 414.
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	Uninformative	Adrenal glands (Adrenals): Dams were subjected to gross necropsy. This endpoint alone is not sensitive for evaluating the toxicity of specific organs/systems.; Renal/Kidney (Adrenals): Dams were subjected to gross necropsy. This endpoint alone is not sensitive for evaluating the toxicity of specific organs/systems.; Clinical observations (Clinical observations): Animals were generally observed for clinical signs twice per day. Detailed clinical observations were not performed.
	Metric 17:	Consistency of Outcome Assessment	High	All Outcomes: Animals from all groups were consistently assessed for the outcome of interest.
	Metric 18:	Sampling Adequacy	High	All Outcomes: Sampling was adequate for the outcomes of interest.
	Metric 19:	Blinding of Assessors	N/A	All Outcomes: Blinding is not required for any of the outcomes of interest.
	Metric 20:	Negative Control Response	High	All Outcomes: The biological responses of the negative control group(s) were adequate (e.g., no/low incidence of outcomes of interest in the study).
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Low	All Outcomes: Palatability issues were noted and mean water intake was decreased by ~24% in the high-dose group resulting in slight changes in body weight gain, and in net body weight and net body weight gain. However, the mild weight changes in females had no effects on fetuses or litters.
	Metric 22:	Health Outcomes Unrelated to Exposure	High	All Outcomes: There is no indication in the data provided that animal attrition or health outcomes unrelated to exposure were observed.
	Metric 23:	Data Presentation and Analysis	High	All Outcomes: Statistical methods were adequately described and applied to all endpoints. The litter was used as the experimental unit when applicable.
	Metric 24:	Reporting of Data	High	All Outcomes: All data were adequately reported for each group; including individual animal data.
Additional Comments:	None			

Overall Quality Determination**Uninformative**

Study Citation:	Dow Chemical, (1960). Results of range finding toxicological tests on 1,1,2-trichloroethane.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: Mortality			
Duration:	Other (specify) Multiple dose - inhalation			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	10699088			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	Medium	The test substance was identified as 1,1,2-trichloroethane.	
	Metric 2: Test Substance Source	Low	The test substance source was not reported and there is no indication that the substance was analytically verified.	
	Metric 3: Test Substance Purity	Low	The test substance purity and/or grade were not reported.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	Uninformative	A negative control group was not discussed/included.	
	Metric 5: Positive Controls	N/A	A positive control is not required for this type of study.	
	Metric 6: Randomized Allocation of Animals	Low	The study did not report how animals were allocated to study groups.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	There was no mention of the methods and equipment used to generate the test substance.	
	Metric 8: Consistency of Exposure Administration	Low	Details of the exposure are not reported.	
	Metric 9: Reporting of Doses/Concentrations	Low	A single exposure concentration was provided, although it is not clear if it is a target, nominal, or analytical concentration.	
	Metric 10: Exposure Frequency and Duration	Uninformative	The exposure duration was reported as 7 hours; however, it was reported that there were repeated exposures but the number of exposures were not provided.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Low	It is unclear if there are multiple dose groups as only a single dose was reported. This study was a repeated dose study, so additional doses would be expected.	
	Metric 12: Exposure Route and Method	Uninformative	No information on the exposure method was provided.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Uninformative	The test species, strain, sex, age, and body weights were not provided.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	The animal husbandry conditions were not provided.	
	Metric 15: Number of Animals per Group	Low	The number of animals was not reported.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	Low	The outcome assessment methodology was not reported.	
	Metric 17: Consistency of Outcome Assessment	Low	Details regarding the outcome methodology were not reported.	
	Metric 18: Sampling Adequacy	Low	Details regarding sampling were not reported.	

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Study Citation:	Dow Chemical, (1960). Results of range finding toxicological tests on 1,1,2-trichloroethane.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: Mortality			
Duration:	Other (specify) Multiple dose - inhalation			
Chemical:	1,1,2-Trichloroethane- Parent compound			
HERO ID:	10699088			
Domain	Metric	Rating	Comments	
	Metric 19:	Blinding of Assessors	N/A	Mortality is not a subjective measure.
	Metric 20:	Negative Control Response	Low	There is no indication that a negative control was included.
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Low	Not enough information was provided to determine if confounders were present.
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.
	Metric 23:	Data Presentation and Analysis	N/A	Statistical analysis is not required for mortality data (assumed outcome).
	Metric 24:	Reporting of Data	Uninformative	Data presentation was inadequate (30 ppm was found to be injurious to laboratory animals).
Additional Comments:	None			
Overall Quality Determination		Uninformative		

Study Citation:	Bowen, S. E., Balster, R. L. (1998). A direct comparison of inhalant effects on locomotor activity and schedule-controlled behavior in mice. Experimental and Clinical Psychopharmacology 6(3):235-247.			
Health Outcome(s):	Neurological/Behavioral			
Reported Health Effect(s):	Neurological/Behavioral: Locomotor activity and operant behavior studies			
Duration:	Acute (less than or equal to 24 hr) 30 min			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5454703			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
Metric 1:	Test Substance Identity	High	Test substance was identified as 1,1,1-trichloroethane (TCE). Defined in the introduction.	
Metric 2:	Test Substance Source	Low	The source of the test substance was Fisher Scientific Co., Fairlawn, NJ. Batch/lot number was not provided.	
Metric 3:	Test Substance Purity	Low	The purity or grade of test substance was not provided.	
Domain 2: Test Design				
Metric 4:	Negative and Vehicle Controls	High	The same mice received all exposure levels. Control activity levels were determined by averaging motor activity on three control air-only test sessions for each mouse.	
Metric 5:	Positive Controls	N/A	Positive control was not required in this study.	
Metric 6:	Randomized Allocation of Animals	Low	The study did not report how animals were allocated.	
Domain 3: Exposure Characterization				
Metric 7:	Preparation and Storage of Test Substance	Low	Given the volatility of the test substance, the study did not adequately report how test substance was prepared or stored.	
Metric 8:	Consistency of Exposure Administration	High	Exposure was administered consistently across dose levels, though each exposure test was performed on different days.	
Metric 9:	Reporting of Doses/Concentrations	Low	Only nominal concentrations were reported. Study reports measured concentration did not vary by more than 10% from nominal values.	
Metric 10:	Exposure Frequency and Duration	High	Exposure frequency and duration were reported and appropriate for acute study (30 min).	
Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	High	Number of dose levels and spacing were appropriate.	
Metric 12:	Exposure Route and Method	Uninformative	A static inhalation chamber was used and therefore the study is deemed unacceptable.	
Domain 4: Test Animals				
Metric 13:	Test Animal Characteristics	Medium	The age of mice was not reported.	
Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	High	Husbandry conditions were adequately reported.	
Metric 15:	Number of Animals per Group	Medium	7-10 animals were exposed to each dose level.	
Domain 5: Outcome Assessment				
Metric 16:	Outcome Assessment Methodology	High	Outcome assessment and methodology were appropriate.	

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Study Citation:	Bowen, S. E., Balster, R. L. (1998). A direct comparison of inhalant effects on locomotor activity and schedule-controlled behavior in mice. Experimental and Clinical Psychopharmacology 6(3):235-247.			
Health Outcome(s):	Neurological/Behavioral			
Reported Health Effect(s):	Neurological/Behavioral: Locomotor activity and operant behavior studies			
Duration:	Acute (less than or equal to 24 hr) 30 min			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5454703			
Domain	Metric	Rating	Comments	
	Metric 17: Consistency of Outcome Assessment	High	Outcome was assessed consistently across dose levels, though the response to each concentration was evaluated on different days.	
	Metric 18: Sampling Adequacy	High	The number of animals evaluated was adequate.	
	Metric 19: Blinding of Assessors	N/A	Blinding was not necessary for this study.	
	Metric 20: Negative Control Response	High	The negative control response was appropriate.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Low	The study did not report all information to determine confounding. Because each mouse served as its own control, the response to each concentration was evaluated on different days. Any laboratory conditions that may have changed over time could contribute to confounding.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	No information was provided to either to support or dismiss differences in groups in health outcomes or attrition.	
	Metric 23: Data Presentation and Analysis	High	Statistical analysis was performed and appropriate.	
	Metric 24: Reporting of Data	High	All outcome data were reported adequately.	

Additional Comments: The study used a static inhalation chamber to deliver the test substance and thus is deemed unacceptable.

Overall Quality Determination

Uninformative

Study Citation:	Carlson, G. (1981). Effect of alterations in drug metabolism on epinephrine-induced cardiac arrhythmias in rabbits exposed to Methylchloroform. Toxicology Letters 9(4):307-313.			
Health Outcome(s):	Cardiovascular			
Reported Health Effect(s):	Cardiovascular: Incidences of cardiac arrhythmias			
Duration:	Acute (less than or equal to 24 hr) nan			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	29371			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	Test substance was identified as 1,1,1-trichloroethane (methyl chloroform)	
	Metric 2: Test Substance Source	High	The source of the test substance was MCB (Cincinnati, OH). Lot number was not provided, however this information is only critical for chemicals that may vary in composition.	
	Metric 3: Test Substance Purity	High	The purity of the test substance was reported to be 98%.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	Low	In the study, the control group consisted of rabbits that were exposed to the test substance, but not to a drug-metabolism inducer. However, the control group was tested for a cardiac response to epinephrine prior to exposure to the test substance.	
	Metric 5: Positive Controls	N/A	Not applicable for this study.	
	Metric 6: Randomized Allocation of Animals	Low	The study did not state how animals were allocated.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	High	Test substance preparation and storage were not adequately described, however, the lack of details is not expected to have a substantial impact for an acute exposure study.	
	Metric 8: Consistency of Exposure Administration	High	Test substance was delivered consistently across study groups.	
	Metric 9: Reporting of Doses/Concentrations	Medium	Chamber concentration was measured using gas chromatography and regulated to give a nominal concentration of 5600 ppm. Analytical concentrations with standard errors were not reported.	
	Metric 10: Exposure Frequency and Duration	High	The exposure frequency and duration were appropriate for the study design.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Medium	There were minor limitations with concentration studied. Only one concentration was studied and no effects were observed; justification for choosing this concentration was not provided.	
	Metric 12: Exposure Route and Method	High	Animals were exposed individually in a 22 liter inhalation chamber under dynamic airflow conditions. Total airflow was approximately 10 liters/minute.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Medium	Age and starting body weight of the animals were not reported.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Medium	Most husbandry conditions were reported.	
	Metric 15: Number of Animals per Group	Medium	The number of animals/group was appropriate (n=9).	

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Study Citation:	Carlson, G. (1981). Effect of alterations in drug metabolism on epinephrine-induced cardiac arrhythmias in rabbits exposed to Methylchloroform. Toxicology Letters 9(4):307-313.
Health Outcome(s):	Cardiovascular
Reported Health Effect(s):	Cardiovascular: Incidences of cardiac arrhythmias
Duration:	Acute (less than or equal to 24 hr) nan
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	29371

Domain	Metric	Rating	Comments
Domain 5: Outcome Assessment			
	Metric 16: Outcome Assessment Methodology	High	The outcome assessment methodology addressed the intended outcomes.
	Metric 17: Consistency of Outcome Assessment	High	Outcomes were assessed consistently across study groups.
	Metric 18: Sampling Adequacy	High	Sampling was adequate.
	Metric 19: Blinding of Assessors	N/A	Blinding was not necessary.
	Metric 20: Negative Control Response	High	The negative control response was appropriate.
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	Low	Test substance is a respiratory irritant and therefore respiratory rate should be reported. Authors did not measure/report respiration rate.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.
	Metric 23: Data Presentation and Analysis	N/A	Statistical analysis was not necessary give the negative results.
	Metric 24: Reporting of Data	High	Data were fully reported.

Additional Comments: None

Overall Quality Determination**Medium**

Study Citation:	Carlson, G. (1981). Effect of alterations in drug metabolism on epinephrine-induced cardiac arrhythmias in rabbits exposed to Methylchloroform. Toxicology Letters 9(4):307-313.			
Health Outcome(s):	Clinical signs (Clinical signs)			
Reported Health Effect(s):	Clinical signs (Clinical signs): Clinical signs			
Duration:	Acute (less than or equal to 24 hr) nan			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	29371			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Test substance was identified as 1,1,1-trichloroethane (methyl chloroform)
	Metric 2:	Test Substance Source	High	The source of the test substance was MCB (Cincinnati, OH). Lot number was not provided, however this information is only critical for chemicals that may vary in composition.
	Metric 3:	Test Substance Purity	High	The purity of the test substance was reported to be 98%.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	Low	In the study, the control group consisted of rabbits that were exposed to the test substance, but not to a drug-metabolism inducer. However, the control group was tested for a cardiac response to epinephrine prior to exposure to the test substance.
	Metric 5:	Positive Controls	N/A	Not applicable for this study.
	Metric 6:	Randomized Allocation of Animals	Low	The study did not state how animals were allocated.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	High	Test substance preparation and storage were not adequately described, however, the lack of details is not expected to have a substantial impact for an acute exposure study.
	Metric 8:	Consistency of Exposure Administration	High	Test substance was delivered consistently across study groups.
	Metric 9:	Reporting of Doses/Concentrations	Medium	Chamber concentration was measured using gas chromatography and regulated to give a nominal concentration of 5600 ppm. Analytical concentrations with standard errors were not reported.
	Metric 10:	Exposure Frequency and Duration	High	The exposure frequency and duration were appropriate for the study design.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Medium	There were minor limitations with concentration studied. Only one concentration was studied and no effects were observed; justification for choosing this concentration was not provided.
	Metric 12:	Exposure Route and Method	High	Animals were exposed individually in a 22 liter inhalation chamber under dynamic airflow conditions. Total airflow was approximately 10 liters/minute.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	Medium	Age and starting body weight of the animals were not reported.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Medium	Most husbandry conditions were reported.
	Metric 15:	Number of Animals per Group	Medium	The number of animals/group was appropriate (n=9).
Domain 5: Outcome Assessment				

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Study Citation:	Carlson, G. (1981). Effect of alterations in drug metabolism on epinephrine-induced cardiac arrhythmias in rabbits exposed to Methylchloroform. Toxicology Letters 9(4):307-313.
Health Outcome(s):	Clinical signs (Clinical signs)
Reported Health Effect(s):	Clinical signs (Clinical signs): Clinical signs
Duration:	Acute (less than or equal to 24 hr) nan
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	29371

Domain	Metric	Rating	Comments
	Metric 16: Outcome Assessment Methodology	Low	It was not clearly reported how clinical signs of toxicity were assessed.
	Metric 17: Consistency of Outcome Assessment	Low	It is not clearly reported when clinical signs of toxicity were assessed.
	Metric 18: Sampling Adequacy	Low	Details on sampling were not reported.
	Metric 19: Blinding of Assessors	N/A	Blinding was not necessary.
	Metric 20: Negative Control Response	High	The negative control response was appropriate.
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	Low	Test substance is a respiratory irritant and therefore respiratory rate should be reported. Authors did not measure/report respiration rate.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.
	Metric 23: Data Presentation and Analysis	N/A	Statistical analysis was not necessary give the negative results.
	Metric 24: Reporting of Data	Medium	Effects were reported as negative in text.

Additional Comments: None

Overall Quality Determination**Medium**

Study Citation:	Carlson, G. P. (1973). Effect of phenobarbital and 3-methylcholanthrene pretreatment on the hepatotoxicity of 1,1,1-trichloroethane and 1,1,2-trichloroethane. Life Sciences 13(1):67-73.			
Health Outcome(s):	Mortality; Hepatic/Liver;			
Reported Health Effect(s):	Mortality: Death; Hepatic/Liver: Relative liver weight, serum SGOT (AST), serum SGPT (ALT) and liver glucose-6-phosphatase levels;			
Duration:	Acute (less than or equal to 24 hr) Acute			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	29336			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	All Outcomes: Test substance was identified as 1,1,1-trichloroethane.	
	Metric 2: Test Substance Source	Low	All Outcomes: The source of the test substance was not identified.	
	Metric 3: Test Substance Purity	Low	All Outcomes: The purity of the test substance was not reported.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	High	All Outcomes: Appropriate negative controls were included.	
	Metric 5: Positive Controls	N/A	All Outcomes: A positive control was not needed. Positive responses were seen in other groups verifying assays.	
	Metric 6: Randomized Allocation of Animals	Low	All Outcomes: The authors do not report how the animals were allocated.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	Mortality: Preparation and storage conditions were not provided. Given the volatility of the test substance, this information would be useful.; Hepatic/Liver: Preparation and storage conditions were not provided. Given the volatility of the test substance, this information would be useful.	
	Metric 8: Consistency of Exposure Administration	High	All Outcomes: Test substance was administered consistently across study groups.	
	Metric 9: Reporting of Doses/Concentrations	Medium	Mortality: Measured concentrations were reported in the table legend. Target concentrations were not reported.; Hepatic/Liver: Measured concentrations were reported in the table legend. Target concentrations were not reported.	
	Metric 10: Exposure Frequency and Duration	High	All Outcomes: Exposure frequency and duration were appropriate for an acute study.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Medium	Mortality: A full range of responses (i.e. both a NOAEL and LOAEL, with at least one dose above the LOAEL) were not obtained with concentrations studied. Justification for concentrations used was not provided.; Hepatic/Liver: A full range of responses (i.e. both a NOAEL and LOAEL, with at least one dose above the LOAEL) were not obtained with concentrations studied. Justification for concentrations used was not provided.	
	Metric 12: Exposure Route and Method	Low	All Outcomes: A dynamic whole body chamber was used. The number of air exchanges was not reported. Minimal details were provided.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Medium	All Outcomes: Age and starting body weight were not reported; however, this is unlikely to have a substantial impact on results.	

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Study Citation:	Carlson, G. P. (1973). Effect of phenobarbital and 3-methylcholanthrene pretreatment on the hepatotoxicity of 1,1,1-trichloroethane and 1,1,2-trichloroethane. Life Sciences 13(1):67-73.
Health Outcome(s):	Mortality; Hepatic/Liver;
Reported Health Effect(s):	Mortality: Death; Hepatic/Liver: Relative liver weight, serum SGOT (AST), serum SGPT (ALT) and liver glucose-6-phosphatase levels;
Duration:	Acute (less than or equal to 24 hr) Acute
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	29336

Domain	Metric	Rating	Comments
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	All Outcomes: No husbandry conditions were not reported.
	Metric 15: Number of Animals per Group	Medium	All Outcomes: The number of animals/groups was appropriate (n=5).
Domain 5: Outcome Assessment			
	Metric 16: Outcome Assessment Methodology	High	All Outcomes: Outcome assessment methodology was appropriate to measure outcome of interest.
	Metric 17: Consistency of Outcome Assessment	Medium	All Outcomes: Minimal details were provided pertaining to outcomes assessment.
	Metric 18: Sampling Adequacy	High	All Outcomes: The sampling was adequate.
	Metric 19: Blinding of Assessors	N/A	All Outcomes: Blinding was not necessary.
	Metric 20: Negative Control Response	High	All Outcomes: The negative control response was appropriate.
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	Low	All Outcomes: Test substance is a respiratory irritant and therefore respiratory rate should be provided.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	All Outcomes: There was no information to support or dismiss the suggestion of health outcomes differences unrelated to exposure.
	Metric 23: Data Presentation and Analysis	High	All Outcomes: Statistical methods were described and appropriate.
	Metric 24: Reporting of Data	High	All Outcomes: All data were reported.

Additional Comments: none

Overall Quality Determination**Medium**

Study Citation:	Carlson, G. P. (1973). Effect of phenobarbital and 3-methylcholanthrene pretreatment on the hepatotoxicity of 1,1,1-trichloroethane and 1,1,2-trichloroethane. Life Sciences 13(1):67-73.			
Health Outcome(s):	Nutritional/Metabolic			
Reported Health Effect(s):	Nutritional/Metabolic: Body weights			
Duration:	Acute (less than or equal to 24 hr) Acute			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	29336			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Test substance was identified as 1,1,1-trichloroethane.
	Metric 2:	Test Substance Source	Low	The source of the test substance was not identified.
	Metric 3:	Test Substance Purity	Low	The purity of the test substance was not reported.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	High	Appropriate negative controls were included.
	Metric 5:	Positive Controls	N/A	A positive control was not needed. Positive responses were seen in other groups verifying assays.
	Metric 6:	Randomized Allocation of Animals	Low	The authors do not report how the animals were allocated.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Low	Preparation and storage conditions were not provided. Given the volatility of the test substance, this information would be useful.
	Metric 8:	Consistency of Exposure Administration	High	Test substance was administered consistently across study groups.
	Metric 9:	Reporting of Doses/Concentrations	Medium	Measured concentrations were reported in the table legend. Target concentrations were not reported.
	Metric 10:	Exposure Frequency and Duration	High	Exposure frequency and duration were appropriate for an acute study.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Medium	A full range of responses (i.e. both a NOAEL and LOAEL, with at least one dose above the LOAEL) were not obtained with concentrations studied. Justification for concentrations used was not provided.
	Metric 12:	Exposure Route and Method	Low	A dynamic whole body chamber was used. The number of air exchanges was not reported. Minimal details were provided.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	Medium	Age and starting body weight were not reported; however, this is unlikely to have a substantial impact on results.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	No husbandry conditions were not reported.
	Metric 15:	Number of Animals per Group	Medium	The number of animals/groups was appropriate (n=5).
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	High	Outcome assessment methodology was appropriate to measure outcome of interest.
	Metric 17:	Consistency of Outcome Assessment	Medium	Minimal details were provided pertaining to outcomes assessment.
	Metric 18:	Sampling Adequacy	High	The sampling was adequate.

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Study Citation:	Carlson, G. P. (1973). Effect of phenobarbital and 3-methylcholanthrene pretreatment on the hepatotoxicity of 1,1,1-trichloroethane and 1,1,2-trichloroethane. Life Sciences 13(1):67-73.			
Health Outcome(s):	Nutritional/Metabolic			
Reported Health Effect(s):	Nutritional/Metabolic: Body weights			
Duration:	Acute (less than or equal to 24 hr) Acute			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	29336			
Domain	Metric	Rating	Comments	
	Metric 19: Blinding of Assessors	N/A	Blinding was not necessary.	
	Metric 20: Negative Control Response	Low	The negative control response was not reported.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Low	Test substance is a respiratory irritant and therefore respiratory rate should be provided.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information to support or dismiss the suggestion of health outcomes differences unrelated to exposure.	
	Metric 23: Data Presentation and Analysis	Uninformative	Data and statistics on body weight were not reported.	
	Metric 24: Reporting of Data	Uninformative	Body weight data were not reported.	
Additional Comments:	Body weight data were not reported.			
Overall Quality Determination		Uninformative		

Study Citation:	Charbonneau, M., Greselin, E., Brodeur, J., Plaa, G. L. (1991). Influence of acetone on the severity of the liver injury induced by haloalkane mixtures. Canadian Journal of Physiology and Pharmacology 69(12):1901-1907.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: Histology of liver tissue and plasma alanine aminotransferase (ALT) activity.			
Duration:	Acute (less than or equal to 24 hr) 1 day			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	660794			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	The chemical was identified as 1,1,1-trichloroethane.	
	Metric 2: Test Substance Source	Low	The source was identified as Aldrich Chemical Co., Milwaukee, WI, but batch/lot number was not provided.	
	Metric 3: Test Substance Purity	Medium	Purity was reported to be 97%.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	Low	It is unclear if the control group that did not receive a haloalkane was sham treated when the haloalkanes were administered to other treatment groups (Table 1 shows no sham treatment and the text does not describe sham treatment for this group).	
	Metric 5: Positive Controls	N/A	Positive controls are not required for this study type.	
	Metric 6: Randomized Allocation of Animals	Low	The study did not report how animals were allocated to study groups.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	Methods of test substance preparation and storage prior to administration of the single dose were not reported and may affect the results (substance may be volatile).	
	Metric 8: Consistency of Exposure Administration	High	Exposure administration appears to have been generally consistent across groups.	
	Metric 9: Reporting of Doses/Concentrations	High	The injected dose level was reported without ambiguity.	
	Metric 10: Exposure Frequency and Duration	High	The single i.p. injection dose was appropriate for the study type.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	N/A	Only one dose was tested but the study was not intended to provide dose-response information.	
	Metric 12: Exposure Route and Method	High	The exposure route and method were suited to the test substance.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Medium	Age was not reported.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Temperature and humidity were not reported.	
	Metric 15: Number of Animals per Group	Medium	There were six male rats per treatment group.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	Medium	Parameters evaluated for liver effects included plasma ALT and quantitative histological evaluation of necrotic (plus inflammatory cells), degenerated, and normal hepatocytes between the central vein and the portal triad.	

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Study Citation:	Charbonneau, M., Greselin, E., Brodeur, J., Plaa, G. L. (1991). Influence of acetone on the severity of the liver injury induced by haloalkane mixtures. Canadian Journal of Physiology and Pharmacology 69(12):1901-1907.
Health Outcome(s):	Hepatic/Liver
Reported Health Effect(s):	Hepatic/Liver: Histology of liver tissue and plasma alanine aminotransferase (ALT) activity.
Duration:	Acute (less than or equal to 24 hr) 1 day
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	660794

Domain	Metric	Rating	Comments
	Metric 17: Consistency of Outcome Assessment	Low	Details regarding the execution of the study protocol for outcome assessment (e.g., timing of assessment across treatment and control group) were not sufficiently described.
	Metric 18: Sampling Adequacy	High	Six rats per treatment group were evaluated for each endpoint.
	Metric 19: Blinding of Assessors	N/A	Blinding was not required.
	Metric 20: Negative Control Response	High	The negative control response was adequate.
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	Although the study did not report all information to determine confounding, the reported information did not identify differences among the study groups.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were any differences among groups in animal attrition or health outcomes unrelated to exposure that could influence the outcome assessment.
	Metric 23: Data Presentation and Analysis	High	Statistical methods were clearly described.
	Metric 24: Reporting of Data	High	Data were reported for all outcomes.

Additional Comments: None

Overall Quality Determination**Medium**

Study Citation:	Dow Chemical, (1988). Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688.			
Health Outcome(s):	Neurological/Behavioral (Clinical signs of toxicity (fur)); Lung/Respiratory;			
Reported Health Effect(s):	Neurological/Behavioral (Clinical signs of toxicity (fur)): Study 1: During the exposure period, incoordination, lethargy, and unresponsiveness to noise were observed in both sexes at all test concentrations. Convulsions were observed in 1 male during the exposure period and lacrimation was observed in both sexes at 15,523 ppm; animals appeared normal by day 1 and throughout the remainder of the observation period. Listlessness was observed in 5 males and 2 females on day 1 at 18,425 ppm; surviving animals appeared normal by day 2 and then throughout the remainder of the observation period. Study 2: Hypoactivity was observed during the exposure period and a decreased responsiveness to noise was observed towards the end of the exposure period. Uncoordinated gait was observed during the exposure period and immediately following the exposure in animals exposed to =>34,500 mg/m3. All rats appeared normal by day 2 and for the remainder of the observation period.; Lung/Respiratory: Study 1: rapid/shallow and/or labored breathing during exposure, clear fluid around the external nares, classified as facial soilingStudy 2: no changes reported;			
Duration:	Acute (less than or equal to 24 hr) 4 hours - Study 2			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5466898			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
Metric 1:	Test Substance Identity	Medium	All Outcomes: The test substances were identified as Aerothene TT, and two different samples were used in this study. The major component was 1,1,1-trichloroethane (CAS No. 71-55-6) and the other components were identified. The physical state was not specified.	
Metric 2:	Test Substance Source	High	All Outcomes: One of the test substances was supplied by the Dow Chemical Company (Lot No. TA 870402-1). The second test substance was manufactured by the Dow Chemical Company but was supplied by the 3M Corporation in Minneapolis, MN (Lot No. TA 8611112). "The identity of the 1,1,1-trichloroethane was verified by GC/MS and IR".	
Metric 3:	Test Substance Purity	Medium	All Outcomes: Two different samples were used in this study. The major component was 1,1,1-trichloroethane (CAS No. 71-55-6) at 94.54% and 94.53%, and the other components were dimethoxymethane at 2.54% and 2.64%, tert-butyl alcohol at 2.10% and 1.98%, and butylene oxide at 0.77% and 0.74%, respectively.	
Domain 2: Test Design				
Metric 4:	Negative and Vehicle Controls	N/A	All Outcomes: Negative controls are not required for acute toxicity tests.	
Metric 5:	Positive Controls	N/A	All Outcomes: Positive controls are not required for acute toxicity tests.	
Metric 6:	Randomized Allocation of Animals	Medium	All Outcomes: Study 2 reported animals were randomized by weight into groups of 5 using a computer randomization program.	
Domain 3: Exposure Characterization				
Metric 7:	Preparation and Storage of Test Substance	Low	All Outcomes: Preparation of the test substance as an aerosol and vapor were described. Storage of the test substance was not described; the test substance is volatile (vapor pressure 100 mm Hg at 20 deg. C).	
Metric 8:	Consistency of Exposure Administration	Low	All Outcomes: The exposure methods were different for each of the 8 exposures. Particle size characteristics were not provided to compare.	
Metric 9:	Reporting of Doses/Concentrations	Medium	All Outcomes: Target, TWA, and nominal concentrations were provided. Standard deviations/errors were not provided. The analytical method to measure the test substance was reported and appropriate. Particle size distribution data were not reported.	

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Study Citation:	Dow Chemical, (1988). Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688.			
Health Outcome(s):	Neurological/Behavioral (Clinical signs of toxicity (fur)); Lung/Respiratory;			
Reported Health Effect(s):	Neurological/Behavioral (Clinical signs of toxicity (fur)): Study 1: During the exposure period, incoordination, lethargy, and unresponsiveness to noise were observed in both sexes at all test concentrations. Convulsions were observed in 1 male during the exposure period and lacrimation was observed in both sexes at 15,523 ppm; animals appeared normal by day 1 and throughout the remainder of the observation period. Listlessness was observed in 5 males and 2 females on day 1 at 18,425 ppm; surviving animals appeared normal by day 2 and then throughout the remainder of the observation period. Study 2: Hypoactivity was observed during the exposure period and a decreased responsiveness to noise was observed towards the end of the exposure period. Uncoordinated gait was observed during the exposure period and immediately following the exposure in animals exposed to =>34,500 mg/m3. All rats appeared normal by day 2 and for the remainder of the observation period.; Lung/Respiratory: Study 1: rapid/shallow and/or labored breathing during exposure, clear fluid around the external nares, classified as facial soilingStudy 2: no changes reported;			
Duration:	Acute (less than or equal to 24 hr) 4 hours - Study 2			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5466898			
Domain	Metric	Rating	Comments	
	Metric 10: Exposure Frequency and Duration	High	All Outcomes: A single, 4-hour exposure was used in Study 2; this is appropriate for acute inhalation studies.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Low	Neurological/Behavioral (Clinical signs of toxicity (fur)): The exposure concentrations/conditions were selected to attempt to replicate the findings of a previous BRRC study. It is not clear if the range of concentrations/exposure scenarios were sufficient to cover a full range of responses for evaluations of behavior patterns or nervous system activity.; Lung/Respiratory: The exposure concentrations/conditions were selected to attempt to replicate the findings of a previous BRRC study. It is not clear if the range of concentrations/exposure scenarios were sufficient to cover a full range of responses for evaluations of mucous membranes and respiration.	
	Metric 12: Exposure Route and Method	Medium	All Outcomes: The number of air changes per hour were not specified, but Study 2 used dynamic airflow conditions. Inhalation is an appropriate exposure route to examine acute toxicity, and methods of exposure were described.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	High	All Outcomes: Male Fischer 344 rats (5/group),7 weeks old, and male Sprague-Dawley rats (5/group), 5 weeks old, were used in these studies. Animals were purchased from Charles River Breeding Laboratories, Inc. in Kingston, NY and Portage, MI, respectively. Animals were exposed at least 1 week following arrival, and exposure dates for each group were provided. Bodyweights for each animal were provided on test day 1.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	High	All Outcomes: Mean temperature, relative humidity, and mean chamber airflow were provided for each concentration/exposure group. Animals were provided with food and water ad libitum except during the exposure period. Animals were maintained on a 12-hour light/dark cycle.	
	Metric 15: Number of Animals per Group	Low	All Outcomes: 5 males/concentration were used in Study 2. The reason for using males instead of females or both sexes in the study was not reported. Test guidelines recommend using both sexes (5/sex) unless one sex is known to be more susceptible.	
Domain 5: Outcome Assessment				
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Study Citation:	Dow Chemical, (1988). Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688.			
Health Outcome(s):	Neurological/Behavioral (Clinical signs of toxicity (fur)); Lung/Respiratory;			
Reported Health Effect(s):	Neurological/Behavioral (Clinical signs of toxicity (fur)): Study 1: During the exposure period, incoordination, lethargy, and unresponsiveness to noise were observed in both sexes at all test concentrations. Convulsions were observed in 1 male during the exposure period and lacrimation was observed in both sexes at 15,523 ppm; animals appeared normal by day 1 and throughout the remainder of the observation period. Listlessness was observed in 5 males and 2 females on day 1 at 18,425 ppm; surviving animals appeared normal by day 2 and then throughout the remainder of the observation period. Study 2: Hypoactivity was observed during the exposure period and a decreased responsiveness to noise was observed towards the end of the exposure period. Uncoordinated gait was observed during the exposure period and immediately following the exposure in animals exposed to =>34,500 mg/m3. All rats appeared normal by day 2 and for the remainder of the observation period.; Lung/Respiratory: Study 1: rapid/shallow and/or labored breathing during exposure, clear fluid around the external nares, classified as facial soilingStudy 2: no changes reported;			
Duration:	Acute (less than or equal to 24 hr) 4 hours - Study 2			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5466898			
Domain	Metric	Rating	Comments	
	Metric 16: Outcome Assessment Methodology	High	Neurological/Behavioral (Clinical signs of toxicity (fur)): Animals were evaluated for clinical signs of toxicity, including behavioral patterns and nervous system activity, during the exposure if possible and daily for two weeks following the exposures. This is appropriate in an acute toxicity test.; Lung/Respiratory: Animals were evaluated for clinical signs of toxicity, including mucous membrane evaluations and respiration observations, during the exposure if possible and daily for two weeks following the exposures. This is appropriate in an acute toxicity test.	
	Metric 17: Consistency of Outcome Assessment	Low	Neurological/Behavioral (Clinical signs of toxicity (fur)): The study noted it was not always possible to observe all animals during the exposure period. Tabulated data were not provided for the clinical signs of toxicity that were observed, and limited details were provided in the text.; Lung/Respiratory: The study noted it was not always possible to observe all animals during the exposure period. Tabulated data were not provided for the clinical signs of toxicity that were observed, and mucous membrane/respiration evaluations were not described in the text.	
	Metric 18: Sampling Adequacy	Low	All Outcomes: It was not clear if all animals in all exposure groups were evaluated for clinical signs of toxicity at all time points.	
	Metric 19: Blinding of Assessors	N/A	All Outcomes: Blinding of assessors is not required for assessment of clinical signs of toxicity.	
	Metric 20: Negative Control Response	N/A	All Outcomes: Negative controls are not required for acute toxicity tests.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	All Outcomes: Although the study did not report all information to determine confounding, reported information did not identify differences among study groups. Respiratory rate was not measured in an inhalation study.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	All Outcomes: There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure that could influence the outcome assessment.	
	Metric 23: Data Presentation and Analysis	N/A	Neurological/Behavioral (Clinical signs of toxicity (fur)): Statistical analysis is not required for the assessment of clinical signs of toxicity.; Lung/Respiratory: Statistical analysis is not required for the assessment of clinical signs of toxicity in an acute toxicity test.	

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Study Citation:	Dow Chemical, (1988). Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688.			
Health Outcome(s):	Neurological/Behavioral (Clinical signs of toxicity (fur)); Lung/Respiratory;			
Reported Health Effect(s):	Neurological/Behavioral (Clinical signs of toxicity (fur)): Study 1: During the exposure period, incoordination, lethargy, and unresponsiveness to noise were observed in both sexes at all test concentrations. Convulsions were observed in 1 male during the exposure period and lacrimation was observed in both sexes at 15,523 ppm; animals appeared normal by day 1 and throughout the remainder of the observation period. Listlessness was observed in 5 males and 2 females on day 1 at 18,425 ppm; surviving animals appeared normal by day 2 and then throughout the remainder of the observation period. Study 2: Hypoactivity was observed during the exposure period and a decreased responsiveness to noise was observed towards the end of the exposure period. Uncoordinated gait was observed during the exposure period and immediately following the exposure in animals exposed to =>34,500 mg/m3. All rats appeared normal by day 2 and for the remainder of the observation period.; Lung/Respiratory: Study 1: rapid/shallow and/or labored breathing during exposure, clear fluid around the external nares, classified as facial soilingStudy 2: no changes reported;			
Duration:	Acute (less than or equal to 24 hr) 4 hours - Study 2			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5466898			
Domain	Metric	Rating	Comments	
	Metric 24: Reporting of Data	Low	Neurological/Behavioral (Clinical signs of toxicity (fur)): Results for clinical signs of toxicity were briefly reported in the text, but were not tabulated and were not specific to the exposure scenario used.; Lung/Respiratory: Results for clinical signs of toxicity were briefly reported in the text, and results for evaluations of mucous membranes/respiration were not provided.	
Additional Comments:	Study 2: OTS0509711-6, 89-880000192, 8EHQ-0688-0535 "An acute inhalation study of aerosolized 1,1,1-trichloroethane in rats with cover letter dated 061688"			

Overall Quality Determination**Medium**

Study Citation:	Dow Chemical, (1988). Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688.			
Health Outcome(s):	Ocular/Sensory; Clinical signs of toxicity (Clinical signs of toxicity (fur));			
Reported Health Effect(s):	Ocular/Sensory: Study 1 and 2: no changes in eyes upon examination; Clinical signs of toxicity (Clinical signs of toxicity (fur)): Study 1 and 2: no alterations observed for evaluations of fur;			
Duration:	Acute (less than or equal to 24 hr) 4 hours - Study 2			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5466898			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Medium	All Outcomes: The test substances were identified as Aerothene TT, and two different samples were used in this study. The major component was 1,1,1-trichloroethane (CAS No. 71-55-6) and the other components were identified. The physical state was not specified.
	Metric 2:	Test Substance Source	High	All Outcomes: One of the test substances was supplied by the Dow Chemical Company (Lot No. TA 870402-1). The second test substance was manufactured by the Dow Chemical Company but was supplied by the 3M Corporation in Minneapolis, MN (Lot No. TA 8611112). "The identity of the 1,1,1-trichloroethane was verified by GC/MS and IR".
	Metric 3:	Test Substance Purity	Medium	All Outcomes: Two different samples were used in this study. The major component was 1,1,1-trichloroethane (CAS No. 71-55-6) at 94.54% and 94.53%, and the other components were dimethoxymethane at 2.54% and 2.64%, tert-butyl alcohol at 2.10% and 1.98%, and butylene oxide at 0.77% and 0.74%, respectively.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	N/A	All Outcomes: Negative controls are not required for acute toxicity tests.
	Metric 5:	Positive Controls	N/A	All Outcomes: Positive controls are not required for acute toxicity tests.
	Metric 6:	Randomized Allocation of Animals	Medium	All Outcomes: Study 2 reported animals were randomized by weight into groups of 5 using a computer randomization program.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Low	All Outcomes: Preparation of the test substance as an aerosol and vapor were described. Storage of the test substance was not described; the test substance is volatile (vapor pressure 100 mm Hg at 20 deg. C).
	Metric 8:	Consistency of Exposure Administration	Low	All Outcomes: The exposure methods were different for each of the 8 exposures. Particle size characteristics were not provided to compare.
	Metric 9:	Reporting of Doses/Concentrations	Medium	All Outcomes: Target, TWA, and nominal concentrations were provided. Standard deviations/errors were not provided. The analytical method to measure the test substance was reported and appropriate. Particle size distribution data were not reported.
	Metric 10:	Exposure Frequency and Duration	High	All Outcomes: A single, 4-hour exposure was used in Study 2; this is appropriate for acute inhalation studies.
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Study Citation: Dow Chemical, (1988). Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688. Health Outcome(s): Ocular/Sensory; Clinical signs of toxicity (Clinical signs of toxicity (fur)); Reported Health Effect(s): Ocular/Sensory: Study 1 and 2: no changes in eyes upon examination; Clinical signs of toxicity (Clinical signs of toxicity (fur)): Study 1 and 2: no alterations observed for evaluations of fur; Duration: Acute (less than or equal to 24 hr) 4 hours - Study 2 Chemical: 1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane HERO ID: 5466898				
Domain		Metric	Rating	Comments
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Low	Ocular/Sensory: The exposure concentrations/conditions were selected to attempt to replicate the findings of a previous BRRC study. It is not clear if the range of concentrations/exposure scenarios were sufficient to cover a full range of responses for evaluations of eyes.; Clinical signs of toxicity (Clinical signs of toxicity (fur)): The exposure concentrations/conditions were selected to attempt to replicate the findings of a previous BRRC study. It is not clear if the range of concentrations/exposure scenarios were sufficient to cover a full range of responses for evaluations of fur.
	Metric 12:	Exposure Route and Method	Medium	All Outcomes: The number of air changes per hour were not specified, but Study 2 used dynamic airflow conditions. Inhalation is an appropriate exposure route to examine acute toxicity, and methods of exposure were described.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	High	All Outcomes: Male Fischer 344 rats (5/group), 7 weeks old, and male Sprague-Dawley rats (5/group), 5 weeks old, were used in these studies. Animals were purchased from Charles River Breeding Laboratories, Inc. in Kingston, NY and Portage, MI, respectively. Animals were exposed at least 1 week following arrival, and exposure dates for each group were provided. Bodyweights for each animal were provided on test day 1.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	High	All Outcomes: Mean temperature, relative humidity, and mean chamber airflow were provided for each concentration/exposure group. Animals were provided with food and water ad libitum except during the exposure period. Animals were maintained on a 12-hour light/dark cycle.
	Metric 15:	Number of Animals per Group	Low	All Outcomes: 5 males/concentration were used in Study 2. The reason for using males instead of females or both sexes in the study was not reported. Test guidelines recommend using both sexes (5/sex) unless one sex is known to be more susceptible.
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	High	Ocular/Sensory: Animals were evaluated for clinical signs of toxicity, including eye evaluations, during the exposure if possible and daily for two weeks following the exposures. Eyes were examined with a microscopic slide and fluorescent illumination upon gross necropsy. This is appropriate in an acute toxicity test.; Clinical signs of toxicity (Clinical signs of toxicity (fur)): Animals were evaluated for clinical signs of toxicity, including fur evaluations, during the exposure if possible and daily for two weeks following the exposures. This is appropriate in an acute toxicity test.
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Study Citation:	Dow Chemical, (1988). Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688.			
Health Outcome(s):	Ocular/Sensory; Clinical signs of toxicity (Clinical signs of toxicity (fur));			
Reported Health Effect(s):	Ocular/Sensory: Study 1 and 2: no changes in eyes upon examination; Clinical signs of toxicity (Clinical signs of toxicity (fur)): Study 1 and 2: no alterations observed for evaluations of fur;			
Duration:	Acute (less than or equal to 24 hr) 4 hours - Study 2			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5466898			
Domain	Metric	Rating	Comments	
	Metric 17: Consistency of Outcome Assessment	Low	Ocular/Sensory: The study noted it was not always possible to observe all animals during the exposure period. Tabulated data were not provided for the clinical signs of toxicity that were observed, and eye evaluations were not described in the text. No results for the eye examinations performed upon gross pathology were provided (generally negative findings for gross pathology).; Clinical signs of toxicity (Clinical signs of toxicity (fur)): The study noted it was not always possible to observe all animals during the exposure period. Tabulated data were not provided for the clinical signs of toxicity that were observed, and fur evaluations were not described in the text.	
	Metric 18: Sampling Adequacy	Low	Ocular/Sensory: It was not clear if all animals in all exposure groups were evaluated for clinical signs of toxicity and eye evaluations at all time points.; Clinical signs of toxicity (Clinical signs of toxicity (fur)): It was not clear if all animals in all exposure groups were evaluated for clinical signs of toxicity and fur evaluations at all time points.	
	Metric 19: Blinding of Assessors	N/A	Ocular/Sensory: Blinding of assessors is not required for assessment of clinical signs of toxicity or gross pathology.; Clinical signs of toxicity (Clinical signs of toxicity (fur)): Blinding of assessors is not required for assessment of clinical signs of toxicity.	
	Metric 20: Negative Control Response	N/A	All Outcomes: Negative controls are not required for acute toxicity tests.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	All Outcomes: Although the study did not report all information to determine confounding, reported information did not identify differences among study groups. Respiratory rate was not measured in an inhalation study.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	All Outcomes: There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure that could influence the outcome assessment.	
	Metric 23: Data Presentation and Analysis	N/A	Ocular/Sensory: Statistical analysis is not required for the assessment of clinical signs of toxicity or gross pathology in an acute toxicity test.; Clinical signs of toxicity (Clinical signs of toxicity (fur)): Statistical analysis is not required for the assessment of clinical signs of toxicity.	
	Metric 24: Reporting of Data	Uninformative	Ocular/Sensory: Results for clinical signs of toxicity were briefly reported in the text, but results for evaluations of eyes were not provided. Gross pathological results did not include evaluations of the eyes.; Clinical signs of toxicity (Clinical signs of toxicity (fur)): Results for clinical signs of toxicity were briefly reported in the text, and results for evaluations of fur were not provided.	
Additional Comments:	Study 2: OTS0509711-6, 89-880000192, 8EHQ-0688-0535 "An acute inhalation study of aerosolized 1,1,1-trichloroethane in rats with cover letter dated 061688"			

Overall Quality Determination**Uninformative**

Study Citation:	Dow Chemical, (1988). Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688.			
Health Outcome(s):	Hepatic/Liver; Gross pathology (Gross pathology);			
Reported Health Effect(s):	Hepatic/Liver: Study 2: A liver hernia was observed in one rat in group two exposed to 17,200 mg/m3.; Gross pathology (Gross pathology): Study 1: Upon gross pathological examinations, clear fluid around the external nares, classified as facial soiling, was observed in 4 males at 21053 ppm and 3 females at 18,425 ppm on day 1. Congestion of visceral tissues was observed in all animals at 21,053 ppm and in 3 females at 18,425 ppm on day 1. Uterus distended with clear fluid were observed in 1 female at 15,523 and 18,425 ppm upon sacrifice.Study 2: A liver hernia was observed in one rat in group two exposed to 17,200 mg/m3. No other gross pathological changes were observed.;			
Duration:	Acute (less than or equal to 24 hr) 4 hours - Study 2			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5466898			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
Metric 1:	Test Substance Identity	Medium	All Outcomes: The test substances were identified as Aerothene TT, and two different samples were used in this study. The major component was 1,1,1-trichloroethane (CAS No. 71-55-6) and the other components were identified. The physical state was not specified.	
Metric 2:	Test Substance Source	High	All Outcomes: One of the test substances was supplied by the Dow Chemical Company (Lot No. TA 870402-1). The second test substance was manufactured by the Dow Chemical Company but was supplied by the 3M Corporation in Minneapolis, MN (Lot No. TA 8611112). "The identity of the 1,1,1-trichloroethane was verified by GC/MS and IR".	
Metric 3:	Test Substance Purity	Medium	All Outcomes: Two different samples were used in this study. The major component was 1,1,1-trichloroethane (CAS No. 71-55-6) at 94.54% and 94.53%, and the other components were dimethoxymethane at 2.54% and 2.64%, tert-butyl alcohol at 2.10% and 1.98%, and butylene oxide at 0.77% and 0.74%, respectively.	
Domain 2: Test Design				
Metric 4:	Negative and Vehicle Controls	N/A	All Outcomes: Negative controls are not required for acute toxicity tests.	
Metric 5:	Positive Controls	N/A	All Outcomes: Positive controls are not required for acute toxicity tests.	
Metric 6:	Randomized Allocation of Animals	Medium	All Outcomes: Study 2 reported animals were randomized by weight into groups of 5 using a computer randomization program.	
Domain 3: Exposure Characterization				
Metric 7:	Preparation and Storage of Test Substance	Low	All Outcomes: Preparation of the test substance as an aerosol and vapor were described. Storage of the test substance was not described; the test substance is volatile (vapor pressure 100 mm Hg at 20 deg. C).	
Metric 8:	Consistency of Exposure Administration	Low	All Outcomes: The exposure methods were different for each of the 8 exposures. Particle size characteristics were not provided to compare.	
Metric 9:	Reporting of Doses/Concentrations	Medium	All Outcomes: Target, TWA, and nominal concentrations were provided. Standard deviations/errors were not provided. The analytical method to measure the test substance was reported and appropriate. Particle size distribution data were not reported.	
Metric 10:	Exposure Frequency and Duration	High	All Outcomes: A single, 4-hour exposure was used in Study 2; this is appropriate for acute inhalation studies.	

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Study Citation: Dow Chemical, (1988). Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688.				
Health Outcome(s): Hepatic/Liver; Gross pathology (Gross pathology);				
Reported Health Effect(s): Hepatic/Liver: Study 2: A liver hernia was observed in one rat in group two exposed to 17,200 mg/m3.; Gross pathology (Gross pathology): Study 1: Upon gross pathological examinations, clear fluid around the external nares, classified as facial soiling, was observed in 4 males at 21053 ppm and 3 females at 18,425 ppm on day 1. Congestion of visceral tissues was observed in all animals at 21,053 ppm and in 3 females at 18,425 ppm on day 1. Uterus distended with clear fluid were observed in 1 female at 15,523 and 18,425 ppm upon sacrifice. Study 2: A liver hernia was observed in one rat in group two exposed to 17,200 mg/m3. No other gross pathological changes were observed.;				
Duration: Acute (less than or equal to 24 hr) 4 hours - Study 2				
Chemical: 1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane				
HERO ID: 5466898				
Domain	Metric		Rating	Comments
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Low	Hepatic/Liver: The exposure concentrations/conditions were selected to attempt to replicate the findings of a previous BRRC study. It is not clear if the range of concentrations/exposure scenarios were sufficient to cover a full range of responses for gross pathology of the liver.; Gross pathology (Gross pathology): The exposure concentrations/conditions were selected to attempt to replicate the findings of a previous BRRC study. It is not clear if the range of concentrations/exposure scenarios were sufficient to cover a full range of responses for gross pathology.
	Metric 12:	Exposure Route and Method	Medium	All Outcomes: The number of air changes per hour were not specified, but Study 2 used dynamic airflow conditions. Inhalation is an appropriate exposure route to examine acute toxicity, and methods of exposure were described.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	High	All Outcomes: Male Fischer 344 rats (5/group), 7 weeks old, and male Sprague-Dawley rats (5/group), 5 weeks old, were used in these studies. Animals were purchased from Charles River Breeding Laboratories, Inc. in Kingston, NY and Portage, MI, respectively. Animals were exposed at least 1 week following arrival, and exposure dates for each group were provided. Bodyweights for each animal were provided on test day 1.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	High	All Outcomes: Mean temperature, relative humidity, and mean chamber airflow were provided for each concentration/exposure group. Animals were provided with food and water ad libitum except during the exposure period. Animals were maintained on a 12-hour light/dark cycle.
	Metric 15:	Number of Animals per Group	Low	All Outcomes: 5 males/concentration were used in Study 2. The reason for using males instead of females or both sexes in the study was not reported. Test guidelines recommend using both sexes (5/sex) unless one sex is known to be more susceptible.
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	High	Hepatic/Liver: Complete gross pathological examinations were performed on all animals, with one incidence of a hernia in the liver. This is appropriate in an acute toxicity test.; Gross pathology (Gross pathology): Complete gross pathological examinations were performed on all animals. This is appropriate in an acute toxicity test.
	Metric 17:	Consistency of Outcome Assessment	Medium	Hepatic/Liver: Gross pathology findings for each animal were provided in the appendix and were performed on days 15-16. One incidence of a liver hernia was reported.; Gross pathology (Gross pathology): Gross pathology findings for each animal were provided in the appendix and were performed on days 15-16.
	Metric 18:	Sampling Adequacy	High	All Outcomes: All 5 animals in each test group were examined for gross pathology.
	Metric 19:	Blinding of Assessors	N/A	All Outcomes: Blinding of assessors is not required for assessment of gross pathology.

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Study Citation:	Dow Chemical, (1988). Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688.
Health Outcome(s):	Hepatic/Liver; Gross pathology (Gross pathology);
Reported Health Effect(s):	Hepatic/Liver: Study 2: A liver hernia was observed in one rat in group two exposed to 17,200 mg/m3.; Gross pathology (Gross pathology): Study 1: Upon gross pathological examinations, clear fluid around the external nares, classified as facial soiling, was observed in 4 males at 21053 ppm and 3 females at 18,425 ppm on day 1. Congestion of visceral tissues was observed in all animals at 21,053 ppm and in 3 females at 18,425 ppm on day 1. Uterus distended with clear fluid were observed in 1 female at 15,523 and 18,425 ppm upon sacrifice. Study 2: A liver hernia was observed in one rat in group two exposed to 17,200 mg/m3. No other gross pathological changes were observed.;
Duration:	Acute (less than or equal to 24 hr) 4 hours - Study 2
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	5466898

Domain	Metric	Rating	Comments
	Metric 20: Negative Control Response	N/A	All Outcomes: Negative controls are not required for acute toxicity tests.
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	All Outcomes: Although the study did not report all information to determine confounding, reported information did not identify differences among study groups. Respiratory rate was not measured in an inhalation study.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	All Outcomes: There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure that could influence the outcome assessment.
	Metric 23: Data Presentation and Analysis	N/A	All Outcomes: Statistical analysis is not required for the assessment of gross pathology in an acute toxicity test.
	Metric 24: Reporting of Data	High	Hepatic/Liver: Gross pathology results were provided in the appendix, including one incidence of a liver hernia.; Gross pathology (Gross pathology): Gross pathology results were provided in the appendix.

Additional Comments: Study 2: OTS0509711-6, 89-880000192, 8EHQ-0688-0535 "An acute inhalation study of aerosolized 1,1,1-trichloroethane in rats with cover letter dated 061688"

Overall Quality Determination**Medium**

Study Citation:	Dow Chemical, (1988). Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688.			
Health Outcome(s):	Nutritional/Metabolic			
Reported Health Effect(s):	Nutritional/Metabolic: Study 1 and 2: decreased following exposures, but greater than starting bodyweights by the end of the observation period			
Duration:	Acute (less than or equal to 24 hr) 4 hours - Study 2			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5466898			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
Metric 1:	Test Substance Identity	Medium	The test substances were identified as Aerothene TT, and two different samples were used in this study. The major component was 1,1,1-trichloroethane (CAS No. 71-55-6) and the other components were identified. The physical state was not specified.	
Metric 2:	Test Substance Source	High	One of the test substances was supplied by the Dow Chemical Company (Lot No. TA 870402-1). The second test substance was manufactured by the Dow Chemical Company but was supplied by the 3M Corporation in Minneapolis, MN (Lot No. TA 8611112). "The identity of the 1,1,1-trichloroethane was verified by GC/MS and IR".	
Metric 3:	Test Substance Purity	Medium	Two different samples were used in this study. The major component was 1,1,1-trichloroethane (CAS No. 71-55-6) at 94.54% and 94.53%, and the other components were dimethoxymethane at 2.54% and 2.64%, tert-butyl alcohol at 2.10% and 1.98%, and butylene oxide at 0.77% and 0.74%, respectively.	
Domain 2: Test Design				
Metric 4:	Negative and Vehicle Controls	N/A	Negative controls are not required for acute toxicity tests.	
Metric 5:	Positive Controls	N/A	Positive controls are not required for acute toxicity tests.	
Metric 6:	Randomized Allocation of Animals	Medium	Study 2 reported animals were randomized by weight into groups of 5 using a computer randomization program.	
Domain 3: Exposure Characterization				
Metric 7:	Preparation and Storage of Test Substance	Low	Preparation of the test substance as an aerosol and vapor were described. Storage of the test substance was not described; the test substance is volatile (vapor pressure 100 mm Hg at 20 deg. C).	
Metric 8:	Consistency of Exposure Administration	Low	The exposure methods were different for each of the 8 exposures. Particle size characteristics were not provided to compare.	
Metric 9:	Reporting of Doses/Concentrations	Medium	Target, TWA, and nominal concentrations were provided. Standard deviations/errors were not provided. The analytical method to measure the test substance was reported and appropriate. Particle size distribution data were not reported.	
Metric 10:	Exposure Frequency and Duration	High	A single, 4-hour exposure was used in Study 2; this is appropriate for acute inhalation studies.	
Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Medium	The exposure concentrations/conditions were selected to attempt to replicate the findings of a previous BRRC study. It is not clear if the range of concentrations/exposure scenarios were sufficient to cover a full range of responses.	
Metric 12:	Exposure Route and Method	Medium	The number of air changes per hour were not specified, but Study 2 used dynamic air-flow conditions. Inhalation is an appropriate exposure route to examine acute toxicity, and methods of exposure were described.	
Domain 4: Test Animals				
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Study Citation:	Dow Chemical, (1988). Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688.			
Health Outcome(s):	Nutritional/Metabolic			
Reported Health Effect(s):	Nutritional/Metabolic: Study 1 and 2: decreased following exposures, but greater than starting bodyweights by the end of the observation period			
Duration:	Acute (less than or equal to 24 hr) 4 hours - Study 2			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5466898			
Domain	Metric	Rating	Comments	
	Metric 13: Test Animal Characteristics	High	Male Fischer 344 rats (5/group),7 weeks old, and male Sprague-Dawley rats (5/group), 5 weeks old, were used in these studies. Animals were purchased from Charles River Breeding Laboratories, Inc. in Kingston, NY and Portage, MI, respectively. Animals were exposed at least 1 week following arrival, and exposure dates for each group were provided. Bodyweights for each animal were provided on test day 1.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	High	Mean temperature, relative humidity, and mean chamber airflow were provided for each concentration/exposure group. Animals were provided with food and water ad libitum except during the exposure period. Animals were maintained on a 12-hour light/dark cycle.	
	Metric 15: Number of Animals per Group	Low	5 males/concentration were used in Study 2. The reason for using males instead of females or both sexes in the study was not reported. Test guidelines recommend using both sexes (5/sex) unless one sex is known to be more susceptible.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	High	Animals were weighed prior to the exposures and on days 2, 4, 8, 11, and 15. This is appropriate in an acute toxicity test.	
	Metric 17: Consistency of Outcome Assessment	High	Bodyweights were provided for each animal, at each time point, in each exposure group.	
	Metric 18: Sampling Adequacy	High	All 5 animals in each exposure group were evaluated for bodyweights. Results were provided in the Table 4.	
	Metric 19: Blinding of Assessors	N/A	Blinding of assessors is not required for assessment of bodyweight.	
	Metric 20: Negative Control Response	N/A	Negative controls are not required for acute toxicity tests.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	Although the study did not report all information to determine confounding, reported information did not identify differences among study groups. Respiratory rate was not measured in an inhalation study.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure that could influence the outcome assessment.	
	Metric 23: Data Presentation and Analysis	High	Means and standard deviations for bodyweights were calculated, but statistical analyses were not conducted. However, individual bodyweights were provided to conduct an independent analysis.	
	Metric 24: Reporting of Data	Medium	Bodyweights were provided in Table 4 for each animal at each time point in each exposure group.	
Additional Comments:	Study 2: OTS0509711-6, 89-880000192, 8EHQ-0688-0535 "An acute inhalation study of aerosolized 1,1,1-trichloroethane in rats with cover letter dated 061688"			
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Study Citation:	Dow Chemical, (1988). Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688.
Health Outcome(s):	Nutritional/Metabolic
Reported Health Effect(s):	Nutritional/Metabolic: Study 1 and 2: decreased following exposures, but greater than starting bodyweights by the end of the observation period
Duration:	Acute (less than or equal to 24 hr) 4 hours - Study 2
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	5466898

Domain	Metric	Rating	Comments
Overall Quality Determination		Medium	

Study Citation:	Dow Chemical, (1988). Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: Study 1: All animals died during the exposure to 21,053 ppm and 3/5 females died during the exposure to 18,425 ppm. No other mortality occurred. The LC50 for males was between 18,425 ppm and 21,053 ppm and for females was 18,000 ppm (95% CI 16,600-19,400 ppm; equivalent to approximately 99,223 mg/m3 based on a MW of 133.4). Study 2: no deaths			
Duration:	Acute (less than or equal to 24 hr) 4 hours - Study 2			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5466898			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
Metric 1:	Test Substance Identity	Medium	The test substances were identified as Aerothene TT, and two different samples were used in this study. The major component was 1,1,1-trichloroethane (CAS No. 71-55-6) and the other components were identified. The physical state was not specified.	
Metric 2:	Test Substance Source	High	One of the test substances was supplied by the Dow Chemical Company (Lot No. TA 870402-1). The second test substance was manufactured by the Dow Chemical Company but was supplied by the 3M Corporation in Minneapolis, MN (Lot No. TA 8611112). "The identity of the 1,1,1-trichloroethane was verified by GC/MS and IR".	
Metric 3:	Test Substance Purity	Medium	Two different samples were used in this study. The major component was 1,1,1-trichloroethane (CAS No. 71-55-6) at 94.54% and 94.53%, and the other components were dimethoxymethane at 2.54% and 2.64%, tert-butyl alcohol at 2.10% and 1.98%, and butylene oxide at 0.77% and 0.74%, respectively.	
Domain 2: Test Design				
Metric 4:	Negative and Vehicle Controls	N/A	Negative controls are not required for acute toxicity tests.	
Metric 5:	Positive Controls	N/A	Positive controls are not required for acute toxicity tests.	
Metric 6:	Randomized Allocation of Animals	Medium	Study 2 reported animals were randomized by weight into groups of 5 using a computer randomization program.	
Domain 3: Exposure Characterization				
Metric 7:	Preparation and Storage of Test Substance	Low	Preparation of the test substance as an aerosol and vapor were described. Storage of the test substance was not described; the test substance is volatile (vapor pressure 100 mm Hg at 20 deg. C).	
Metric 8:	Consistency of Exposure Administration	Low	The exposure methods were different for each of the 8 exposures. Particle size characteristics were not provided to compare.	
Metric 9:	Reporting of Doses/Concentrations	Medium	Target, TWA, and nominal concentrations were provided. Standard deviations/errors were not provided. The analytical method to measure the test substance was reported and appropriate. Particle size distribution data were not reported.	
Metric 10:	Exposure Frequency and Duration	High	A single, 4-hour exposure was used in Study 2; this is appropriate for acute inhalation studies.	
Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Medium	The exposure concentrations/conditions were selected to attempt to replicate the findings of a previous BRRC study. No mortality was observed.	
Metric 12:	Exposure Route and Method	Medium	The number of air changes per hour were not specified, but Study 2 used dynamic air-flow conditions. Inhalation is an appropriate exposure route to examine acute toxicity, and methods of exposure were described.	
Domain 4: Test Animals				
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Study Citation:	Dow Chemical, (1988). Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: Study 1: All animals died during the exposure to 21,053 ppm and 3/5 females died during the exposure to 18,425 ppm. No other mortality occurred. The LC50 for males was between 18,425 ppm and 21,053 ppm and for females was 18,000 ppm (95% CI 16,600-19,400 ppm; equivalent to approximately 99,223 mg/m3 based on a MW of 133.4). Study 2: no deaths			
Duration:	Acute (less than or equal to 24 hr) 4 hours - Study 2			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5466898			
Domain		Metric	Rating	Comments
	Metric 13:	Test Animal Characteristics	High	Male Fischer 344 rats (5/group),7 weeks old, and male Sprague-Dawley rats (5/group), 5 weeks old, were used in these studies. Animals were purchased from Charles River Breeding Laboratories, Inc. in Kingston, NY and Portage, MI, respectively. Animals were exposed at least 1 week following arrival, and exposure dates for each group were provided. Bodyweights for each animal were provided on test day 1.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	High	Mean temperature, relative humidity, and mean chamber airflow were provided for each concentration/exposure group. Animals were provided with food and water ad libitum except during the exposure period. Animals were maintained on a 12-hour light/dark cycle.
	Metric 15:	Number of Animals per Group	Low	5 males/concentration were used in Study 2. The reason for using males instead of females or both sexes in the study was not reported. Test guidelines recommend using both sexes (5/sex) unless one sex is known to be more susceptible.
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	High	Animals were observed for mortality during the exposure and daily for 2 weeks following the exposures; this is appropriate in an acute toxicity test.
	Metric 17:	Consistency of Outcome Assessment	High	Although mortality was not tabulated separately, the mode of death was provided on the gross pathology reported for each animal in each exposure group (all were sacrificed).
	Metric 18:	Sampling Adequacy	High	All 5 animals in each exposure group were evaluated for mortality. Results were provided in the text and in the gross pathology results.
	Metric 19:	Blinding of Assessors	N/A	Blinding of assessors is not required for assessment of mortality.
	Metric 20:	Negative Control Response	N/A	Negative controls are not required for acute toxicity tests.
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Medium	Although the study did not report all information to determine confounding, reported information did not identify differences among study groups. Respiratory rate was not measured in an inhalation study.
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure that could influence the outcome assessment.
	Metric 23:	Data Presentation and Analysis	N/A	No mortality occurred; statistical analysis was not required.
	Metric 24:	Reporting of Data	Medium	The test indicated no mortality was observed and gross pathology reports indicate animals were sacrificed, although do not indicate the date of sacrifice, only the date of necropsy.
Additional Comments:	Study 2: OTS0509711-6, 89-880000192, 8EHQ-0688-0535 "An acute inhalation study of aerosolized 1,1,1-trichloroethane in rats with cover letter dated 061688"			

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Study Citation:	Dow Chemical, (1988). Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688.
Health Outcome(s):	Mortality
Reported Health Effect(s):	Mortality: Study 1: All animals died during the exposure to 21,053 ppm and 3/5 females died during the exposure to 18,425 ppm. No other mortality occurred. The LC50 for males was between 18,425 ppm and 21,053 ppm and for females was 18,000 ppm (95% CI 16,600-19,400 ppm; equivalent to approximately 99,223 mg/m3 based on a MW of 133.4). Study 2: no deaths
Duration:	Acute (less than or equal to 24 hr) 4 hours - Study 2
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	5466898

Domain	Metric	Rating	Comments

Overall Quality Determination

Medium

Study Citation:	Dow Chemical, (1988). Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: Study 1: All animals died during the exposure to 21,053 ppm and 3/5 females died during the exposure to 18,425 ppm. No other mortality occurred. The LC50 for males was between 18,425 ppm and 21,053 ppm and for females was 18,000 ppm (95% CI 16,600-19,400 ppm; equivalent to approximately 99,223 mg/m3 based on a MW of 133.4). Study 2: no deaths			
Duration:	Acute (less than or equal to 24 hr) 4 hours - Study 1			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5466898			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
Metric 1:	Test Substance Identity	Medium	The test substance was identified as Aerothene TT; the major component was 1,1,1-trichloroethane and the other components were noted as "components of the inhibitor system" but were not further classified. The physical state was liquid.	
Metric 2:	Test Substance Source	High	The test substance was supplied by Dow Chemical U.S.A. in Freeport, TX (Lot No. TA 870402-1). "The composition of the test material was determined by GC, GC/MS and IR".	
Metric 3:	Test Substance Purity	Medium	The major component was 1,1,1-trichloroethane at 94.5%. The other 5.5% were noted as "components of the inhibitor system" but were not further classified.	
Domain 2: Test Design				
Metric 4:	Negative and Vehicle Controls	N/A	Negative controls are not required for acute toxicity tests.	
Metric 5:	Positive Controls	N/A	Positive controls are not required for acute toxicity tests.	
Metric 6:	Randomized Allocation of Animals	Medium	Study 1 reported animals were randomized by weight into groups of 5 using a computer randomization program.	
Domain 3: Exposure Characterization				
Metric 7:	Preparation and Storage of Test Substance	Low	Preparation of the test substance as a vapor was described, and methods were cited to Miller et al. 1980. Storage of the test substance was not described; the test substance is volatile (vapor pressure 100 mm Hg at 20 deg. C).	
Metric 8:	Consistency of Exposure Administration	Medium	157 L glass and stainless steel Rochester-type whole-body inhalation chambers (1 animal/chamber) were used for the exposures. Particle size characteristics were not provided to compare among groups.	
Metric 9:	Reporting of Doses/Concentrations	Medium	Target, analytical, and nominal concentrations were provided. Standard deviations/errors were not provided. The analytical method to measure the test substance was reported and appropriate. Particle size distribution data were not reported.	
Metric 10:	Exposure Frequency and Duration	High	A single, 4-hour exposure was used in Study 1; this is appropriate for acute inhalation studies.	
Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	High	Justification for selection of the exposure groups and spacing were not provided. Although, all animals died at the highest concentration tested and no deaths occurred at the lowest.	
Metric 12:	Exposure Route and Method	High	The number of air changes per hour were not specified, but Study 1 used dynamic air-flow conditions. Inhalation is an appropriate exposure route to examine acute toxicity, and methods of exposure were described.	
Domain 4: Test Animals				
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Study Citation:	Dow Chemical, (1988). Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: Study 1: All animals died during the exposure to 21,053 ppm and 3/5 females died during the exposure to 18,425 ppm. No other mortality occurred. The LC50 for males was between 18,425 ppm and 21,053 ppm and for females was 18,000 ppm (95% CI 16,600-19,400 ppm; equivalent to approximately 99,223 mg/m3 based on a MW of 133.4). Study 2: no deaths			
Duration:	Acute (less than or equal to 24 hr) 4 hours - Study 1			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5466898			
Domain	Metric	Rating	Comments	
	Metric 13: Test Animal Characteristics	High	Fischer 344 rats (5/sex/group), 12 weeks old during exposure and 7 weeks old upon purchase, were used in this study. Animals were purchased from Charles River Breeding Laboratory in Kingston, NY. Bodyweights for each animal were provided on test day 1.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Medium	Mean temperature, relative humidity, and mean chamber airflow were provided for each concentration group. Animals were provided with food and water ad libitum except during the exposure period. Light/dark cycles were not described.	
	Metric 15: Number of Animals per Group	Medium	5 animals/sex/concentration were used; this is appropriate for an acute inhalation toxicity test.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	High	Animals were observed for mortality during the exposure and daily for 2 weeks following the exposures; this is appropriate in an acute toxicity test.	
	Metric 17: Consistency of Outcome Assessment	High	Table 6 reports the assessment of mortality in each group in each sex. Time of death was reported in Table 2.	
	Metric 18: Sampling Adequacy	High	5 animals/sex were evaluated at each concentration and results were provided in Table 6 for Study 1.	
	Metric 19: Blinding of Assessors	N/A	Blinding of assessors is not required for assessment of mortality.	
	Metric 20: Negative Control Response	N/A	Negative controls are not required for acute toxicity tests.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	Although the study did not report all information to determine confounding, reported information did not identify differences among study groups. Respiration rates were not provided, but effects to respiration were reported (labored breathing, etc.).	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure that could influence the outcome assessment.	
	Metric 23: Data Presentation and Analysis	High	"The LC50 was determined by the moving average method (Thompson and Weil, 1952)". Additionally, the number of deaths per sex in each group were reported.	
	Metric 24: Reporting of Data	High	Mortality for each concentration in each sex were reported in Table 6 and time of death was reported in Table 2. No death was observed at the lowest concentration.	
Additional Comments:	Study 1: OTS0509711-6, 89-880000176, 8EHQ-0588-0535 "Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688"			

Overall Quality Determination**High**

Study Citation:	Dow Chemical, (1988). Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688.			
Health Outcome(s):	Ocular/Sensory			
Reported Health Effect(s):	Ocular/Sensory: Study 1 and 2: no changes in eyes upon examination			
Duration:	Acute (less than or equal to 24 hr) 4 hours - Study 1			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5466898			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
Metric 1:	Test Substance Identity	Medium	The test substance was identified as Aerothene TT; the major component was 1,1,1-trichloroethane and the other components were noted as "components of the inhibitor system" but were not further classified. The physical state was liquid.	
Metric 2:	Test Substance Source	High	The test substance was supplied by Dow Chemical U.S.A. in Freeport, TX (Lot No. TA 870402-1). "The composition of the test material was determined by GC, GC/MS and IR".	
Metric 3:	Test Substance Purity	Medium	The major component was 1,1,1-trichloroethane at 94.5%. The other 5.5% were noted as "components of the inhibitor system" but were not further classified.	
Domain 2: Test Design				
Metric 4:	Negative and Vehicle Controls	N/A	Negative controls are not required for acute toxicity tests.	
Metric 5:	Positive Controls	N/A	Positive controls are not required for acute toxicity tests.	
Metric 6:	Randomized Allocation of Animals	Medium	Study 1 reported animals were randomized by weight into groups of 5 using a computer randomization program.	
Domain 3: Exposure Characterization				
Metric 7:	Preparation and Storage of Test Substance	Low	Preparation of the test substance as a vapor was described, and methods were cited to Miller et al. 1980. Storage of the test substance was not described; the test substance is volatile (vapor pressure 100 mm Hg at 20 deg. C).	
Metric 8:	Consistency of Exposure Administration	Medium	157 L glass and stainless steel Rochester-type whole-body inhalation chambers (1 animal/chamber) were used for the exposures. Particle size characteristics were not provided to compare among groups.	
Metric 9:	Reporting of Doses/Concentrations	Medium	Target, analytical, and nominal concentrations were provided. Standard deviations/errors were not provided. The analytical method to measure the test substance was reported and appropriate. Particle size distribution data were not reported.	
Metric 10:	Exposure Frequency and Duration	High	A single, 4-hour exposure was used in Study 1; this is appropriate for acute inhalation studies.	
Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Low	Justification for selection of the exposure groups and spacing were not provided. It was unclear if the range of doses tested were sufficient to cover the full range of responses for eye evaluations.	
Metric 12:	Exposure Route and Method	High	The number of air changes per hour were not specified, but Study 1 used dynamic air-flow conditions. Inhalation is an appropriate exposure route to examine acute toxicity, and methods of exposure were described.	
Domain 4: Test Animals				
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Study Citation:	Dow Chemical, (1988). Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688.			
Health Outcome(s):	Ocular/Sensory			
Reported Health Effect(s):	Ocular/Sensory: Study 1 and 2: no changes in eyes upon examination			
Duration:	Acute (less than or equal to 24 hr) 4 hours - Study 1			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5466898			
Domain	Metric	Rating	Comments	
	Metric 13:	Test Animal Characteristics	High	Fischer 344 rats (5/sex/group), 12 weeks old during exposure and 7 weeks old upon purchase, were used in this study. Animals were purchased from Charles River Breeding Laboratory in Kingston, NY. Bodyweights for each animal were provided on test day 1.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Medium	Mean temperature, relative humidity, and mean chamber airflow were provided for each concentration group. Animals were provided with food and water ad libitum except during the exposure period. Light/dark cycles were not described.
	Metric 15:	Number of Animals per Group	Medium	5 animals/sex/concentration were used; this is appropriate for an acute inhalation toxicity test.
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	High	Animals were examined for evaluations of the eyes during the exposure and daily for two weeks following the exposure period. Detailed eye examinations for animals that survived were also performed as part of the gross pathologic examinations. This is appropriate in an acute toxicity test.
	Metric 17:	Consistency of Outcome Assessment	Low	Table 2 reports the clinical signs of toxicity that were observed at each time point, but results for the eye evaluations were not provided in the text or table (only positive observations were recorded in the table). Results for the eye examinations were not provided.
	Metric 18:	Sampling Adequacy	Medium	5 animals/sex were evaluated for clinical signs of toxicity at each concentration, but evaluations for eyes were not provided. Detailed eye examinations were performed on surviving animals only.
	Metric 19:	Blinding of Assessors	N/A	Blinding of assessors is not required for assessment of clinical signs of toxicity or gross pathology.
	Metric 20:	Negative Control Response	N/A	Negative controls are not required for acute toxicity tests.
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Medium	Although the study did not report all information to determine confounding, reported information did not identify differences among study groups. Respiration rates were not provided, but effects to respiration were reported (labored breathing, etc.).
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure that could influence the outcome assessment.
	Metric 23:	Data Presentation and Analysis	N/A	Statistical analyses are not required for the assessment of clinical signs of toxicity or gross pathology in an acute toxicity test.
	Metric 24:	Reporting of Data	Low	Results for clinical signs of toxicity were provided in Table 2, but results for the eye evaluations were not provided (only positive observations were recorded). Results for gross pathological examinations were provided in the appendix, but results for eye evaluations were not individually reported.

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Study Citation:	Dow Chemical, (1988). Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688.
Health Outcome(s):	Ocular/Sensory
Reported Health Effect(s):	Ocular/Sensory: Study 1 and 2: no changes in eyes upon examination
Duration:	Acute (less than or equal to 24 hr) 4 hours - Study 1
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	5466898

Domain	Metric	Rating	Comments
Additional Comments:	Study 1: OTS0509711-6, 89-880000176, 8EHQ-0588-0535 "Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688"		

Overall Quality Determination

Medium

Study Citation:	Dow Chemical, (1988). Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688.			
Health Outcome(s):	Gross pathology (Gross pathology); Reproductive/Developmental;			
Reported Health Effect(s):	Gross pathology (Gross pathology): Study 1: Upon gross pathological examinations, clear fluid around the external nares, classified as facial soiling, was observed in 4 males at 21053 ppm and 3 females at 18,425 ppm on day 1. Congestion of visceral tissues was observed in all animals at 21,053 ppm and in 3 females at 18,425 ppm on day 1. Uterus distended with clear fluid were observed in 1 female at 15,523 and 18,425 ppm upon sacrifice.Study 2: A liver hernia was observed in one rat in group two exposed to 17,200 mg/m3. No other gross pathological changes were observed.; Reproductive/Developmental: Study 1: Uterus distended with clear fluid were observed in 1 female at 15,523 and 18,425 ppm upon sacrifice.;			
Duration:	Acute (less than or equal to 24 hr) 4 hours - Study 1			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5466898			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	Medium	All Outcomes: The test substance was identified as Aerothene TT; the major component was 1,1,1-trichloroethane and the other components were noted as "components of the inhibitor system" but were not further classified. The physical state was liquid.	
	Metric 2: Test Substance Source	High	All Outcomes: The test substance was supplied by Dow Chemical U.S.A. in Freeport, TX (Lot No. TA 870402-1). "The composition of the test material was determined by GC, GC/MS and IR".	
	Metric 3: Test Substance Purity	Medium	All Outcomes: The major component was 1,1,1-trichloroethane at 94.5%. The other 5.5% were noted as "components of the inhibitor system" but were not further classified.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	N/A	All Outcomes: Negative controls are not required for acute toxicity tests.	
	Metric 5: Positive Controls	N/A	All Outcomes: Positive controls are not required for acute toxicity tests.	
	Metric 6: Randomized Allocation of Animals	Medium	All Outcomes: Study 1 reported animals were randomized by weight into groups of 5 using a computer randomization program.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	All Outcomes: Preparation of the test substance as a vapor was described, and methods were cited to Miller et al. 1980. Storage of the test substance was not described; the test substance is volatile (vapor pressure 100 mm Hg at 20 deg. C).	
	Metric 8: Consistency of Exposure Administration	Medium	All Outcomes: 157 L glass and stainless steel Rochester-type whole-body inhalation chambers (1 animal/chamber) were used for the exposures. Particle size characteristics were not provided to compare among groups.	
	Metric 9: Reporting of Doses/Concentrations	Medium	All Outcomes: Target, analytical, and nominal concentrations were provided. Standard deviations/errors were not provided. The analytical method to measure the test substance was reported and appropriate. Particle size distribution data were not reported.	
	Metric 10: Exposure Frequency and Duration	High	All Outcomes: A single, 4-hour exposure was used in Study 1; this is appropriate for acute inhalation studies.	
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Study Citation:	Dow Chemical, (1988). Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688.			
Health Outcome(s):	Gross pathology (Gross pathology); Reproductive/Developmental;			
Reported Health Effect(s):	Gross pathology (Gross pathology): Study 1: Upon gross pathological examinations, clear fluid around the external nares, classified as facial soiling, was observed in 4 males at 21053 ppm and 3 females at 18,425 ppm on day 1. Congestion of visceral tissues was observed in all animals at 21,053 ppm and in 3 females at 18,425 ppm on day 1. Uterus distended with clear fluid were observed in 1 female at 15,523 and 18,425 ppm upon sacrifice.Study 2: A liver hernia was observed in one rat in group two exposed to 17,200 mg/m3. No other gross pathological changes were observed.; Reproductive/Developmental: Study 1: Uterus distended with clear fluid were observed in 1 female at 15,523 and 18,425 ppm upon sacrifice.;			
Duration:	Acute (less than or equal to 24 hr) 4 hours - Study 1			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5466898			
Domain	Metric	Rating	Comments	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Low	Gross pathology (Gross pathology): Justification for selection of the exposure groups and spacing were not provided. It was unclear if the range of doses tested were sufficient to cover the full range of responses for gross pathological alterations, although congestion of visceral organs was observed in animals that died at the mid- and high-concentrations.; Reproductive/Developmental: Justification for selection of the exposure groups and spacing were not provided. It was unclear if the range of doses tested were sufficient to cover the full range of responses for gross pathological alterations in the uterus.	
	Metric 12: Exposure Route and Method	High	All Outcomes: The number of air changes per hour were not specified, but Study 1 used dynamic airflow conditions. Inhalation is an appropriate exposure route to examine acute toxicity, and methods of exposure were described.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	High	All Outcomes: Fischer 344 rats (5/sex/group), 12 weeks old during exposure and 7 weeks old upon purchase, were used in this study. Animals were purchased from Charles River Breeding Laboratory in Kingston, NY. Bodyweights for each animal were provided on test day 1.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Medium	All Outcomes: Mean temperature, relative humidity, and mean chamber airflow were provided for each concentration group. Animals were provided with food and water ad libitum except during the exposure period. Light/dark cycles were not described.	
	Metric 15: Number of Animals per Group	Medium	All Outcomes: 5 animals/sex/concentration were used; this is appropriate for an acute inhalation toxicity test.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	High	All Outcomes: Complete gross pathologic examinations were performed on all animals upon sacrifice. This is appropriate in an acute toxicity test.	
	Metric 17: Consistency of Outcome Assessment	Medium	All Outcomes: Gross pathology results were provided in Table 4 and the appendix; results for each animal at each test concentration were provided. Surviving animals were examined on test days 14-16.	
	Metric 18: Sampling Adequacy	High	All Outcomes: 5 animals/sex were evaluated for gross pathology at each concentration.	
	Metric 19: Blinding of Assessors	N/A	All Outcomes: Blinding of assessors is not required for assessment of gross pathology.	
	Metric 20: Negative Control Response	N/A	All Outcomes: Negative controls are not required for acute toxicity tests.	
Domain 6: Confounding / Variable Control				
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Study Citation:	Dow Chemical, (1988). Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688.			
Health Outcome(s):	Gross pathology (Gross pathology); Reproductive/Developmental;			
Reported Health Effect(s):	Gross pathology (Gross pathology): Study 1: Upon gross pathological examinations, clear fluid around the external nares, classified as facial soiling, was observed in 4 males at 21053 ppm and 3 females at 18,425 ppm on day 1. Congestion of visceral tissues was observed in all animals at 21,053 ppm and in 3 females at 18,425 ppm on day 1. Uterus distended with clear fluid were observed in 1 female at 15,523 and 18,425 ppm upon sacrifice.Study 2: A liver hernia was observed in one rat in group two exposed to 17,200 mg/m3. No other gross pathological changes were observed.; Reproductive/Developmental: Study 1: Uterus distended with clear fluid were observed in 1 female at 15,523 and 18,425 ppm upon sacrifice.;			
Duration:	Acute (less than or equal to 24 hr) 4 hours - Study 1			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5466898			
Domain	Metric	Rating	Comments	
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	All Outcomes: Although the study did not report all information to determine confounding, reported information did not identify differences among study groups. Respiration rates were not provided, but effects to respiration were reported (labored breathing, etc.).	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	All Outcomes: There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure that could influence the outcome assessment.	
	Metric 23: Data Presentation and Analysis	N/A	All Outcomes: Statistical analyses are not required for the assessment of gross pathology in an acute toxicity test.	
	Metric 24: Reporting of Data	High	Gross pathology (Gross pathology): Results for gross pathological examinations were provided in Table 4 and the appendix.; Reproductive/Developmental: Results for gross pathological examinations were provided in Table 4 and the appendix. Uterus distended with clear fluid were observed in 1 female at 15,523 and 18,425 ppm upon sacrifice.	
Additional Comments:	Study 1: OTS0509711-6, 89-880000176, 8EHQ-0588-0535 ”Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688”			

Overall Quality Determination**High**

Study Citation:	Dow Chemical, (1988). Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688.			
Health Outcome(s):	Neurological/Behavioral			
Reported Health Effect(s):	Neurological/Behavioral: Study 1: During the exposure period, incoordination, lethargy, and unresponsiveness to noise were observed in both sexes at all test concentrations. Convulsions were observed in 1 male during the exposure period and lacrimation was observed in both sexes at 15,523 ppm; animals appeared normal by day 1 and throughout the remainder of the observation period. Listlessness was observed in 5 males and 2 females on day 1 at 18,425 ppm; surviving animals appeared normal by day 2 and then throughout the remainder of the observation period. Study 2: Hypoactivity was observed during the exposure period and a decreased responsiveness to noise was observed towards the end of the exposure period. Uncoordinated gait was observed during the exposure period and immediately following the exposure in animals exposed to =>34,500 mg/m3. All rats appeared normal by day 2 and for the remainder of the observation period.			
Duration:	Acute (less than or equal to 24 hr) 4 hours - Study 1			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5466898			
Domain		Metric	Rating	Comments
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Medium	The test substance was identified as Aerothene TT; the major component was 1,1,1-trichloroethane and the other components were noted as "components of the inhibitor system" but were not further classified. The physical state was liquid.
	Metric 2:	Test Substance Source	High	The test substance was supplied by Dow Chemical U.S.A. in Freeport, TX (Lot No. TA 870402-1). "The composition of the test material was determined by GC, GC/MS and IR".
	Metric 3:	Test Substance Purity	Medium	The major component was 1,1,1-trichloroethane at 94.5%. The other 5.5% were noted as "components of the inhibitor system" but were not further classified.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	N/A	Negative controls are not required for acute toxicity tests.
	Metric 5:	Positive Controls	N/A	Positive controls are not required for acute toxicity tests.
	Metric 6:	Randomized Allocation of Animals	Medium	Study 1 reported animals were randomized by weight into groups of 5 using a computer randomization program.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Low	Preparation of the test substance as a vapor was described, and methods were cited to Miller et al. 1980. Storage of the test substance was not described; the test substance is volatile (vapor pressure 100 mm Hg at 20 deg. C).
	Metric 8:	Consistency of Exposure Administration	Medium	157 L glass and stainless steel Rochester-type whole-body inhalation chambers (1 animal/chamber) were used for the exposures. Particle size characteristics were not provided to compare among groups.
	Metric 9:	Reporting of Doses/Concentrations	Medium	Target, analytical, and nominal concentrations were provided. Standard deviations/errors were not provided. The analytical method to measure the test substance was reported and appropriate. Particle size distribution data were not reported.
	Metric 10:	Exposure Frequency and Duration	High	A single, 4-hour exposure was used in Study 1; this is appropriate for acute inhalation studies.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Low	Justification for selection of the exposure groups and spacing were not provided. Behavior pattern and nervous system activity were affected at all concentrations.

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Study Citation:	Dow Chemical, (1988). Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688.			
Health Outcome(s):	Neurological/Behavioral			
Reported Health Effect(s):	Neurological/Behavioral: Study 1: During the exposure period, incoordination, lethargy, and unresponsiveness to noise were observed in both sexes at all test concentrations. Convulsions were observed in 1 male during the exposure period and lacrimation was observed in both sexes at 15,523 ppm; animals appeared normal by day 1 and throughout the remainder of the observation period. Listlessness was observed in 5 males and 2 females on day 1 at 18,425 ppm; surviving animals appeared normal by day 2 and then throughout the remainder of the observation period. Study 2: Hypoactivity was observed during the exposure period and a decreased responsiveness to noise was observed towards the end of the exposure period. Uncoordinated gait was observed during the exposure period and immediately following the exposure in animals exposed to =>34,500 mg/m3. All rats appeared normal by day 2 and for the remainder of the observation period.			
Duration:	Acute (less than or equal to 24 hr) 4 hours - Study 1			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5466898			
Domain	Metric	Rating	Comments	
	Metric 12:	Exposure Route and Method	High	The number of air changes per hour were not specified, but Study 1 used dynamic air-flow conditions. Inhalation is an appropriate exposure route to examine acute toxicity, and methods of exposure were described.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	High	Fischer 344 rats (5/sex/group), 12 weeks old during exposure and 7 weeks old upon purchase, were used in this study. Animals were purchased from Charles River Breeding Laboratory in Kingston, NY. Bodyweights for each animal were provided on test day 1.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Medium	Mean temperature, relative humidity, and mean chamber airflow were provided for each concentration group. Animals were provided with food and water ad libitum except during the exposure period. Light/dark cycles were not described.
	Metric 15:	Number of Animals per Group	Medium	5 animals/sex/concentration were used; this is appropriate for an acute inhalation toxicity test.
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	High	Animals were examined for behavior patterns and nervous system activity during the exposure and daily for two weeks following the exposure period. This is appropriate in an acute toxicity test.
	Metric 17:	Consistency of Outcome Assessment	Medium	Table 2 reports the clinical signs of toxicity that were observed at each time point (during exposure at the highest conc., until day 14 at mid-conc., and until day 12 at the low-conc.).
	Metric 18:	Sampling Adequacy	High	5 animals/sex were evaluated for clinical signs of toxicity at each concentration.
	Metric 19:	Blinding of Assessors	N/A	Blinding of assessors is not required for assessment of clinical signs of toxicity.
	Metric 20:	Negative Control Response	N/A	Negative controls are not required for acute toxicity tests.
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Medium	Although the study did not report all information to determine confounding, reported information did not identify differences among study groups. Respiration rates were not provided, but effects to respiration were reported (labored breathing, etc.).
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure that could influence the outcome assessment.
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Study Citation:	Dow Chemical, (1988). Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688.			
Health Outcome(s):	Neurological/Behavioral			
Reported Health Effect(s):	Neurological/Behavioral: Study 1: During the exposure period, incoordination, lethargy, and unresponsiveness to noise were observed in both sexes at all test concentrations. Convulsions were observed in 1 male during the exposure period and lacrimation was observed in both sexes at 15,523 ppm; animals appeared normal by day 1 and throughout the remainder of the observation period. Listlessness was observed in 5 males and 2 females on day 1 at 18,425 ppm; surviving animals appeared normal by day 2 and then throughout the remainder of the observation period. Study 2: Hypoactivity was observed during the exposure period and a decreased responsiveness to noise was observed towards the end of the exposure period. Uncoordinated gait was observed during the exposure period and immediately following the exposure in animals exposed to $\geq 34,500$ mg/m ³ . All rats appeared normal by day 2 and for the remainder of the observation period.			
Duration:	Acute (less than or equal to 24 hr) 4 hours - Study 1			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5466898			
Domain	Metric		Rating	Comments
	Metric 23:	Data Presentation and Analysis	N/A	Statistical analyses are not required for the assessment of clinical signs of toxicity in an acute toxicity test.
	Metric 24:	Reporting of Data	Medium	Results for clinical signs of toxicity were provided in Table 2 (only positive observations were recorded).
Additional Comments:	Study 1: OTS0509711-6, 89-880000176, 8EHQ-0588-0535 "Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688"			

Overall Quality Determination**Medium**

Study Citation:	Dow Chemical, (1988). Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688.			
Health Outcome(s):	Clinical signs of toxicity (Clinical signs of toxicity (fur))			
Reported Health Effect(s):	Clinical signs of toxicity (Clinical signs of toxicity (fur)): Study 1 and 2: no alterations observed for evaluations of fur			
Duration:	Acute (less than or equal to 24 hr) 4 hours - Study 1			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5466898			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
Metric 1:	Test Substance Identity	Medium	The test substance was identified as Aerothene TT; the major component was 1,1,1-trichloroethane and the other components were noted as "components of the inhibitor system" but were not further classified. The physical state was liquid.	
Metric 2:	Test Substance Source	High	The test substance was supplied by Dow Chemical U.S.A. in Freeport, TX (Lot No. TA 870402-1). "The composition of the test material was determined by GC, GC/MS and IR".	
Metric 3:	Test Substance Purity	Medium	The major component was 1,1,1-trichloroethane at 94.5%. The other 5.5% were noted as "components of the inhibitor system" but were not further classified.	
Domain 2: Test Design				
Metric 4:	Negative and Vehicle Controls	N/A	Negative controls are not required for acute toxicity tests.	
Metric 5:	Positive Controls	N/A	Positive controls are not required for acute toxicity tests.	
Metric 6:	Randomized Allocation of Animals	Medium	Study 1 reported animals were randomized by weight into groups of 5 using a computer randomization program.	
Domain 3: Exposure Characterization				
Metric 7:	Preparation and Storage of Test Substance	Low	Preparation of the test substance as a vapor was described, and methods were cited to Miller et al. 1980. Storage of the test substance was not described; the test substance is volatile (vapor pressure 100 mm Hg at 20 deg. C).	
Metric 8:	Consistency of Exposure Administration	Medium	157 L glass and stainless steel Rochester-type whole-body inhalation chambers (1 animal/chamber) were used for the exposures. Particle size characteristics were not provided to compare among groups.	
Metric 9:	Reporting of Doses/Concentrations	Medium	Target, analytical, and nominal concentrations were provided. Standard deviations/errors were not provided. The analytical method to measure the test substance was reported and appropriate. Particle size distribution data were not reported.	
Metric 10:	Exposure Frequency and Duration	High	A single, 4-hour exposure was used in Study 1; this is appropriate for acute inhalation studies.	
Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Low	Justification for selection of the exposure groups and spacing were not provided. It was unclear if the range of doses tested were sufficient to cover the full range of responses for fur evaluations.	
Metric 12:	Exposure Route and Method	High	The number of air changes per hour were not specified, but Study 1 used dynamic air-flow conditions. Inhalation is an appropriate exposure route to examine acute toxicity, and methods of exposure were described.	
Domain 4: Test Animals				
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Study Citation:	Dow Chemical, (1988). Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688.			
Health Outcome(s):	Clinical signs of toxicity (Clinical signs of toxicity (fur))			
Reported Health Effect(s):	Clinical signs of toxicity (Clinical signs of toxicity (fur)): Study 1 and 2: no alterations observed for evaluations of fur			
Duration:	Acute (less than or equal to 24 hr) 4 hours - Study 1			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5466898			
Domain	Metric	Rating	Comments	
	Metric 13: Test Animal Characteristics	High	Fischer 344 rats (5/sex/group), 12 weeks old during exposure and 7 weeks old upon purchase, were used in this study. Animals were purchased from Charles River Breeding Laboratory in Kingston, NY. Bodyweights for each animal were provided on test day 1.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Medium	Mean temperature, relative humidity, and mean chamber airflow were provided for each concentration group. Animals were provided with food and water ad libitum except during the exposure period. Light/dark cycles were not described.	
	Metric 15: Number of Animals per Group	Medium	5 animals/sex/concentration were used; this is appropriate for an acute inhalation toxicity test.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	High	Animals were examined for evaluations of the fur during the exposure and daily for two weeks following the exposure period. This is appropriate in an acute toxicity test.	
	Metric 17: Consistency of Outcome Assessment	Medium	Table 2 reports the clinical signs of toxicity that were observed at each time point, but results for the fur evaluations were not provided in the text or table (only positive observations were recorded).	
	Metric 18: Sampling Adequacy	Medium	5 animals/sex were evaluated for clinical signs of toxicity at each concentration, but evaluations for fur were not provided.	
	Metric 19: Blinding of Assessors	N/A	Blinding of assessors is not required for assessment of clinical signs of toxicity.	
	Metric 20: Negative Control Response	N/A	Negative controls are not required for acute toxicity tests.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	Although the study did not report all information to determine confounding, reported information did not identify differences among study groups. Respiration rates were not provided, but effects to respiration were reported (labored breathing, etc.).	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure that could influence the outcome assessment.	
	Metric 23: Data Presentation and Analysis	N/A	Statistical analyses are not required for the assessment of clinical signs of toxicity.	
	Metric 24: Reporting of Data	Low	Results for clinical signs of toxicity were provided in Table 2, but results for the fur evaluations were not provided (only positive observations were recorded).	
Additional Comments:	Study 1: OTS0509711-6, 89-880000176, 8EHQ-0588-0535 "Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688"			

Overall Quality Determination**Medium**

Study Citation:	Dow Chemical, (1988). Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688.			
Health Outcome(s):	Lung/Respiratory			
Reported Health Effect(s):	Lung/Respiratory: Study 1: rapid/shallow and/or labored breathing during exposure, clear fluid around the external nares, classified as facial soilingStudy 2: no changes reported			
Duration:	Acute (less than or equal to 24 hr) 4 hours - Study 1			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5466898			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Medium	The test substance was identified as Aerothene TT; the major component was 1,1,1-trichloroethane and the other components were noted as "components of the inhibitor system" but were not further classified. The physical state was liquid.
	Metric 2:	Test Substance Source	High	The test substance was supplied by Dow Chemical U.S.A. in Freeport, TX (Lot No. TA 870402-1). "The composition of the test material was determined by GC, GC/MS and IR".
	Metric 3:	Test Substance Purity	Medium	The major component was 1,1,1-trichloroethane at 94.5%. The other 5.5% were noted as "components of the inhibitor system" but were not further classified.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	N/A	Negative controls are not required for acute toxicity tests.
	Metric 5:	Positive Controls	N/A	Positive controls are not required for acute toxicity tests.
	Metric 6:	Randomized Allocation of Animals	Medium	Study 1 reported animals were randomized by weight into groups of 5 using a computer randomization program.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Low	Preparation of the test substance as a vapor was described, and methods were cited to Miller et al. 1980. Storage of the test substance was not described; the test substance is volatile (vapor pressure 100 mm Hg at 20 deg. C).
	Metric 8:	Consistency of Exposure Administration	Medium	157 L glass and stainless steel Rochester-type whole-body inhalation chambers (1 animal/chamber) were used for the exposures. Particle size characteristics were not provided to compare among groups.
	Metric 9:	Reporting of Doses/Concentrations	Medium	Target, analytical, and nominal concentrations were provided. Standard deviations/errors were not provided. The analytical method to measure the test substance was reported and appropriate. Particle size distribution data were not reported.
	Metric 10:	Exposure Frequency and Duration	High	A single, 4-hour exposure was used in Study 1; this is appropriate for acute inhalation studies.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Low	Justification for selection of the exposure groups and spacing were not provided. It was unclear if the range of doses tested were sufficient to cover the full range of responses for mucous membranes. Respiration was affected in all dose groups, and facial soiling around the external nares was observed in the mid- and high-concentration groups.
	Metric 12:	Exposure Route and Method	High	The number of air changes per hour were not specified, but Study 1 used dynamic air-flow conditions. Inhalation is an appropriate exposure route to examine acute toxicity, and methods of exposure were described.
Domain 4: Test Animals				
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Study Citation:	Dow Chemical, (1988). Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688.			
Health Outcome(s):	Lung/Respiratory			
Reported Health Effect(s):	Lung/Respiratory: Study 1: rapid/shallow and/or labored breathing during exposure, clear fluid around the external nares, classified as facial soilingStudy 2: no changes reported			
Duration:	Acute (less than or equal to 24 hr) 4 hours - Study 1			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5466898			
Domain	Metric	Rating	Comments	
	Metric 13: Test Animal Characteristics	High	Fischer 344 rats (5/sex/group), 12 weeks old during exposure and 7 weeks old upon purchase, were used in this study. Animals were purchased from Charles River Breeding Laboratory in Kingston, NY. Bodyweights for each animal were provided on test day 1.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Medium	Mean temperature, relative humidity, and mean chamber airflow were provided for each concentration group. Animals were provided with food and water ad libitum except during the exposure period. Light/dark cycles were not described.	
	Metric 15: Number of Animals per Group	Medium	5 animals/sex/concentration were used; this is appropriate for an acute inhalation toxicity test.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	High	Animals were examined for evaluations of the mucous membranes and respiration during the exposure and daily for two weeks following the exposure period. Gross pathologic examinations were performed on surviving animals upon sacrifice. This is appropriate in an acute toxicity test.	
	Metric 17: Consistency of Outcome Assessment	Medium	Table 2 reports the clinical signs of toxicity that were observed at each time point, but results for the mucous membrane evaluations were not provided in the text or table (only positive observations were recorded in the table). Changes in respiration were reported in Table 2. Facial soiling was noted in the gross pathology reports.	
	Metric 18: Sampling Adequacy	Medium	5 animals/sex were evaluated for clinical signs of toxicity at each concentration, but evaluations for mucous membranes were not provided. changes in respiration were observed at all concentrations, and facial soiling was observed at the mid- and high-concentrations.	
	Metric 19: Blinding of Assessors	N/A	Blinding of assessors is not required for assessment of clinical signs of toxicity or gross pathology.	
	Metric 20: Negative Control Response	N/A	Negative controls are not required for acute toxicity tests.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	Although the study did not report all information to determine confounding, reported information did not identify differences among study groups. Respiration rates were not provided, but effects to respiration were reported (labored breathing, etc.).	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure that could influence the outcome assessment.	
	Metric 23: Data Presentation and Analysis	N/A	Statistical analyses are not required for the assessment of clinical signs of toxicity or gross pathology in an acute toxicity test.	
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Study Citation:	Dow Chemical, (1988). Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688.
Health Outcome(s):	Lung/Respiratory
Reported Health Effect(s):	Lung/Respiratory: Study 1: rapid/shallow and/or labored breathing during exposure, clear fluid around the external nares, classified as facial soilingStudy 2: no changes reported
Duration:	Acute (less than or equal to 24 hr) 4 hours - Study 1
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	5466898

Domain	Metric	Rating	Comments
	Metric 24: Reporting of Data	Medium	Results for clinical signs of toxicity were provided in Table 2, but results for the mucous membrane evaluations were not provided (only positive observations were recorded). Changes in respiration were reported in Table 2. Results for gross pathological examinations were provided in the appendix.

Additional Comments: Study 1: OTS0509711-6, 89-880000176, 8EHQ-0588-0535 "Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688"

Overall Quality Determination

Medium

Study Citation:	Dow Chemical, (1988). Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688.		
Health Outcome(s):	Nutritional/Metabolic		
Reported Health Effect(s):	Nutritional/Metabolic: Study 1 and 2: decreased following exposures, but greater than starting bodyweights by the end of the observation period		
Duration:	Acute (less than or equal to 24 hr) 4 hours - Study 1		
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane		
HERO ID:	5466898		
Domain	Metric	Rating	Comments
Domain 1: Test Substance			
Metric 1:	Test Substance Identity	Medium	The test substance was identified as Aerothene TT; the major component was 1,1,1-trichloroethane and the other components were noted as "components of the inhibitor system" but were not further classified. The physical state was liquid.
Metric 2:	Test Substance Source	High	The test substance was supplied by Dow Chemical U.S.A. in Freeport, TX (Lot No. TA 870402-1). "The composition of the test material was determined by GC, GC/MS and IR".
Metric 3:	Test Substance Purity	Medium	The major component was 1,1,1-trichloroethane at 94.5%. The other 5.5% were noted as "components of the inhibitor system" but were not further classified.
Domain 2: Test Design			
Metric 4:	Negative and Vehicle Controls	N/A	Negative controls are not required for acute toxicity tests.
Metric 5:	Positive Controls	N/A	Positive controls are not required for acute toxicity tests.
Metric 6:	Randomized Allocation of Animals	Medium	Study 1 reported animals were randomized by weight into groups of 5 using a computer randomization program.
Domain 3: Exposure Characterization			
Metric 7:	Preparation and Storage of Test Substance	Low	Preparation of the test substance as a vapor was described, and methods were cited to Miller et al. 1980. Storage of the test substance was not described; the test substance is volatile (vapor pressure 100 mm Hg at 20 deg. C).
Metric 8:	Consistency of Exposure Administration	Medium	157 L glass and stainless steel Rochester-type whole-body inhalation chambers (1 animal/chamber) were used for the exposures. Particle size characteristics were not provided to compare among groups.
Metric 9:	Reporting of Doses/Concentrations	Medium	Target, analytical, and nominal concentrations were provided. Standard deviations/errors were not provided. The analytical method to measure the test substance was reported and appropriate. Particle size distribution data were not reported.
Metric 10:	Exposure Frequency and Duration	High	A single, 4-hour exposure was used in Study 1; this is appropriate for acute inhalation studies.
Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Medium	Justification for selection of the exposure groups and spacing were not provided. It was unclear if the range of doses tested were sufficient to cover the full range of responses.
Metric 12:	Exposure Route and Method	High	The number of air changes per hour were not specified, but Study 1 used dynamic air-flow conditions. Inhalation is an appropriate exposure route to examine acute toxicity, and methods of exposure were described.
Domain 4: Test Animals			
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Study Citation:	Dow Chemical, (1988). Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688.			
Health Outcome(s):	Nutritional/Metabolic			
Reported Health Effect(s):	Nutritional/Metabolic: Study 1 and 2: decreased following exposures, but greater than starting bodyweights by the end of the observation period			
Duration:	Acute (less than or equal to 24 hr) 4 hours - Study 1			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5466898			
Domain	Metric	Rating	Comments	
	Metric 13: Test Animal Characteristics	High	Fischer 344 rats (5/sex/group), 12 weeks old during exposure and 7 weeks old upon purchase, were used in this study. Animals were purchased from Charles River Breeding Laboratory in Kingston, NY. Bodyweights for each animal were provided on test day 1.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Medium	Mean temperature, relative humidity, and mean chamber airflow were provided for each concentration group. Animals were provided with food and water ad libitum except during the exposure period. Light/dark cycles were not described.	
	Metric 15: Number of Animals per Group	Medium	5 animals/sex/concentration were used; this is appropriate for an acute inhalation toxicity test.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	High	Animals were weighed prior to the exposure and on days 2, 4, 8, 11 and 15. This is appropriate in an acute toxicity test.	
	Metric 17: Consistency of Outcome Assessment	High	Table 3 reports the assessment of bodyweight in each animal for each sex. Only one bodyweight measurement was missing in animals that survived.	
	Metric 18: Sampling Adequacy	High	5 animals/sex were evaluated at each concentration and results were provided in Table 3 for Study 1.	
	Metric 19: Blinding of Assessors	N/A	Blinding of assessors is not required for assessment of bodyweight.	
	Metric 20: Negative Control Response	N/A	Negative controls are not required for acute toxicity tests.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	Although the study did not report all information to determine confounding, reported information did not identify differences among study groups. Respiration rates were not provided, but effects to respiration were reported (labored breathing, etc.).	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure that could influence the outcome assessment.	
	Metric 23: Data Presentation and Analysis	High	Means and standard deviations were calculated for bodyweight assessments and bodyweight outliers were identified using the outlier test described by Grubbs, 1969. No statistical analyses were conducted, but individual data were provided to conduct an independent assessment.	
	Metric 24: Reporting of Data	High	Individual and mean bodyweights were provided for each animal at each test concentration in Table 3 for Study 1.	
Additional Comments:	Study 1: OTS0509711-6, 89-880000176, 8EHQ-0588-0535 "Aerothene TT: An acute vapor inhalation study in Fischer 344 rats with cover letter dated 051688"			

Overall Quality Determination**High**

Study Citation:	Evans, E. B., Balster, R. L. (1993). Inhaled 1,1,1-trichloroethane-produced physical dependence in mice: effects of drugs and vapors on withdrawal. Journal of Pharmacology and Experimental Therapeutics 264(2):726-733.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: Mortality			
Duration:	Acute (less than or equal to 24 hr) 4 days			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5360			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
Metric 1:	Test Substance Identity	High	The test substance was identified definitively as 1,1,1-trichloroethane.	
Metric 2:	Test Substance Source	High	The test substance was certified and the source of the test substance was reported (Fisher Scientific Co).	
Metric 3:	Test Substance Purity	Low	Purity and grade of the test substance were not reported.	
Domain 2: Test Design				
Metric 4:	Negative and Vehicle Controls	High	The study authors reported using an appropriate negative control group (air only exposed control).	
Metric 5:	Positive Controls	N/A	This study type does not require a positive control.	
Metric 6:	Randomized Allocation of Animals	Low	The study authors did not report how the animals were allocated to study groups.	
Domain 3: Exposure Characterization				
Metric 7:	Preparation and Storage of Test Substance	Low	Test substance preparation and storage conditions were not reported; due to the volatility of the test substance, this could have a substantial impact on the study results. The method and equipment used to generate the test substance were reported.	
Metric 8:	Consistency of Exposure Administration	Low	Details of exposure administration are not completely reported, specifically, whether there were any differences in the methods of exposure between exposure groups.	
Metric 9:	Reporting of Doses/Concentrations	Low	Nominal concentrations were reported; however, analytically determined vapor concentrations were not reported.	
Metric 10:	Exposure Frequency and Duration	Medium	The exposure frequency and duration differed from standard acute inhalation toxicity studies. In this study, the exposure was continuous over a period of 4 days. However, this is unlikely to have a substantial impact on the results.	
Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	High	The number of exposure groups and dose/concentration spacing were appropriate and relevant for the study type and outcomes evaluated. While the study authors did not provide justification for the selected concentrations; the selected concentrations were appropriate to evaluate the intended outcomes.	
Metric 12:	Exposure Route and Method	Medium	The route and the method of exposure were reported and were suited to the study type; however, the number of air changes per hour was not reported.	
Domain 4: Test Animals				
Metric 13:	Test Animal Characteristics	Medium	Most details on animal characteristics (species, strain, sex, starting body weight, and source) were reported; however, the age of the animals at the start of the study was not reported.	

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Study Citation:	Evans, E. B., Balster, R. L. (1993). Inhaled 1,1,1-trichloroethane-produced physical dependence in mice: effects of drugs and vapors on withdrawal. Journal of Pharmacology and Experimental Therapeutics 264(2):726-733.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: Mortality			
Duration:	Acute (less than or equal to 24 hr) 4 days			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5360			
Domain	Metric	Rating	Comments	
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not sufficiently reported to allow an evaluation of whether the conditions were adequate. The temperature and light cycle in the room with the standard mouse cages (housing before/after the exposure period) was reported; however, the husbandry conditions during the exposure period were not reported. It was not stated whether the exposure chambers (housing during the 4-day exposure period) were in the same room as the standard mouse cages, so husbandry conditions during exposure are unknown.
	Metric 15:	Number of Animals per Group	Medium	The number of animals per study group was reported and appropriate for the study type and intended outcomes.
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	High	The study outcome assessment methodology addressed the intended endpoint (mortality) and the assessment methodology was sensitive and appropriate for these measurements/endpoints.
	Metric 17:	Consistency of Outcome Assessment	High	There was incomplete reporting of details of the outcome assessment, such as whether the evaluations were conducted at the same time of day within and among groups. These uncertainties are unlikely to have a substantial impact on the results for this outcome.
	Metric 18:	Sampling Adequacy	Medium	The study does not fully report how many animals were sampled for this outcome (mortality). Sampling can not be determined from the results because the results for mortality are only reported qualitatively and for only some exposure groups (mortality is reported only for the high concentration group).
	Metric 19:	Blinding of Assessors	High	The study did not report whether assessors were blinded to treatment group; however, this is not expected to impact the results for this outcome because animals are assessed as live or dead.
	Metric 20:	Negative Control Response	Low	The biological responses of the negative control group were not explicitly reported for this outcome (mortality).
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Medium	The study did not report all information to determine whether there were any confounding factors; however, the reported information did not identify differences among the study groups that are expected to result in confounding.
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure that could affect the outcome assessment.
	Metric 23:	Data Presentation and Analysis	Low	Statistical analysis was not performed/reported and quantitative values were not provided for all treatment groups to allow an independent analysis.
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Study Citation:	Evans, E. B., Balster, R. L. (1993). Inhaled 1,1,1-trichloroethane-produced physical dependence in mice: effects of drugs and vapors on withdrawal. Journal of Pharmacology and Experimental Therapeutics 264(2):726-733.
Health Outcome(s):	Mortality
Reported Health Effect(s):	Mortality: Mortality
Duration:	Acute (less than or equal to 24 hr) 4 days
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	5360

Domain	Metric	Rating	Comments
	Metric 24: Reporting of Data	Low	Data for exposure-related findings (mortality) were not shown for each study group; results for this outcome were described qualitatively, and only for the high concentration.

Additional Comments: None

Overall Quality Determination

Medium

Study Citation:	Evans, E. B., Balster, R. L. (1993). Inhaled 1,1,1-trichloroethane-produced physical dependence in mice: effects of drugs and vapors on withdrawal. Journal of Pharmacology and Experimental Therapeutics 264(2):726-733.			
Health Outcome(s):	Nutritional/Metabolic			
Reported Health Effect(s):	Nutritional/Metabolic: Body weight, body weight loss			
Duration:	Acute (less than or equal to 24 hr) 4 days			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5360			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	The test substance was identified definitively as 1,1,1-trichloroethane.	
	Metric 2: Test Substance Source	High	The test substance was certified and the source of the test substance was reported (Fisher Scientific Co).	
	Metric 3: Test Substance Purity	Low	Purity and grade of the test substance were not reported.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	High	The study authors reported using an appropriate negative control group (air only exposed control).	
	Metric 5: Positive Controls	N/A	Positive controls are not applicable/needed in this study.	
	Metric 6: Randomized Allocation of Animals	Low	The study authors did not report how the animals were allocated to study groups.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	Test substance preparation and storage conditions were not reported; due to the volatility of the test substance, this could have a substantial impact on the study results. The method and equipment used to generate the test substance were reported.	
	Metric 8: Consistency of Exposure Administration	Low	Details of exposure administration are not completely reported, specifically, whether there were any differences in the methods of exposure between exposure groups.	
	Metric 9: Reporting of Doses/Concentrations	Low	Nominal concentrations were reported; however, analytically determined vapor concentrations were not reported.	
	Metric 10: Exposure Frequency and Duration	Medium	The exposure frequency and duration differed from standard acute inhalation toxicity studies. In this study, the exposure was continuous over a period of 4 days. However, this is unlikely to have a substantial impact on the results.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	High	The number of exposure groups and dose/concentration spacing were appropriate and relevant for the study type and outcomes evaluated. While the study authors did not provide justification for the selected concentrations; the selected concentrations were appropriate to evaluate the intended outcomes.	
	Metric 12: Exposure Route and Method	Medium	The route and the method of exposure were reported and were suited to the study type; however, the number of air changes per hour was not reported.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Medium	Most details on animal characteristics (species, strain, sex, starting body weight, and source) were reported; however, the age of the animals at the start of the study was not reported.	

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Study Citation:	Evans, E. B., Balster, R. L. (1993). Inhaled 1,1,1-trichloroethane-produced physical dependence in mice: effects of drugs and vapors on withdrawal. Journal of Pharmacology and Experimental Therapeutics 264(2):726-733.			
Health Outcome(s):	Nutritional/Metabolic			
Reported Health Effect(s):	Nutritional/Metabolic: Body weight, body weight loss			
Duration:	Acute (less than or equal to 24 hr) 4 days			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5360			
Domain	Metric	Rating	Comments	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not sufficiently reported to allow an evaluation of whether the conditions were adequate. The temperature and light cycle in the room with the standard mouse cages (housing before/after the exposure period) was reported; however, the husbandry conditions during the exposure period were not reported. It was not stated whether the exposure chambers (housing during the 4-day exposure period) were in the same room as the standard mouse cages, so husbandry conditions during exposure are unknown.	
	Metric 15: Number of Animals per Group	Medium	The number of animals per study group was reported and appropriate for the study type and intended outcomes.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	High	The study outcome assessment methodology addressed the intended endpoint (body weight) and the assessment methodology was sensitive and appropriate for these measurements/endpoints.	
	Metric 17: Consistency of Outcome Assessment	Low	There was incomplete reporting of details of the outcome assessment, such as whether the evaluations were conducted at the same time of day within and among groups. This uncertainty may have a substantial impact on the results.	
	Metric 18: Sampling Adequacy	High	The reported methodological details indicate that the study used adequate sampling for this outcome (e.g., n = 10/concentration, body weight data, Figure 3).	
	Metric 19: Blinding of Assessors	High	The study did not report whether assessors were blinded to treatment group; however, this is not expected to substantially impact the results for this outcome because the measurements (body weights) were quantitative.	
	Metric 20: Negative Control Response	High	The biological responses of the negative control group were adequate.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	The study did not report all information to determine whether there were any confounding factors; however, the reported information did not identify differences among the study groups that are expected to result in confounding.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure that could affect the outcome assessment.	
	Metric 23: Data Presentation and Analysis	High	Statistical analysis was not performed/reported. However, mean values with variability were reported (Figure 3). Therefore, independent analyses could be conducted.	
	Metric 24: Reporting of Data	High	Data for exposure-related findings were presented for all outcomes by exposure group.	
Additional Comments:	None			

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Study Citation:	Evans, E. B., Balster, R. L. (1993). Inhaled 1,1,1-trichloroethane-produced physical dependence in mice: effects of drugs and vapors on withdrawal. Journal of Pharmacology and Experimental Therapeutics 264(2):726-733.
Health Outcome(s):	Nutritional/Metabolic
Reported Health Effect(s):	Nutritional/Metabolic: Body weight, body weight loss
Duration:	Acute (less than or equal to 24 hr) 4 days
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	5360

Domain	Metric	Rating	Comments
Overall Quality Determination		Medium	

Study Citation:	Evans, E. B., Balster, R. L. (1993). Inhaled 1,1,1-trichloroethane-produced physical dependence in mice: effects of drugs and vapors on withdrawal. Journal of Pharmacology and Experimental Therapeutics 264(2):726-733.			
Health Outcome(s):	Irritation			
Reported Health Effect(s):	Irritation: Eye irritation			
Duration:	Acute (less than or equal to 24 hr) 4 days			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5360			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified definitively as 1,1,1-trichloroethane.
	Metric 2:	Test Substance Source	High	The test substance was certified and the source of the test substance was reported (Fisher Scientific Co).
	Metric 3:	Test Substance Purity	Low	Purity and grade of the test substance were not reported.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	High	The study authors reported using an appropriate negative control group (air only exposed control).
	Metric 5:	Positive Controls	N/A	Positive controls are not applicable/needed in this study.
	Metric 6:	Randomized Allocation of Animals	Low	The study authors did not report how the animals were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Low	Test substance preparation and storage conditions were not reported; due to the volatility of the test substance, this could have a substantial impact on the study results. The method and equipment used to generate the test substance were reported.
	Metric 8:	Consistency of Exposure Administration	Low	Details of exposure administration are not completely reported, specifically, whether there were any differences in the methods of exposure between exposure groups.
	Metric 9:	Reporting of Doses/Concentrations	Low	Nominal concentrations were reported; however, analytically determined vapor concentrations were not reported.
	Metric 10:	Exposure Frequency and Duration	Medium	The exposure frequency and duration differed from standard acute inhalation toxicity studies. In this study, the exposure was continuous over a period of 4 days. However, this is unlikely to have a substantial impact on the results.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	High	The number of exposure groups and dose/concentration spacing were appropriate and relevant for the study type and outcomes evaluated. While the study authors did not provide justification for the selected concentrations; the selected concentrations were appropriate to evaluate the intended outcomes.
	Metric 12:	Exposure Route and Method	Medium	The route and the method of exposure were reported and were suited to the study type; however, the number of air changes per hour was not reported.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	Medium	Most details on animal characteristics (species, strain, sex, starting body weight, and source) were reported; however, the age of the animals at the start of the study was not reported.

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Study Citation:	Evans, E. B., Balster, R. L. (1993). Inhaled 1,1,1-trichloroethane-produced physical dependence in mice: effects of drugs and vapors on withdrawal. Journal of Pharmacology and Experimental Therapeutics 264(2):726-733.
Health Outcome(s):	Irritation
Reported Health Effect(s):	Irritation: Eye irritation
Duration:	Acute (less than or equal to 24 hr) 4 days
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	5360

Domain	Metric	Rating	Comments
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not sufficiently reported to allow an evaluation of whether the conditions were adequate. The temperature and light cycle in the room with the standard mouse cages (housing before/after the exposure period) was reported; however, the husbandry conditions during the exposure period were not reported. It was not stated whether the exposure chambers (housing during the 4-day exposure period) were in the same room as the standard mouse cages, so husbandry conditions during exposure are unknown.
	Metric 15: Number of Animals per Group	Medium	The number of animals per study group was reported and appropriate for the study type and intended outcomes.
Domain 5: Outcome Assessment			
	Metric 16: Outcome Assessment Methodology	Low	The study outcome assessment methodology was not described for this outcome (irritation to eyes).
	Metric 17: Consistency of Outcome Assessment	Low	There was incomplete reporting of details of the outcome assessment, such as whether the evaluations were conducted at the same time of day within and among groups. These uncertainties may have a substantial impact on the results.
	Metric 18: Sampling Adequacy	Low	Details regarding sampling were not reported for this outcome (irritation to eyes) and this deficiency is likely to have a substantial impact on results.
	Metric 19: Blinding of Assessors	Low	The study did not report whether assessors were blinded to treatment group and this uncertainty may substantially impact the results for this outcome (irritation to eyes).
	Metric 20: Negative Control Response	Low	The biological responses of the negative control group were not reported for this outcome (irritation to eyes).
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	The study did not report all information to determine whether there were any confounding factors; however, the reported information did not identify differences among the study groups that are expected to result in confounding.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure that could affect the outcome assessment.
	Metric 23: Data Presentation and Analysis	Low	Statistical analysis was not performed/reported and sufficient information was not provided to allow an independent analysis.
	Metric 24: Reporting of Data	Low	Data for exposure-related findings were inadequately reported. Eye irritation effects were reported qualitatively in the text.
Additional Comments: None			

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Study Citation:	Evans, E. B., Balster, R. L. (1993). Inhaled 1,1,1-trichloroethane-produced physical dependence in mice: effects of drugs and vapors on withdrawal. Journal of Pharmacology and Experimental Therapeutics 264(2):726-733.
Health Outcome(s):	Irritation
Reported Health Effect(s):	Irritation: Eye irritation
Duration:	Acute (less than or equal to 24 hr) 4 days
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	5360

Domain	Metric	Rating	Comments
Overall Quality Determination		Low	

Study Citation:	Evans, E. B., Balster, R. L. (1993). Inhaled 1,1,1-trichloroethane-produced physical dependence in mice: effects of drugs and vapors on withdrawal. Journal of Pharmacology and Experimental Therapeutics 264(2):726-733.			
Health Outcome(s):	Neurological/Behavioral			
Reported Health Effect(s):	Neurological/Behavioral: Clinical signs (sedation, dull fur coat), withdrawal reaction (based on scoring of handling-induced convulsions)			
Duration:	Acute (less than or equal to 24 hr) 4 days			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5360			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	The test substance was identified definitively as 1,1,1-trichloroethane.	
	Metric 2: Test Substance Source	High	The test substance was certified and the source of the test substance was reported (Fisher Scientific Co).	
	Metric 3: Test Substance Purity	Low	Purity and grade of the test substance were not reported.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	High	The study authors reported using an appropriate negative control group (air only exposed control).	
	Metric 5: Positive Controls	N/A	Positive controls are not applicable/needed in this study.	
	Metric 6: Randomized Allocation of Animals	Low	The study authors did not report how the animals were allocated to study groups.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	Test substance preparation and storage conditions were not reported; due to the volatility of the test substance, this could have a substantial impact on the study results. The method and equipment used to generate the test substance were reported.	
	Metric 8: Consistency of Exposure Administration	Low	Details of exposure administration are not completely reported, specifically, whether there were any differences in the methods of exposure between exposure groups.	
	Metric 9: Reporting of Doses/Concentrations	Low	Nominal concentrations were reported; however, analytically determined vapor concentrations were not reported.	
	Metric 10: Exposure Frequency and Duration	Medium	The exposure frequency and duration differed from standard acute inhalation toxicity studies. In this study, the exposure was continuous over a period of 4 days. However, this is unlikely to have a substantial impact on the results.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	High	The number of exposure groups and dose/concentration spacing were appropriate and relevant for the study type and outcomes evaluated. While the study authors did not provide justification for the selected concentrations; the selected concentrations were appropriate to evaluate the intended outcomes.	
	Metric 12: Exposure Route and Method	Medium	The route and the method of exposure were reported and were suited to the study type; however, the number of air changes per hour was not reported.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Medium	Most details on animal characteristics (species, strain, sex, starting body weight, and source) were reported; however, the age of the animals at the start of the study was not reported.	

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Study Citation:	Evans, E. B., Balster, R. L. (1993). Inhaled 1,1,1-trichloroethane-produced physical dependence in mice: effects of drugs and vapors on withdrawal. Journal of Pharmacology and Experimental Therapeutics 264(2):726-733.			
Health Outcome(s):	Neurological/Behavioral			
Reported Health Effect(s):	Neurological/Behavioral: Clinical signs (sedation, dull fur coat), withdrawal reaction (based on scoring of handling-induced convulsions)			
Duration:	Acute (less than or equal to 24 hr) 4 days			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5360			
Domain	Metric	Rating	Comments	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not sufficiently reported to allow an evaluation of whether the conditions were adequate. The temperature and light cycle in the room with the standard mouse cages (housing before/after the exposure period) was reported; however, the husbandry conditions during the exposure period were not reported. It was not stated whether the exposure chambers (housing during the 4-day exposure period) were in the same room as the standard mouse cages, so husbandry conditions during exposure are unknown.	
	Metric 15: Number of Animals per Group	Medium	The number of animals per study group was reported and appropriate for the study type and intended outcomes.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	Medium	The study outcome assessment methodology addressed the intended endpoints (withdrawal symptoms, clinical signs) and the assessment methodology was sensitive and appropriate for these measurements/endpoints. However, the study included a limited range of potential measures for the assessment of neurological and behavioral effects.	
	Metric 17: Consistency of Outcome Assessment	Low	There was incomplete reporting of details of the outcome assessment, such as whether the evaluations were conducted at the same time of day within and among groups. These uncertainties may have a substantial impact on the results.	
	Metric 18: Sampling Adequacy	Medium	The reported methodological details indicate that the study used adequate sampling for some of the outcomes of interest (e.g., n = 10 animals/concentration were evaluated for withdrawal effects, Fig 1, Table 1). The numbers of animals evaluated for clinical signs per group was not stated.	
	Metric 19: Blinding of Assessors	Low	The study did not report whether assessors were blinded to treatment group for subjective outcomes (e.g., scoring for withdrawal symptoms, clinical signs), and this deficiency is likely to have a substantial impact on results.	
	Metric 20: Negative Control Response	Low	The biological responses of the negative control group were adequate (e.g., no/low incidence of outcomes of interest in the study) for withdrawal symptoms measurements. The biological responses of the negative control group were not reported for exposure-related effects on clinical signs.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	The study did not report all information to determine whether there were any confounding factors; however, the reported information did not identify differences among the study groups that are expected to result in confounding.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure that could affect the outcome assessment.	
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Study Citation:	Evans, E. B., Balster, R. L. (1993). Inhaled 1,1,1-trichloroethane-produced physical dependence in mice: effects of drugs and vapors on withdrawal. Journal of Pharmacology and Experimental Therapeutics 264(2):726-733.
Health Outcome(s):	Neurological/Behavioral
Reported Health Effect(s):	Neurological/Behavioral: Clinical signs (sedation, dull fur coat), withdrawal reaction (based on scoring of handling-induced convulsions)
Duration:	Acute (less than or equal to 24 hr) 4 days
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	5360

Domain	Metric	Rating	Comments
	Metric 23: Data Presentation and Analysis	Low	Statistical analysis was not performed/reported. However, quantitative values (percentage of animals with the effect) were provided for most exposure-related effects (e.g., Figure 1/Table 1). Quantitative values (number of animals affected) were not reported for exposure-related effects on clinical signs so an independent analysis can not be conducted for these effects.
	Metric 24: Reporting of Data	Low	Data for most measurements for this outcome were reported quantitatively (e.g., time course and incidence/% of animals displaying convulsions; scoring). Data for clinical signs observed during the study were reported only qualitatively.

Additional Comments: None

Overall Quality Determination**Medium**

Study Citation:	Gehring, P. J. (1968). Hepatotoxic potency of various chlorinated hydrocarbon vapours relative to their narcotic and lethal potencies in mice. Toxicology and Applied Pharmacology 13(3):287-298.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: death			
Duration:	Acute (less than or equal to 24 hr) 17h inhalation; 1,1,1-TCA			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	29227; Linked HERO ID(s): 29227, 2799686			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified as 1,1,1-trichlorethane. CASRN was not reported
	Metric 2:	Test Substance Source	Low	The source of the test substance was not reported. The test substance was not analytical verified.
	Metric 3:	Test Substance Purity	High	All chemicals contained less than 0.5% impurities
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	High	A concurrent air-exposed control group was included.
	Metric 5:	Positive Controls	N/A	Positive controls are not required for the study type.
	Metric 6:	Randomized Allocation of Animals	Low	The study authors did not report how animals were allocated to the study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Medium	Method and equipment for the production of the test substance vapor were cited (Adams, 1940 and Rowe et al., 1952) and briefly described here with limited details. Storage conditions were not reported.
	Metric 8:	Consistency of Exposure Administration	Medium	Exposure durations were varied between groups, but this was the design of the study. The study varied the duration of exposure but kept the concentration consistent. Concentration of test substance during exposure was continuously analyzed and did not vary more than 7% (data not shown). The chamber design was consistent. The number of animals/chamber was not reported.
	Metric 9:	Reporting of Doses/Concentrations	Medium	Target concentration was reported. Concentrations in the inhalation chamber were analytically determined. It was stated by study authors that if deviations greater than 7% occurred, the data were not used, and the exposure was repeated. Analytical concentrations not shown.
	Metric 10:	Exposure Frequency and Duration	Low	Exposure duration varied but encompassed standard study design.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Medium	A single concentration was studied with varied exposure durations. The aim of the study was to determine the time at which effects were observed; therefore the single concentration was acceptable.

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Study Citation:	Gehring, P. J. (1968). Hepatotoxic potency of various chlorinated hydrocarbon vapours relative to their narcotic and lethal potencies in mice. Toxicology and Applied Pharmacology 13(3):287-298.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: death			
Duration:	Acute (less than or equal to 24 hr) 17h inhalation; 1,1,1-TCA			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	29227; Linked HERO ID(s): 29227, 2799686			
Domain	Metric	Rating	Comments	
	Metric 12:	Exposure Route and Method	Low	A whole-body inhalation chamber was used. The test solution was metered at a "constant rate into a tube, heat being applied at the point of vaporization as needed to effect complete volatilization. All air entering the chamber passes through this tube and enters the chamber..." The air flow ranged from 17-30 L/min in a 160 L chamber. The number of animals in the chamber at one time was not reported. The authors do state that the design of the chamber allowed for animals to be introduced and withdrawn with little change in concentration. It is not clear if deceased animals were removed during the exposure period or new ones were added.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	Medium	The species, strain, sex, and starting body weight were described and appropriate, age was not reported. The source of animals was not reported but "arrival in the laboratory" indicates external source. Mice are commonly used for study type.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not reported and could not be evaluated.
	Metric 15:	Number of Animals per Group	Low	The number of animals exposed to the test substance was not reported.
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	High	Outcome assessment methodology appeared appropriate for mortality (time when respiratory movements stopped).
	Metric 17:	Consistency of Outcome Assessment	Medium	Study authors state animals were "repeatedly observed" for death. Exact timing of observations was not reported.
	Metric 18:	Sampling Adequacy	High	The number of animals was reported in the figure legend (composite groups of 20-135 mice) and adequate for the study type.
	Metric 19:	Blinding of Assessors	N/A	Blinding was not reported; however, blinding is not required for the outcomes of interest.
	Metric 20:	Negative Control Response	N/A	Not relevant for study type.
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Low	The control animals were sham treated. The details related to food consumption, water intake, and individual body weights were not reported. Respiratory rates were not measured in an inhalation study, and the test substance may be a respiratory irritant.
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.
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Study Citation:	Gehring, P. J. (1968). Hepatotoxic potency of various chlorinated hydrocarbon vapours relative to their narcotic and lethal potencies in mice. Toxicology and Applied Pharmacology 13(3):287-298.
Health Outcome(s):	Mortality
Reported Health Effect(s):	Mortality: death
Duration:	Acute (less than or equal to 24 hr) 17h inhalation; 1,1,1-TCA
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	29227; Linked HERO ID(s): 29227, 2799686

Domain	Metric	Rating	Comments
	Metric 23: Data Presentation and Analysis	High	Statistical methods to determine LT50s and ET50s were done according to the method published by Litchfield and Wilcoxon 1949 (A Simplified Method of Evaluating Dose-Effect Experiments, Experimental Therapeutics, 1949). The cited paper describes in detail the method to determine ED50s with confidence limits. Although this study determined LT50s and ET50s, the method described in the paper seems applicable and appropriate. There was also sufficient data reported where an independent analysis could be performed (estimated from figures 3 and 7).
	Metric 24: Reporting of Data	Medium	Study authors reported LT50s with 95% confidence limits in Table 3. The percentage of mice that died at different time points is shown graphically.

Additional Comments: 11.14.2025 DH (dherber@srcinc.com). The following metric scores were changed: Metric 8, 11, 15, 16, 21, and 23. Text changes to comments fields were made for all metrics.

Overall Quality Determination

Medium

Study Citation:	Gehring, P. J. (1968). Hepatotoxic potency of various chlorinated hydrocarbon vapours relative to their narcotic and lethal potencies in mice. Toxicology and Applied Pharmacology 13(3):287-298.			
Health Outcome(s):	Neurological/Behavioral			
Reported Health Effect(s):	Neurological/Behavioral: anesthesia/immobilization			
Duration:	Acute (less than or equal to 24 hr) 17h inhalation; 1,1,1-TCA			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	29227; Linked HERO ID(s): 29227, 2799686			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified as 1,1,1-trichlorethane. CASRN was not reported
	Metric 2:	Test Substance Source	Low	The source of the test substance was not reported. The test substance was not analytical verified.
	Metric 3:	Test Substance Purity	High	All chemicals contained less than 0.5% impurities
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	High	A concurrent air-exposed control group was included.
	Metric 5:	Positive Controls	N/A	Positive controls are not required for the study type.
	Metric 6:	Randomized Allocation of Animals	Low	The study authors did not report how animals were allocated to the study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Medium	Method and equipment for the production of the test substance vapor were cited (Adams, 1940 and Rowe et al., 1952) and briefly described here with limited details. Storage conditions were not reported.
	Metric 8:	Consistency of Exposure Administration	Medium	Exposure durations were varied between groups, but this was the design of the study. The study varied the duration of exposure but kept the concentration consistent. Concentration of test substance during exposure was continuously analyzed and did not vary more than 7% (data not shown). The chamber design was consistent. The number of animals/chamber was not reported.
	Metric 9:	Reporting of Doses/Concentrations	Medium	Target concentration was reported. Concentrations in the inhalation chamber were analytically determined. It was stated by study authors that if deviations greater than 7% occurred, the data were not used, and the exposure was repeated. Analytical concentrations not shown.
	Metric 10:	Exposure Frequency and Duration	Low	Exposure duration varied but encompassed standard study design.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Medium	A single concentration was studied with varied exposure durations. The aim of the study was to determine the time at which effects were observed; therefore the single concentration was acceptable.
	Metric 12:	Exposure Route and Method	Low	A whole-body inhalation chamber was used. The test solution was metered at a "constant rate into a tube, heat being applied at the point of vaporization as needed to effect complete volatilization. All air entering the chamber passes through this tube and enters the chamber..." The air flow ranged from 17-30 L/min in a 160 L chamber. The number of animals in the chamber at one time was not reported. The authors do state that the design of the chamber allowed for animals to be introduced and withdrawn with little change in concentration. It is not clear if deceased animals were removed during the exposure period or new ones were added.

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Study Citation:	Gehring, P. J. (1968). Hepatotoxic potency of various chlorinated hydrocarbon vapours relative to their narcotic and lethal potencies in mice. Toxicology and Applied Pharmacology 13(3):287-298.			
Health Outcome(s):	Neurological/Behavioral			
Reported Health Effect(s):	Neurological/Behavioral: anesthesia/immobilization			
Duration:	Acute (less than or equal to 24 hr) 17h inhalation; 1,1,1-TCA			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	29227; Linked HERO ID(s): 29227, 2799686			
Domain	Metric	Rating	Comments	
Domain 4: Test Animals				
Metric 13:	Test Animal Characteristics	Medium	The species, strain, sex, and starting body weight were described and appropriate, age was not reported. The source of animals was not reported but "arrival in the laboratory" indicates external source. Mice are commonly used for study type.	
Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not reported and could not be evaluated.	
Metric 15:	Number of Animals per Group	Low	The number of animals exposed to the test substance was not reported.	
Domain 5: Outcome Assessment				
Metric 16:	Outcome Assessment Methodology	Low	The methodology had limited details and was described only as "The duration of time between the initiation of an exposure and onset of anesthesia was also recorded for each mouse. Onset of anesthesia was considered to be the time at which the mouse became immobilized." which was when the mouse remained within the same square marked on the floor of the cage. Because the neuro outcome was limited to immobilization (prior to death) and the methodology was based primarily on observation, this metric is scored low as it was unclear whether the methods were sensitive for the outcome of interest.	
Metric 17:	Consistency of Outcome Assessment	Medium	Animals were observed in anesthetic/immobilized condition during exposure. "Onset of anesthesia was considered to be the time at which the mouse became immobilized." It is unclear the exact criteria and if this assessed consistently for all animals.	
Metric 18:	Sampling Adequacy	High	The number of animals was reported in the figure legend (composite groups of 20-135 mice) and adequate for the study type.	
Metric 19:	Blinding of Assessors	Low	Blinding was not reported; assessment of immobilization could be subjective and should be assessed blindly.	
Metric 20:	Negative Control Response	Low	The negative control response was not reported.	
Domain 6: Confounding / Variable Control				
Metric 21:	Confounding Variables in Test Design and Procedures	Low	The control animals were sham treated. The details related to food consumption, water intake, and individual body weights were not reported. Respiratory rates were not measured in an inhalation study, and the test substance may be a respiratory irritant.	
Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.	
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Study Citation:	Gehring, P. J. (1968). Hepatotoxic potency of various chlorinated hydrocarbon vapours relative to their narcotic and lethal potencies in mice. Toxicology and Applied Pharmacology 13(3):287-298.			
Health Outcome(s):	Neurological/Behavioral			
Reported Health Effect(s):	Neurological/Behavioral: anesthesia/immobilization			
Duration:	Acute (less than or equal to 24 hr) 17h inhalation; 1,1,1-TCA			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	29227; Linked HERO ID(s): 29227, 2799686			
Domain	Metric		Rating	Comments
	Metric 23:	Data Presentation and Analysis	High	Statistical methods to determine LT50s and ET50s were done according to the method published by Litchfield and Wilcoxon 1949 (A Simplified Method of Evaluating Dose-Effect Experiments, Experimental Therapeutics, 1949). The cited paper describes in detail the method to determine ED50s with confidence limits. Although this study determined LT50s and ET50s, the method described in the paper seems applicable and appropriate. There was also sufficient data reported where an independent analysis could be performed (estimated from figures 3 and 7).
	Metric 24:	Reporting of Data	Medium	Study authors reported ET50s with 95% confidence limits in Table 3. The percentage of mice affected at different time points is shown graphically.
Additional Comments:	11.14.2025 DH (dherber@srcinc.com). The following metric scores were changed: Metric 8, 11, 15, 19, 23, and 24. Text changes to comments fields were made for all metrics.			
Overall Quality Determination			Medium	

Study Citation:	Gehring, P. J. (1968). Hepatotoxic potency of various chlorinated hydrocarbon vapours relative to their narcotic and lethal potencies in mice. Toxicology and Applied Pharmacology 13(3):287-298.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: serum ALT (SGPT activity)			
Duration:	Acute (less than or equal to 24 hr) 17h inhalation; 1,1,1-TCA			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	29227; Linked HERO ID(s): 29227, 2799686			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	The test substance was identified as 1,1,1-trichlorethane. CASRN was not reported	
	Metric 2: Test Substance Source	Low	The source of the test substance was not reported. The test substance was not analytical verified.	
	Metric 3: Test Substance Purity	High	All chemicals contained less than 0.5% impurities	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	High	A concurrent air-exposed control group was included.	
	Metric 5: Positive Controls	N/A	Positive controls are not required for the study type.	
	Metric 6: Randomized Allocation of Animals	Low	The study authors did not report how animals were allocated to the study groups.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Medium	Method and equipment for the production of the test substance vapor were cited (Adams, 1940 and Rowe et al., 1952) and briefly described here with limited details. Storage conditions were not reported.	
	Metric 8: Consistency of Exposure Administration	Medium	Exposure durations were varied between groups, but this was the design of the study. The study varied the duration of exposure but kept the concentration consistent. Concentration of test substance during exposure was continuously analyzed and did not vary more than 7% (data not shown). The chamber design was consistent. The number of animals/chamber was not reported.	
	Metric 9: Reporting of Doses/Concentrations	Medium	Target concentration was reported. Concentrations in the inhalation chamber were analytically determined. It was stated by study authors that if deviations greater than 7% occurred, the data were not used, and the exposure was repeated. Analytical concentrations not shown.	
	Metric 10: Exposure Frequency and Duration	Low	Exposure duration varied but encompassed standard study design.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Medium	A single concentration was studied with varied exposure durations. The aim of the study was to determine the time at which effects were observed; therefore the single concentration was acceptable.	
	Metric 12: Exposure Route and Method	Low	A whole-body inhalation chamber was used. The test solution was metered at a "constant rate into a tube, heat being applied at the point of vaporization as needed to effect complete volatilization. All air entering the chamber passes through this tube and enters the chamber..." The air flow ranged from 17-30 L/min in a 160 L chamber. The number of animals in the chamber at one time was not reported. The authors do state that the design of the chamber allowed for animals to be introduced and withdrawn with little change in concentration. It is not clear if deceased animals were removed during the exposure period or new ones were added.	

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Study Citation:	Gehring, P. J. (1968). Hepatotoxic potency of various chlorinated hydrocarbon vapours relative to their narcotic and lethal potencies in mice. Toxicology and Applied Pharmacology 13(3):287-298.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: serum ALT (SGPT activity)			
Duration:	Acute (less than or equal to 24 hr) 17h inhalation; 1,1,1-TCA			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	29227; Linked HERO ID(s): 29227, 2799686			
Domain	Metric	Rating	Comments	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Medium	The species, strain, sex, and starting body weight were described and appropriate, age was not reported. The source of animals was not reported but "arrival in the laboratory" indicates external source. Mice are commonly used for study type.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not reported and could not be evaluated.	
	Metric 15: Number of Animals per Group	Low	The number of animals exposed to the test substance was not reported.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	Low	Outcome assessment methodology partially addressed outcome of interest. Only serum ALT (SGPT) was used to determine hepatic effects. Method was cited previously (Reitman and Frankel 1957 and specified in the Sigman Technical Bulletin 505 1964); limited details were provided in current study.	
	Metric 17: Consistency of Outcome Assessment	Medium	For SGPT levels in the blood, the outcome assessment was performed "Twenty-four hours after the beginning of an exposure or the injection of an agent" by collecting a blood sample via cardiac puncture under anesthesia. Then the SGPT was determined using the cited source "the method of Reitman and Frankel (1957) as specified in the Sigma Technical Bulletin 505 (1964)". The criteria for SGPT effect were ~2 fold higher than the SGPT levels determined in the control mice is considered an abnormal change. The ET50 for ALT activity was defined as the duration of exposure that produced increased ALT levels in one-half of the exposed mice. According to the Figure 3 and 7, serum ALT levels were determined at earlier time points than 24 hours after exposure was initiated. This may have been an oversight in reporting methods by the study authors, as serum ALT levels were determined 24 hours after i.p. injection. Timing of evaluation of serum ALT can be determined from Figures, but it is unclear if these are all the timepoints evaluated. The outcome assessment appears to be consistent across groups, but there are some incompletely reported/confusing details and missing details which are unlikely to have a substantial impact on results.	
	Metric 18: Sampling Adequacy	High	The number of animals evaluated is reported in the figure legend. Data is reported for 8-18 animals/group and is adequate for the study type.	
	Metric 19: Blinding of Assessors	N/A	Blinding was not reported; however, blinding is not required for the outcomes of interest.	
	Metric 20: Negative Control Response	Low	Control ALT levels were not reported for the group of mice concurrently ran with the test substance, rather a composite of 254 control mice that were air-exposed were used to determine control serum ALT levels. These control animals were the concurrent controls for several different chemicals.	
Domain 6: Confounding / Variable Control				
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Study Citation:	Gehring, P. J. (1968). Hepatotoxic potency of various chlorinated hydrocarbon vapours relative to their narcotic and lethal potencies in mice. Toxicology and Applied Pharmacology 13(3):287-298.
Health Outcome(s):	Hepatic/Liver
Reported Health Effect(s):	Hepatic/Liver: serum ALT (SGPT activity)
Duration:	Acute (less than or equal to 24 hr) 17h inhalation; 1,1,1-TCA
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	29227; Linked HERO ID(s): 29227, 2799686

Domain	Metric	Rating	Comments
	Metric 21: Confounding Variables in Test Design and Procedures	Low	The control animals were sham treated. The details related to food consumption, water intake, and individual body weights were not reported. Respiratory rates were not measured in an inhalation study, and the test substance may be a respiratory irritant.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.
	Metric 23: Data Presentation and Analysis	High	Statistical methods to determine LT50s and ET50s were done according to the method published by Litchfield and Wilcoxon 1949 (A Simplified Method of Evaluating Dose-Effect Experiments, Experimental Therapeutics, 1949). The cited paper describes in detail the method to determine ED50s with confidence limits. Although this study determined LT50s and ET50s, the method described in the paper seems applicable and appropriate. There was also sufficient data reported where an independent analysis could be performed (estimated from figures 3 and 7).
	Metric 24: Reporting of Data	Medium	Study authors reported ET50s with 95% confidence limits in Table 3. The percentage of mice affected at different time points is shown graphically.

Additional Comments: 11.14.2025 DH (dherber@srcinc.com). The following metric scores were changed Metric 8, 11, 15, 23, and 24. Text changes to comments fields were made for all metrics.

Overall Quality Determination

Medium

Study Citation:	Gehring, P. J. (1968). Hepatotoxic potency of various chlorinated hydrocarbon vapours relative to their narcotic and lethal potencies in mice. Toxicology and Applied Pharmacology 13(3):287-298.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: death			
Duration:	Acute (less than or equal to 24 hr) single administration I.P.; 1,1,1-TCA			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	29227; Linked HERO ID(s): 29227, 2799686			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	The test substance was identified as 1,1,1-trichlorethane. CASRN was not reported	
	Metric 2: Test Substance Source	Low	The source of the test substance was not reported. The test substance was not analytical verified.	
	Metric 3: Test Substance Purity	High	All chemicals contained less than 0.5% impurities	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	Low	Study authors state "50 mice treated with corn oil" served as the control group for i.p. injection experiments. It is unclear if the same volume was injected into the control animal, if these animals were concurrently treated, or exactly how the corn oil was administered.	
	Metric 5: Positive Controls	N/A	Positive controls are not required for the study type.	
	Metric 6: Randomized Allocation of Animals	Low	The study authors did not report how animals were allocated to the study groups.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Medium	Test substance was dissolved in corn oil. No information on mixing or homogeneity was provided. Storage conditions were not reported.	
	Metric 8: Consistency of Exposure Administration	Medium	A single injection was given. Doses were calculated to have consistent final volume for i.p. injection of 0.01 ml/g. No other details reported	
	Metric 9: Reporting of Doses/Concentrations	Low	Injected doses were not reported but doses needed to produce LD50/ED50 were reported in mmole/kg and can be converted.	
	Metric 10: Exposure Frequency and Duration	High	A single i.p. injection was administered and was appropriate.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Uninformative	The number of exposure groups and doses were not reported. This is an LD50 study, so it is not uncommon for this information to be missing. Since the LD50 was clearly reported (with 95% confidence interval), the overall score of the study will be upgraded to Low.	
	Metric 12: Exposure Route and Method	High	Exposure route was suited for the test substance. A volume of 0.01 mg/g was injected intraperitoneally.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Medium	The species, strain, sex, and starting body weight were described and appropriate, age was not reported. The source of animals was not reported but "arrival in the laboratory" indicates external source. Mice are commonly used for study type.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not reported and could not be evaluated.	
	Metric 15: Number of Animals per Group	Low	The number of animals exposed to the test substance was not reported.	

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Study Citation:	Gehring, P. J. (1968). Hepatotoxic potency of various chlorinated hydrocarbon vapours relative to their narcotic and lethal potencies in mice. Toxicology and Applied Pharmacology 13(3):287-298.
Health Outcome(s):	Mortality
Reported Health Effect(s):	Mortality: death
Duration:	Acute (less than or equal to 24 hr) single administration I.P.; 1,1,1-TCA
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	29227; Linked HERO ID(s): 29227, 2799686

Domain	Metric	Rating	Comments
Domain 5: Outcome Assessment			
Metric 16:	Outcome Assessment Methodology	High	Outcome assessment methodology appeared appropriate for mortality (time when respiratory movements stopped).
Metric 17:	Consistency of Outcome Assessment	Medium	Study authors state animals were "repeatedly observed" for death. Exact timing of observations was not reported.
Metric 18:	Sampling Adequacy	Low	The number of animals data was obtained from was not reported.
Metric 19:	Blinding of Assessors	N/A	Blinding was not reported; however, blinding is not required for the outcomes of interest.
Metric 20:	Negative Control Response	N/A	Not relevant for study type.
Domain 6: Confounding / Variable Control			
Metric 21:	Confounding Variables in Test Design and Procedures	Low	The control animals were exposed to the vehicle. The details related to food consumption, water intake, and individual body weights were not reported.
Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.
Metric 23:	Data Presentation and Analysis	High	Statistical methods to determine LD50s and ED50s were done according to method published by Litchfield and Wilcoxon 1949 (A Simplified Method of Evaluating Dose-Effect Experiments, Experimental Therapeutics 1949) and were appropriate.
Metric 24:	Reporting of Data	Medium	Study authors only reported LD50 and ED50 with 95% confidence limits in Table 1.

Additional Comments: 11.14.2025 DH (dherber@srcinc.com). The following metric scores were changed Metric 4, 8, 11, 16, 23, and 24. Text changes to comments fields were made for all metrics.

Overall Quality Determination

Low

Study Citation:	Gehring, P. J. (1968). Hepatotoxic potency of various chlorinated hydrocarbon vapours relative to their narcotic and lethal potencies in mice. Toxicology and Applied Pharmacology 13(3):287-298.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: serum ALT (SGPT activity)			
Duration:	Acute (less than or equal to 24 hr) single administration I.P.; 1,1,1-TCA			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	29227; Linked HERO ID(s): 29227, 2799686			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	The test substance was identified as 1,1,1-trichlorethane. CASRN was not reported	
	Metric 2: Test Substance Source	Low	The source of the test substance was not reported. The test substance was not analytical verified.	
	Metric 3: Test Substance Purity	High	All chemicals contained less than 0.5% impurities	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	Low	Study authors state "50 mice treated with corn oil" served as the control group for i.p. injection experiments. It is unclear if the same volume was injected into the control animal, if these animals were concurrently treated, or exactly how the corn oil was administered.	
	Metric 5: Positive Controls	N/A	Positive controls are not required for the study type.	
	Metric 6: Randomized Allocation of Animals	Low	The study authors did not report how animals were allocated to the study groups.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Medium	Test substance was dissolved in corn oil. No information on mixing or homogeneity was provided. Storage conditions were not reported.	
	Metric 8: Consistency of Exposure Administration	Medium	A single injection was given. Doses were calculated to have consistent final volume for i.p. injection of 0.01 ml/g. No other details reported	
	Metric 9: Reporting of Doses/Concentrations	Low	Injected doses were not reported but doses needed to produce LD50/ED50 were reported in mmole/kg and can be converted.	
	Metric 10: Exposure Frequency and Duration	High	A single i.p. injection was administered and was appropriate.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Uninformative	The number of exposure groups and doses were not reported.	
	Metric 12: Exposure Route and Method	High	Exposure route was suited for the test substance. A volume of 0.01 mg/g was injected intraperitoneally.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Medium	The species, strain, sex, and starting body weight were described and appropriate, age was not reported. The source of animals was not reported but "arrival in the laboratory" indicates external source. Mice are commonly used for study type.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not reported and could not be evaluated.	
	Metric 15: Number of Animals per Group	Low	The number of animals exposed to the test substance was not reported.	
Domain 5: Outcome Assessment				

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Study Citation:	Gehring, P. J. (1968). Hepatotoxic potency of various chlorinated hydrocarbon vapours relative to their narcotic and lethal potencies in mice. Toxicology and Applied Pharmacology 13(3):287-298.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: serum ALT (SGPT activity)			
Duration:	Acute (less than or equal to 24 hr) single administration I.P.; 1,1,1-TCA			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	29227; Linked HERO ID(s): 29227, 2799686			
Domain	Metric	Rating	Comments	
	Metric 16: Outcome Assessment Methodology	Low	Outcome assessment methodology partially addressed outcome of interest. Only serum ALT (SGPT) was used to determine hepatic effects. Method was cited previously (Reitman and Frankel 1957 and specified in the Sigman Technical Bulletin 505 1964); limited details were provided in current study.	
	Metric 17: Consistency of Outcome Assessment	Medium	For SGPT levels in the blood, the outcome assessment was performed “Twenty-four hours after the beginning of an exposure or the injection of an agent” by collecting a blood sample via cardiac puncture under anesthesia. Then the SGPT was determined using the cited source “the method of Reitman and Frankel (1957) as specified in the Sigma Technical Bulletin 505 (1964)”. The criteria for SGPT effect was ~2 fold higher than the SGPT levels determined in the control mice is considered an abnormal change and the ED50 is the dose where abnormal SGPT was observed in 50% of mice. Details that were not reported were whether the outcome assessment was performed in animals surviving 24h (which seems likely as the animal would need to be living for a cardiac puncture). As this is an LD50 study, it is likely that higher doses had higher mortality, which may affect the number of surviving animals available for the liver outcome assessment. The outcome assessment appears to be consistent across groups, but there are a some incompletely reported/confusing details and missing details which are unlikely to have a substantial impact on results.	
	Metric 18: Sampling Adequacy	Low	The number of animals data was obtained from was not reported.	
	Metric 19: Blinding of Assessors	N/A	Blinding was not reported; however, blinding is not required for the outcomes of interest.	
	Metric 20: Negative Control Response	N/A	Not relevant for study type.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Low	The control animals were exposed to the vehicle. The details related to food consumption, water intake, and individual body weights were not reported.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.	
	Metric 23: Data Presentation and Analysis	High	Statistical methods to determine LD50s and ED50s were done according to method published by Litchfield and Wilcoxon 1949 (A Simplified Method of Evaluating Dose-Effect Experiments, Experimental Therapeutics 1949) and were appropriate.	
	Metric 24: Reporting of Data	Medium	Study authors only reported LD50 and ED50 with 95% confidence limits in Table 1.	
Additional Comments:	11.14.2025 DH (dherber@srcinc.com). The following metric scores were changed Metric 4, 9, 11, 23, and 24. Text changes to comments fields were made for all metrics.			

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Study Citation:	Gehring, P. J. (1968). Hepatotoxic potency of various chlorinated hydrocarbon vapours relative to their narcotic and lethal potencies in mice. Toxicology and Applied Pharmacology 13(3):287-298.		
Health Outcome(s):	Hepatic/Liver		
Reported Health Effect(s):	Hepatic/Liver: serum ALT (SGPT activity)		
Duration:	Acute (less than or equal to 24 hr) single administration I.P.; 1,1,1-TCA		
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane		
HERO ID:	29227; Linked HERO ID(s): 29227, 2799686		
Domain	Metric	Rating	Comments
Overall Quality Determination		Uninformative	

Study Citation:	Hobara, T., Kobayashi, H., Higashihara, E., Kawamoto, T., Sakai, T. (1984). Acute effects of 1,1,1-trichloroethane, trichloroethylene, and toluene on the hematologic parameters in dogs. Archives of Environmental Contamination and Toxicology 13(5):589-593.			
Health Outcome(s):	Immune/Hematological			
Reported Health Effect(s):	Immune/Hematological: Hematology (White Blood Cell count, White Blood Cell differential, Red Blood Cell count, platelet count, Hematocrit)			
Duration:	Acute (less than or equal to 24 hr) 1 hour			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	75061			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified definitively by nomenclature ("1,1,1-trichloroethane"). The test substance was obtained from a commercial source. No batch or lot number was reported. Purity of the test substance was reported to be 99%.
	Metric 2:	Test Substance Source	Low	
	Metric 3:	Test Substance Purity	High	
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	Low	Negative controls were exposed to fresh air only. It is unclear whether negative controls were sham-treated (i.e. restrained in the same manner as treated groups), and if so, for how long, as there were two exposure durations (1 hr, 4 hr) included in the study. No positive controls are required for this study type. The study authors did not report the method of allocation.
	Metric 5:	Positive Controls	N/A	
	Metric 6:	Randomized Allocation of Animals	Low	
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	High	Test substance vaporization was reported adequately. Elevated temperature conditions were reported for oven and injection temperatures. Column packing details and carrier gas and flow rate were reported as well in Table 1. It appears that the test substance was administered consistently across study groups via tracheal intubation while animals were sedated. Target chamber concentrations were reported without ambiguity and analytical concentrations in air were verified by gas chromatography. Raw analytical concentrations were not reported; however, it was reported that analytical concentrations varied by less than 3%. Because information regarding the range of analytical concentrations was reported, this is not considered to be a deficiency and the metric is rated High.
	Metric 8:	Consistency of Exposure Administration	High	
	Metric 9:	Reporting of Doses/Concentrations	High	
	Metric 10:	Exposure Frequency and Duration	High	The acute exposure duration was appropriate for the intended purpose of the study. No justification was provided for the range of concentrations tested; however, these concentrations covered a range of responses, including a NOAEC, LOAEC, and several concentrations above the LOAEC. The inhalation route and method (tracheal intubation) were appropriate for the intended purpose of the study. Flow rate of the carrier gas (nitrogen) was given as 60 mL/min.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	High	
	Metric 12:	Exposure Route and Method	High	
Domain 4: Test Animals				
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Study Citation:	Hobara, T., Kobayashi, H., Higashihara, E., Kawamoto, T., Sakai, T. (1984). Acute effects of 1,1,1-trichloroethane, trichloroethylene, and toluene on the hematologic parameters in dogs. Archives of Environmental Contamination and Toxicology 13(5):589-593.			
Health Outcome(s):	Immune/Hematological			
Reported Health Effect(s):	Immune/Hematological: Hematology (White Blood Cell count, White Blood Cell differential, Red Blood Cell count, platelet count, Hematocrit)			
Duration:	Acute (less than or equal to 24 hr) 1 hour			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	75061			
Domain		Metric	Rating	Comments
	Metric 13:	Test Animal Characteristics	Medium	The test animal species and age were reported. The dogs were reported to be "cross-bred" rather than a specific strain/breed. The dogs were stated to be both male and female, but no information was given regarding numbers of each or whether they were evenly allocated to test groups. Starting body weight was not reported. The source of the animals was not reported.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not reported.
	Metric 15:	Number of Animals per Group	Medium	Each treatment group consisted of 5 individuals and the fresh air control group consisted of 15 individuals. This is considered to be adequate given that it is an acute study.
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	High	Blood sampling and methodology of assessing various hematology parameters were reported in detail and appropriate for the endpoints of interest.
	Metric 17:	Consistency of Outcome Assessment	High	It appears that outcomes were assessed consistently across treatment groups. A protocol is provided.
	Metric 18:	Sampling Adequacy	Low	Although it was reported that n = 5 for treated groups and n = 15 for the control group, it was not specifically stated in figure legends or elsewhere that all animals exposed were also assessed for hematology parameters; therefore, this metric is rated as Low.
	Metric 19:	Blinding of Assessors	N/A	No subjective outcomes were assessed.
	Metric 20:	Negative Control Response	High	Negative control responses were appropriate.
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	High	No confounding variables were identified that could influence outcomes. Respiratory rate was controlled for under the tracheal intubation apparatus and was reported (20 cycles/min).
	Metric 22:	Health Outcomes Unrelated to Exposure	High	No health outcomes unrelated to exposure were identified or reported.
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Study Citation:	Hobara, T., Kobayashi, H., Higashihara, E., Kawamoto, T., Sakai, T. (1984). Acute effects of 1,1,1-trichloroethane, trichloroethylene, and toluene on the hematologic parameters in dogs. Archives of Environmental Contamination and Toxicology 13(5):589-593.			
Health Outcome(s):	Immune/Hematological			
Reported Health Effect(s):	Immune/Hematological: Hematology (White Blood Cell count, White Blood Cell differential, Red Blood Cell count, platelet count, Hematocrit)			
Duration:	Acute (less than or equal to 24 hr) 1 hour			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	75061			
Domain	Metric		Rating	Comments
	Metric 23:	Data Presentation and Analysis	Uninformative	Statistical analysis was performed using an inappropriate method. The only statistical method reported was the t-test, which is not appropriate when more than two groups are being compared; with each repeated t-test on the same data, the probability of Type I error increases substantially beyond the generally accepted error rate of 5%. Not only were there multiple dose groups, but there were also multiple timepoints post-exposure assessed (see Figure 1). Furthermore, no test to determine whether data were normally distributed was conducted. Sufficient data are not provided to enable an independent statistical analysis, as Figure 1 does not specify whether means and standard deviations are shown (as opposed to other summary values) and Figure 2 does not show a representation of data variability. Because improper statistical tests were utilized and sufficient data for independent analysis were not given, this metric is rated Unacceptable. However, this study may still contribute to a weight-of-evidence.
	Metric 24:	Reporting of Data	High	Data were reported adequately.
Additional Comments: None				

Overall Quality Determination**Uninformative**

Study Citation:	Hobara, T., Kobayashi, H., Higashihara, E., Kawamoto, T., Sakai, T. (1984). Acute effects of 1,1,1-trichloroethane, trichloroethylene, and toluene on the hematologic parameters in dogs. Archives of Environmental Contamination and Toxicology 13(5):589-593.			
Health Outcome(s):	Immune/Hematological			
Reported Health Effect(s):	Immune/Hematological: Hematology (White Blood Cell count, White Blood Cell differential, Red Blood Cell count, platelet count, Hematocrit)			
Duration:	Acute (less than or equal to 24 hr) 4 hour			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	75061			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	The test substance was identified definitively by nomenclature ("1,1,1-trichloroethane"). The test substance was obtained from a commercial source. No batch or lot number was reported. Purity of the test substance was reported to be 99%.	
	Metric 2: Test Substance Source	Low		
	Metric 3: Test Substance Purity	High		
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	Low	Negative controls were exposed to fresh air only. It is unclear whether negative controls were sham-treated (i.e. restrained in the same manner as treated groups), and if so, for how long, as there were two exposure durations (1 hr, 4 hr) included in the study. No positive controls are required for this study type. The study authors did not report the method of allocation.	
	Metric 5: Positive Controls	N/A		
	Metric 6: Randomized Allocation of Animals	Low		
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	High	Test substance vaporization was reported adequately. Elevated temperature conditions were reported for oven and injection temperatures. Column packing details and carrier gas and flow rate were reported as well in Table 1. It appears that the test substance was administered consistently across study groups via tracheal intubation while animals were sedated. Target chamber concentrations were reported without ambiguity and analytical concentrations in air were verified by gas chromatography. Raw analytical concentrations were not reported; however, it was reported that analytical concentrations varied by less than 3%. Because information regarding the range of analytical concentrations was reported, this is not considered to be a deficiency and the metric is rated High.	
	Metric 8: Consistency of Exposure Administration	High		
	Metric 9: Reporting of Doses/Concentrations	High		
	Metric 10: Exposure Frequency and Duration	High	The acute exposure duration was appropriate for the intended purpose of the study. No rationale was provided for the single concentration tested for the 4-hour inhalation exposure. However, the range of concentrations tested and responses observed in the 1-hr inhalation exposure portion of this study gives context to the single concentration tested for the 4-hr exposure; therefore, this is not expected to substantially impact results and this metric is rated as Medium. The range of concentrations in the 1-hr exposure covered a range of responses, including a NOAEC, LOAEC, and several concentrations above the LOAEC.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Medium		
	Metric 12: Exposure Route and Method	High		
Domain 4: Test Animals				

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Study Citation:	Hobara, T., Kobayashi, H., Higashihara, E., Kawamoto, T., Sakai, T. (1984). Acute effects of 1,1,1-trichloroethane, trichloroethylene, and toluene on the hematologic parameters in dogs. Archives of Environmental Contamination and Toxicology 13(5):589-593.			
Health Outcome(s):	Immune/Hematological			
Reported Health Effect(s):	Immune/Hematological: Hematology (White Blood Cell count, White Blood Cell differential, Red Blood Cell count, platelet count, Hematocrit)			
Duration:	Acute (less than or equal to 24 hr) 4 hour			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	75061			
Domain		Metric	Rating	Comments
	Metric 13:	Test Animal Characteristics	Medium	The test animal species and age were reported. The dogs were reported to be "cross-bred" rather than a specific strain/breed. The dogs were stated to be both male and female, but no information was given regarding numbers of each or whether they were evenly allocated to test groups. Starting body weight was not reported. The source of the animals was not reported.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not reported.
	Metric 15:	Number of Animals per Group	Medium	Each treatment group consisted of 5 individuals and the fresh air control group consisted of 15 individuals. This is considered to be adequate given that it is an acute study.
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	High	Blood sampling and methodology of assessing various hematology parameters were reported in detail and appropriate for the endpoints of interest.
	Metric 17:	Consistency of Outcome Assessment	High	It appears that outcomes were assessed consistently across treatment groups. A protocol is provided.
	Metric 18:	Sampling Adequacy	Low	Although it was reported that n = 5 for treated groups and n = 15 for the control group, it was not specifically stated in the figure legends or elsewhere that all animals exposed were also assessed for hematology parameters; therefore, this metric is rated as Low.
	Metric 19:	Blinding of Assessors	N/A	No subjective outcomes were assessed.
	Metric 20:	Negative Control Response	High	Negative control responses were appropriate.
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	High	No confounding variables were identified that could influence outcomes. Respiratory rate was controlled for under the tracheal intubation apparatus and was reported (20 cycles/min).
	Metric 22:	Health Outcomes Unrelated to Exposure	High	No health outcomes unrelated to exposure were identified or reported.
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Study Citation:	Hobara, T., Kobayashi, H., Higashihara, E., Kawamoto, T., Sakai, T. (1984). Acute effects of 1,1,1-trichloroethane, trichloroethylene, and toluene on the hematologic parameters in dogs. Archives of Environmental Contamination and Toxicology 13(5):589-593.			
Health Outcome(s):	Immune/Hematological			
Reported Health Effect(s):	Immune/Hematological: Hematology (White Blood Cell count, White Blood Cell differential, Red Blood Cell count, platelet count, Hematocrit)			
Duration:	Acute (less than or equal to 24 hr) 4 hour			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	75061			
Domain	Metric		Rating	Comments
	Metric 23:	Data Presentation and Analysis	Uninformative	Statistical analysis was performed using an inappropriate method. The only statistical method reported was the t-test, which is not appropriate when more than two groups are being compared; with each repeated t-test on the same data, the probability of Type I error increases substantially beyond the generally accepted error rate of 5%. Although there was only a single dose, multiple timepoints post-exposure were assessed (see Figure 6). Additionally, no test to determine whether data were normally distributed was conducted. Sufficient data are not provided to enable an independent statistical analysis, as Figure 6 does not specify whether means and standard deviations are shown for treatment groups (as opposed to other summary values) and for controls, no error bars are shown. Because improper statistical tests were utilized and sufficient data for independent analysis were not given, this metric is rated Unacceptable. However, this study may still contribute to a weight-of-evidence.
	Metric 24:	Reporting of Data	High	Data were reported adequately.
Additional Comments: None				

Overall Quality Determination**Uninformative**

Study Citation:	Hobara, T., Kobayashi, H., Higashihara, E., Kawamoto, T., Sakai, T. (1984). Acute effects of 1,1,1-trichloroethane, trichloroethylene, and toluene on the hematologic parameters in dogs. Archives of Environmental Contamination and Toxicology 13(5):589-593.			
Health Outcome(s):	Immune/Hematological			
Reported Health Effect(s):	Immune/Hematological: Hematology (White Blood Cell count, White Blood Cell differential, Red Blood Cell count, platelet count, Hematocrit)			
Duration:	Acute (less than or equal to 24 hr) Single dose injection			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	75061			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	The test substance was identified definitively by nomenclature ("1,1,1-trichloroethane").	
	Metric 2: Test Substance Source	Low	The test substance was obtained from a commercial source. No batch or lot number was reported.	
	Metric 3: Test Substance Purity	High	Purity of the test substance was reported to be 99%.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	Low	It appears that negative controls used for the inhalation portion of the study also served as controls for the injection portion of the study. Negative controls were exposed to fresh air only. It is unclear whether negative controls were sham-treated (i.e. restrained in the same manner as inhalation treated groups), and if so, for how long, as there were two inhalation exposure durations (1 hr, 4 hr) included in the study.	
	Metric 5: Positive Controls	N/A	No positive controls are required for this study type.	
	Metric 6: Randomized Allocation of Animals	Low	The study authors did not report the method of allocation.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	Test substance preparation and storage were not reported. No vehicle was reported, but it is possible that the test substance was administered undiluted.	
	Metric 8: Consistency of Exposure Administration	High	The test substance was administered consistently across study groups via intravenous injection at an approximate rate of 1 mL/min through the right femoral vein in each of the dogs while animals were sedated.	
	Metric 9: Reporting of Doses/Concentrations	High	The single dose of 50 mg/kg was provided without ambiguity.	
	Metric 10: Exposure Frequency and Duration	High	The acute exposure duration was appropriate for the intended purpose of the study.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	N/A	The study goal was not to have a dose-dependent effect but rather to compare exposure routes (inhalation versus ip injection). A single 50 mg/kg dose of 1, 1, 1-trichlorethylene dose was injected.	
	Metric 12: Exposure Route and Method	High	The injection route and method (intravenous administration) were appropriate for the intended purpose of the study. Administration rate was approximately 1 mL/min.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Medium	The test animal species and age were reported. The dogs were reported to be "cross-bred" rather than a specific strain/breed. The dogs were stated to be both male and female, but no information was given regarding numbers of each or whether they were evenly allocated to test groups. Starting body weight was not reported. The source of the animals was not reported.	
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Study Citation:	Hobara, T., Kobayashi, H., Higashihara, E., Kawamoto, T., Sakai, T. (1984). Acute effects of 1,1,1-trichloroethane, trichloroethylene, and toluene on the hematologic parameters in dogs. Archives of Environmental Contamination and Toxicology 13(5):589-593.			
Health Outcome(s):	Immune/Hematological			
Reported Health Effect(s):	Immune/Hematological: Hematology (White Blood Cell count, White Blood Cell differential, Red Blood Cell count, platelet count, Hematocrit)			
Duration:	Acute (less than or equal to 24 hr) Single dose injection			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	75061			
Domain	Metric	Rating	Comments	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not reported.	
	Metric 15: Number of Animals per Group	Medium	Each treatment group consisted of 5 individuals and the fresh air control group consisted of 15 individuals. This is considered to be adequate given that it is an acute study.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	High	Blood sampling and methodology of assessing various hematology parameters was were reported in detail and appropriate for the endpoints of interest.	
	Metric 17: Consistency of Outcome Assessment	High	It appears that outcomes were assessed consistently across treatment groups. A protocol is provided.	
	Metric 18: Sampling Adequacy	Low	Although it was reported that n = 5 for treated groups and n = 15 for the control group, it was not specifically stated in the figure legends or elsewhere that all animals exposed were also assessed for hematology parameters; therefore, this metric is rated as Low.	
	Metric 19: Blinding of Assessors	N/A	No subjective outcomes were assessed.	
	Metric 20: Negative Control Response	High	Negative control responses were appropriate.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	High	No confounding variables were identified that could influence outcomes.	
	Metric 22: Health Outcomes Unrelated to Exposure	High	No health outcomes unrelated to exposure were identified or reported.	
	Metric 23: Data Presentation and Analysis	Uninformative	Statistical analysis was performed using an inappropriate method. The only statistical method reported was the t-test, which is not appropriate when more than two groups are being compared; with each repeated t-test on the same data, the probability of Type I error increases substantially beyond the generally accepted error rate of 5%. Although there was only a single dose, multiple timepoints post-injection were assessed (see Figure 7). Additionally, no test to determine whether data were normally distributed was conducted. Sufficient data are not provided to enable an independent statistical analysis, as Figure 7 does not specify whether means and standard deviations are shown for treatment groups (as opposed to other summary values) and for controls, no error bars are shown. Because improper statistical tests were utilized and sufficient data for independent analysis were not given, this metric is rated Unacceptable. However, this study may still contribute to a weight-of-evidence.	
	Metric 24: Reporting of Data	High	Data were reported adequately.	
Additional Comments:	None			

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Study Citation:	Hobara, T., Kobayashi, H., Higashihara, E., Kawamoto, T., Sakai, T. (1984). Acute effects of 1,1,1-trichloroethane, trichloroethylene, and toluene on the hematologic parameters in dogs. Archives of Environmental Contamination and Toxicology 13(5):589-593.		
Health Outcome(s):	Immune/Hematological		
Reported Health Effect(s):	Immune/Hematological: Hematology (White Blood Cell count, White Blood Cell differential, Red Blood Cell count, platelet count, Hematocrit)		
Duration:	Acute (less than or equal to 24 hr) Single dose injection		
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane		
HERO ID:	75061		
Domain	Metric	Rating	Comments
Overall Quality Determination		Uninformative	

Study Citation:	Klaassen, C. D., Plaa, G. L. (1966). Relative effects of various chlorinated hydrocarbons on liver and kidney function in mice. Toxicology and Applied Pharmacology 9(1):139-151.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: Changes to liver function - increase in sulfobromophthalein retention, increase in serum ALT activity and changes to histopathology (cellular infiltration, vacuolation, and necrosis)			
Duration:	Acute (less than or equal to 24 hr) Acute; single injection			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	64549; Linked HERO ID(s): 64549, 2799680			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Test substance was identified as 1,1,1-trichloroethane.
	Metric 2:	Test Substance Source	High	The test substance was analytically verified by Dow Chemical Company using infrared spectroscopy.
	Metric 3:	Test Substance Purity	Medium	The nature and quantity of the impurities should not significantly impact the study, and the test substance is the main component.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	Low	Study reports two sets of control mice (one referring to 59, oil treated run simultaneously; and another group of 77 control mice). It is not clear if the 77 mice were run simultaneously or if data is based off of historic information. Also, it was unclear if negative controls were performed to evaluate changes to histopathology.
	Metric 5:	Positive Controls	N/A	Not needed for this study
	Metric 6:	Randomized Allocation of Animals	Low	Animals were randomly allocated into cages (10/cage). Authors do not report how study groups were formed.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Low	Preparation and storage conditions were not properly reported given the volatility of the test substance.
	Metric 8:	Consistency of Exposure	High	Exposure was consistent across study groups.
	Metric 9:	Administration Reporting of Doses/Concentrations	Uninformative	All doses that were used for histopathology and the liver function changes during the LD50 study were not reported. The only reported doses were the LD50, LD10, and to study BSP retention and ALT activity in the presence or absence of ethanol.
	Metric 10:	Exposure Frequency and Duration	High	Exposure and frequency were appropriate for outcome studied.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Low	The number of exposure groups and doses were not reported to assess liver function changes during the LD50 study. For histopathology, the number of groups used was not reported. The number of groups for the LD10 and for the impact of ethanol on BSP retention and ALT activity was reported because there was only one dosing group per study.
	Metric 12:	Exposure Route and Method	High	Route of exposure was i.p. injection.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	Low	The source and age of the mice were not reported.

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Study Citation:	Klaassen, C. D., Plaa, G. L. (1966). Relative effects of various chlorinated hydrocarbons on liver and kidney function in mice. Toxicology and Applied Pharmacology 9(1):139-151.
Health Outcome(s):	Hepatic/Liver
Reported Health Effect(s):	Hepatic/Liver: Changes to liver function - increase in sulfobromophthalein retention, increase in serum ALT activity and changes to histopathology (cellular infiltration, vacuolation, and necrosis)
Duration:	Acute (less than or equal to 24 hr) Acute; single injection
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	64549; Linked HERO ID(s): 64549, 2799680

Domain	Metric	Rating	Comments
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not reported.
	Metric 15: Number of Animals per Group	Medium	The number of animals per study groups were reported in the table or text. The number of animals used in histopathology studies was ambiguous and listed as 10-15.
Domain 5: Outcome Assessment			
	Metric 16: Outcome Assessment Methodology	High	The outcome assessment and methodology were appropriate.
	Metric 17: Consistency of Outcome Assessment	High	Details regarding outcome assessment were reported and assessments were assessed consistently.
	Metric 18: Sampling Adequacy	Medium	Details regarding sampling of outcomes were reported with some limitations.
	Metric 19: Blinding of Assessors	N/A	Blinding was not needed for this study.
	Metric 20: Negative Control Response	Medium	Negative control responses were reported in text and were appropriate, however negative control histology was not reported.
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	Although the study did not report all information to determine confounding, reported information did not identify differences between the groups.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.
	Metric 23: Data Presentation and Analysis	High	Statistical analysis was performed and described.
	Metric 24: Reporting of Data	Low	Data for each study group were not reported for in the assessment of histopathology and for liver dysfunction parameters assessed in the LD50 study.

Additional Comments: Doses were not adequately described for the assessment of liver dysfunction and changes to histopathology.

Overall Quality Determination

Low

Study Citation:	Klaassen, C. D., Plaa, G. L. (1966). Relative effects of various chlorinated hydrocarbons on liver and kidney function in mice. Toxicology and Applied Pharmacology 9(1):139-151.			
Health Outcome(s):	Renal/Kidney			
Reported Health Effect(s):	Renal/Kidney: Changes to kidney function - increased excretion of urine protein and/or glucose, decreased phenolsulfonephthalein excretion, and changes to kidney histopathology (hyaline droplets, hydropic degeneration, increased eosinophilia, and necrosis).			
Duration:	Acute (less than or equal to 24 hr) Acute; single injection			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	64549; Linked HERO ID(s): 64549, 2799680			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	Test substance was identified as 1,1,1-trichloroethane.	
	Metric 2: Test Substance Source	High	The test substance was analytically verified by Dow Chemical Company using infrared spectroscopy.	
	Metric 3: Test Substance Purity	Medium	The nature and quantity of the impurities should not significantly impact the study, and the test substance is the main component.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	Low	Details regarding the control mice are not provided. It is not clear if the control mice were run simultaneously or if data is based off of historic information. Also, it was unclear if negative controls were performed to evaluate changes to histopathology.	
	Metric 5: Positive Controls	N/A	Not needed for this study	
	Metric 6: Randomized Allocation of Animals	Low	Animals were randomly allocated into cages (10/cage). Authors do not report how study groups were formed.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	Preparation and storage conditions were not properly reported given the volatility of the test substance.	
	Metric 8: Consistency of Exposure Administration	High	Exposure was consistent across study groups.	
	Metric 9: Reporting of Doses/Concentrations	Uninformative	Study does not report the doses that were administered other than the LD50. However, it is not clearly reported if this was an actual dose used to study changes to the histopathology.	
	Metric 10: Exposure Frequency and Duration	High	Exposure and frequency were appropriate for outcome studied.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Uninformative	The number of exposure groups and doses were not reported to assess kidney function changes and to evaluate histopathological changes.	
	Metric 12: Exposure Route and Method	High	Route of exposure was i.p. injection.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Low	The source and age of the mice were not reported.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not reported.	
	Metric 15: Number of Animals per Group	Medium	The number of animals per study groups were reported in the table or text. The number of animals used in histopathology studies was ambiguous and listed as 10-15.	
Domain 5: Outcome Assessment				

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Study Citation:	Klaassen, C. D., Plaa, G. L. (1966). Relative effects of various chlorinated hydrocarbons on liver and kidney function in mice. Toxicology and Applied Pharmacology 9(1):139-151.			
Health Outcome(s):	Renal/Kidney			
Reported Health Effect(s):	Renal/Kidney: Changes to kidney function - increased excretion of urine protein and/or glucose, decreased phenolsulfonephthalein excretion, and changes to kidney histopathology (hyaline droplets, hydropic degeneration, increased eosinophilia, and necrosis).			
Duration:	Acute (less than or equal to 24 hr) Acute; single injection			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	64549; Linked HERO ID(s): 64549, 2799680			
Domain	Metric	Rating	Comments	
	Metric 16: Outcome Assessment Methodology	High	The outcome assessment and methodology were appropriate.	
	Metric 17: Consistency of Outcome Assessment	High	Details regarding outcome assessment were reported and assessments were assessed consistently.	
	Metric 18: Sampling Adequacy	Medium	Details regarding sampling of outcomes were reported with limitations.	
	Metric 19: Blinding of Assessors	N/A	Blinding of assessors is not needed for this study	
	Metric 20: Negative Control Response	Medium	Negative control responses were reported in text and were appropriate, however negative control histology was not reported.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	Although the study did not report all information to determine confounding, reported information did not identify differences between the groups.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.	
	Metric 23: Data Presentation and Analysis	High	Statistical analysis was adequately described.	
	Metric 24: Reporting of Data	Low	Data for the different dose groups were not reported and there was no data reported for the parameters evaluating kidney dysfunction for 1,1,1-dichloroethane. It was just stated in the text that at all doses phenosulfonphthalein excretion was in the normal range.	
Additional Comments:	This study did not report the doses that were administered. Study does not report the doses that were administered other than the LD50. However, it is not clearly reported if this was an actual dose used to study changes to the histopathology.			

Overall Quality Determination**Low**

Study Citation:	Klaassen, C. D., Plaa, G. L. (1966). Relative effects of various chlorinated hydrocarbons on liver and kidney function in mice. Toxicology and Applied Pharmacology 9(1):139-151.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: Determination of LD50 after 24 h			
Duration:	Acute (less than or equal to 24 hr) Acute; single injection			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	64549; Linked HERO ID(s): 64549, 2799680			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	Test substance was identified.	
	Metric 2: Test Substance Source	High	The test substance was analytically verified by Dow Chemical Company using infrared spectroscopy.	
	Metric 3: Test Substance Purity	Medium	The nature and quantity of the impurities should not significantly impact the study, and the test substance is the main component.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	N/A	No control was required (LD50)	
	Metric 5: Positive Controls	N/A	Not needed for this study	
	Metric 6: Randomized Allocation of Animals	Low	Animals were randomly allocated into cages (10/cage). Authors do not report how study groups were formed.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	Preparation and storage conditions were not properly reported given the volatility of the test substance.	
	Metric 8: Consistency of Exposure Administration	High	Exposure was consistent across study groups.	
	Metric 9: Reporting of Doses/Concentrations	Uninformative	Study does not report the doses that were administered.	
	Metric 10: Exposure Frequency and Duration	High	Exposure and frequency were appropriate for outcome studied.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Uninformative	The doses were not reported so the number of study groups could not be determined.	
	Metric 12: Exposure Route and Method	High	Route of exposure was i.p. injection.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Low	The source and age of the mice were not reported.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not reported.	
	Metric 15: Number of Animals per Group	Medium	The number of animals/groups are reported (n=10).	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	High	The outcome assessment and methodology were appropriate.	
	Metric 17: Consistency of Outcome Assessment	High	Details regarding outcome assessment were reported and assessments were assessed consistently.	
	Metric 18: Sampling Adequacy	Medium	Sampling outcomes were reported with some limitations	
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Study Citation:	Klaassen, C. D., Plaa, G. L. (1966). Relative effects of various chlorinated hydrocarbons on liver and kidney function in mice. Toxicology and Applied Pharmacology 9(1):139-151.
Health Outcome(s):	Mortality
Reported Health Effect(s):	Mortality: Determination of LD50 after 24 h
Duration:	Acute (less than or equal to 24 hr) Acute; single injection
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	64549; Linked HERO ID(s): 64549, 2799680

Domain	Metric	Rating	Comments
	Metric 19: Blinding of Assessors	N/A	Blinding is not necessary for this study
	Metric 20: Negative Control Response	N/A	Negative control was not required (LD50)
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	Although the study did not report all information to determine confounding, reported information did not identify differences between the groups.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.
	Metric 23: Data Presentation and Analysis	High	Statistical analysis was adequately described.
	Metric 24: Reporting of Data	Low	Data for the different dose groups were not reported.

Additional Comments: This study did not report the doses that were administered and is therefore rated as unacceptable.

Overall Quality Determination

Low

Study Citation:	Klaassen, C. D., Plaa, G. L. (1967). Relative effects of various chlorinated hydrocarbons on liver and kidney function in dogs. Toxicology and Applied Pharmacology 10(1):119-131.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: Increased SGPT activity, liver histopathology			
Duration:	Acute (less than or equal to 24 hr) Single injection - 1,1,1-TCE			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	64550			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	The test substance was identified as 1,1,1-trichloroethane.	
	Metric 2: Test Substance Source	Low	The source of the test substance was not reported.	
	Metric 3: Test Substance Purity	Low	The authors did not report the purity or grade of the test substance.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	Low	The paper indicates that controls were included for measurement of liver function. However, the paper does not specify how controls were treated (it is unclear whether negative controls were administered the vehicle).	
	Metric 5: Positive Controls	N/A	Positive controls are not needed for the evaluated endpoint.	
	Metric 6: Randomized Allocation of Animals	Low	The paper did not report how animals were allocated to each dose level.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	Information on preparation and storage was not provided, and the test substance is volatile. The paper simply states that the test substance was mixed with corn oil, with no further details.	
	Metric 8: Consistency of Exposure Administration	Low	The volume used for ip injection was not reported. It is unknown whether the exposures were administered consistently across dose groups.	
	Metric 9: Reporting of Doses/Concentrations	High	Doses were reported without ambiguity, in units of mL/kg.	
	Metric 10: Exposure Frequency and Duration	High	A single injection is acceptable for determination of acute effects on the liver.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Medium	The authors did not justify the selected range of doses. Some hepatic effects were observed, but it was unclear whether the dose range sufficiently covered the full range of responses because detailed quantitative results were not reported. Two dose levels (0.75 and 1.05 mL/kg) were used for SGPT measurements and responses were described as either elevated (greater than the control mean + 2SD) or normal (within control mean + 2SD). Histology was examined at the following dose levels: 0.75, 1.05, and 2.5 mL/kg; hepatic lesions were reported qualitatively (incidence data not reported for each dose level), preventing assessment of the range of responses.	
	Metric 12: Exposure Route and Method	High	The route of exposure (ip injection) is suited to the test substance.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Low	Mongrel dogs of both sexes were used (a specific breed was not used). The age and source of animals were not reported. Also, there was a wide range of starting body weights (7-14 kg).	

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Study Citation:	Klaassen, C. D., Plaa, G. L. (1967). Relative effects of various chlorinated hydrocarbons on liver and kidney function in dogs. Toxicology and Applied Pharmacology 10(1):119-131.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: Increased SGPT activity, liver histopathology			
Duration:	Acute (less than or equal to 24 hr) Single injection - 1,1,1-TCE			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	64550			
Domain	Metric	Rating	Comments	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not reported.	
	Metric 15: Number of Animals per Group	Low	There were 2-3 dogs used per dose level. This is fewer than the typical number used to assess hepatic toxicity, but is acceptable given the species used.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	Medium	Only SGPT activity and histology were evaluated. Additional endpoints (e.g., other serum chemistry measurements) would have been useful for assessing hepatic effects.	
	Metric 17: Consistency of Outcome Assessment	Medium	SGPT activity was measured consistently across dose levels (at 24 or 48 hours after dosing, but only data from 24 hours are reported). There were minor differences in the timing of assessment of histology across dose levels (at 24 hours in animals from the LD50 study and at 48 hours in animals from the ED50 study).	
	Metric 18: Sampling Adequacy	High	All surviving animals were evaluated for histology. SGPT activity was measured in all animals dosed for that purpose. Metric 15 was downgraded for the low number of animals per group, and the study is not further downgraded in Metric 18 because all dosed animals were evaluated.	
	Metric 19: Blinding of Assessors	N/A	The outcome of SGPT activity is not subjective, and blinding is not required for initial histopathology review.	
	Metric 20: Negative Control Response	Medium	SGPT activity in control dogs appears adequate, but histology of control dogs is not reported.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	Limited details were provided, but the reported information did not identify differences among study groups that would have confounded the results.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.	
	Metric 23: Data Presentation and Analysis	Uninformative	Statistical analysis was not conducted on SGPT activity, and data enabling an independent analysis were not provided (n = 2-3). Although the authors provided a rough analysis by comparing the values of exposed animals to the control mean + 2SD (using the SD of control animals), this does not take into consideration the variability in the exposed animals. Therefore, the score for this metric is Unacceptable for SGPT activity. This metric is not applicable to the histopathology findings.	
	Metric 24: Reporting of Data	Uninformative	For SGPT activity, numerical data are not provided; results are only reported as "normal" (within control mean + 2SD) or "elevated" (greater than control mean + 2SD). These results cannot be interpreted for biological relevance without more information on magnitude and variability. For histopathology, results are only described qualitatively, and the report does not differentiate among findings in multiple exposure groups.	

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Study Citation:	Klaassen, C. D., Plaa, G. L. (1967). Relative effects of various chlorinated hydrocarbons on liver and kidney function in dogs. Toxicology and Applied Pharmacology 10(1):119-131.
Health Outcome(s):	Hepatic/Liver
Reported Health Effect(s):	Hepatic/Liver: Increased SGPT activity, liver histopathology
Duration:	Acute (less than or equal to 24 hr) Single injection - 1,1,1-TCE
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	64550

Domain	Metric	Rating	Comments

Additional Comments: This form is for 1,1,1-trichloroethane. Due to the lack of quantitative data for each dose level, reliable NOAEL and LOAEL values cannot be identified.

Overall Quality Determination

Uninformative

Study Citation:	Klaassen, C. D., Plaa, G. L. (1967). Relative effects of various chlorinated hydrocarbons on liver and kidney function in dogs. Toxicology and Applied Pharmacology 10(1):119-131.			
Health Outcome(s):	Renal/Kidney			
Reported Health Effect(s):	Renal/Kidney: Decreased PSP excretion, kidney histopathology			
Duration:	Acute (less than or equal to 24 hr) Single injection - 1,1,1-TCE			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	64550			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	The test substance was identified as 1,1,1-trichloroethane.	
	Metric 2: Test Substance Source	Low	The source of the test substance was not reported.	
	Metric 3: Test Substance Purity	Low	The authors did not report the purity or grade of the test substance.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	Low	The paper indicates that controls were included for measurement of kidney function. However, the paper does not specify how controls were treated (it is unclear whether negative controls were administered the vehicle).	
	Metric 5: Positive Controls	N/A	Positive controls are not needed for the evaluated endpoint.	
	Metric 6: Randomized Allocation of Animals	Low	The paper did not report how animals were allocated to each dose level.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	Information on preparation and storage was not provided, and the test substance is volatile. The paper simply states that the test substance was mixed with corn oil, with no further details.	
	Metric 8: Consistency of Exposure Administration	Low	The volume used for ip injection was not reported. It is unknown whether the exposures were administered consistently across dose groups.	
	Metric 9: Reporting of Doses/Concentrations	Uninformative	The doses used for the PSP test and histopathology were not reported, with the exception that 2.5 mL/kg was one of the doses used for histopathology.	
	Metric 10: Exposure Frequency and Duration	High	A single injection is acceptable for determination of acute effects on the kidney.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Uninformative	The range of doses was not reported for the PSP test or kidney histopathology. The only dose that is known to have been used for histopathology is 2.5 mL/kg.	
	Metric 12: Exposure Route and Method	High	The route of exposure (ip injection) is suited to the test substance.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Low	Mongrel dogs of both sexes were used (a specific breed was not used). The age and source of animals were not reported. Also, there was a wide range of starting body weights (7-14 kg).	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not reported.	
	Metric 15: Number of Animals per Group	Low	There were 3 dogs used at the 2.5 mL/kg dose level. This is fewer than the typical number used to assess kidney toxicity, but is acceptable given the species used. The study does not report how many animals were used at other dose levels.	
Domain 5: Outcome Assessment				

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Study Citation:	Klaassen, C. D., Plaa, G. L. (1967). Relative effects of various chlorinated hydrocarbons on liver and kidney function in dogs. Toxicology and Applied Pharmacology 10(1):119-131.			
Health Outcome(s):	Renal/Kidney			
Reported Health Effect(s):	Renal/Kidney: Decreased PSP excretion, kidney histopathology			
Duration:	Acute (less than or equal to 24 hr) Single injection - 1,1,1-TCE			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	64550			
Domain	Metric	Rating	Comments	
	Metric 16: Outcome Assessment Methodology	Medium	Only PSP excretion and histology were evaluated. Additional endpoints (e.g., serum chemistry and urinary measurements) would have been useful for assessing kidney effects.	
	Metric 17: Consistency of Outcome Assessment	Medium	The PSP test was consistently administered across dose levels (at 24 hours after dosing). There were minor differences in the timing of assessment of histology across dose levels (at 24 hours in animals from the LD50 study and at 48 hours in animals from the ED50 study).	
	Metric 18: Sampling Adequacy	High	All surviving animals were evaluated for histology. PSP excretion was measured in all animals dosed for that purpose. Metric 15 was downgraded for the low number of animals per group, and the study is not further downgraded in Metric 18 because all dosed animals were evaluated.	
	Metric 19: Blinding of Assessors	N/A	The outcome of the PSP test is not subjective, and blinding is not required for initial histopathology review.	
	Metric 20: Negative Control Response	Medium	PSP excretion in control dogs was reported and appears acceptable, but the authors do not indicate the normal historical control range for this endpoint. Histology of control dogs is not reported.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	Limited details were provided, but the reported information did not identify differences among study groups that would have confounded the results.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.	
	Metric 23: Data Presentation and Analysis	Uninformative	Statistical analysis was not performed for the PSP test and data enabling an independent analysis were not reported. This metric is N/A for histopathology.	
	Metric 24: Reporting of Data	Uninformative	For PSP excretion, numerical data are not provided; the authors indicate that no effect on PSP excretion was observed (results were within control mean - 2SD). Without quantitative data, this conclusion cannot be confirmed. For histopathology, results are only described qualitatively, and incidence data are not provided for control and exposed groups.	

Additional Comments: This form is for 1,1,1-trichloroethane. Due to the lack of quantitative data for each dose level, reliable NOAEL and LOAEL values cannot be identified.

Overall Quality Determination

Uninformative

Study Citation:	Klaassen, C. D., Plaa, G. L. (1967). Relative effects of various chlorinated hydrocarbons on liver and kidney function in dogs. Toxicology and Applied Pharmacology 10(1):119-131.
Health Outcome(s):	Mortality
Reported Health Effect(s):	Mortality: Increased mortality
Duration:	Acute (less than or equal to 24 hr) Single injection - 1,1,1-TCE
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	64550

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	High	The test substance was identified as 1,1,1-trichloroethane.
	Metric 2: Test Substance Source	Low	The source of the test substance was not reported.
	Metric 3: Test Substance Purity	Low	The authors did not report the purity or grade of the test substance.
Domain 2: Test Design			
	Metric 4: Negative and Vehicle Controls	N/A	The paper did not indicate whether controls were used for the lethality part of the study. However, controls are not required for acute lethality (LD50) determination.
	Metric 5: Positive Controls	N/A	Positive controls are not needed for the evaluated endpoint.
	Metric 6: Randomized Allocation of Animals	Low	The paper did not report how animals were allocated to each dose level.
Domain 3: Exposure Characterization			
	Metric 7: Preparation and Storage of Test Substance	Low	Information on preparation and storage was not provided, and the test substance is volatile. The paper simply states that the test substance was mixed with corn oil, with no further details.
	Metric 8: Consistency of Exposure Administration	Low	The volume used for ip injection was not reported. It is unknown whether the exposures were administered consistently across dose groups.
	Metric 9: Reporting of Doses/Concentrations	High	Doses were reported without ambiguity, in units of mL/kg.
	Metric 10: Exposure Frequency and Duration	High	A single injection is appropriate for determination of the LD50.
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	High	The authors followed the up-and-down method described by Brownlee et al. (1953). The doses used to determine lethality were 2.5 and 3.5 mL/kg. A range of responses (survival or death) was observed.
	Metric 12: Exposure Route and Method	High	The route of exposure (ip injection) is suited to the test substance.
Domain 4: Test Animals			
	Metric 13: Test Animal Characteristics	Low	Mongrel dogs of both sexes were used (a specific breed was not used). The age and source of animals were not reported. Also, there was a wide range of starting body weights (7-14 kg).
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not reported.
	Metric 15: Number of Animals per Group	Medium	There were 2-3 dogs used per dose level, with a total of 5 animals and 4 consistent dose reversals. This appears to be acceptable according to the guidance provided in OECD 425 (up-and-down procedure for acute toxicity in rodents).
Domain 5: Outcome Assessment			
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Study Citation:	Klaassen, C. D., Plaa, G. L. (1967). Relative effects of various chlorinated hydrocarbons on liver and kidney function in dogs. Toxicology and Applied Pharmacology 10(1):119-131.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: Increased mortality			
Duration:	Acute (less than or equal to 24 hr) Single injection - 1,1,1-TCE			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	64550			
Domain	Metric	Rating	Comments	
	Metric 16: Outcome Assessment Methodology	Medium	The outcome was mortality within 24 hours after dosing. Current OECD guidance for determination of lethal effects recommends observation for 14 days after dosing.	
	Metric 17: Consistency of Outcome Assessment	High	The outcome of mortality was assessed consistently across study groups (i.e., at 24 hours after dosing).	
	Metric 18: Sampling Adequacy	High	All animals were evaluated for survival.	
	Metric 19: Blinding of Assessors	N/A	The outcome (mortality) is not subjective.	
	Metric 20: Negative Control Response	N/A	There was no negative control, and one is not required for LD50 determination.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	High	It is unlikely that there were confounding variables in test design or procedures that affected the outcome of mortality.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.	
	Metric 23: Data Presentation and Analysis	High	The method of Brownlee et al. (1953) was followed but not described herein. However, sufficient data were provided to conduct an independent statistical analysis.	
	Metric 24: Reporting of Data	High	Survival data are provided for each dose and for each animal.	
Additional Comments:	This form is for 1,1,1-trichloroethane. The up-and-down procedure used here appears sufficient to determine an approximate LD50, although a more reliable value would be obtained with additional animals.			
Overall Quality Determination		Medium		

Study Citation:	Klaassen, C. D., Plaa, G. L. (1969). Comparison of the biochemical alterations elicited in livers from rats treated with carbon tetrachloride, chloroform, 1,1,2-trichloroethane and 1,1,1-trichloroethane. Biochemical Pharmacology 18(8):2019-2027.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: Liver triglycerides, glucose 6-phosphatase and lipid peroxidation			
Duration:	Acute (less than or equal to 24 hr) Liver G-6-P and lipid peroxidation			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	9913			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	Test substance was identified as 1,1,2-trichloroethane.	
	Metric 2: Test Substance Source	Low	The source of the test substance was not reported.	
	Metric 3: Test Substance Purity	High	Test substance was identified as analytical grade.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	Low	Time 0 was reported. It is not clear if these animals were administered a vehicle or were untreated or if these were run concurrently.	
	Metric 5: Positive Controls	N/A	A positive control group was not necessary.	
	Metric 6: Randomized Allocation of Animals	Low	The study did not report how animals were allocated.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	Preparation and storage were not described adequately given the volatility of the test substance.	
	Metric 8: Consistency of Exposure Administration	Medium	Details of exposure were limited; however, this is unlikely to substantially impact results.	
	Metric 9: Reporting of Doses/Concentrations	Medium	Dose was reported but with some ambiguity. Reported as 0.75 x LD50	
	Metric 10: Exposure Frequency and Duration	High	Exposure duration was appropriate for study.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Low	Only one dose studied which was based off of the LD50.	
	Metric 12: Exposure Route and Method	High	Exposure route was appropriate (i.p injection).	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Low	Source of test animals was not reported.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not reported.	
	Metric 15: Number of Animals per Group	Low	Numbers of animal/group were not reported.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	Medium	Liver histology and serum chemistry were not evaluated to assess hepatotoxicity.	
	Metric 17: Consistency of Outcome Assessment	Medium	Details regarding outcome assessment were limited.	
	Metric 18: Sampling Adequacy	Low	Number of animals/group were not reported	
	Metric 19: Blinding of Assessors	N/A	Blinding was not necessary for this study.	

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Study Citation:	Klaassen, C. D., Plaa, G. L. (1969). Comparison of the biochemical alterations elicited in livers from rats treated with carbon tetrachloride, chloroform, 1,1,2-trichloroethane and 1,1,1-trichloroethane. Biochemical Pharmacology 18(8):2019-2027.
Health Outcome(s):	Hepatic/Liver
Reported Health Effect(s):	Hepatic/Liver: Liver triglycerides, glucose 6-phosphatase and lipid peroxidation
Duration:	Acute (less than or equal to 24 hr) Liver G-6-P and lipid peroxidation
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	9913

Domain	Metric	Rating	Comments
Metric 20:	Negative Control Response	Low	Data from timepoint 0 hour was reported (not clear if this was run concurrently).
Domain 6: Confounding / Variable Control			
Metric 21:	Confounding Variables in Test Design and Procedures	Medium	Study did not report all information to determine confounding, reported information did not identify differences between groups.
Metric 22:	Health Outcomes Unrelated to Exposure	Medium	No information was provided to either to support or dismiss differences in groups in health outcomes or attrition.
Metric 23:	Data Presentation and Analysis	High	Statistical analysis was appropriate.
Metric 24:	Reporting of Data	Medium	There were were some deficiencies in reported data.

Additional Comments: none

Overall Quality Determination

Medium

Study Citation:	Klaassen, C. D., Plaa, G. L. (1969). Comparison of the biochemical alterations elicited in livers from rats treated with carbon tetrachloride, chloroform, 1,1,2-trichloroethane and 1,1,1-trichloroethane. Biochemical Pharmacology 18(8):2019-2027.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: LD50			
Duration:	Acute (less than or equal to 24 hr) Single i.p injection			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	9913			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	Test substance was identified as 1,1,2-trichloroethane.	
	Metric 2: Test Substance Source	Low	The source of the test substance was not reported.	
	Metric 3: Test Substance Purity	High	Test substance was identified as analytical grade.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	N/A	Not applicable for LD50 study.	
	Metric 5: Positive Controls	N/A	A positive control group was not necessary.	
	Metric 6: Randomized Allocation of Animals	Low	The study did not report how animals were allocated.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	Preparation and storage were not described adequately given the volatility of the test substance.	
	Metric 8: Consistency of Exposure Administration	Medium	Details of exposure were limited; however, this is unlikely to substantially impact results.	
	Metric 9: Reporting of Doses/Concentrations	Uninformative	The doses administered were not reported.	
	Metric 10: Exposure Frequency and Duration	High	Exposure duration was appropriate for study.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Uninformative	The number of exposure groups were reported as 4-5, but doses were not reported.	
	Metric 12: Exposure Route and Method	High	Exposure route was appropriate (i.p injection).	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Low	Source of test animals was not reported.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not reported.	
	Metric 15: Number of Animals per Group	Medium	The number of animals /group were appropriate.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	High	Outcome assessment was appropriate.	
	Metric 17: Consistency of Outcome Assessment	Medium	Details regarding outcome assessment were limited.	
	Metric 18: Sampling Adequacy	Low	Details regarding sampling of outcomes were not reported.	
	Metric 19: Blinding of Assessors	N/A	Blinding was not necessary for this study.	
	Metric 20: Negative Control Response	N/A	Negative control not necessary for LD50	
Domain 6: Confounding / Variable Control				
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Study Citation:	Klaassen, C. D., Plaa, G. L. (1969). Comparison of the biochemical alterations elicited in livers from rats treated with carbon tetrachloride, chloroform, 1,1,2-trichloroethane and 1,1,1-trichloroethane. Biochemical Pharmacology 18(8):2019-2027.
Health Outcome(s):	Mortality
Reported Health Effect(s):	Mortality: LD50
Duration:	Acute (less than or equal to 24 hr) Single i.p injection
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	9913

Domain	Metric	Rating	Comments
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	Study did not report all information to determine confounding, reported information did not identify differences between groups.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	No information was provided to either to support or dismiss differences in groups in health outcomes or attrition.
	Metric 23: Data Presentation and Analysis	High	Statistical analysis was appropriate.
	Metric 24: Reporting of Data	Low	Data were not adequately reported.

Additional Comments: Study did not report the doses administered and was therefore rated as unacceptable.

Overall Quality Determination

Low

Study Citation:	Klaassen, C. D., Plaa, G. L. (1969). Comparison of the biochemical alterations elicited in livers from rats treated with carbon tetrachloride, chloroform, 1,1,2-trichloroethane and 1,1,1-trichloroethane. Biochemical Pharmacology 18(8):2019-2027.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: Liver triglycerides, glucose 6-phosphatase and lipid peroxidation			
Duration:	Acute (less than or equal to 24 hr) Liver triglycerides			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	9913			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	Test substance was identified as 1,1,2-trichloroethane.	
	Metric 2: Test Substance Source	Low	The source of the test substance was not reported.	
	Metric 3: Test Substance Purity	High	Test substance was identified as analytical grade.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	Uninformative	A negative control group was not reported.	
	Metric 5: Positive Controls	N/A	A positive control group was not necessary.	
	Metric 6: Randomized Allocation of Animals	Low	The study did not report how animals were allocated.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	Preparation and storage were not described adequately given the volatility of the test substance.	
	Metric 8: Consistency of Exposure Administration	Medium	Details of exposure were limited; however, this is unlikely to substantially impact results.	
	Metric 9: Reporting of Doses/Concentrations	Low	The doses were not reported without ambiguity.	
	Metric 10: Exposure Frequency and Duration	High	Exposure duration was appropriate for study.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Low	Full range of responses were not obtained.	
	Metric 12: Exposure Route and Method	High	Exposure route was appropriate (i.p injection).	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Low	Source of test animals was not reported.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not reported.	
	Metric 15: Number of Animals per Group	Low	Numbers of animal/group were not reported.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	Medium	Liver histology and serum chemistry were not evaluated to assess hepatotoxicity.	
	Metric 17: Consistency of Outcome Assessment	Medium	Details regarding outcome assessment were limited.	
	Metric 18: Sampling Adequacy	Medium	3 animals/group were evaluated	
	Metric 19: Blinding of Assessors	N/A	Blinding was not necessary for this study.	
	Metric 20: Negative Control Response	Low	Negative control response was not reported.	
Domain 6: Confounding / Variable Control				
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Study Citation:	Klaassen, C. D., Plaa, G. L. (1969). Comparison of the biochemical alterations elicited in livers from rats treated with carbon tetrachloride, chloroform, 1,1,2-trichloroethane and 1,1,1-trichloroethane. Biochemical Pharmacology 18(8):2019-2027.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: Liver triglycerides, glucose 6-phosphatase and lipid peroxidation			
Duration:	Acute (less than or equal to 24 hr) Liver triglycerides			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	9913			
Domain	Metric		Rating	Comments
	Metric 21:	Confounding Variables in Test Design and Procedures	Medium	Study did not report all information to determine confounding, reported information did not identify differences between groups.
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	No information was provided to either to support or dismiss differences in groups in health outcomes or attrition.
	Metric 23:	Data Presentation and Analysis	High	Statistical analysis was appropriate.
	Metric 24:	Reporting of Data	High	Data were adequately reported.
Additional Comments: A negative control group was not included therefore the study was rated as unacceptable.				

Overall Quality Determination**Uninformative**

Study Citation:	Lundberg, I., Ekdahl, M., Kronevi, T., Lidums, V., Lundberg, S. (1986). Relative hepatotoxicity of some industrial solvents after intraperitoneal injection or inhalation exposure in rats. Environmental Research 40(2):411-420.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: Sorbitol dehydrogenase activity			
Duration:	Acute (less than or equal to 24 hr) single administration			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	62934			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
Metric 1:	Test Substance Identity	High	Test substance definitively identified as 1,1,1, trichloroethane.	
Metric 2:	Test Substance Source	Low	The source was not reported and the test substance identity was not analytically verified.	
Metric 3:	Test Substance Purity	Low	Study authors state that "all solvents were of proanalysis quality, except styrene and 1,1,2-trichloroethane which were of "purum" quality with a guaranteed solvent content more than 98%." However, precise purity values were not reported for 1,1,1-trichloroethane.	
Domain 2: Test Design				
Metric 4:	Negative and Vehicle Controls	High	A vehicle control group was included (rats injected with 1.0 ml of peanut oil).	
Metric 5:	Positive Controls	N/A	Not necessary for this study type.	
Metric 6:	Randomized Allocation of Animals	Low	The study did not report how animals were allocated to study groups.	
Domain 3: Exposure Characterization				
Metric 7:	Preparation and Storage of Test Substance	Medium	The test substance was diluted in peanut oil. Additional details of test substance preparation and storage were not reported, however, this is a single dose acute study so this is unlikely to substantially impact study results.	
Metric 8:	Consistency of Exposure Administration	Low	Details of exposure administration are not completely reported. Authors do report that solvents were diluted in peanut oil "making the finally administered volume 0.1 to 1.0 ml."	
Metric 9:	Reporting of Doses/Concentrations	Medium	Exact dose levels were not reported, however, study authors state that doses were 1/8, 1/16, and 1/32 of the 24 hour LD50 value, which enables doses to be independently calculated.	
Metric 10:	Exposure Frequency and Duration	High	The test substance was administered as a single ip injection, which is appropriate for acute lethality testing.	
Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	High	This study included 3 treatment groups. Dose levels were 1/8, 1/16, and 1/32 of the 24 hour LD50. A small (magnitude of chance not reported) increase in SDH activity was observed at the highest dose group enabling NOELs and LOELs to be identified.	
Metric 12:	Exposure Route and Method	High	The route and method (ip injection) of exposure were reported and were suited to the test substance.	
Domain 4: Test Animals				
Metric 13:	Test Animal Characteristics	Medium	Species, strain, sex, and weight were reported and are appropriate, age was not reported. It was not specified if animals were sourced commercially or in house.	

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Study Citation:	Lundberg, I., Ekdahl, M., Kronevi, T., Lidums, V., Lundberg, S. (1986). Relative hepatotoxicity of some industrial solvents after intraperitoneal injection or inhalation exposure in rats. Environmental Research 40(2):411-420.
Health Outcome(s):	Hepatic/Liver
Reported Health Effect(s):	Hepatic/Liver: Sorbitol dehydrogenase activity
Duration:	Acute (less than or equal to 24 hr) single administration
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	62934

Domain	Metric	Rating	Comments
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not sufficiently reported to evaluate if husbandry was adequate.
	Metric 15: Number of Animals per Group	Medium	Six rats were included per dose group. This is appropriate for acute toxicity testing.
Domain 5: Outcome Assessment			
	Metric 16: Outcome Assessment Methodology	Low	Hepatotoxicity was evaluated based on a biomarker (i.e., serum SDH). Other measures of hepatotoxicity were not measured (i.e., liver weight, gross pathology, histopathology, serum ALT, AST, ALP).
	Metric 17: Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported and outcomes were assessed consistently across study groups. All ip injections were performed at 2pm and then animals were sacrificed at 8am the following morning. Blood samples were collected and frozen at -20C and SDH activity was analyzed within a week after sacrifice.
	Metric 18: Sampling Adequacy	Low	Details regarding sampling of outcomes were not reported.
	Metric 19: Blinding of Assessors	N/A	Not necessary for this study type.
	Metric 20: Negative Control Response	Low	The biological responses of the negative control group(s) were adequate.
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	Body weight changes and food/water intake were not reported. However, given the acute nature of this study, this is not likely to substantially impact results.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.
	Metric 23: Data Presentation and Analysis	Low	Study authors state that "statistical evaluation was carried out using Student's t test. Two-sided tests were applied. Statistical significance means that $P < 0.05$." No further description is provided. Numerous pairwise comparisons to the control were made, and it is unclear if any corrections for multiple comparisons were made.
	Metric 24: Reporting of Data	High	Data for exposure-related findings were presented for all outcomes by exposure group. Serum SDH activity is reported as mean +/- SEM in Figure 1.

Additional Comments: This form is for the isomer, 1,1,1-trichloroethane.

Overall Quality Determination**Medium**

Study Citation:	Lundberg, I., Ekdahl, M., Kronevi, T., Lidums, V., Lundberg, S. (1986). Relative hepatotoxicity of some industrial solvents after intraperitoneal injection or inhalation exposure in rats. Environmental Research 40(2):411-420.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: LD50			
Duration:	Acute (less than or equal to 24 hr) single administration			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	62934			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Test substance definitively identified as 1,1,1, trichloroethane.
	Metric 2:	Test Substance Source	Low	The source was not reported and the test substance identity was not analytically verified.
	Metric 3:	Test Substance Purity	Low	Study authors state that "all solvents were of proanalysis quality, except styrene and 1,1,2-trichloroethane which were of "purum" quality with a guaranteed solvent content more than 98%." However, precise purity values were not reported for 1,1,1-trichloroethane.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	N/A	Not necessary acute acute lethality testing.
	Metric 5:	Positive Controls	N/A	Not necessary for this study type.
	Metric 6:	Randomized Allocation of Animals	Low	The study did not report how animals were allocated to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Medium	The test substance was diluted in peanut oil. Additional details of test substance preparation and storage were not reported, however, this is a single dose acute study so this is unlikely to substantially impact study results.
	Metric 8:	Consistency of Exposure Administration	Low	Details of exposure administration are not completely reported. Authors report that solvents were diluted in peanut oil "making the finally administered volume 0.1 to 1.0 ml." This indicates that volume differed across treatment groups.
	Metric 9:	Reporting of Doses/Concentrations	Uninformative	Study authors state that groups of six rats "were administered solvent doses according to a geometric series." However, exact dosage groups are not reported.
	Metric 10:	Exposure Frequency and Duration	High	The test substance was administered as a single ip injection, which is appropriate for acute lethality testing.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Uninformative	Study authors state that groups of six rats "were administered solvent doses according to a geometric series." However, the number of dosage groups was not reported.
	Metric 12:	Exposure Route and Method	High	The route and method (ip injection) of exposure were reported and were suited to the test substance.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	Medium	Species, strain, sex, and weight were reported and are appropriate, age was not reported. It was not specified if animals were sourced commercially or in house.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not sufficiently reported to evaluate if husbandry was adequate.
	Metric 15:	Number of Animals per Group	Medium	Six rats were included per dose group. This is appropriate for acute lethality testing.

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Study Citation:	Lundberg, I., Ekdahl, M., Kronevi, T., Lidums, V., Lundberg, S. (1986). Relative hepatotoxicity of some industrial solvents after intraperitoneal injection or inhalation exposure in rats. Environmental Research 40(2):411-420.
Health Outcome(s):	Mortality
Reported Health Effect(s):	Mortality: LD50
Duration:	Acute (less than or equal to 24 hr) single administration
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	62934

Domain	Metric	Rating	Comments
Domain 5: Outcome Assessment			
	Metric 16: Outcome Assessment Methodology	High	The outcome assessment methodology addressed the intended outcome of interest.
	Metric 17: Consistency of Outcome Assessment	Medium	Details were not completely reported (i.e., the timing of when animals in various dose groups were observed for mortality or signs of morbidity was not reported). However, this is unlikely to have a substantial impact on results.
	Metric 18: Sampling Adequacy	Low	Details regarding sampling of outcomes were not reported.
	Metric 19: Blinding of Assessors	N/A	Not necessary for this study type.
	Metric 20: Negative Control Response	N/A	Negative controls are not necessary for acute lethality testing.
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	Although the study did not report all information to determine confounding, reported information did not identify differences.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.
	Metric 23: Data Presentation and Analysis	N/A	Statistical analysis is not necessary for LD50 calculations.
	Metric 24: Reporting of Data	Medium	LD50 and 95% confidence intervals were reported, however, data for lethality at each dose level was not reported.
Additional Comments: This form is for the isomer, 1,1,1-trichloroethane.			

Overall Quality Determination**Low**

Study Citation:	Milman, H. A., Story, D. L., Riccio, E. S., Sivak, A., Tu, A. S., Williams, G. M., Tong, C., Tyson, C. A. (1988). Rat liver foci and in vitro assays to detect initiating and promoting effects of chlorinated ethanes and ethylenes. Annals of the New York Academy of Sciences 534:521-530.			
Health Outcome(s):	Cancer/Carcinogenesis			
Reported Health Effect(s):	Cancer/Carcinogenesis: Increased incidence of GGT-positive liver foci in rats dosed during promotion phase (1,1,2-TCE only)			
Duration:	Acute (less than or equal to 24 hr) Single dose (initiation protocol) - 1,1,1-TCE			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	200479; Linked HERO ID(s): 200479, 200616			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Source	Low	The source was reported as Aldrich, but a batch or lot number was not provided.
	Metric 3:	Test Substance Purity	Medium	Purity was reported as 97 to 99%.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	High	A concurrent negative control group received vehicle (corn oil) only.
	Metric 5:	Positive Controls	Medium	Diethylnitrosamine was used as a positive control for the tumor initiation protocol.
	Metric 6:	Randomized Allocation of Animals	Medium	The study reports randomization of animals.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Low	The study does not report test substance storage and preparation conditions, and the test substance is volatile.
	Metric 8:	Consistency of Exposure Administration	Low	Gavage volume is not reported for treated animals.
	Metric 9:	Reporting of Doses/Concentrations	High	Doses were reported without ambiguity in mg/kg.
	Metric 10:	Exposure Frequency and Duration	High	A single gavage dose appears sufficient for determination of tumor initiation potential (similar protocol used by Pereira et al., 1982).
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Medium	Only a single dose level was used, but it was justified as the MTD.
	Metric 12:	Exposure Route and Method	High	The exposure route (gavage) was appropriate for the test substance.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	Low	Species, sex, strain, and starting body weight were reported. Age and source were not reported.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	Temperature, humidity, and light-dark cycle were not reported and it is not possible to determine whether differences occurred between control and exposed populations.
	Metric 15:	Number of Animals per Group	Medium	The number of animals per study group (10) was appropriate for the study type and outcome analysis.
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	High	The outcome assessment was appropriate and sensitive for tumor initiation potential.
	Metric 17:	Consistency of Outcome Assessment	High	Timing of necropsy was consistent across groups.

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Study Citation:	Milman, H. A., Story, D. L., Riccio, E. S., Sivak, A., Tu, A. S., Williams, G. M., Tong, C., Tyson, C. A. (1988). Rat liver foci and in vitro assays to detect initiating and promoting effects of chlorinated ethanes and ethylenes. Annals of the New York Academy of Sciences 534:521-530.
Health Outcome(s):	Cancer/Carcinogenesis
Reported Health Effect(s):	Cancer/Carcinogenesis: Increased incidence of GGT-positive liver foci in rats dosed during promotion phase (1,1,2-TCE only)
Duration:	Acute (less than or equal to 24 hr) Single dose (initiation protocol) - 1,1,1-TCE
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	200479; Linked HERO ID(s): 200479, 200616

Domain	Metric	Rating	Comments
	Metric 18: Sampling Adequacy	High	Sample size (n = 9-10) was adequate for assessment of tumor initiation potential.
	Metric 19: Blinding of Assessors	N/A	Blinding is not required for initial histopathology review.
	Metric 20: Negative Control Response	High	The biological response (incidence of GGT-positive foci) of the negative control group was adequate.
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	High	There is no evidence of confounding variables in test design and procedures that would affect tumor initiation.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	Only 1/10 animals administered 1,1,1-TCE died (group receiving phenobarbital). There was no information either to support or dismiss the suggestion that differences among groups in animal attrition or health outcomes unrelated to exposure could influence the outcome assessment.
	Metric 23: Data Presentation and Analysis	Low	Statistical analysis was performed, but the methods were not described.
	Metric 24: Reporting of Data	High	Incidence data, with standard errors, are reported for each group in Table 3.

Additional Comments: This form is for 1,1,1-TCE. The primary purpose of this study was to evaluate the tumor initiation and promotion potential of the chemical.

Overall Quality Determination

High

Study Citation:	Milman, H. A., Story, D. L., Riccio, E. S., Sivak, A., Tu, A. S., Williams, G. M., Tong, C., Tyson, C. A. (1988). Rat liver foci and in vitro assays to detect initiating and promoting effects of chlorinated ethanes and ethylenes. Annals of the New York Academy of Sciences 534:521-530.			
Health Outcome(s):	Nutritional/Metabolic			
Reported Health Effect(s):	Nutritional/Metabolic: Decreased body weight gain (1,1,2-TCE only)			
Duration:	Acute (less than or equal to 24 hr) Single dose (initiation protocol) - 1,1,1-TCE			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	200479; Linked HERO ID(s): 200479, 200616			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Source	Low	The source was reported as Aldrich, but a batch or lot number was not provided.
	Metric 3:	Test Substance Purity	Medium	Purity was reported as 97 to 99%.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	High	A concurrent negative control group received vehicle (corn oil) only.
	Metric 5:	Positive Controls	N/A	A positive control is not required for the endpoint of body weight.
	Metric 6:	Randomized Allocation of Animals	Medium	The study reports randomization of animals.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Low	The study does not report test substance storage and preparation conditions, and the test substance is volatile.
	Metric 8:	Consistency of Exposure Administration	Low	Gavage volume is not reported for treated animals.
	Metric 9:	Reporting of Doses/Concentrations	High	Doses were reported without ambiguity in mg/kg.
	Metric 10:	Exposure Frequency and Duration	High	A single gavage dose is appropriate for determination of acute effects.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Medium	Only a single dose level was used, but it was justified as the MTD.
	Metric 12:	Exposure Route and Method	High	The exposure route (gavage) was appropriate for the test substance.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	Low	Species, sex, strain, and starting body weight were reported. Age and source were not reported.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	Temperature, humidity, and light-dark cycle were not reported and it is not possible to determine whether differences occurred between control and exposed populations.
	Metric 15:	Number of Animals per Group	Medium	The number of animals per study group (10) was appropriate for the study type and outcome analysis.
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	High	The outcome assessment methodology was appropriate. Body weight and body weight gain were measured.
	Metric 17:	Consistency of Outcome Assessment	Low	The timing of body weight measurements was not reported.
	Metric 18:	Sampling Adequacy	Low	Sample size for body weight and body weight gain was not reported.
	Metric 19:	Blinding of Assessors	N/A	The outcome (body weight) is not subjective.

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Study Citation:	Milman, H. A., Story, D. L., Riccio, E. S., Sivak, A., Tu, A. S., Williams, G. M., Tong, C., Tyson, C. A. (1988). Rat liver foci and in vitro assays to detect initiating and promoting effects of chlorinated ethanes and ethylenes. Annals of the New York Academy of Sciences 534:521-530.			
Health Outcome(s):	Nutritional/Metabolic			
Reported Health Effect(s):	Nutritional/Metabolic: Decreased body weight gain (1,1,2-TCE only)			
Duration:	Acute (less than or equal to 24 hr) Single dose (initiation protocol) - 1,1,1-TCE			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	200479; Linked HERO ID(s): 200479, 200616			
Domain	Metric	Rating	Comments	
	Metric 20: Negative Control Response	Low	The biological response (body weight) of the negative control group was not reported.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	High	Food and water were provided ad libitum. There is no evidence of confounding variables in test design and procedures that would affect the endpoint of body weight.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	Only 1/10 animals administered 1,1,1-TCE died (group receiving phenobarbital). There was no information either to support or dismiss the suggestion that differences among groups in animal attrition or health outcomes unrelated to exposure could influence the outcome assessment.	
	Metric 23: Data Presentation and Analysis	Low	Statistical analysis was performed, but the methods were not described.	
	Metric 24: Reporting of Data	Low	Results were described only in the text. Numerical values (i.e., body weight, body weight gain) were not provided.	
Additional Comments:	This form is for 1,1,1-TCE. The primary purpose of this study was to evaluate the tumor initiation and promotion potential of the chemical. Effects on body weight and body weight gain were not the primary purpose of the study, and only minimal details are provided for these endpoints.			

Overall Quality Determination**Medium**

Study Citation:	Milman, H. A., Story, D. L., Riccio, E. S., Sivak, A., Tu, A. S., Williams, G. M., Tong, C., Tyson, C. A. (1988). Rat liver foci and in vitro assays to detect initiating and promoting effects of chlorinated ethanes and ethylenes. Annals of the New York Academy of Sciences 534:521-530.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: Decreased absolute liver weight (1,1,2-TCE only)			
Duration:	Acute (less than or equal to 24 hr) Single dose (initiation protocol) - 1,1,1-TCE			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	200479; Linked HERO ID(s): 200479, 200616			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	The test substance was identified by name.	
	Metric 2: Test Substance Source	Low	The source was reported as Aldrich, but a batch or lot number was not provided.	
	Metric 3: Test Substance Purity	Medium	Purity was reported as 97 to 99%.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	High	A concurrent negative control group received vehicle (corn oil) only.	
	Metric 5: Positive Controls	N/A	A positive control is not required for the endpoint of liver weight.	
	Metric 6: Randomized Allocation of Animals	Medium	The study reports randomization of animals.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	The study does not report test substance storage and preparation conditions, and the test substance is volatile.	
	Metric 8: Consistency of Exposure Administration	Low	Gavage volume is not reported for treated animals.	
	Metric 9: Reporting of Doses/Concentrations	High	Doses were reported without ambiguity in mg/kg.	
	Metric 10: Exposure Frequency and Duration	High	A single gavage dose is appropriate for determination of acute effects.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Medium	Only a single dose level was used, but it was justified as the MTD.	
	Metric 12: Exposure Route and Method	High	The exposure route (gavage) was appropriate for the test substance.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Low	Species, sex, strain, and starting body weight were reported. Age and source were not reported.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Temperature, humidity, and light-dark cycle were not reported and it is not possible to determine whether differences occurred between control and exposed populations.	
	Metric 15: Number of Animals per Group	Medium	The number of animals per study group (10) was appropriate for the study type and outcome analysis.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	Low	The outcome assessment for liver was very limited (liver weight only).	
	Metric 17: Consistency of Outcome Assessment	High	Timing of necropsy was consistent across groups.	
	Metric 18: Sampling Adequacy	Low	Sample size for liver weight measurements was not reported.	
	Metric 19: Blinding of Assessors	N/A	The outcome (liver weight) is not subjective.	
	Metric 20: Negative Control Response	Low	The biological response (liver weight) of the negative control group was not reported.	

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Study Citation:	Milman, H. A., Story, D. L., Riccio, E. S., Sivak, A., Tu, A. S., Williams, G. M., Tong, C., Tyson, C. A. (1988). Rat liver foci and in vitro assays to detect initiating and promoting effects of chlorinated ethanes and ethylenes. Annals of the New York Academy of Sciences 534:521-530.
Health Outcome(s):	Hepatic/Liver
Reported Health Effect(s):	Hepatic/Liver: Decreased absolute liver weight (1,1,2-TCE only)
Duration:	Acute (less than or equal to 24 hr) Single dose (initiation protocol) - 1,1,1-TCE
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	200479; Linked HERO ID(s): 200479, 200616

Domain	Metric	Rating	Comments
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	High	Food and water were provided ad libitum. There is no evidence of confounding variables in test design and procedures that would affect the endpoint of liver weight.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	Only 1/10 animals administered 1,1,1-TCE died (group receiving phenobarbital). There was no information either to support or dismiss the suggestion that differences among groups in animal attrition or health outcomes unrelated to exposure could influence the outcome assessment.
	Metric 23: Data Presentation and Analysis	Low	Statistical analysis was performed, but the methods were not described.
	Metric 24: Reporting of Data	Low	Results were described only in the text. Numerical values (i.e., absolute and relative liver weights) were not provided.

Additional Comments: This form is for 1,1,1-TCE. The primary purpose of this study was to evaluate the tumor initiation and promotion potential of the chemical. Effects on liver weight were not the primary purpose of the study, and only minimal details are provided for this endpoint.

Overall Quality Determination**Medium**

Study Citation:	Moser, V. C., Balster, R. L. (1986). The effects of inhaled toluene, halothane, 1,1,1-trichloroethane, and ethanol on fixed-interval responding in mice. Neurotoxicology and Teratology 8(5):525-531.			
Health Outcome(s):	Neurological/Behavioral			
Reported Health Effect(s):	Neurological/Behavioral: Fixed interval response testing			
Duration:	Acute (less than or equal to 24 hr) One time 30 minute exposure			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	95470			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Test substance identified by name (1,1,1-trichloroethane)
	Metric 2:	Test Substance Source	Low	Test substance obtained from Fisher Scientific Co. Batch/lot number not reported.
	Metric 3:	Test Substance Purity	Low	Purity was not reported.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	High	Subjects served as their own controls, and authors made effort to consider temporal changes in untreated responses. "The subjects were exposed in the static chamber to ambient air for 30 min before daily operant sessions when solvents were not being tested" and "All tests were carried out on Tuesdays and Fridays, and one week of air exposure intervened between each solvent. Data obtained on Thursdays were averaged together as control. Due to the drifting baseline response rates of several subjects over the months required for this study, control responding for each solvent was computed as the average of data from Thursdays during the weeks of testing for that solvent"
	Metric 5:	Positive Controls	N/A	Not required for study type
	Metric 6:	Randomized Allocation of Animals	N/A	Randomization not relevant when animals serve as their own controls
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Medium	Method and equipment used to generate vapor were reported. "Briefly, these chambers were 29-liter glass jars with acryliccovers. A fan projected into the chamber above a wire basket which supported a piece of filter paper. The mice were placed in the bottom of the exposure chamber, the top put in place, and a calculated amount of solvent injected onto the filter paper and volatilized to produce the desired concentration". Storage conditions were not described.
	Metric 8:	Consistency of Exposure Administration	Medium	"The order of solvent exposure was different for eachgroup." and "However, there was no effect of order of solvent exposures"
	Metric 9:	Reporting of Doses/Concentrations	Low	Actual concentrations were not reported
	Metric 10:	Exposure Frequency and Duration	Medium	single 30 minute exposure was used; while this is brief, effects were observed.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	High	Four exposures plus control, with 1.5 or 2x intervals were used; both NOAEL and LOAEL identified.
	Metric 12:	Exposure Route and Method	Uninformative	Study used static exposure chamber
Domain 4: Test Animals				

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Study Citation:	Moser, V. C., Balster, R. L. (1986). The effects of inhaled toluene, halothane, 1,1,1-trichloroethane, and ethanol on fixed-interval responding in mice. Neurotoxicology and Teratology 8(5):525-531.			
Health Outcome(s):	Neurological/Behavioral			
Reported Health Effect(s):	Neurological/Behavioral: Fixed interval response testing			
Duration:	Acute (less than or equal to 24 hr) One time 30 minute exposure			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	95470			
Domain	Metric	Rating	Comments	
	Metric 13: Test Animal Characteristics	Medium	Species, strain, and sex reported; source was Charles River Co. Starting age and body weight were not reported.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Medium	Temperature, feed, and light/dark cycle were reported. Water availability and relative humidity were not.	
	Metric 15: Number of Animals per Group	Medium	15 animals were used.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	High	Fixed interval responses were assessed, with details of the operant chambers, training schedule, reward (sweetened milk), etc.	
	Metric 17: Consistency of Outcome Assessment	Low	"All subjects were tested with all four solvents and PO ethanol, and all concentrations were tested in an ascending order. Oral ethanol was given last in all subjects, but otherwise the order of solvent exposure was different for each group."	
	Metric 18: Sampling Adequacy	High	All animals were tested for the outcome	
	Metric 19: Blinding of Assessors	N/A	Not required; measurements were automated	
	Metric 20: Negative Control Response	Low	Control responses (pre-exposure) were not reported; results given as percent of control response rate.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Low	All subjects were exposed to several solvents with one week of air exposure between, so there is a potential for cumulative effects. However, the authors used the control response on the Thursday during the week of testing for each solvent in an effort to control for the change in baseline response rates over time.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.	
	Metric 23: Data Presentation and Analysis	High	Statistical analysis by multiple one way ANOVA with repeated measures; comparison to control with Dunnett's t-test	
	Metric 24: Reporting of Data	High	Results reported graphically (mean and SD) for all outcomes.	
Additional Comments:	None			

Overall Quality Determination**Uninformative**

Study Citation:	Plaa, G. L., Evans, E. A., Hine, C. H. (1958). Relative hepatotoxicity of seven halogenated hydrocarbons. Journal of Pharmacology and Experimental Therapeutics 123:224-229.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: Sleeping time following sodium pentobarbital exposure, gross and microscopic examinations, bromsulfalein (BSP) retention.			
Duration:	Acute (less than or equal to 24 hr) Single injection			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	29447			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified as 1,1,1-trichloroethane. A CASRN was not provided.
	Metric 2:	Test Substance Source	Low	The test substance was fractionally distilled in the testing laboratory. Further validation or analytical analysis of the test substance was not provided in the report.
	Metric 3:	Test Substance Purity	Low	The purity was not explicitly reported.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	Low	The negative control data was generated prior to the treatments and therefore was not concurrent. The sleeping time of ALL animals used in the study (270 total) was tested. These data were pooled to determine the "normal" duration of anaesthesia and this value was used as the untreated control value for data analysis. It does not appear that a vehicle (peanut oil) control group was included in the study.
	Metric 5:	Positive Controls	Medium	A positive control was included (Tannic acid); it is unclear if experiments with these animals were performed concurrently with those treated with the test substance.
	Metric 6:	Randomized Allocation of Animals	Low	The study did not report how animals were allocated into groups.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Medium	The test substance was diluted into peanut oil. No further information on preparation, homogeneity, or storage was provided. Storage is not expected to be an issue for this study because animals were administered single injections only.
	Metric 8:	Consistency of Exposure Administration	High	The study indicates that injection volumes for all dose groups were 0.1mL "whenever possible"
	Metric 9:	Reporting of Doses/Concentrations	High	The dose concentrations were reported in units of mM/kg. Doses in mg/kg can be determined using the molecular weight of the test substance.
	Metric 10:	Exposure Frequency and Duration	High	The exposure frequency (single dose) was appropriate for the purposes of the study.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	High	The number of exposure groups were appropriate to determined ED50 and LD50 values
	Metric 12:	Exposure Route and Method	Low	No justification was provided for the route of exposure (subcutaneous injection), and it is unlikely this is the most relevant route of exposure for evaluating hepatotoxicity which was the purpose of the study.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	Medium	Animal species, strain, sex, and ranges of starting body weights were provided. Animal age and source were not reported.

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Study Citation:	Plaa, G. L., Evans, E. A., Hine, C. H. (1958). Relative hepatotoxicity of seven halogenated hydrocarbons. Journal of Pharmacology and Experimental Therapeutics 123:224-229.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: Sleeping time following sodium pentobarbital exposure, gross and microscopic examinations, bromsulfalein (BSP) retention.			
Duration:	Acute (less than or equal to 24 hr) Single injection			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	29447			
Domain	Metric	Rating	Comments	
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	Animal husbandry conditions were not reported.
	Metric 15:	Number of Animals per Group	Medium	The number of animals per group varied (5-10 for sleeping time studies and 10-15 for LD50 determination). It was not indicated why there were different animal numbers per group.
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	Medium	The methods used were appropriate for the purposes of the study. Organ weights and relative clinical chemistry measurements were not included in the study; however, the study focus was on liver function.
	Metric 17:	Consistency of Outcome Assessment	Medium	The sleeping time data for the untreated controls was recorded prior to treatment.
	Metric 18:	Sampling Adequacy	Medium	Based on the data provided, there were enough samples to evaluate the outcomes of interest. The sampling for some outcomes was not clear due to lack of data reporting.
	Metric 19:	Blinding of Assessors	N/A	Blinding was not required for the outcomes of interest.
	Metric 20:	Negative Control Response	Medium	There is no indication in the text that the control responses were not acceptable. Control responses weren't reported for histopathology.
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Medium	The study did not report information to determine confounding.
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.
	Metric 23:	Data Presentation and Analysis	Low	The methods for EC50 and LD50 determinations were clearly reported. It does not appear that incidences of histopathological findings were statistically analyzed, and these data were not reported for an independent analysis.
	Metric 24:	Reporting of Data	Medium	Data for exposure-related findings were reported for most, but not all outcomes. Histopathology results were not specifically reported for the 1,1,1-trichloroethane isomer. General histopathological results were reported for multiple chemicals.
Additional Comments:	This form is for the 1,1,1-Trichloroethane isomer. Necropsy and histopathology results for the kidney were not reported for this isomer and therefore were not evaluated in a separate form.			

Overall Quality Determination**Medium**

Study Citation:	Plaa, G. L., Larson, R. E. (1965). Relative nephrotoxic properties of chlorinated methane, ethane, and ethylene derivatives in mice. Toxicology and Applied Pharmacology 7(1):37-44.			
Health Outcome(s):	Renal/Kidney			
Reported Health Effect(s):	Renal/Kidney: Urinary glucose and protein; renal histopathology			
Duration:	Acute (less than or equal to 24 hr) Acute- single dose			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	64411			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Test substance was identified as 1,1,1-trichloroethane.
	Metric 2:	Test Substance Source	Low	The source of the test substance was not reported.
	Metric 3:	Test Substance Purity	Low	The purity of the test substance was not reported.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	Uninformative	Details of negative control are not reported. It appears the data on the negative controls come from historic data. The strain, age, sex of the animals are not provided nor is information on if the animals were sham or untreated.
	Metric 5:	Positive Controls	N/A	Not applicable for this study.
	Metric 6:	Randomized Allocation of Animals	Low	Authors do not report if how study groups were formed.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Low	Preparation and storage conditions were not properly reported given the volatility of the test substance.
	Metric 8:	Consistency of Exposure Administration	Medium	Details of exposure administration are incomplete.
	Metric 9:	Reporting of Doses/Concentrations	High	Exposure doses were reported without ambiguity.
	Metric 10:	Exposure Frequency and Duration	High	Exposure and frequency were appropriate for outcome studied.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Medium	There were minor limitation in dose spacing.
	Metric 12:	Exposure Route and Method	High	Route of exposure was i.p. injection.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	Low	The source and age of the mice was not reported.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not reported.
	Metric 15:	Number of Animals per Group	Medium	The number of animals exposed/group was not reported as 10 in each group (Table 4 legend).
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	Medium	Some details regarding the outcome assessment methodology were lacking (e.g how long urine was collected for).

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Study Citation:	Plaa, G. L., Larson, R. E. (1965). Relative nephrotoxic properties of chlorinated methane, ethane, and ethylene derivatives in mice. Toxicology and Applied Pharmacology 7(1):37-44.			
Health Outcome(s):	Renal/Kidney			
Reported Health Effect(s):	Renal/Kidney: Urinary glucose and protein; renal histopathology			
Duration:	Acute (less than or equal to 24 hr) Acute- single dose			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	64411			
Domain	Metric	Rating	Comments	
	Metric 17:	Consistency of Outcome Assessment	High	Outcomes were assessed consistently across study groups.
	Metric 18:	Sampling Adequacy	Medium	The sampling was adequate (all surviving mice)
	Metric 19:	Blinding of Assessors	N/A	Blinding was not necessary for outcomes studied.
	Metric 20:	Negative Control Response	High	Negative control responses for urinary parameters were reported in text and were appropriate for some outcomes.
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Medium	Study did not report all information to determine confounding, reported information did not identify differences among study groups.
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.
	Metric 23:	Data Presentation and Analysis	Low	Statistics analysis were not performed. Significance of increased urinary glucose or protein was determined by a cutoff number set by the authors.
	Metric 24:	Reporting of Data	Medium	Incidence data is provided for presence of urinary glucose or protein above cutoff level. The measured level of glucose and protein would be more useful.
Additional Comments:	Study is rated as unacceptable based on lack of information regarding the negative control.			
Overall Quality Determination		Uninformative		

Study Citation:	Plaa, G. L., Larson, R. E. (1965). Relative nephrotoxic properties of chlorinated methane, ethane, and ethylene derivatives in mice. Toxicology and Applied Pharmacology 7(1):37-44.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: Mortality			
Duration:	Acute (less than or equal to 24 hr) Acute- single dose			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	64411			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Test substance was identified as 1,1,1-trichloroethane.
	Metric 2:	Test Substance Source	Low	The source of the test substance was not reported.
	Metric 3:	Test Substance Purity	Low	The purity of the test substance was not reported.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	Uninformative	Details of negative control are not reported. It appears the data on the negative controls come from historic data. The strain, age, sex of the animals are not provided nor is information on if the animals were sham or untreated.
	Metric 5:	Positive Controls	N/A	Not applicable for this study.
	Metric 6:	Randomized Allocation of Animals	Low	Authors do not report if how study groups were formed.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Low	Preparation and storage conditions were not properly reported given the volatility of the test substance.
	Metric 8:	Consistency of Exposure Administration	Medium	Details of exposure administration are incomplete.
	Metric 9:	Reporting of Doses/Concentrations	High	Exposure doses were reported without ambiguity.
	Metric 10:	Exposure Frequency and Duration	High	Exposure and frequency were appropriate for outcome studied.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Medium	There were minor limitation in dose spacing.
	Metric 12:	Exposure Route and Method	High	Route of exposure was i.p. injection.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	Low	The source and age of the mice was not reported.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not reported.
	Metric 15:	Number of Animals per Group	Medium	The number of animals exposed/group was not reported as 10 in each group (Table 4 legend).
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	Medium	Details regarding the outcome assessment methodology were lacking.
	Metric 17:	Consistency of Outcome Assessment	High	Outcomes were assessed consistently across study groups.
	Metric 18:	Sampling Adequacy	Medium	The sampling was adequate.
	Metric 19:	Blinding of Assessors	N/A	Blinding was not necessary for outcomes studied.

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Study Citation:	Plaa, G. L., Larson, R. E. (1965). Relative nephrotoxic properties of chlorinated methane, ethane, and ethylene derivatives in mice. Toxicology and Applied Pharmacology 7(1):37-44.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: Mortality			
Duration:	Acute (less than or equal to 24 hr) Acute- single dose			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	64411			
Domain	Metric		Rating	Comments
	Metric 20:	Negative Control Response	Low	Negative control responses was not reported.
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Medium	Study did not report all information to determine confounding, reported information did not identify differences among study groups.
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.
	Metric 23:	Data Presentation and Analysis	High	Statistics analysis were not performed but data is presented so that independent analysis can be done.
	Metric 24:	Reporting of Data	High	Mortality data is adequately presented.
Additional Comments: Study is rated as unacceptable based on lack of information regarding the negative control.				

Overall Quality Determination**Uninformative**

Study Citation:	Stacey, N. H. (1989). Toxicity of combinations of chlorinated aliphatic hydrocarbons in-vitro and in-vivo. Toxicology In Vitro 3(2):137-144.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: Liver weight, Plasma AST, ALT, LDH			
Duration:	Acute (less than or equal to 24 hr) Acute- single i.p.			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5465564			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	Test substance was identified as 1,1,1-trichloroethane.	
	Metric 2: Test Substance Source	Low	The source of the test substance was not reported.	
	Metric 3: Test Substance Purity	Low	The purity of the test substance was not reported. Authors report using "the highest grade commercially available from local suppliers."	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	High	Negative controls were treated with the corn oil vehicle.	
	Metric 5: Positive Controls	N/A	Positive control was not required in this study.	
	Metric 6: Randomized Allocation of Animals	Low	The study did not report how animals were allocated.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	Preparation and storage were not described.	
	Metric 8: Consistency of Exposure Administration	Medium	Details of exposure were limited; however, this is unlikely to substantially impact results.	
	Metric 9: Reporting of Doses/Concentrations	High	The dose was reported without ambiguity.	
	Metric 10: Exposure Frequency and Duration	High	Exposure duration was appropriate for study.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	N/A	Only one dose was studied, based off of preliminary experiments. The study was not designed to provide dose-response information.	
	Metric 12: Exposure Route and Method	High	Exposure route was appropriate (i.p injection).	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Medium	Age of the rat was not reported.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Medium	Husbandry conditions were not adequately reported (only information on food and water were reported)	
	Metric 15: Number of Animals per Group	Low	The total number of animals treated per group was not clearly reported, though may be inferred to be n=6 based on the sample size reported in results.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	Medium	Liver weight and serum chemistry were evaluated to assess liver damage (no histology).	
	Metric 17: Consistency of Outcome Assessment	Medium	Details regarding outcome assessment were limited.	
	Metric 18: Sampling Adequacy	High	The sampling for each endpoint was adequate (n=6).	
	Metric 19: Blinding of Assessors	N/A	Blinding was not necessary for this study.	

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Study Citation:	Stacey, N. H. (1989). Toxicity of combinations of chlorinated aliphatic hydrocarbons in-vitro and in-vivo. Toxicology In Vitro 3(2):137-144.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: Liver weight, Plasma AST, ALT, LDH			
Duration:	Acute (less than or equal to 24 hr) Acute- single i.p.			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5465564			
Domain	Metric		Rating	Comments
	Metric 20:	Negative Control Response	High	Negative control response was appropriate.
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Medium	Study did not report all information to determine confounding, reported information did not identify differences between groups.
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	No information was provided to either to support or dismiss differences in groups in health outcomes or attrition.
	Metric 23:	Data Presentation and Analysis	High	Statistical analysis was appropriate.
	Metric 24:	Reporting of Data	High	Exposure related outcomes were reported.
Additional Comments: None				
Overall Quality Determination			Medium	

Study Citation:	Stacey, N. H. (1989). Toxicity of combinations of chlorinated aliphatic hydrocarbons in-vitro and in-vivo. Toxicology In Vitro 3(2):137-144.			
Health Outcome(s):	Renal/Kidney			
Reported Health Effect(s):	Renal/Kidney: Serum urea levels			
Duration:	Acute (less than or equal to 24 hr) Acute- single i.p.			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5465564			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	Test substance was identified as 1,1,1-trichloroethane.	
	Metric 2: Test Substance Source	Low	The source of the test substance was not reported.	
	Metric 3: Test Substance Purity	Low	The purity of the test substance was not reported. Authors report using "the highest grade commercially available from local suppliers."	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	High	Negative controls were treated with the corn oil vehicle.	
	Metric 5: Positive Controls	N/A	Positive control was not required in this study.	
	Metric 6: Randomized Allocation of Animals	Low	The study did not report how animals were allocated.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	Preparation and storage were not described.	
	Metric 8: Consistency of Exposure Administration	Medium	Details of exposure were limited; however, this is unlikely to substantially impact results.	
	Metric 9: Reporting of Doses/Concentrations	High	The dose was reported without ambiguity.	
	Metric 10: Exposure Frequency and Duration	High	Exposure duration was appropriate for study.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	N/A	Only one dose was studied, based off of preliminary experiments. The study was not designed to provide dose-response information.	
	Metric 12: Exposure Route and Method	High	Exposure route was appropriate (i.p injection).	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Medium	Age of the rat was not reported.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Medium	Husbandry conditions were not adequately reported (only information on food and water were reported)	
	Metric 15: Number of Animals per Group	Low	The total number of animals treated per group was not clearly reported, though may be inferred to be n=6 based on the sample size reported in results.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	Medium	Only blood urea level was used to assess renal injury.	
	Metric 17: Consistency of Outcome Assessment	Medium	Details regarding outcome assessment were limited.	
	Metric 18: Sampling Adequacy	Low	It is not reported how many samples were evaluated for serum urea levels.	
	Metric 19: Blinding of Assessors	N/A	Blinding was not necessary for this study.	
	Metric 20: Negative Control Response	Low	Negative control response was not reported.	

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Study Citation:	Stacey, N. H. (1989). Toxicity of combinations of chlorinated aliphatic hydrocarbons in-vitro and in-vivo. Toxicology In Vitro 3(2):137-144.
Health Outcome(s):	Renal/Kidney
Reported Health Effect(s):	Renal/Kidney: Serum urea levels
Duration:	Acute (less than or equal to 24 hr) Acute- single i.p.
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	5465564

Domain	Metric	Rating	Comments
Domain 6: Confounding / Variable Control			
Metric 21:	Confounding Variables in Test Design and Procedures	Medium	Study did not report all information to determine confounding, reported information did not identify differences between groups.
Metric 22:	Health Outcomes Unrelated to Exposure	Medium	No information was provided to either to support or dismiss differences in groups in health outcomes or attrition.
Metric 23:	Data Presentation and Analysis	High	Statistical analysis was appropriate.
Metric 24:	Reporting of Data	High	Negative findings for serum urea levels are reported qualitatively in the text.

Additional Comments: None

Overall Quality Determination**Medium**

Study Citation:	Stacey, N. H. (1989). Toxicity of mixtures of trichloroethylene, tetrachloroethylene and 1,1,1-trichloroethane: Similarity of in vitro to in vivo responses. Toxicology and Industrial Health 5(3):441-450.			
Health Outcome(s):	Hepatic/Liver; Renal/Kidney;			
Reported Health Effect(s):	Hepatic/Liver: Liver weightPlasma ALT and SDH levels; Renal/Kidney: Blood urea levels;			
Duration:	Acute (less than or equal to 24 hr) 1,1,1-Trichloroethane			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	75357			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	All Outcomes: Test substance was identified as 1,1,1-trichloroethane.	
	Metric 2: Test Substance Source	Low	All Outcomes: The source of the test substance was not reported, and the test substance identity was not reported to be analytically verified by the performing laboratory.	
	Metric 3: Test Substance Purity	Low	All Outcomes: The purity of the test substance was not reported.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	Low	All Outcomes: The negative control group was included and were administered corn oil (i.p.), however it is not clear if this is the vehicle used for the test compound.	
	Metric 5: Positive Controls	N/A	All Outcomes: Not applicable for this study.	
	Metric 6: Randomized Allocation of Animals	Low	All Outcomes: The study did not report how animals were allocated.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	All Outcomes: Test substance preparation and storage were not adequately described given the volatility of the test substance.	
	Metric 8: Consistency of Exposure Administration	Medium	All Outcomes: Volume of test substance and corn oil injected (i.p.) were not reported.	
	Metric 9: Reporting of Doses/Concentrations	High	All Outcomes: Doses were adequately reported.	
	Metric 10: Exposure Frequency and Duration	High	All Outcomes: The exposure frequency and duration were reported and appropriate for this study.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	N/A	All Outcomes: A NOAEL was not obtained. The dose studied was based on a preliminary experiment and found to be near threshold for hepatotoxicity. However, the study goal was not to have a dose-dependent effect and there is only one exposure concentration.	
	Metric 12: Exposure Route and Method	Medium	Hepatic/Liver: Vehicle is not clearly reported. It is assumed to be corn oil for this review based on treatment used for control animals.; Renal/Kidney: Vehicle is not clearly reported. It is assumed to be corn oil for this review based on treatment used for control animals.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Medium	All Outcomes: Age of test animals was not reported.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	All Outcomes: Limited husbandry conditions were reported. Only reported that animals had free access to food.	
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Study Citation:	Stacey, N. H. (1989). Toxicity of mixtures of trichloroethylene, tetrachloroethylene and 1,1,1-trichloroethane: Similarity of in vitro to in vivo responses. Toxicology and Industrial Health 5(3):441-450.
Health Outcome(s):	Hepatic/Liver; Renal/Kidney;
Reported Health Effect(s):	Hepatic/Liver: Liver weight/Plasma ALT and SDH levels; Renal/Kidney: Blood urea levels;
Duration:	Acute (less than or equal to 24 hr) 1,1,1-Trichloroethane
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	75357

Domain	Metric	Rating	Comments
	Metric 15: Number of Animals per Group	Low	All Outcomes: The number of animals per study group were reported in Figure 2 as N= 5 or 6. This is sufficient for statistical analysis but is lower than the typical number of animals for assessing liver/kidney toxicity.
Domain 5: Outcome Assessment			
	Metric 16: Outcome Assessment Methodology	Medium	All Outcomes: The outcome assessment methodology partially addressed the intended outcomes(s) of interest of liver and kidney damage (serum chemistry and organ weight evaluated in the absence of histology).
	Metric 17: Consistency of Outcome Assessment	High	All Outcomes: Outcomes were assessed consistently across study groups.
	Metric 18: Sampling Adequacy	High	All Outcomes: Sampling was adequate (n=5-6).
	Metric 19: Blinding of Assessors	N/A	All Outcomes: Blinding was not necessary.
	Metric 20: Negative Control Response	High	All Outcomes: The negative control response was appropriate.
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	All Outcomes: Although the study did not report all information to determine confounding, reported information did not identify differences.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	All Outcomes: There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.
	Metric 23: Data Presentation and Analysis	High	All Outcomes: Statistical analysis was appropriate.
	Metric 24: Reporting of Data	High	All Outcomes: Data were fully reported.
Additional Comments:	The main goal of this study is to compare the toxic effects of solvent mixtures The outcome assessment methodology partially addresses the intended outcomes of interest of liver and kidney damage (i.e., serum chemistry and organ weight evaluated in the absence of histology) at a high concentration of 1,1,1, trichloroethane.		

Overall Quality Determination**Medium**

Study Citation:	Stadler, J. C., Kennedy, G. L., Jr (1996). Evaluation of the sensory irritation potential of volatile organic chemicals from carpets: Alone and in combination. Food and Chemical Toxicology 34(11-12):1125-1130.			
Health Outcome(s):	Irritation			
Reported Health Effect(s):	Irritation: RD50			
Duration:	Acute (less than or equal to 24 hr) One time 30 minute exposure			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	83190			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Test substance identified as 1,1,1-trichloroethane
	Metric 2:	Test Substance Source	Low	Source was Aldrich Chemical Company; batch/lot number not provided
	Metric 3:	Test Substance Purity	Low	Purity not reported
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	Low	Control animals were exposed to room air but no other details were provided.
	Metric 5:	Positive Controls	N/A	Not required for study type
	Metric 6:	Randomized Allocation of Animals	Low	Method of allocation was not reported
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Low	Information on preparation and storage was not reported and lack of details could substantially impact results
	Metric 8:	Consistency of Exposure Administration	Low	Details of exposure administration are insufficiently reported
	Metric 9:	Reporting of Doses/Concentrations	Low	Actual exposure concentrations were not reported
	Metric 10:	Exposure Frequency and Duration	High	Single 30 minute exposure is not unusual for RD50 test
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	High	One concentration used as limit test
	Metric 12:	Exposure Route and Method	High	Vapor inhalation is suitable for volatile substance and for evaluation of respiratory irritation
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	Medium	Test animal species, strain, sex, and starting body weight were reported; age was not; animals obtained commercially from Taconic.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	Only diet was reported. Other husbandry conditions were not sufficiently reported to evaluate if husbandry was adequate and whether differences occurred between control and exposed populations.
	Metric 15:	Number of Animals per Group	Uninformative	Number per group was not reported and no effects observed with 1,1,1-trichloroethane
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	Low	No information on the outcome assessment (RD50) methodology was reported. Paper cites ASTM Designation E981 which was not available for review in HERO.

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Study Citation:	Stadler, J. C., Kennedy, G. L., Jr (1996). Evaluation of the sensory irritation potential of volatile organic chemicals from carpets: Alone and in combination. Food and Chemical Toxicology 34(11-12):1125-1130.			
Health Outcome(s):	Irritation			
Reported Health Effect(s):	Irritation: RD50			
Duration:	Acute (less than or equal to 24 hr) One time 30 minute exposure			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	83190			
Domain	Metric	Rating	Comments	
	Metric 17:	Consistency of Outcome Assessment	Low	Details regarding the execution of the study protocol for outcome assessment were not reported
	Metric 18:	Sampling Adequacy	Uninformative	Study did not report number of animals evaluated for respiratory rate
	Metric 19:	Blinding of Assessors	N/A	Blinding not typically necessary for RD50 study
	Metric 20:	Negative Control Response	High	"Control animals exposed to room air had respiratory rate decreases of 5-8%"
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Medium	Although the study did not report all information to determine confounding, reported information did not identify differences among study groups in the listed confounding factors.
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure
	Metric 23:	Data Presentation and Analysis	Uninformative	Statistical analysis was not performed and data enabling an independent statistical analysis were not provided. Results for 1,1,1-trichloroethane were reported qualitatively.
	Metric 24:	Reporting of Data	Uninformative	Results for 1,1,1-trichloroethane were reported qualitatively ("eliminated with the limit test"); limit test description indicated that additional testing was done only if respiratory rate decrease of 20% or more was seen.
Additional Comments: None				
Overall Quality Determination			Uninformative	

Study Citation:	Umezu, T., Shibata, Y. (2014). Different behavioral effect dose-response profiles in mice exposed to two-carbon chlorinated hydrocarbons: influence of structural and physical properties. Toxicology and Applied Pharmacology 279(2):103-112.			
Health Outcome(s):	Neurological/Behavioral			
Reported Health Effect(s):	Neurological/Behavioral: Righting reflex test, Bridge test, FR20 operant test and MULT operant test			
Duration:	Acute (less than or equal to 24 hr) Acute- 1,1,1-trichloroethane			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5554867			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Test substance was identified as 1,1,1-trichloroethane.
	Metric 2:	Test Substance Source	Low	The source of the test substance was Wako Pure Chemical Industries (Osaka, Japan). Batch/lot number was not provided.
	Metric 3:	Test Substance Purity	Low	The purity of the test substance was not reported.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	Low	Negative controls were included and appropriate (vehicle) for all behavioral tests except the righting reflex test. A negative control was not included for this test.
	Metric 5:	Positive Controls	N/A	Positive control was not required in this study.
	Metric 6:	Randomized Allocation of Animals	Low	The study did not report how animals were allocated.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Low	Storage and preparation conditions were not adequately described given the volatility of the test substance.
	Metric 8:	Consistency of Exposure Administration	High	Test substance was administered consistently across study groups.
	Metric 9:	Reporting of Doses/Concentrations	High	Doses are reported without ambiguity.
	Metric 10:	Exposure Frequency and Duration	High	Exposure frequency and duration were reported and appropriate (single i.p injection).
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	High	The number of exposure groups and dose spacing were appropriate.
	Metric 12:	Exposure Route and Method	High	Exposure route was appropriate (i.p injection).
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	High	Animal characteristics were adequately reported.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Medium	Humidity was not reported; all other husbandry conditions were reported.
	Metric 15:	Number of Animals per Group	Medium	The number of animals exposed per group were reported.
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	High	Outcome assessment methodology were appropriate.
	Metric 17:	Consistency of Outcome Assessment	High	Outcome assessment protocols were reported and consistently assessed across the study groups.

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Study Citation:	Umezu, T., Shibata, Y. (2014). Different behavioral effect dose-response profiles in mice exposed to two-carbon chlorinated hydrocarbons: influence of structural and physical properties. Toxicology and Applied Pharmacology 279(2):103-112.
Health Outcome(s):	Neurological/Behavioral
Reported Health Effect(s):	Neurological/Behavioral: Righting reflex test, Bridge test, FR20 operant test and MULT operant test
Duration:	Acute (less than or equal to 24 hr) Acute- 1,1,1-trichloroethane
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	5554867

Domain	Metric	Rating	Comments
	Metric 18: Sampling Adequacy	High	The number of animals evaluated were reported and adequate.
	Metric 19: Blinding of Assessors	N/A	Blinding was not necessary for this study.
	Metric 20: Negative Control Response	High	Negative control group responses were appropriate.

Domain 6: Confounding / Variable Control

Metric 21:	Confounding Variables in Test Design and Procedures	Medium	Study did not report all information to determine confounding, reported information did not identify differences.
Metric 22:	Health Outcomes Unrelated to Exposure	Medium	No information was provided to either to support or dismiss differences in groups in health outcomes or attrition.
Metric 23:	Data Presentation and Analysis	High	Statistical analysis was appropriate.
Metric 24:	Reporting of Data	High	Data for exposure related finds were reported.

Additional Comments: None

Overall Quality Determination**High**

Study Citation:	Umezu, T., Shibata, Y. (2014). Different behavioral effect dose-response profiles in mice exposed to two-carbon chlorinated hydrocarbons: influence of structural and physical properties. Toxicology and Applied Pharmacology 279(2):103-112.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: 24 hour lethality			
Duration:	Acute (less than or equal to 24 hr) Acute- 1,1,1-trichloroethane			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5554867			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Test substance was identified as 1,1,1-trichloroethane.
	Metric 2:	Test Substance Source	Low	The source of the test substance was Wako Pure Chemical Industries (Osaka, Japan). Batch/lot number was not provided.
	Metric 3:	Test Substance Purity	Low	The purity of the test substance was not reported.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	N/A	Acute lethality, negative control was not necessary.
	Metric 5:	Positive Controls	N/A	Positive control was not required in this study.
	Metric 6:	Randomized Allocation of Animals	Low	The study did not report how animals were allocated.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Low	Storage and preparation conditions were not adequately described given the volatility of the test substance.
	Metric 8:	Consistency of Exposure Administration	High	Test substance was administered consistently across study groups.
	Metric 9:	Reporting of Doses/Concentrations	High	Doses are reported without ambiguity.
	Metric 10:	Exposure Frequency and Duration	High	Exposure frequency and duration were reported and appropriate (single i.p injection).
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	High	The number of exposure groups and dose spacing were appropriate.
	Metric 12:	Exposure Route and Method	High	Exposure route was appropriate (i.p injection).
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	High	Animal characteristics were adequately reported.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Medium	Humidity was not reported; all other husbandry conditions were reported.
	Metric 15:	Number of Animals per Group	Medium	The number of animals exposed per group were reported.
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	High	Outcome assessment methodology were appropriate.
	Metric 17:	Consistency of Outcome Assessment	High	Outcome assessment protocols were reported and consistently assessed across the study groups.
	Metric 18:	Sampling Adequacy	High	The number of animals evaluated were reported and adequate.
	Metric 19:	Blinding of Assessors	N/A	Blinding was not necessary for this study.
	Metric 20:	Negative Control Response	N/A	Negative control group was not studied.

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Study Citation:	Umezu, T., Shibata, Y. (2014). Different behavioral effect dose-response profiles in mice exposed to two-carbon chlorinated hydrocarbons: influence of structural and physical properties. Toxicology and Applied Pharmacology 279(2):103-112.
Health Outcome(s):	Mortality
Reported Health Effect(s):	Mortality: 24 hour lethality
Duration:	Acute (less than or equal to 24 hr) Acute- 1,1,1-trichloroethane
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	5554867

Domain	Metric	Rating	Comments
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	Study did not report all information to determine confounding, reported information did not identify differences.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	No information was provided to either to support or dismiss differences in groups in health outcomes or attrition.
	Metric 23: Data Presentation and Analysis	High	Statistical analysis was appropriate.
	Metric 24: Reporting of Data	High	Data for exposure related finds were reported.

Additional Comments: None

Overall Quality Determination**High**

Study Citation:	Wahlberg, J. E., Boman, A. (1979). Comparative percutaneous toxicity of ten industrial solvents in the guinea pig. Scandinavian Journal of Work, Environment and Health 5(4):345-351.			
Health Outcome(s):	Nutritional/Metabolic			
Reported Health Effect(s):	Nutritional/Metabolic: Body weights; body weight gain			
Duration:	Acute (less than or equal to 24 hr) Single dose; observations for 35 days			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	61688			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	Test substance is identified as 1,1,1-trichlorethane; CASRN was not provided.	
	Metric 2: Test Substance Source	Low	A commercial source was identified, but batch/lot number and/or certification of test substance identity was not reported	
	Metric 3: Test Substance Purity	Low	Grade and purity were not reported	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	High	Control animals were exposed to distilled water alone.	
	Metric 5: Positive Controls	N/A	Not necessary for study type	
	Metric 6: Randomized Allocation of Animals	Low	Randomization is not reported	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	Test substance storage (prior to study initiation) was not reported; the test substance is considered a volatile chemical. The test substance was administered undiluted as a single application, so no preparation or solutions or post-exposure storage was necessary.	
	Metric 8: Consistency of Exposure Administration	High	Concurrent control and treated groups were administered the same volume of water or test substance.	
	Metric 9: Reporting of Doses/Concentrations	Medium	Only dose volumes were reported; however, initial body weights (as a range), and Mean weights ± SEM were provided, and the test substance was applied undiluted. Dose estimates can be calculated using the compound density.	
	Metric 10: Exposure Frequency and Duration	High	Study was designed to evaluated toxicity following a single dose.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Medium	A single dose was evaluated. The selected dose was based on experiments in a previous study. The purpose of this study was to evaluate cumulative mortality rates and body weight changes over time and to compare with results from a previous study; therefore, the same dose was used and was appropriate for the purposes of the study.	
	Metric 12: Exposure Route and Method	Medium	Both percutaneous and IP routes of exposure were evaluated. The reader is referred to other publications for additional details on methods. The methods in these sources were adequately described.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Low	Guinea pigs (strain, sex, and age were not specified). Initial body weight ranges were provided. The previous study (which is referred to for methods) used both sexes. The source of animals was not reported in either study.	
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Study Citation:	Wahlberg, J. E., Boman, A. (1979). Comparative percutaneous toxicity of ten industrial solvents in the guinea pig. Scandinavian Journal of Work, Environment and Health 5(4):345-351.			
Health Outcome(s):	Nutritional/Metabolic			
Reported Health Effect(s):	Nutritional/Metabolic: Body weights; body weight gain			
Duration:	Acute (less than or equal to 24 hr) Single dose; observations for 35 days			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	61688			
Domain	Metric	Rating	Comments	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Limited animal husbandry conditions were reported: housing (e.g., 3/cage), type of food and water (frequency or availability not reported).	
	Metric 15: Number of Animals per Group	Low	The number of animals was appropriate (20/group for epicutaneous exposure; 10/group for IP exposure)	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	High	Animal body weights were monitored for 35 days. This was done to allow mutual comparison between a number of solvents, and also to make comparisons with other publications.	
	Metric 17: Consistency of Outcome Assessment	High	Outcome assessment was consistent across study groups.	
	Metric 18: Sampling Adequacy	High	All animals exposed were evaluated.	
	Metric 19: Blinding of Assessors	N/A	Not necessary for the study type	
	Metric 20: Negative Control Response	High	No effects were observed in control animals	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	No confounding variables were reported.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	No health outcomes unrelated to exposure were reported	
	Metric 23: Data Presentation and Analysis	High	The text indicates an analysis of variance was applied, statistical results were included in the data table.	
	Metric 24: Reporting of Data	Medium	Bodyweight data were clearly reported following epicutaneous exposure. The methods indicated that animals exposed via IP were followed in the same manner, however, no bodyweight data following this route of exposure were reported.	
Additional Comments:	This study has a non-standard study design, acute (single exposures) either epicutaneous or via IP were not used for LD50 determinations, but instead, were done for the purpose of comparing cumulative mortality rates and body weight changes between a number of solvents, and between two different exposure routes. It is unclear whether or not bodyweights were measured after the IP route of exposure.			

Overall Quality Determination**Medium**

Study Citation:	Wahlberg, J. E., Boman, A. (1979). Comparative percutaneous toxicity of ten industrial solvents in the guinea pig. Scandinavian Journal of Work, Environment and Health 5(4):345-351.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: Mortality			
Duration:	Acute (less than or equal to 24 hr) Single dose; observations for 35 days			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	61688			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Test substance is identified as 1,1,1-trichlorethane; CASRN was not provided.
	Metric 2:	Test Substance Source	Low	A commercial source was identified, but batch/lot number and/or certification of test substance identity was not reported
	Metric 3:	Test Substance Purity	Low	Grade and purity were not reported
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	High	Control animals were exposed to distilled water alone.
	Metric 5:	Positive Controls	N/A	Not necessary for study type
	Metric 6:	Randomized Allocation of Animals	Low	Randomization is not reported
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Low	Test substance storage (prior to study initiation) was not reported; the test substance is considered a volatile chemical. The test substance was administered undiluted as a single application, so no preparation or solutions or post-exposure storage was necessary.
	Metric 8:	Consistency of Exposure Administration	High	concurrent control and treated groups were administered the same volume of water or test substance.
	Metric 9:	Reporting of Doses/Concentrations	Medium	Only dose volumes were reported; however, initial body weights (as a range) were provided, and the test substance was applied undiluted. Dose estimates can be calculated using the compound density.
	Metric 10:	Exposure Frequency and Duration	High	Study was designed to evaluated toxicity following a single dose.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Medium	A single dose was evaluated. The selected dose was based on experiments in a previous study. The purpose of this study was to evaluate cumulative mortality rates and to compare with results from a previous study; therefore, the same dose was used and was appropriate for the purposes of the study.
	Metric 12:	Exposure Route and Method	Medium	Both percutaneous and IP routes of exposure were evaluated. The reader is referred to other publications for additional details on methods. The methods in these sources waswere adequately described.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	Low	Guinea pigs (strain, sex, and age were not specified). Initial body weight ranges were provided. The previous study (which is referred to for methods) used both sexes. The source of animals was not reported in either study.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	Limited animal husbandry conditions were reported: housing (e.g., 3/cage), type of food and water (frequency or availability not reported).
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Study Citation:	Wahlberg, J. E., Boman, A. (1979). Comparative percutaneous toxicity of ten industrial solvents in the guinea pig. Scandinavian Journal of Work, Environment and Health 5(4):345-351.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: Mortality			
Duration:	Acute (less than or equal to 24 hr) Single dose; observations for 35 days			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	61688			
Domain	Metric	Rating	Comments	
	Metric 15:	Number of Animals per Group	Low	The number of animals was appropriate (20/group for epicutaneous exposure; 10/group for IP exposure)
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	High	Animals were monitored for mortality for 35 days. This was done to allow mutual comparison between a number of solvents, and also to make comparisons with other publications.
	Metric 17:	Consistency of Outcome Assessment	High	Outcome assessment was consistent across study groups.
	Metric 18:	Sampling Adequacy	High	All animals exposed were evaluated.
	Metric 19:	Blinding of Assessors	N/A	Not necessary for the study type
	Metric 20:	Negative Control Response	High	No effects were observed in control animals
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Medium	No confounding variables were reported.
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	No health outcomes unrelated to exposure were reported
	Metric 23:	Data Presentation and Analysis	Low	The text indicates an analysis of variance was applied, but no further descriptions were provided
	Metric 24:	Reporting of Data	High	Mortality data were clearly reported.
Additional Comments:	This study has a non-standard study design, acute (single exposures) either epicutaneous or via IP were not used for LD50 determinations, but instead, were done for the purpose of comparing cumulative mortality rates and body weight changes between a number of solvents, and between two different exposure routes.The study also reported mortality data following percutaneous application of 0.25, 0.5, and 2 mL of 1,1,2-Trichloroethane (Table 4), but this appears to be data extracted from another source, and therefore was not considered in this evaluation.			

Overall Quality Determination**Medium**

Study Citation:	Wiley, J. L., Bowen, S. E., Balster, R. L. (2001). Effects of volatile inhalants on sensorimotor reactivity in rats. Addiction Biology 6(1):35-43.			
Health Outcome(s):	Neurological/Behavioral			
Reported Health Effect(s):	Neurological/Behavioral: Sensorimotor reactivity to a loud stimulus			
Duration:	Acute (less than or equal to 24 hr) 1,1,1-trichloroethane; 15-minutes			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5465795			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Test substance was identified as 1,1,1-trichloroethane.
	Metric 2:	Test Substance Source	Low	The source of the test substance was Fisher Scientific Co. The lot number was not reported.
	Metric 3:	Test Substance Purity	Low	The purity of the test substance was not reported.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	Low	Each animal served as its own control. A baseline response before any test compound was delivered was not performed. Concentrations were delivered randomly, therefore it is possible animals were exposed to the test compound before they were exposed to air alone. The study did wait at least 72 hours in between exposures, but it would be helpful to have a baseline response to compare to.
	Metric 5:	Positive Controls	N/A	Not applicable for this study.
	Metric 6:	Randomized Allocation of Animals	Medium	Each rat was exposed to all concentrations, the order of the concentrations was randomized across the rats.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Low	Preparation and storage of test substance were not adequately reported given the volatility of the test substance.
	Metric 8:	Consistency of Exposure Administration	High	Test substance was delivered consistently across study groups.
	Metric 9:	Reporting of Doses/Concentrations	Low	Actual concentrations were not measured. Study only reports nominal concentration. Previous studies by this group showed measured concentrations did not differ more than 5% from the nominal and remained stable, however no such measurements were made in this study.
	Metric 10:	Exposure Frequency and Duration	High	Exposure frequency and duration were appropriate for this study type.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Low	No effects were seen, even at the highest dose, and authors do not justify the concentrations chosen.
	Metric 12:	Exposure Route and Method	Uninformative	A static inhalation chamber was used.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	Medium	Age of the test animals was not reported.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	High	Husbandry conditions were adequately reported.
	Metric 15:	Number of Animals per Group	Medium	The number of animals /group was appropriate.

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Study Citation:	Wiley, J. L., Bowen, S. E., Balster, R. L. (2001). Effects of volatile inhalants on sensorimotor reactivity in rats. Addiction Biology 6(1):35-43.			
Health Outcome(s):	Neurological/Behavioral			
Reported Health Effect(s):	Neurological/Behavioral: Sensorimotor reactivity to a loud stimulus			
Duration:	Acute (less than or equal to 24 hr) 1,1,1-trichloroethane; 15-minutes			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5465795			
Domain	Metric	Rating	Comments	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	High	The outcome assessment methodology addressed the intended outcomes of interest.	
	Metric 17: Consistency of Outcome Assessment	Low	Details regarding the execution of the protocol were limited (e.g. details on how response was measured were not reported).	
	Metric 18: Sampling Adequacy	High	Sampling was adequate.	
	Metric 19: Blinding of Assessors	N/A	Blinding was not necessary.	
	Metric 20: Negative Control Response	High	The negative control response was appropriate.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Low	Test substance is a respiratory irritant and respiratory rate was not measured.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.	
	Metric 23: Data Presentation and Analysis	High	Statistical analysis was appropriate.	
	Metric 24: Reporting of Data	Medium	Data on 85 dB[A] pre-pulse alone and 69 dB[A] were not reported.	
Additional Comments:	This study is deemed unacceptable based on Metric 12. A static inhalation chamber was used.			
Overall Quality Determination		Uninformative		

Study Citation:	Xia, L., Yu, T. (1992). Study of the relationship between the hepatotoxicity and free radical induced by 1,1,2-trichloroethane and 1,1,1-trichloroethane in rat. Biomedical and Environmental Sciences 5(4):303-313.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: Serum GPT (alanine aminotransferase - ALT), sorbitol dehydrogenase (SDH), and glutamate dehydrogenase (GDH); microscopic examinations of liver			
Duration:	Acute (less than or equal to 24 hr) Single dose			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	659098			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	The test substance was clearly identified by name; the CASRN was not provided.	
	Metric 2: Test Substance Source	High	A commercial test substance source was reported. A batch/lot number was not provided but the chemical was specifically identified by the chemical name.	
	Metric 3: Test Substance Purity	Low	The purity was not reported.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	High	A negative vehicle control was included.	
	Metric 5: Positive Controls	Medium	A positive control was utilized for one of the experiments.	
	Metric 6: Randomized Allocation of Animals	Low	The allocation of animals into group was not reported.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	The test substance was dissolved in arachidic oil. Storage details were not provided.	
	Metric 8: Consistency of Exposure Administration	High	Animals were consistently exposed.	
	Metric 9: Reporting of Doses/Concentrations	High	The dose was reported in mmol/kg; the mean body weights of the animals were provided.	
	Metric 10: Exposure Frequency and Duration	High	Animals were administered a single dose with varying sacrifice times.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Medium	Animals were administered the test substance using only one dose group with varying sacrifice times.	
	Metric 12: Exposure Route and Method	High	The exposure route (gavage) was appropriate for the test material.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	High	The test animal species, strain, sex, body weights, source, and age (adult) were reported. The animals were appropriate for the study.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	High	Temperature, humidity, and photoperiod were reported. Animal diet and water were available ad libitum. All animals were similarly housed individually.	
	Metric 15: Number of Animals per Group	Low	The number of animals per group was not reported.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	Medium	The study evaluated a specific subset of responses based on previous data in the literature. Histopathology was performed, which is considered to be a sensitive endpoint. Liver weights were not measured.	

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Study Citation:	Xia, L., Yu, T. (1992). Study of the relationship between the hepatotoxicity and free radical induced by 1,1,2-trichloroethane and 1,1,1-trichloroethane in rat. Biomedical and Environmental Sciences 5(4):303-313.
Health Outcome(s):	Hepatic/Liver
Reported Health Effect(s):	Hepatic/Liver: Serum GPT (alanine aminotransferase - ALT), sorbitol dehydrogenase (SDH), and glutamate dehydrogenase (GDH); microscopic examinations of liver
Duration:	Acute (less than or equal to 24 hr) Single dose
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	659098

Domain	Metric	Rating	Comments
	Metric 17: Consistency of Outcome Assessment	High	Outcomes were consistently assessed across study groups.
	Metric 18: Sampling Adequacy	Low	Details regarding sampling of outcomes were not reported and this deficiency is likely to have a substantial impact on results.
	Metric 19: Blinding of Assessors	N/A	Blinding was not necessary for the outcomes of interest.
	Metric 20: Negative Control Response	High	The negative control responses were appropriate.
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	Low	The study did not measure variables such as animal body weight or changes in food or water intake throughout the study.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.
	Metric 23: Data Presentation and Analysis	High	Statistical methods were described and were appropriate for the data sets.
	Metric 24: Reporting of Data	Low	Data were reported graphically over time for all groups. Data points represented means, but no measures of variance were included in the figures. Statistical significance was clearly indicated. Histopathology incidence data were not provided. Results were described in the text without an indication of significance.

Additional Comments: This form is for 1,1,1-Trichloroethane.

Overall Quality Determination**Medium**

Study Citation:	Bernard, A. M., Russis, de, R., Normand, J. C., Lauwerys, R. R. (1989). Evaluation of the subacute nephrotoxicity of cyclohexane and other industrial solvents in the female Sprague-Dawley rat. Toxicology Letters 45(2-3):271-280.			
Health Outcome(s):	Renal/Kidney			
Reported Health Effect(s):	Renal/Kidney: Urinalysis and measures of kidney function			
Duration:	Short-term (>1-30 days) 2 weeks - 1,1,1-TCE			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	64580			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	The test substance was identified definitively.	
	Metric 2: Test Substance Source	Low	Source was not identified or analytically verified	
	Metric 3: Test Substance Purity	Low	Purity was not reported	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	High	Olive oil administered to control animals	
	Metric 5: Positive Controls	N/A	Positive controls not required for this study type	
	Metric 6: Randomized Allocation of Animals	Low	Random allocation was not reported	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	Preparation and storage conditions were not reported	
	Metric 8: Consistency of Exposure Administration	High	Details of exposure administration were reported and exposures were administered consistently across study groups in a scientifically sound manner.	
	Metric 9: Reporting of Doses/Concentrations	High	Doses reported in graphical results and reported as % of LD50	
	Metric 10: Exposure Frequency and Duration	High	The exposure frequency and duration of exposure were reported and appropriate.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Low	Only one dose group	
	Metric 12: Exposure Route and Method	High	The route and method of exposure were reported and suitable.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Low	Source of the animals was not reported	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	High	Husbandry conditions were reported and adequate.	
	Metric 15: Number of Animals per Group	Medium	5 animals per group	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	Low	Urinary metabolite methodology cited to another source	
	Metric 17: Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported and outcomes were assessed consistently across study groups.	
	Metric 18: Sampling Adequacy	Medium	Minor limitations were identified in the sampling of the outcome(s) of interest.	
	Metric 19: Blinding of Assessors	N/A	Blinding of assessors not required for conducting urinalysis	
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Study Citation:	Bernard, A. M., Russis, de, R., Normand, J. C., Lauwerys, R. R. (1989). Evaluation of the subacute nephrotoxicity of cyclohexane and other industrial solvents in the female Sprague-Dawley rat. Toxicology Letters 45(2-3):271-280.
Health Outcome(s):	Renal/Kidney
Reported Health Effect(s):	Renal/Kidney: Urinalysis and measures of kidney function
Duration:	Short-term (>1-30 days) 2 weeks - 1,1,1-TCE
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	64580

Domain	Metric	Rating	Comments
	Metric 20: Negative Control Response	Low	Negative control outcomes not reported
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	Low	Body weight changes, etc. were not reported.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	No info to support or dismiss animal attrition
	Metric 23: Data Presentation and Analysis	High	Statistical methods were reported and appropriate.
	Metric 24: Reporting of Data	Low	Exposure-related findings were not reported for each study group. Complete results for exams conducted were not reported for all chemicals.

Additional Comments: Limited data reporting make this study difficult to interpret.

Overall Quality Determination

Medium

Study Citation:	Kjellstrand, P., Bjerkemo, M., Adler-Maihofer, M., Holmquist, B. (1985). Effects of solvent exposure on testosterone levels and butyrylcholinesterase activity in mice. Acta Pharmacologica et Toxicologica 57(4):242-249.			
Health Outcome(s):	Nutritional/Metabolic			
Reported Health Effect(s):	Nutritional/Metabolic: Body weight			
Duration:	Short-term (>1-30 days) 30 days			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	62385			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
Metric 1:	Test Substance Identity	Medium	chemical name reported; 1,1,1-Trichloroethane, isomer of 1,1,2-Trichloroethane. No CAS number was reported;	
Metric 2:	Test Substance Source	High	Source reported: ICI, Mond Division, England; Lot/Batch number not reported.	
Metric 3:	Test Substance Purity	Medium	"commercial cleaning grade free from dioxane, 5% stabilizers, with minor amounts of butyloxide"	
Domain 2: Test Design				
Metric 4:	Negative and Vehicle Controls	High	untreated air	
Metric 5:	Positive Controls	N/A	Not applicable for this study design	
Metric 6:	Randomized Allocation of Animals	Low	Did not report how animals were allocated to groups	
Domain 3: Exposure Characterization				
Metric 7:	Preparation and Storage of Test Substance	Low	There was no information about the preparation or storage of the test substance. The exposure unit and other exposure information was noted to have been described in a previously published study (kjellstrand et al. 1981); review of that study provided a limited description of the exposure chamber.	
Metric 8:	Consistency of Exposure Administration	Low	Exposure was noted to be continuous for the 30 days except for 2 short periods, twice a week, when water, food and bedding were changed. Measurement of solvent in exposure chambers over the duration of the study was not reported.	
Metric 9:	Reporting of Doses/Concentrations	Low	The concentration tested was reported. Only one concentration was tested.	
Metric 10:	Exposure Frequency and Duration	High	30 days; continuous exposure	
Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Medium	Only a single concentration tested; however, this study was designed to test testosterone and BuChE levels. It was not designed as a comprehensive repeated dose toxicity test. For this endpoint, a dose-response could not be obtained.	
Metric 12:	Exposure Route and Method	Low	The study did not report the route of exposure; however, noted that exposure information was described in a previously published study (Kjellstrand et al. 1981) indicating inhalation exposure. Only one concentration was tested. Minimal details about the methods for inhalation exposure administration were reported, resulting in significant uncertainty about the true exposure parameters. The cited study methods described the exposure unit and technical arrangements, but were for exposure to TCE and not this chemical substance Each exposure chamber was noted to have a volume of 150 L and was provided with 12 L air or solvent-air mixture/min. method of measurement of solvent in exposure chambers over the duration of the study was not reported.	

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Study Citation:	Kjellstrand, P., Bjerkemo, M., Adler-Maihofer, M., Holmquist, B. (1985). Effects of solvent exposure on testosterone levels and butyrylcholinesterase activity in mice. Acta Pharmacologica et Toxicologica 57(4):242-249.			
Health Outcome(s):	Nutritional/Metabolic			
Reported Health Effect(s):	Nutritional/Metabolic: Body weight			
Duration:	Short-term (>1-30 days) 30 days			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	62385			
Domain	Metric	Rating	Comments	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Medium	Male and female NMRI mice (Anticimex, Sweden) were used. Age and starting bd wt were not reported	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Medium	Animals were housed in groups of 10 or 11. commercial laboratory mouse food and water ad libitum. Temperature was 21 +- 2 and a 12-hour lighting was scheduled with a half hour of twilight conditions at dusk and dawn. Humidity was not reported.	
	Metric 15: Number of Animals per Group	Medium	10-11/sex	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	Low	Body weights were not reported to be measured in the methodology; however, body weights changes were noted in the text of the results section. It is not reported when body weight was measured, though text in the results section indicate body weight changes at the end of exposure.	
	Metric 17: Consistency of Outcome Assessment	Low	Minimal reporting of outcome assessment protocol execution. Details regarding the execution of the study protocol for outcome assessment were not reported.	
	Metric 18: Sampling Adequacy	Low	Details regarding sampling of outcomes were not reported	
	Metric 19: Blinding of Assessors	N/A	Not applicable for this study design	
	Metric 20: Negative Control Response	Low	The biological response of the negative control groups were not reported	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Low	Body weight or food intake was not reported. Respiratory rate is not reported.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure for the experiment in 1,1,1-Trichloroethane.	
	Metric 23: Data Presentation and Analysis	High	Statistical methods were reported; statistical treatment of body and organ weights and interpretation of results have been discussed in a previously published study (Kjellstrand & Holmquist, 1984)	
	Metric 24: Reporting of Data	Uninformative	Actual mean body weights were not reported for the control or treatment group. It is noted that some of the groups exposed animals had decreased body weight compared to controls; though unclear if this included the treatment groups for this test substance. The results mention significant differences for experiments using other test substances, but not for 1,1,1-trichloroethane.	

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Study Citation:	Kjellstrand, P., Bjerkemo, M., Adler-Maihofer, M., Holmquist, B. (1985). Effects of solvent exposure on testosterone levels and butyrylcholinesterase activity in mice. Acta Pharmacologica et Toxicologica 57(4):242-249.		
Health Outcome(s):	Nutritional/Metabolic		
Reported Health Effect(s):	Nutritional/Metabolic: Body weight		
Duration:	Short-term (>1-30 days) 30 days		
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane		
HERO ID:	62385		
Domain	Metric	Rating	Comments
Additional Comments:	The study was designed to test for effects on testosterone levels and BuChE activity; only one concentration was tested; there was limited reporting of the methodology and inhalation exposure protocol. Actual mean body weights were not reported for the control or treatment group. It is noted that some of the groups exposed animals had decreased body weight compared to controls; though unclear if this included the treatment groups for this test substance.		

Overall Quality Determination**Uninformative**

Study Citation:	Kjellstrand, P., Bjerkemo, M., Adler-Maihofer, M., Holmquist, B. (1985). Effects of solvent exposure on testosterone levels and butyrylcholinesterase activity in mice. Acta Pharmacologica et Toxicologica 57(4):242-249.
Health Outcome(s):	Hepatic/Liver; Renal/Kidney;
Reported Health Effect(s):	Hepatic/Liver: liver weight; Renal/Kidney: kidney weight;
Duration:	Short-term (>1-30 days) 30 days
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	62385

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
Metric 1:	Test Substance Identity	Medium	Hepatic/Liver: Chemical name reported: 1,1,1-Trichloroethane, isomer of 1,1,2-Trichloroethane. No CAS number was reported.; Renal/Kidney: chemical name reported; 1,1,1-Trichloroethane, isomer of 1,1,2-Trichloroethane. No CAS number was reported;
Metric 2:	Test Substance Source	High	All Outcomes: Source reported: ICI, Mond Division, England; Lot/Batch number not reported.
Metric 3:	Test Substance Purity	Medium	All Outcomes: "commercial cleaning grade free from dioxane, 5% stabilizers, with minor amounts of butyloxide"
Domain 2: Test Design			
Metric 4:	Negative and Vehicle Controls	High	All Outcomes: untreated air
Metric 5:	Positive Controls	N/A	All Outcomes: Not applicable for this study design
Metric 6:	Randomized Allocation of Animals	Low	All Outcomes: Did not report how animals were allocated to groups
Domain 3: Exposure Characterization			
Metric 7:	Preparation and Storage of Test Substance	Low	All Outcomes: There was no information about the preparation or storage of the test substance. The exposure unit and other exposure information was noted to have been described in a previously published study (Kjellstrand et al. 1981); review of that study provided a limited description of the exposure chamber.
Metric 8:	Consistency of Exposure Administration	Low	All Outcomes: Exposure was noted to be continuous for the 30 days except for 2 short periods, twice a week, when water, food and bedding were changed. Measurement of solvent in exposure chambers over the duration of the study was not reported.
Metric 9:	Reporting of Doses/Concentrations	Low	All Outcomes: The concentration tested was reported. Only one concentration was tested.
Metric 10:	Exposure Frequency and Duration	High	All Outcomes: 30 days; continuous exposure
Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Medium	All Outcomes: Only a single concentration tested; however, this study was designed to test testosterone and BuChE levels. It was not designed as a comprehensive repeated dose toxicity test. For this endpoint, a dose-response could not be obtained.

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Study Citation:	Kjellstrand, P., Bjerkemo, M., Adler-Maihofer, M., Holmquist, B. (1985). Effects of solvent exposure on testosterone levels and butyrylcholinesterase activity in mice. Acta Pharmacologica et Toxicologica 57(4):242-249.			
Health Outcome(s):	Hepatic/Liver; Renal/Kidney;			
Reported Health Effect(s):	Hepatic/Liver: liver weight; Renal/Kidney: kidney weight;			
Duration:	Short-term (>1-30 days) 30 days			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	62385			
Domain	Metric	Rating	Comments	
	Metric 12:	Exposure Route and Method	Low	All Outcomes: The study did not report the route of exposure; however, noted that exposure information was described in a previously published study (Kjellstrand et al. 1981) indicating inhalation exposure. Only one concentration was tested. Minimal details about the methods for inhalation exposure administration were reported, resulting in significant uncertainty about the true exposure parameters. The cited study methods described the exposure unit and technical arrangements, but were for exposure to TCE and not this chemical substance Each exposure chamber was noted to have a volume of 150 L and was provided with 12 L air or solvent-air mixture/min. method of measurement of solvent in exposure chambers over the duration of the study was not reported.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	Medium	All Outcomes: Male and female NMRI mice (Anticimex, Sweden) were used. Age and starting bd wt were not reported
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Medium	All Outcomes: Animals were housed in groups of 10 or 11. commercial laboratory mouse food and water ad libitum. Temperature was 21 +/- 2 and a 12-hour lighting was scheduled with a half hour of twilight conditions at dusk and dawn. Humidity was not reported.
	Metric 15:	Number of Animals per Group	Medium	All Outcomes: 10-11/sex
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	Low	All Outcomes: Organ was removed and weighted following end of exposure; minimal methodology details were reported. It is not mentioned if organ weight was absolute or relative. Body weights were not reported to be measured in the methodology; however, body weights changes were noted in the text of the results section.
	Metric 17:	Consistency of Outcome Assessment	Medium	All Outcomes: Minimal reporting of outcome assessment protocol execution.
	Metric 18:	Sampling Adequacy	High	All Outcomes: 10/sex
	Metric 19:	Blinding of Assessors	N/A	All Outcomes: Not applicable for this study design
	Metric 20:	Negative Control Response	High	Hepatic/Liver: Negative control response was reported for both males and females; Renal/Kidney: Negative control response was reported for both males and females and appear appropriate
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Low	Hepatic/Liver: Body weight or food intake was not reported. Differences in use of castration surgery were not reported. Respiratory rate is not reported.; Renal/Kidney: Body weight or food intake was not reported. Respiratory rate is not reported.

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Study Citation:	Kjellstrand, P., Bjerkemo, M., Adler-Maihofer, M., Holmquist, B. (1985). Effects of solvent exposure on testosterone levels and butyrylcholinesterase activity in mice. Acta Pharmacologica et Toxicologica 57(4):242-249.
Health Outcome(s):	Hepatic/Liver; Renal/Kidney;
Reported Health Effect(s):	Hepatic/Liver: liver weight; Renal/Kidney: kidney weight;
Duration:	Short-term (>1-30 days) 30 days
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	62385

Domain	Metric	Rating	Comments
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	Hepatic/Liver: There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure for the experiment in 1,1,1-Trichloroethane; Renal/Kidney: There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure for the experiment in 1,1,1-Trichloroethane.
	Metric 23: Data Presentation and Analysis	High	All Outcomes: Statistical methods were reported; statistical treatment of body and organ weights and interpretation of results have been discussed in a previously published study (Kjellstrand & Holmquist, 1984)
	Metric 24: Reporting of Data	Medium	Hepatic/Liver: Data were reported for mean liver weight by sex; corresponding bd wt was not reported.; Renal/Kidney: Data were reported for mean kidney weight by sex; corresponding bd wt was not reported.

Additional Comments: None

Overall Quality Determination**Medium**

Study Citation:	Kjellstrand, P., Bjerkemo, M., Adler-Maihofer, M., Holmquist, B. (1985). Effects of solvent exposure on testosterone levels and butyrylcholinesterase activity in mice. Acta Pharmacologica et Toxicologica 57(4):242-249.			
Health Outcome(s):	Immune/Hematological			
Reported Health Effect(s):	Immune/Hematological: spleen weight			
Duration:	Short-term (>1-30 days) 30 days			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	62385			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	Medium	chemical name reported; 1,1,1-Trichloroethane, isomer of 1,1,2-Trichloroethane. No CAS number was reported;
	Metric 2:	Test Substance Source	High	Source reported: ICI, Mond Division, England; Lot/Batch number not reported.
	Metric 3:	Test Substance Purity	Medium	”commercial cleaning grade free from dioxane, 5% stabilizers, with minor amounts of butyloxide”
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	High	untreated air
	Metric 5:	Positive Controls	N/A	Not applicable for this study design
	Metric 6:	Randomized Allocation of Animals	Low	Did not report how animals were allocated to groups
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Low	There was no information about the preparation or storage of the test substance. The exposure unit and other exposure information was noted to have been described in a previously published study (kjellstrand et al. 1981); review of that study provided a limited description of the exposure chamber.
	Metric 8:	Consistency of Exposure Administration	Low	Exposure was noted to be continuous for the 30 days except for 2 short periods, twice a week, when water, food and bedding were changed. Measurement of solvent in exposure chambers over the duration of the study was not reported.
	Metric 9:	Reporting of Doses/Concentrations	Low	The concentration tested was reported. Only one concentration was tested.
	Metric 10:	Exposure Frequency and Duration	High	30 days; continuous exposure
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Medium	Only a single concentration tested; however, this study was designed to test testosterone and BuChE levels. It was not designed as a comprehensive repeated dose toxicity test. For this endpoint, a dose-response could not be obtained.
	Metric 12:	Exposure Route and Method	Low	The study did not report the route of exposure; however, noted that exposure information was described in a previously published study (Kjellstrand et al. 1981) indicating inhalation exposure. Only one concentration was tested. Minimal details about the methods for inhalation exposure administration were reported, resulting in significant uncertainty about the true exposure parameters. The cited study methods described the exposure unit and technical arrangements, but were for exposure to TCE and not this chemical substance Each exposure chamber was noted to have a volume of 150 L and was provided with 12 L air or solvent-air mixture/min. method of measurement of solvent in exposure chambers over the duration of the study was not reported.
Domain 4: Test Animals				
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Study Citation:	Kjellstrand, P., Bjerkemo, M., Adler-Maihofer, M., Holmquist, B. (1985). Effects of solvent exposure on testosterone levels and butyrylcholinesterase activity in mice. Acta Pharmacologica et Toxicologica 57(4):242-249.			
Health Outcome(s):	Immune/Hematological			
Reported Health Effect(s):	Immune/Hematological: spleen weight			
Duration:	Short-term (>1-30 days) 30 days			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	62385			
Domain	Metric	Rating	Comments	
	Metric 13: Test Animal Characteristics	Medium	Male and female NMRI mice (Anticimex, Sweden) were used. Age and starting bd wt were not reported	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Medium	Animals were housed in groups of 10 or 11. commercial laboratory mouse food and water ad libitum. Temperature was 21 +/- 2 and a 12-hour lighting was scheduled with a half hour of twilight conditions at dusk and dawn. Humidity was not reported.	
	Metric 15: Number of Animals per Group	Medium	10-11/sex	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	Low	Organ was removed and weighted following end of exposure; minimal methodology details were reported. It is not mentioned if organ weight was absolute or relative. Body weights were not reported to be measured in the methodology; however, body weights changes were noted in the text of the results section.	
	Metric 17: Consistency of Outcome Assessment	Medium	Minimal reporting of outcome assessment protocol execution.	
	Metric 18: Sampling Adequacy	Low	The number of animals evaluated for spleen weight was not specified, but could assume 10/sex similar to liver and kidney weight evaluation.	
	Metric 19: Blinding of Assessors	N/A	Not applicable for this study design	
	Metric 20: Negative Control Response	Low	Negative control response was not reported	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design	Low	body weight or food intake was not reported. Respiratory rate is not reported.	
	Metric 22: and Procedures Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure for the experiment in 1,1,1-Trichloroethane.	
	Metric 23: Data Presentation and Analysis	High	Statistical methods were reported; statistical treatment of body and organ weights and interpretation of results have been discussed in a previously published study (Kjellstrand & Holmquist, 1984)	
	Metric 24: Reporting of Data	Uninformative	Data for mean spleen weight was not reported by sex; Actual organ weight data was not reported; however, results in the text note that spleen weight was decreased by 10% in males exposed to the test substance; spleen weight change was not reported for females as only changes with significant changes were reported; corresponding bd wt was not reported.	
Additional Comments:	The study was designed to test for effects on testosterone levels and BuChE activity; only one concentration was tested; there was limited reporting of the methodology and inhalation exposure protocol. Spleen weight data was not reported; it was noted in the text of the results section that there was a statistically significant 10% change in spleen weight of males. There were no results given for females.			

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1,1,2-Trichloroethane

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Study Citation:	Kjellstrand, P., Bjerkemo, M., Adler-Maihofer, M., Holmquist, B. (1985). Effects of solvent exposure on testosterone levels and butyrylcholinesterase activity in mice. Acta Pharmacologica et Toxicologica 57(4):242-249.
Health Outcome(s):	Immune/Hematological
Reported Health Effect(s):	Immune/Hematological: spleen weight
Duration:	Short-term (>1-30 days) 30 days
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	62385

Domain	Metric	Rating	Comments
Overall Quality Determination		Uninformative	

Study Citation:	Koizumi, A., Fujita, H., Sadamoto, T., Yamamoto, M., Kumai, M., Ikeda, M. (1984). Inhibition of delta-aminolevulinic acid dehydratase by trichloroethylene. Toxicology 30(2):93-102.			
Health Outcome(s):	Hepatic/Liver (Hematological); Immune/Hematological (Liver);			
Reported Health Effect(s):	Hepatic/Liver (Hematological): Liver enzyme activity and concentrations for delta-aminolaevulinic acid dehydratase (ALA-D) and delta-aminolaevulinic acid synthase (ALA-S) activity, and serum glutamic pyruvic transaminase (SGPT) concentrations; Immune/Hematological (Liver): Erythrocyte and leukocyte count in peripheral blood.;			
Duration:	Short-term (>1-30 days) 1,1,1-Trichloroethane 2-day inhalation study			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5471358			
Domain	Metric		Rating	Comments
Domain 1: Test Substance	Metric 1:	Test Substance Identity	High	All Outcomes: The test substance is definitively identified by nomenclature.
	Metric 2:	Test Substance Source	High	All Outcomes: The test substance source/manufacturer was identified but the lot/batch number was not reported, and no analytical verification of the test substance identity was performed (only verification of vapor concentration during the exposure was performed). The test substance does not vary in composition, so the lack of batch/lot number is unlikely to be a problem.
	Metric 3:	Test Substance Purity	High	All Outcomes: The authors report a test substance purity of 99.5% and also state that no stabilizers that could impact metabolism were present as potential impurities.
Domain 2: Test Design	Metric 4:	Negative and Vehicle Controls	High	All Outcomes: The authors report using an appropriate sham-air control as a negative control.
	Metric 5:	Positive Controls	N/A	All Outcomes: A positive control was not required for this assay.
	Metric 6:	Randomized Allocation of Animals	Low	All Outcomes: The authors did not describe how animals were allocated into groups.
Domain 3: Exposure Characterization	Metric 7:	Preparation and Storage of Test Substance	Low	All Outcomes: Test substance storage and preparation conditions were not described, and volatility of the test substance may have a substantial impact on the results. Information on how the test substance vapor was generated was not described in the text but may be present in a previous study that the authors cited in the methods section.
	Metric 8:	Consistency of Exposure Administration	High	All Outcomes: Details of exposure administration are reported and are consistent between groups.
	Metric 9:	Reporting of Doses/Concentrations	Medium	All Outcomes: The authors only report target concentrations. The authors did monitor analytical concentrations during the exposure but did not report these values. They only stated that the coefficient of variation was less than 6% throughout the experiment. The method they used is reliable and this lack of reporting is unlikely to have a large impact on the results.
	Metric 10:	Exposure Frequency and Duration	High	All Outcomes: A 48-hour duration for a single exposure inhalation study is appropriate.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Medium	All Outcomes: The exposure concentration spacing was not justified and the highest concentration did not show biologically relevant results, so the highest concentration may not have been high enough.
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Study Citation:	Koizumi, A., Fujita, H., Sadamoto, T., Yamamoto, M., Kumai, M., Ikeda, M. (1984). Inhibition of delta-aminolevulinic acid dehydratase by trichloroethylene. Toxicology 30(2):93-102.			
Health Outcome(s):	Hepatic/Liver (Hematological); Immune/Hematological (Liver);			
Reported Health Effect(s):	Hepatic/Liver (Hematological): Liver enzyme activity and concentrations for delta-aminolaevulinic acid dehydratase (ALA-D) and delta-aminolaevulinic acid synthase (ALA-S) activity, and serum glutamic pyruvic transaminase (SGPT) concentrations; Immune/Hematological (Liver): Erythrocyte and leukocyte count in peripheral blood.;			
Duration:	Short-term (>1-30 days) 1,1,1-Trichloroethane 2-day inhalation study			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5471358			
Domain		Metric	Rating	Comments
	Metric 12:	Exposure Route and Method	Medium	All Outcomes: A dynamic whole-body chamber was used but the number of air exchanges/hours were not reported.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	Low	All Outcomes: The test animal source was not reported. Sex, strain, approximate age (they were indicated as adult, but no specific age was reported), and starting body weights were reported.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Medium	All Outcomes: Light/dark cycle and food and water availability were reported, but temperature and humidity were not reported. No differences in housing conditions were identified between groups, but given the short duration of the study, these deficiencies are unlikely to have a major impact on the results.
	Metric 15:	Number of Animals per Group	Medium	All Outcomes: The number of animals per group were reported and are sufficient for short-term study types.
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	Medium	Hepatic/Liver (Hematological): The outcome assessment methodology was sensitive to measure endpoints of interest. The authors did not measure several other outcomes (such as liver organ weights or liver histopathology) that could have allowed them to more comprehensively characterize toxicity to the hepatic system.; Immune/Hematological (Liver): The outcome assessment methodology was sensitive to measure endpoints of interest. The authors only measured two cell types in peripheral blood, which may not be enough to comprehensively determine hematological effects.
	Metric 17:	Consistency of Outcome Assessment	High	All Outcomes: The timing of outcome assessment appeared to be consistent between groups.
	Metric 18:	Sampling Adequacy	High	All Outcomes: The sampling used in this study is adequate to measure the outcomes of interest.
	Metric 19:	Blinding of Assessors	Medium	All Outcomes: Blinding is not reported but is not likely to have a major impact on the results as the endpoints of interest are objective in nature.
	Metric 20:	Negative Control Response	High	All Outcomes: The biological response of the control group was reported and appears to be adequate.
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Low	All Outcomes: Respiratory rate is not measured, and the test substance is a respiratory irritant.
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	All Outcomes: Not enough information was presented to determine whether animal attrition occurred.

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Study Citation:	Koizumi, A., Fujita, H., Sadamoto, T., Yamamoto, M., Kumai, M., Ikeda, M. (1984). Inhibition of delta-aminolevulinic acid dehydratase by trichloroethylene. Toxicology 30(2):93-102.
Health Outcome(s):	Hepatic/Liver (Hematological); Immune/Hematological (Liver);
Reported Health Effect(s):	Hepatic/Liver (Hematological): Liver enzyme activity and concentrations for delta-aminolaevulinic acid dehydratase (ALA-D) and delta-aminolaevulinic acid synthase (ALA-S) activity, and serum glutamic pyruvic transaminase (SGPT) concentrations; Immune/Hematological (Liver): Erythrocyte and leukocyte count in peripheral blood.;
Duration:	Short-term (>1-30 days) 1,1,1-Trichloroethane 2-day inhalation study
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	5471358

Domain	Metric	Rating	Comments
Metric 23:	Data Presentation and Analysis	Low	All Outcomes: Statistical methods were presented, but some deficiencies are identified with the methods used. For example, the authors imply that t-tests were used to measure differences between means with more than 1 study group with no correction for multiple comparisons.
Metric 24:	Reporting of Data	Low	All Outcomes: Data for less than half of the prespecified outcomes were reported.

Additional Comments: None

Overall Quality Determination**Medium**

Study Citation:	Kyrklund, T., Haglid, K. G. (1990). Exposure of rats to high concentrations of 1,1,1-trichloroethane and its effects on brain lipid and fatty acid composition. Pharmacology & Toxicology 67(5):384-386.			
Health Outcome(s):	Neurological/Behavioral			
Reported Health Effect(s):	Neurological/Behavioral: Brain weight; cerebral cortex weight, fatty acid pattern in the cerebral cortex			
Duration:	Short-term (>1-30 days) 30 days			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	631732			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was clearly identified as 1,1,1-Trichloroethane; a CASRN was not provided.
	Metric 2:	Test Substance Source	Low	A commercial source was named; a lot and/or batch number was not provided. The test substance was not verified by the the laboratory that performed the study.
	Metric 3:	Test Substance Purity	Medium	The test substance was reported to be "extra pure".
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	Low	A control group was included; but details on whether these animals were untreated, or exposed to air only, were not provided.
	Metric 5:	Positive Controls	N/A	Positive controls were not necessary for the study type.
	Metric 6:	Randomized Allocation of Animals	Low	Allocation of animals into study groups were not specified. Mean body weights were provided for both the experimental group (182 g) and the control group (185g), so it is unclear whether animals were stratified by BW.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Medium	The report referenced another study for exposure details; but did reported some information on the vapor generation system. Storage conditions were not reported. The referenced study is not in HERO and was not freely accessible for review.
	Metric 8:	Consistency of Exposure Administration	Medium	Based on the information available, there is no indication that there were inconsistencies of exposure administration; however, some details are lacking.
	Metric 9:	Reporting of Doses/Concentrations	Medium	Vapor concentrations were measured daily using a Miran 1A infrared spectrometer. Measured concentrations on day 1(1160 ppm and day 30 1280 ppm were provided. A concentration of 1200 ppm is referenced in the remainder of the study. It is unclear if this was the target, or if it is a mean of the analytical measurements taken throughout the exposure period.
	Metric 10:	Exposure Frequency and Duration	Medium	Animals were exposed continuously in order to attain a steady state blood concentration. Animals were exposed for 30 days to mimic previous experiments.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	High	A single exposure group was used for the 30-day duration study. The concentration used was justified by the study authors and appropriate for the purposes of the study.
	Metric 12:	Exposure Route and Method	Low	Animals were exposed whole body. The number of air changes per hour was not specified, although another study by the same author was referenced by the authors. This study is not in HERO and was not freely accessible for review.
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Study Citation:	Kyrklund, T., Haglid, K. G. (1990). Exposure of rats to high concentrations of 1,1,1-trichloroethane and its effects on brain lipid and fatty acid composition. Pharmacology & Toxicology 67(5):384-386.			
Health Outcome(s):	Neurological/Behavioral			
Reported Health Effect(s):	Neurological/Behavioral: Brain weight; cerebral cortex weight, fatty acid pattern in the cerebral cortex			
Duration:	Short-term (>1-30 days) 30 days			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	631732			
Domain	Metric	Rating	Comments	
Domain 4: Test Animals				
Metric 13:	Test Animal Characteristics	Medium	Animal species, strain, sex, source, and starting body weights were provided. These animals were appropriate for this study. Age was not specified.	
Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	Animal husbandry conditions were not reported.	
Metric 15:	Number of Animals per Group	Medium	The number of animals per group (n=8) was adequate for the purposes of the study; however, only a single sex was used. Use of 5 animals/sex is recommended for sub-acute inhalation studies.	
Domain 5: Outcome Assessment				
Metric 16:	Outcome Assessment Methodology	Low	Details regarding outcome assessment methodology (e.g., timing for organ weight measurement were lacking). Two other studies were referenced for lipid and fatty acid determination methodology These papers were not freely accessible for review. The outcomes examined were sufficient/sensitive for the specialized focus of this study.	
Metric 17:	Consistency of Outcome Assessment	Low	Based on the available data, there is no indication that there were inconsistencies in the outcome assessment; however, due to the lack of details provided, this cannot be verified.	
Metric 18:	Sampling Adequacy	High	Details regarding the sampling of organ weight measurements were not reported, but were sufficient for statistical analysis. Sampling for fatty acid measurements was adequate.	
Metric 19:	Blinding of Assessors	N/A	Blinding was not necessary for the outcome of interest.	
Metric 20:	Negative Control Response	High	The biological responses of the control group were adequate.	
Domain 6: Confounding / Variable Control				
Metric 21:	Confounding Variables in Test Design and Procedures	Low	Although the study did not report all information to determine confounding, reported information did not identify differences among study groups. However, respiratory rate was not reported and the test substance is considered to be a respiratory irritant.	
Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.	
Metric 23:	Data Presentation and Analysis	High	Data were statistically analyzed using students T-tests.	
Metric 24:	Reporting of Data	High	Data were quantitatively provided in the text (organ weight) and in tables for other endpoints. Measures of variance and statistical significance were provided.	
Additional Comments:	Separate evaluations were not performed for the 24 hr and 5-day duration experiments because the only endpoints evaluated for those durations were related to ADME.			

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Study Citation:	Kyrklund, T., Haglid, K. G. (1990). Exposure of rats to high concentrations of 1,1,1-trichloroethane and its effects on brain lipid and fatty acid composition. Pharmacology & Toxicology 67(5):384-386.
Health Outcome(s):	Neurological/Behavioral
Reported Health Effect(s):	Neurological/Behavioral: Brain weight; cerebral cortex weight, fatty acid pattern in the cerebral cortex
Duration:	Short-term (>1-30 days) 30 days
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	631732

Domain	Metric	Rating	Comments
Overall Quality Determination		Medium	

Study Citation:	Kyrklund, T., Haglid, K. G. (1990). Exposure of rats to high concentrations of 1,1,1-trichloroethane and its effects on brain lipid and fatty acid composition. Pharmacology & Toxicology 67(5):384-386.
Health Outcome(s):	Nutritional/Metabolic
Reported Health Effect(s):	Nutritional/Metabolic: Body weights
Duration:	Short-term (>1-30 days) 30 days
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	631732

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	High	The test substance was clearly identified as 1,1,1-Trichloroethane; a CASRN was not provided.
	Metric 2: Test Substance Source	Low	A commercial source was named; a lot and/or batch number was not provided. The test substance was not verified by the the laboratory that performed the study.
	Metric 3: Test Substance Purity	Medium	The test substance was reported to be "extra pure".
Domain 2: Test Design			
	Metric 4: Negative and Vehicle Controls	Low	A control group was included; but details on whether these animals were untreated, or exposed to air only, were not provided.
	Metric 5: Positive Controls	N/A	Positive controls were not necessary for the study type.
	Metric 6: Randomized Allocation of Animals	Low	Allocation of animals into study groups were not specified. Mean body weights were provided for both the experimental group (182 g) and the control group (185g), so it is unclear whether animals were stratified by BW.
Domain 3: Exposure Characterization			
	Metric 7: Preparation and Storage of Test Substance	Medium	The report referenced another study for exposure details but did report some information on the vapor generation system. Storage conditions were not reported. The referenced study is not in HERO and was not freely accessible for review.
	Metric 8: Consistency of Exposure Administration	Medium	Based on the information available, there is no indication that there were inconsistencies of exposure administration; however, some details are lacking.
	Metric 9: Reporting of Doses/Concentrations	Medium	Vapor concentrations were measured daily using a Miran 1A infrared spectrometer. Measured concentrations on day 1(1160 ppm and day 30 1280 ppm were provided. A concentration of 1200 ppm is referenced in the remainder of the study. It is unclear if this was the target, or if it is a mean of the analytical measurements taken throughout the exposure period.
	Metric 10: Exposure Frequency and Duration	Medium	Animals were exposed continuously in order to attain a steady state blood concentration. Animals were exposed for 30 days to mimic previous experiments.
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	High	A single exposure group was used for the 30-day duration study. The concentration used was justified by the study authors and appropriate for the purposes of the study.
	Metric 12: Exposure Route and Method	Low	Animals were exposed whole body. The number of air changes per hour was not specified, although another study by the same author was referenced by the authors. This study is not in HERO and was not freely accessible for review.
Domain 4: Test Animals			

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Study Citation:	Kyrklund, T., Haglid, K. G. (1990). Exposure of rats to high concentrations of 1,1,1-trichloroethane and its effects on brain lipid and fatty acid composition. Pharmacology & Toxicology 67(5):384-386.			
Health Outcome(s):	Nutritional/Metabolic			
Reported Health Effect(s):	Nutritional/Metabolic: Body weights			
Duration:	Short-term (>1-30 days) 30 days			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	631732			
Domain	Metric	Rating	Comments	
	Metric 13:	Test Animal Characteristics	Medium	Animal species, strain, sex, source, and starting body weights were provided. These animals were appropriate for this study. Age was not specified.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	Animal husbandry conditions were not reported.
	Metric 15:	Number of Animals per Group	Medium	The number of animals per group (n=8) was adequate for the purposes of the study; however, only a single sex was used. Use of 5 animals/sex is recommended for sub-acute inhalation studies.
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	Low	Details regarding outcome assessment methodology were lacking; the timing of measurements was not explicitly stated.
	Metric 17:	Consistency of Outcome Assessment	Low	Based on the available data, there is no indication that there were inconsistencies in the outcome assessment; however, due to the lack of details provided, this cannot be verified.
	Metric 18:	Sampling Adequacy	Low	Details regarding the sampling of the outcome of interest were not reported.
	Metric 19:	Blinding of Assessors	N/A	Blinding was not necessary for the outcome of interest.
	Metric 20:	Negative Control Response	High	The biological responses of the control group was adequate.
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Low	Although the study did not report all information to determine confounding, reported information did not identify differences among study groups. However, respiratory rate was not reported and the test substance is considered to be a respiratory irritant.
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.
	Metric 23:	Data Presentation and Analysis	High	Data were statistically analyzed using students T-tests.
	Metric 24:	Reporting of Data	High	Negative findings were quantitatively described in the text and included measures of variance and statistical significance.
Additional Comments:	Separate evaluations were not performed for the 24 hr and 5-day duration experiments because the only endpoints evaluated for those durations were related to ADME.			
Overall Quality Determination		Medium		

Study Citation:	Kyrklund, T., Haglid, K. G. (1990). Exposure of rats to high concentrations of 1,1,1-trichloroethane and its effects on brain lipid and fatty acid composition. Pharmacology & Toxicology 67(5):384-386.
Health Outcome(s):	Hepatic/Liver
Reported Health Effect(s):	Hepatic/Liver: Liver weight
Duration:	Short-term (>1-30 days) 30 days
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	631732

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	High	The test substance was clearly identified as 1,1,1-Trichloroethane; a CASRN was not provided.
	Metric 2: Test Substance Source	Low	A commercial source was named; a lot and/or batch number was not provided. The test substance was not verified by the the laboratory that performed the study.
	Metric 3: Test Substance Purity	Medium	The test substance was reported to be "extra pure".
Domain 2: Test Design			
	Metric 4: Negative and Vehicle Controls	Low	A control group was included; but details on whether these animals were untreated, or exposed to air only, were not provided.
	Metric 5: Positive Controls	N/A	Positive controls were not necessary for the study type.
	Metric 6: Randomized Allocation of Animals	Low	Allocation of animals into study groups were not specified. Mean body weights were provided for both the experimental group (182 g) and the control group (185g), so it is unclear whether animals were stratified by BW.
Domain 3: Exposure Characterization			
	Metric 7: Preparation and Storage of Test Substance	Medium	The report referenced another study for exposure details; but did reported some information on the vapor generation system. Storage conditions were not reported. The referenced study is not in HERO and was not freely accessible for review.
	Metric 8: Consistency of Exposure Administration	Medium	Based on the information available, there is no indication that there were inconsistencies of exposure administration; however, some details are lacking.
	Metric 9: Reporting of Doses/Concentrations	Medium	Vapor concentrations were measured daily using a Miran 1A infrared spectrometer. Measured concentrations on day 1(1160 ppm and day 30 1280 ppm were provided. A concentration of 1200 ppm is referenced in the remainder of the study. It is unclear if this was the target, or if it is a mean of the analytical measurements taken throughout the exposure period.
	Metric 10: Exposure Frequency and Duration	Medium	Animals were exposed continuously in order to attain a steady state blood concentration. Animals were exposed for 30 days to mimic previous experiments.
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	High	A single exposure group was used for the 30-day duration study. The concentration used was justified by the study authors and appropriate for the purposes of the study.
	Metric 12: Exposure Route and Method	Low	Animals were exposed whole body. The number of air changes per hour was not specified, although another study by the same author was referenced by the authors. This study is not in HERO and was not freely accessible for review.
Domain 4: Test Animals			

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Study Citation:	Kyrklund, T., Haglid, K. G. (1990). Exposure of rats to high concentrations of 1,1,1-trichloroethane and its effects on brain lipid and fatty acid composition. Pharmacology & Toxicology 67(5):384-386.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: Liver weight			
Duration:	Short-term (>1-30 days) 30 days			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	631732			
Domain	Metric	Rating	Comments	
	Metric 13: Test Animal Characteristics	Medium	Animal species, strain, sex, source, and starting body weights were provided. These animals were appropriate for this study. Age was not specified.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Animal husbandry conditions were not reported.	
	Metric 15: Number of Animals per Group	Medium	The number of animals per group (n=8) was adequate for the purposes of the study; however, only a single sex was used. Use of 5 animals/sex is recommended for sub-acute inhalation studies.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	Medium	Details regarding outcome assessment methodology were lacking; but this is not expected to have a major impact on the study results. Liver toxicity was not the focus of the study and therefore only liver weights were measured (serum chemistry measurements and histopathology were not included).	
	Metric 17: Consistency of Outcome Assessment	Low	Based on the available data, there is no indication that there were inconsistencies in the outcome assessment; however, due to the lack of details provided, this cannot be verified.	
	Metric 18: Sampling Adequacy	Low	Details regarding the sampling of the outcome of interest were not reported.	
	Metric 19: Blinding of Assessors	N/A	Blinding was not necessary for the outcome of interest.	
	Metric 20: Negative Control Response	High	The biological responses of the control group was adequate.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Low	Although the study did not report all information to determine confounding, reported information did not identify differences among study groups. However, respiratory rate was not reported and the test substance is considered to be a respiratory irritant.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.	
	Metric 23: Data Presentation and Analysis	High	Data were statistically analyzed using students T-tests.	
	Metric 24: Reporting of Data	High	Data were quantitatively provided in the text and included measures of variance and statistical significance.	
Additional Comments:	Separate evaluations were not performed for the 24 hr and 5-day duration experiments because the only endpoints evaluated for those durations were related to ADME.			

Overall Quality Determination**Medium**

Study Citation:	Nakahama, T., Sarutani, S., Inouye, Y. (2000). Effects of tetrachloroethylene and 1,1,1-trichloroethane on the expression of P450 isoforms in rat lung and liver. Journal of Health Science 46(1):21-28.			
Health Outcome(s):	Nutritional/Metabolic; Hepatic/Liver; Lung/Respiratory;			
Reported Health Effect(s):	Nutritional/Metabolic: Body weight; Hepatic/Liver: Liver weight; Lung/Respiratory: Lung weight;			
Duration:	Short-term (>1-30 days) 3-day			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5465638			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	All Outcomes: Test substance was identified as 1,1,1-trichloroethane.
	Metric 2:	Test Substance Source	High	All Outcomes: The source of the test substance was reported to be Wako Pure Chemical Ind. (Osaka).
	Metric 3:	Test Substance Purity	Medium	All Outcomes: The test substance was reported to be 95% pure with 3% stabilizer.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	High	All Outcomes: The negative control group was appropriate (corn oil).
	Metric 5:	Positive Controls	N/A	All Outcomes: A positive control group was not necessary.
	Metric 6:	Randomized Allocation of Animals	Low	All Outcomes: Study does not state how animals were allocated into groups.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Low	All Outcomes: Details regarding preparation and storage of test substance are not reported. Given the volatility of the chemical, the lack of details could substantially impact results.
	Metric 8:	Consistency of Exposure Administration	High	All Outcomes: Test substance was delivered consistently across study groups.
	Metric 9:	Reporting of Doses/Concentrations	High	All Outcomes: Doses were reported without ambiguity.
	Metric 10:	Exposure Frequency and Duration	High	All Outcomes: The exposure frequency and duration were appropriate for the study type.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	N/A	All Outcomes: The goal of the study was not to have a dose-dependent effect, the one dose studies was appropriate.
	Metric 12:	Exposure Route and Method	Low	All Outcomes: Volume of test substance and control injected were not reported.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	High	All Outcomes: Test animal characteristics were fully reported.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	All Outcomes: Husbandry conditions were not reported.
	Metric 15:	Number of Animals per Group	Medium	All Outcomes: The number of animals/group were reported and appropriate (n=4-6).
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	High	All Outcomes: Outcome assessment methodology addressed the intended outcome of interest.
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Study Citation:	Nakahama, T., Sarutani, S., Inouye, Y. (2000). Effects of tetrachloroethylene and 1,1,1-trichloroethane on the expression of P450 isoforms in rat lung and liver. Journal of Health Science 46(1):21-28.
Health Outcome(s):	Nutritional/Metabolic; Hepatic/Liver; Lung/Respiratory;
Reported Health Effect(s):	Nutritional/Metabolic: Body weight; Hepatic/Liver: Liver weight; Lung/Respiratory: Lung weight;
Duration:	Short-term (>1-30 days) 3-day
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	5465638

Domain	Metric	Rating	Comments
	Metric 17: Consistency of Outcome Assessment	Medium	All Outcomes: Details regarding outcome assessment are lacking, however this is unlikely to substantially impact results.
	Metric 18: Sampling Adequacy	High	All Outcomes: Sampling was adequate (n=4-6).
	Metric 19: Blinding of Assessors	N/A	All Outcomes: Blinding was not necessary.
	Metric 20: Negative Control Response	High	All Outcomes: The negative control response was appropriate.
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	All Outcomes: Although the study did not report all information to determine confounding, reported information did not identify differences among study groups.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	All Outcomes: There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure that could influence the outcome assessment.
	Metric 23: Data Presentation and Analysis	High	All Outcomes: Statistical methods were appropriate.
	Metric 24: Reporting of Data	High	All Outcomes: Data were adequately reported.

Additional Comments: None

Overall Quality Determination**High**

Study Citation:	Plaa, G. L., Larson, R. E. (1965). Relative nephrotoxic properties of chlorinated methane, ethane, and ethylene derivatives in mice. Toxicology and Applied Pharmacology 7(1):37-44.			
Health Outcome(s):	Renal/Kidney			
Reported Health Effect(s):	Renal/Kidney: Urinary glucose and protein; renal histopathology			
Duration:	Short-term (>1-30 days) Short-term- 3 days			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	64411			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	Test substance was identified as 1,1,1-trichloroethane.	
	Metric 2: Test Substance Source	Low	The source of the test substance was not reported.	
	Metric 3: Test Substance Purity	Low	The purity of the test substance was not reported.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	Uninformative	Details of negative control are not reported. It appears the data on the negative controls come from historic data. The strain, age, sex of the animals are not provided nor is information on if the animals were sham or untreated.	
	Metric 5: Positive Controls	N/A	Not applicable for this study.	
	Metric 6: Randomized Allocation of Animals	Low	Authors do not report if how study groups were formed.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	Preparation and storage conditions were not properly reported given the volatility of the test substance.	
	Metric 8: Consistency of Exposure Administration	Medium	Details of exposure administration are incomplete.	
	Metric 9: Reporting of Doses/Concentrations	High	Exposure doses were reported without ambiguity.	
	Metric 10: Exposure Frequency and Duration	High	Exposure and frequency were appropriate for outcome studied.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Medium	The one dose studied was the highest one that did not cause lethality.	
	Metric 12: Exposure Route and Method	High	Route of exposure was i.p. injection.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Low	The source and age of mice were not reported.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not reported.	
	Metric 15: Number of Animals per Group	Low	The number of animals/group were not reported.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	Low	Some details regarding the outcome assessment methodology were lacking (e.g how long urine was collected for, histological evaluations)	
	Metric 17: Consistency of Outcome Assessment	High	Outcomes were assessed consistently across study groups.	

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Study Citation:	Plaa, G. L., Larson, R. E. (1965). Relative nephrotoxic properties of chlorinated methane, ethane, and ethylene derivatives in mice. Toxicology and Applied Pharmacology 7(1):37-44.			
Health Outcome(s):	Renal/Kidney			
Reported Health Effect(s):	Renal/Kidney: Urinary glucose and protein; renal histopathology			
Duration:	Short-term (> 1-30 days) Short-term- 3 days			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	64411			
Domain	Metric	Rating	Comments	
	Metric 18: Sampling Adequacy	Uninformative	Histology was not performed on controls.	
	Metric 19: Blinding of Assessors	N/A	Blinding was not necessary for outcomes studied.	
	Metric 20: Negative Control Response	Low	Negative control histology was not reported.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Low	Potential confounding variables were not reported.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.	
	Metric 23: Data Presentation and Analysis	High	Statistical analysis was not performed; independent statistics could be done.	
	Metric 24: Reporting of Data	Low	Combistix analysis data were not presented.	
Additional Comments:	Lack of information on the negative control group makes the study unacceptable.			

Overall Quality Determination**Uninformative**

Study Citation:	Wahlberg, J. E. (1984). Edema-inducing effects of solvents following topical administration. Dermatosen in Beruf und Umwelt 32(3):91-94.			
Health Outcome(s):	Irritation			
Reported Health Effect(s):	Irritation: skin-fold thickness, visual scoring (presence of erythema, edema, fissuring and scaling)			
Duration:	Short-term (>1-30 days) 10 days			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5469150			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Test substance was identified as 1,1,1- trichloroethane.
	Metric 2:	Test Substance Source	Low	The source the test substance was Fluka AG, Buchs SG, Switzerland. Lot/Batch number were not provided.
	Metric 3:	Test Substance Purity	Medium	
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	Low	An unexposed control site was used for comparison, not clear if it was sham-treated. Also included a separate control group, it is unclear if these were sham-treated.
	Metric 5:	Positive Controls	N/A	Positive control was not required in this study.
	Metric 6:	Randomized Allocation of Animals	Low	Study does not report how animals were allocated.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Low	Preparation and storage were not adequately described given the volatility of the test substance.
	Metric 8:	Consistency of Exposure Administration	High	Test substance was delivered consistently across study groups.
	Metric 9:	Reporting of Doses/Concentrations	Low	Body weights were not provided.
	Metric 10:	Exposure Frequency and Duration	High	Exposure frequency and duration were reported and appropriate.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Medium	Only one dose was studied (neat) was studied.
	Metric 12:	Exposure Route and Method	Medium	There are minor uncertainties with the route given the volatility of the test substance.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	Low	Test animal characteristics were not adequately reported. Source and sex of animals were not reported.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	Husbandry conditions were not sufficiently reported.
	Metric 15:	Number of Animals per Group	Low	The number of animals/group was not adequate reported.
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	Medium	Histological analysis was not performed on skin.
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Study Citation:	Wahlberg, J. E. (1984). Edema-inducing effects of solvents following topical administration. Dermatosen in Beruf und Umwelt 32(3):91-94.			
Health Outcome(s):	Irritation			
Reported Health Effect(s):	Irritation: skin-fold thickness, visual scoring (presence of erythema, edema, fissuring and scaling)			
Duration:	Short-term (>1-30 days) 10 days			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5469150			
Domain	Metric	Rating	Comments	
	Metric 17:	Consistency of Outcome Assessment	Medium	Details of assessment are cited in previous published paper (Wahlberg 1983). Details describe that the measurement technique was consistent across test groups, but minor details are missing or nebulous (i.e. time of day). The number of animals sampled was adequate. Blinding was not necessary for this study. A negative control group response was adequate.
	Metric 18:	Sampling Adequacy	High	
	Metric 19:	Blinding of Assessors	N/A	
	Metric 20:	Negative Control Response	High	
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Medium	Although the study did not report all information to determine confounding, reported information did not identify differences among study groups.
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	No information was provided to either to support or dismiss differences in groups in health outcomes or attrition.
	Metric 23:	Data Presentation and Analysis	Uninformative	Statistical analyses were not performed. Presentation of exposure data does not allow for independent analysis.
	Metric 24:	Reporting of Data	Medium	Exposure data are presented, however only the mean values (and not standard deviations) are presented.
Additional Comments:	Statistical analyses were not performed. Presentation of exposure data does not allow for independent analysis.			
Overall Quality Determination		Uninformative		

Study Citation:	Chan, P. C. (2000). NTP technical report on the toxicity studies of 1,1,1-trichloroethane (CAS No. 71-55-6) administered in microcapsules in feed to F344/N rats and B6C3F1 mice. Toxicity Report Series, vol. 41 41(1):1-E20.			
Health Outcome(s):	Hepatic/Liver; Immune/Hematological; Cardiovascular; Renal/Kidney; Lung/Respiratory; Reproductive/Developmental; Gastrointestinal; Endocrine (Endocrine); Musculoskeletal; Neurological/Behavioral;			
Reported Health Effect(s):	Hepatic/Liver: Liver weight and histology.Serum ALT, ALP, SDH and bile acids (rats); Immune/Hematological: Hematology (rats)Thymus weight and histology on lymph nodes (mandibular and mesenteric), spleen and thymus; Cardiovascular: Heart weight and histology; Renal/Kidney: Right kidney weight, histology on kidney and urinary bladder.Clinical chemistry (rats): Blood urea nitrogen, creatinine, total protein and albuminUrinalysis (rats): urine volume, urine creatinine, trichloroacetic acid and free and total trichloroethanol; Lung/Respiratory: Lung weight and histology on lung, nose and trachea; Reproductive/Developmental: Right testis weight and histology on clitoral gland mammary gland, ovary, preputial gland, prostate gland testis (with epididymis and seminal vesicle) and uterus.Sperm motility and vaginal cytology for evaluation of estrous cycle; Gastrointestinal: Histology on esophagus, gallbladder (mice), large intestine (cecum, colon, rectum), small intestine (duodenum, jejunum, ileum), salivary gland, stomach (forestomach and glandular stomach); Endocrine (Endocrine): Histology on adrenal gland, pancreas, parathyroid gland, pituitary gland, thyroid gland; Musculoskeletal: Histology on bone and bone marrowSerum creatine kinase levels (rats); Neurological/Behavioral: Histology on brain;			
Duration:	Subchronic (>30-91 days) 1,1,1-trichloroethane			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5469437			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	All Outcomes: Test substance was identified as 1,1,1-trichloroethane.
	Metric 2:	Test Substance Source	High	All Outcomes: The source of the test substance was Dow Chemical Company (Midland, MI), Lot number TA 821004-1.
	Metric 3:	Test Substance Purity	High	All Outcomes: The purity of the test substance was reported to be >99%.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	High	All Outcomes: The negative control was appropriate (an untreated group and vehicle-control group were included).
	Metric 5:	Positive Controls	N/A	All Outcomes: Not applicable for this study.
	Metric 6:	Randomized Allocation of Animals	Medium	All Outcomes: Study states animals were randomly distributed into study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	High	All Outcomes: Preparation and storage of test substance was described and appropriate.
	Metric 8:	Consistency of Exposure Administration	High	All Outcomes: Test substance was administered consistently across study groups.
	Metric 9:	Reporting of Doses/Concentrations	Medium	All Outcomes: Study reports dosage based on feed consumption, however study states: " feed consumption values and exposure concentrations were determined by the disappearance of feed from the feeder and may not accurately represent intake".
	Metric 10:	Exposure Frequency and Duration	High	All Outcomes: Exposure frequency and duration were appropriate.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	High	All Outcomes: Doses were appropriate and based on results of preliminary studies.
	Metric 12:	Exposure Route and Method	High	All Outcomes: Exposure route and method were appropriate for test substance.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	High	All Outcomes: Animal characteristics were adequately reported.

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Study Citation:	Chan, P. C. (2000). NTP technical report on the toxicity studies of 1,1,1-trichloroethane (CAS No. 71-55-6) administered in microcapsules in feed to F344/N rats and B6C3F1 mice. Toxicity Report Series, vol. 41 41(1):1-E20.			
Health Outcome(s):	Hepatic/Liver; Immune/Hematological; Cardiovascular; Renal/Kidney; Lung/Respiratory; Reproductive/Developmental; Gastrointestinal; Endocrine (Endocrine); Musculoskeletal; Neurological/Behavioral;			
Reported Health Effect(s):	Hepatic/Liver: Liver weight and histology.Serum ALT, ALP, SDH and bile acids (rats); Immune/Hematological: Hematology (rats)Thymus weight and histology on lymph nodes (mandibular and mesenteric), spleen and thymus; Cardiovascular: Heart weight and histology; Renal/Kidney: Right kidney weight, histology on kidney and urinary bladder.Clinical chemistry (rats): Blood urea nitrogen, creatinine, total protein and albuminUrinalysis (rats): urine volume, urine creatinine, trichloroacetic acid and free and total trichloroethanol; Lung/Respiratory: Lung weight and histology on lung, nose and trachea; Reproductive/Developmental: Right testis weight and histology on clitoral gland mammary gland, ovary, preputial gland, prostate gland testis (with epididymis and seminal vesicle) and uterus.Sperm motility and vaginal cytology for evaluation of estrous cycle; Gastrointestinal: Histology on esophagus, gallbladder (mice), large intestine (cecum, colon, rectum), small intestine (duodenum, jejunum, ileum), salivary gland, stomach (forestomach and glandular stomach); Endocrine (Endocrine): Histology on adrenal gland, pancreas, parathyroid gland, pituitary gland, thyroid gland; Musculoskeletal: Histology on bone and bone marrowSerum creatine kinase levels (rats); Neurological/Behavioral: Histology on brain;			
Duration:	Subchronic (>30-91 days) 1,1,1-trichloroethane			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5469437			
Domain	Metric	Rating	Comments	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	High	All Outcomes: Husbandry conditions were adequately reported.	
	Metric 15: Number of Animals per Group	Medium	All Outcomes: The number of animals per study group was appropriate (10/group).	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	High	All Outcomes: The outcome assessment methodology addressed the intended outcomes of interest.	
	Metric 17: Consistency of Outcome Assessment	High	All Outcomes: Outcomes were assessed consistently across study groups.	
	Metric 18: Sampling Adequacy	High	All Outcomes: Sampling was adequate for outcome of interest.	
	Metric 19: Blinding of Assessors	N/A	All Outcomes: Blinding was not necessary.	
	Metric 20: Negative Control Response	High	All Outcomes: The negative control response was appropriate.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	All Outcomes: Although the study did not report all information to determine confounding (water intake), reported information did not identify differences.	
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	All Outcomes: There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.	
	Metric 23: Data Presentation and Analysis	High	All Outcomes: Statistical analysis was appropriate.	
	Metric 24: Reporting of Data	High	All Outcomes: Data were fully reported.	
Additional Comments: For rat and mouse studies.				
Overall Quality Determination		High		

Study Citation:	Milman, H. A., Story, D. L., Riccio, E. S., Sivak, A., Tu, A. S., Williams, G. M., Tong, C., Tyson, C. A. (1988). Rat liver foci and in vitro assays to detect initiating and promoting effects of chlorinated ethanes and ethylenes. Annals of the New York Academy of Sciences 534:521-530.			
Health Outcome(s):	Cancer/Carcinogenesis			
Reported Health Effect(s):	Cancer/Carcinogenesis: Increased incidence of GGT-positive liver foci in rats dosed during promotion phase (1,1,2-TCE only)			
Duration:	Subchronic (>30-91 days) 7 Weeks (promotion protocol) - 1,1,1-TCE			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	200479; Linked HERO ID(s): 200479, 200616			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Source	Low	The source was reported as Aldrich, but a batch or lot number was not provided.
	Metric 3:	Test Substance Purity	Medium	Purity was reported as 97 to 99%.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	High	A concurrent negative control group received vehicle (corn oil) only.
	Metric 5:	Positive Controls	Medium	Phenobarbital was used as a positive control for the tumor promotion protocol.
	Metric 6:	Randomized Allocation of Animals	Medium	The study reports randomization of animals.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Low	The study does not report test substance storage and preparation conditions, and the test substance is volatile.
	Metric 8:	Consistency of Exposure Administration	Low	Gavage volume is not reported for treated animals.
	Metric 9:	Reporting of Doses/Concentrations	High	Doses were reported without ambiguity in mg/kg.
	Metric 10:	Exposure Frequency and Duration	High	The exposure period (5 days/week for 7 weeks) appears sufficient for determination of tumor promotion potential based on the positive control response.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Medium	Only a single dose level was used, but it was justified as 2/3 of the MTD.
	Metric 12:	Exposure Route and Method	High	The exposure route (gavage) was appropriate for the test substance.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	Low	Species, sex, strain, and starting body weight were reported. Age and source were not reported.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	Temperature, humidity, and light-dark cycle were not reported and it is not possible to determine whether differences occurred between control and exposed populations.
	Metric 15:	Number of Animals per Group	Medium	The number of animals per study group (10) was appropriate for the study type and outcome analysis.
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	High	The outcome assessment was appropriate and sensitive for tumor promotion potential.
	Metric 17:	Consistency of Outcome Assessment	High	Timing of necropsy was consistent across groups.

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Study Citation:	Milman, H. A., Story, D. L., Riccio, E. S., Sivak, A., Tu, A. S., Williams, G. M., Tong, C., Tyson, C. A. (1988). Rat liver foci and in vitro assays to detect initiating and promoting effects of chlorinated ethanes and ethylenes. Annals of the New York Academy of Sciences 534:521-530.
Health Outcome(s):	Cancer/Carcinogenesis
Reported Health Effect(s):	Cancer/Carcinogenesis: Increased incidence of GGT-positive liver foci in rats dosed during promotion phase (1,1,2-TCE only)
Duration:	Subchronic (>30-91 days) 7 Weeks (promotion protocol) - 1,1,1-TCE
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	200479; Linked HERO ID(s): 200479, 200616

Domain	Metric	Rating	Comments
	Metric 18: Sampling Adequacy	High	Sample size (n = 7-10) was adequate for assessment of tumor promotion potential.
	Metric 19: Blinding of Assessors	N/A	Blinding is not required for initial histopathology review.
	Metric 20: Negative Control Response	High	The biological response (incidence of GGT-positive foci) of the negative control group appeared adequate.
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	High	There is no evidence of confounding variables in test design and procedures that would affect tumor promotion.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	A low amount of attrition (0-3/10 animals) occurred in this experiment. However, there was no information provided either to support or dismiss the suggestion that differences among groups in health outcomes unrelated to exposure could influence the outcome assessment.
	Metric 23: Data Presentation and Analysis	Low	Statistical analysis was performed, but the methods were not described.
	Metric 24: Reporting of Data	High	Incidence data, with standard errors, are reported for each group in Table 4.

Additional Comments: This form is for 1,1,1-TCE. The primary purpose of this study was to evaluate the tumor initiation and promotion potential of the chemical.

Overall Quality Determination

High

Study Citation:	Milman, H. A., Story, D. L., Riccio, E. S., Sivak, A., Tu, A. S., Williams, G. M., Tong, C., Tyson, C. A. (1988). Rat liver foci and in vitro assays to detect initiating and promoting effects of chlorinated ethanes and ethylenes. Annals of the New York Academy of Sciences 534:521-530.			
Health Outcome(s):	Nutritional/Metabolic			
Reported Health Effect(s):	Nutritional/Metabolic: Decreased body weight gain (1,1,2-TCE only)			
Duration:	Subchronic (>30-91 days) 7 Weeks (promotion protocol) - 1,1,1-TCE			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	200479; Linked HERO ID(s): 200479, 200616			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	The test substance was identified by name.	
	Metric 2: Test Substance Source	Low	The source was reported as Aldrich, but a batch or lot number was not provided.	
	Metric 3: Test Substance Purity	Medium	Purity was reported as 97 to 99%.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	High	A concurrent negative control group received vehicle (corn oil) only.	
	Metric 5: Positive Controls	N/A	A positive control is not required for the endpoint of body weight.	
	Metric 6: Randomized Allocation of Animals	Medium	The study reports randomization of animals.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	The study does not report test substance storage and preparation conditions, and the test substance is volatile.	
	Metric 8: Consistency of Exposure Administration	Low	Gavage volume is not reported for treated animals.	
	Metric 9: Reporting of Doses/Concentrations	High	Doses were reported without ambiguity in mg/kg.	
	Metric 10: Exposure Frequency and Duration	High	Animals received the test substance by gavage 5 days/week for 7 weeks, which is appropriate for determining subchronic effects.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Medium	Only a single dose level was used, but it was justified as 2/3 of the MTD.	
	Metric 12: Exposure Route and Method	High	The exposure route (gavage) was appropriate for the test substance.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Low	Species, sex, strain, and starting body weight were reported. Age and source were not reported.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Temperature, humidity, and light-dark cycle were not reported and it is not possible to determine whether differences occurred between control and exposed populations.	
	Metric 15: Number of Animals per Group	Medium	The number of animals per study group (10) was appropriate for the study type and outcome analysis.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	High	The outcome assessment methodology was appropriate. Body weight and body weight gain were measured.	
	Metric 17: Consistency of Outcome Assessment	Low	The timing of body weight measurements was not reported.	
	Metric 18: Sampling Adequacy	Low	Sample size for body weight and body weight gain was not reported.	

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Study Citation:	Milman, H. A., Story, D. L., Riccio, E. S., Sivak, A., Tu, A. S., Williams, G. M., Tong, C., Tyson, C. A. (1988). Rat liver foci and in vitro assays to detect initiating and promoting effects of chlorinated ethanes and ethylenes. Annals of the New York Academy of Sciences 534:521-530.
Health Outcome(s):	Nutritional/Metabolic
Reported Health Effect(s):	Nutritional/Metabolic: Decreased body weight gain (1,1,2-TCE only)
Duration:	Subchronic (>30-91 days) 7 Weeks (promotion protocol) - 1,1,1-TCE
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	200479; Linked HERO ID(s): 200479, 200616

Domain	Metric	Rating	Comments
	Metric 19: Blinding of Assessors	N/A	The outcome (body weight) is not subjective.
	Metric 20: Negative Control Response	Low	The biological response (body weight) of the negative control group was not reported.
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	High	Food and water were provided ad libitum. There is no evidence of confounding variables in test design and procedures that would affect the endpoint of body weight.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	A low amount of attrition (0-3/10 animals) occurred in this experiment. However, there was no information provided either to support or dismiss the suggestion that differences among groups in health outcomes unrelated to exposure could influence the outcome assessment.
	Metric 23: Data Presentation and Analysis	Low	Statistical analysis was performed, but the methods were not described.
	Metric 24: Reporting of Data	Low	Results were described only in the text. Numerical values (i.e., body weight, body weight gain) were not provided.

Additional Comments: This form is for 1,1,1-TCE. The primary purpose of this study was to evaluate the tumor initiation and promotion potential of the chemical. Effects on body weight and body weight gain were not the primary purpose of the study, and only minimal details are provided for these endpoints.

Overall Quality Determination

Medium

Study Citation:	Milman, H. A., Story, D. L., Riccio, E. S., Sivak, A., Tu, A. S., Williams, G. M., Tong, C., Tyson, C. A. (1988). Rat liver foci and in vitro assays to detect initiating and promoting effects of chlorinated ethanes and ethylenes. Annals of the New York Academy of Sciences 534:521-530.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: Decreased absolute liver weight (1,1,2-TCE only)			
Duration:	Subchronic (>30-91 days) 7 Weeks (promotion protocol) - 1,1,1-TCE			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	200479; Linked HERO ID(s): 200479, 200616			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	The test substance was identified by name.
	Metric 2:	Test Substance Source	Low	The source was reported as Aldrich, but a batch or lot number was not provided.
	Metric 3:	Test Substance Purity	Medium	Purity was reported as 97 to 99%.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	High	A concurrent negative control group received vehicle (corn oil) only.
	Metric 5:	Positive Controls	N/A	A positive control is not required for the endpoint of liver weight.
	Metric 6:	Randomized Allocation of Animals	Medium	The study reports randomization of animals.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Low	The study does not report test substance storage and preparation conditions, and the test substance is volatile.
	Metric 8:	Consistency of Exposure Administration	Low	Gavage volume is not reported for treated animals.
	Metric 9:	Reporting of Doses/Concentrations	High	Doses were reported without ambiguity in mg/kg.
	Metric 10:	Exposure Frequency and Duration	High	Animals received the test substance by gavage 5 days/week for 7 weeks, which is appropriate for determining subchronic effects.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Medium	Only a single dose level was used, but it was justified as 2/3 of the MTD.
	Metric 12:	Exposure Route and Method	High	The exposure route (gavage) was appropriate for the test substance.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	Low	Species, sex, strain, and starting body weight were reported. Age and source were not reported.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Low	Temperature, humidity, and light-dark cycle were not reported and it is not possible to determine whether differences occurred between control and exposed populations.
	Metric 15:	Number of Animals per Group	Medium	The number of animals per study group (10) was appropriate for the study type and outcome analysis.
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	Low	The outcome assessment for liver was very limited (liver weight only).
	Metric 17:	Consistency of Outcome Assessment	High	Timing of necropsy was consistent across groups.
	Metric 18:	Sampling Adequacy	Low	Sample size for liver weight measurements was not reported.
	Metric 19:	Blinding of Assessors	N/A	The outcome (liver weight) is not subjective.

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Study Citation:	Milman, H. A., Story, D. L., Riccio, E. S., Sivak, A., Tu, A. S., Williams, G. M., Tong, C., Tyson, C. A. (1988). Rat liver foci and in vitro assays to detect initiating and promoting effects of chlorinated ethanes and ethylenes. Annals of the New York Academy of Sciences 534:521-530.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: Decreased absolute liver weight (1,1,2-TCE only)			
Duration:	Subchronic (>30-91 days) 7 Weeks (promotion protocol) - 1,1,1-TCE			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	200479; Linked HERO ID(s): 200479, 200616			
Domain	Metric	Rating	Comments	
	Metric 20:	Negative Control Response	Low	The biological response (liver weight) of the negative control group was not reported.
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	High	Food and water were provided ad libitum. There is no evidence of confounding variables in test design and procedures that would affect the endpoint of liver weight.
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	A low amount of attrition (0-3/10 animals) occurred in this experiment. However, there was no information provided either to support or dismiss the suggestion that differences among groups in health outcomes unrelated to exposure could influence the outcome assessment.
	Metric 23:	Data Presentation and Analysis	Low	Statistical analysis was performed, but the methods were not described.
	Metric 24:	Reporting of Data	Low	Results were described only in the text. Numerical values (i.e., absolute and relative liver weights) were not provided. The absence of effects on liver weights is implied but not explicitly stated.
Additional Comments:	The primary purpose of this study was to evaluate the tumor initiation and promotion potential of the chemical. Effects on liver weight were not the primary purpose of the study, and only minimal details are provided for this endpoint.			

Overall Quality Determination**Medium**

Study Citation:	Coleman, C. N., Mason, T., Hooker, E. P., Robinson, S. E. (1999). Developmental effects of intermittent prenatal exposure to 1,1,1-trichloroethane in the rat. <i>Neurotoxicology and Teratology</i> 21(6):699-708.			
Health Outcome(s):	Reproductive/Developmental			
Reported Health Effect(s):	Reproductive/Developmental: Number of litters, gestation length, number of live pups, number of dead or deformed offspring, sex ratio, resorptions, litter weight, pup weightBehavior test on pups: righting reflex, behavioral tests (negative geotaxis, inverted screen test), muscle strength (vertical screen test, forelimb grip strength)Physical development and motor activity of pup: days eyes opened, pinnae detached, incisors erupted; spontaneous motor activity (total and ambulatory), rearing activity, pup brain weight at PND22			
Duration:	Reproductive/Developmental 1,1,1-Trichloroethane			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	196341			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	Test substance was identified as 1,1,1-trichloroethane.	
	Metric 2: Test Substance Source	Low	The source of the test substance was not reported.	
	Metric 3: Test Substance Purity	Low	The purity of the test substance was not reported.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	High	The negative control group was appropriate (sham-treated).	
	Metric 5: Positive Controls	N/A	Not applicable for this study.	
	Metric 6: Randomized Allocation of Animals	Low	The study did not report how animals were allocated.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	High	Test substance preparation and storage were not adequately described, however, the concentration in the exposure chamber was monitored continuously by an infrared spectrophotometer.	
	Metric 8: Consistency of Exposure Administration	High	Test substance was delivered consistently across study groups.	
	Metric 9: Reporting of Doses/Concentrations	Medium	Chamber concentration was measured using an infrared spectrophotometer and regulated to produce a nominal concentration of 7000 ppm. Analytical concentrations were not reported. Recorded concentration with standard error was not reported.	
	Metric 10: Exposure Frequency and Duration	Medium	There were minor limitations in exposure frequency and duration (3 hours a day), but this is unlikely to substantially impact results.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Low	Only a single dose group was used in the study. A NOAEL was not obtained. The concentration studied was based on a pilot study.	
	Metric 12: Exposure Route and Method	High	Whole body dynamic chamber was used. The overall flow rate was 10 liters/min in a 20.8 liter chamber.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	High	Animal characteristics were adequately reported.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	High	Husbandry conditions were adequately reported.	
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Study Citation:	Coleman, C. N., Mason, T., Hooker, E. P., Robinson, S. E. (1999). Developmental effects of intermittent prenatal exposure to 1,1,1-trichloroethane in the rat. Neurotoxicology and Teratology 21(6):699-708.			
Health Outcome(s):	Reproductive/Developmental			
Reported Health Effect(s):	Reproductive/Developmental: Number of litters, gestation length, number of live pups, number of dead or deformed offspring, sex ratio, resorptions, litter weight, pup weightBehavior test on pups: righting reflex, behavioral tests (negative geotaxis, inverted screen test), muscle strength (vertical screen test, forelimb grip strength)Physical development and motor activity of pup: days eyes opened, pinnae detached, incisors erupted; spontaneous motor activity (total and ambulatory), rearing activity, pup brain weight at PND22			
Duration:	Reproductive/Developmental 1,1,1-Trichloroethane			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	196341			
Domain	Metric	Rating	Comments	
	Metric 15:	Number of Animals per Group	Low	The number of animals/group (n=9-10) was lower than the recommended number of litters in the OECD 414 guideline (i.e., 20 female animals with implantation sites at necropsy).
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed the intended outcomes.
	Metric 17:	Consistency of Outcome Assessment	High	Outcomes were assessed consistently across study groups.
	Metric 18:	Sampling Adequacy	High	Sampling was adequate.
	Metric 19:	Blinding of Assessors	Low	The study did not report whether assessors were blinded to treatment group for subjective outcomes.
	Metric 20:	Negative Control Response	High	The negative control response was appropriate.
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Low	Test substance is a respiratory irritant and therefore respiratory rate should be reported. Authors did not measure/report respiration rate.
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.
	Metric 23:	Data Presentation and Analysis	High	Statistical analysis was appropriate.
	Metric 24:	Reporting of Data	Medium	Data for exposure-related findings were reported for most, but not all, outcomes by exposure group. Outcomes without exposure-related effects are indicated as negative in text.
Additional Comments:	None			

Overall Quality Determination**Medium**

Study Citation:	Coleman, C. N., Mason, T., Hooker, E. P., Robinson, S. E. (1999). Developmental effects of intermittent prenatal exposure to 1,1,1-trichloroethane in the rat. <i>Neurotoxicology and Teratology</i> 21(6):699-708.			
Health Outcome(s):	Nutritional/Metabolic			
Reported Health Effect(s):	Nutritional/Metabolic: Maternal body weight. Maternal food and water consumption			
Duration:	Reproductive/Developmental 1,1,1-Trichloroethane			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	196341			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	Test substance was identified as 1,1,1-trichloroethane.	
	Metric 2: Test Substance Source	Low	The source of the test substance was not reported.	
	Metric 3: Test Substance Purity	Low	The purity of the test substance was not reported.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	High	The negative control group was appropriate (sham-treated).	
	Metric 5: Positive Controls	N/A	Not applicable for this study.	
	Metric 6: Randomized Allocation of Animals	Low	The study did not report how animals were allocated.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	High	Test substance preparation and storage were not adequately described, however, the concentration in the exposure chamber was monitored continuously by an infrared spectrophotometer.	
	Metric 8: Consistency of Exposure Administration	High	Test substance was delivered consistently across study groups.	
	Metric 9: Reporting of Doses/Concentrations	Medium	Chamber concentration was measured using an infrared spectrophotometer and regulated to produce a nominal concentration of 7000 ppm. Analytical concentrations were not reported. Recorded concentration with standard error was not reported.	
	Metric 10: Exposure Frequency and Duration	Medium	There were minor limitations in exposure frequency and duration (3 hours a day), but this is unlikely to substantially impact results.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Low	Only a single dose group was used in the study. A NOAEL was not obtained. The concentration studied was based on a pilot study.	
	Metric 12: Exposure Route and Method	High	Whole body dynamic chamber was used. The overall flow rate was 10 liters/min in a 20.8 liter chamber.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	High	Animal characteristics were adequately reported.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	High	Husbandry conditions were adequately reported.	
	Metric 15: Number of Animals per Group	Low	The number of animals/group (n=9-10) was lower than the recommended number of litters in the OECD 414 guideline (i.e., 20 female animals with implantation sites at necropsy).	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	High	The outcome assessment methodology addressed the intended outcomes.	

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Study Citation:	Coleman, C. N., Mason, T., Hooker, E. P., Robinson, S. E. (1999). Developmental effects of intermittent prenatal exposure to 1,1,1-trichloroethane in the rat. <i>Neurotoxicology and Teratology</i> 21(6):699-708.
Health Outcome(s):	Nutritional/Metabolic
Reported Health Effect(s):	Nutritional/Metabolic: Maternal body weight. Maternal food and water consumption
Duration:	Reproductive/Developmental 1,1,1-Trichloroethane
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	196341

Domain	Metric	Rating	Comments
	Metric 17: Consistency of Outcome Assessment	High	Outcomes were assessed consistently across study groups.
	Metric 18: Sampling Adequacy	High	Sampling was adequate.
	Metric 19: Blinding of Assessors	N/A	Blinding was not necessary.
	Metric 20: Negative Control Response	High	The negative control response was appropriate.
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	Low	Test substance is a respiratory irritant and therefore respiratory rate should be reported. Authors did not measure/report respiration rate.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.
	Metric 23: Data Presentation and Analysis	High	Statistical analysis was appropriate.
	Metric 24: Reporting of Data	Medium	Mean weight gain is reported for GD0-21 and GD13-19, however since 2 dams resorbed their entire litter, it would be helpful to see individual dam weights.

Additional Comments: None

Overall Quality Determination**Medium**

Study Citation:	Coleman, C. N., Mason, T., Hooker, E. P., Robinson, S. E. (1999). Developmental effects of intermittent prenatal exposure to 1,1,1-trichloroethane in the rat. <i>Neurotoxicology and Teratology</i> 21(6):699-708.			
Health Outcome(s):	Clinical signs			
Reported Health Effect(s):	Clinical signs: Maternal salivation, lacrimation, piloerection, behavior (gait abnormalities, ability to locomote, clonic movements)			
Duration:	Reproductive/Developmental 1,1,1-Trichloroethane			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	196341			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	Test substance was identified as 1,1,1-trichloroethane.	
	Metric 2: Test Substance Source	Low	The source of the test substance was not reported.	
	Metric 3: Test Substance Purity	Low	The purity of the test substance was not reported.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	High	The negative control group was appropriate (sham-treated).	
	Metric 5: Positive Controls	N/A	Not applicable for this study.	
	Metric 6: Randomized Allocation of Animals	Low	The study did not report how animals were allocated.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	High	Test substance preparation and storage were not adequately described, however, the concentration in the exposure chamber was monitored continuously by an infrared spectrophotometer.	
	Metric 8: Consistency of Exposure Administration	High	Test substance was delivered consistently across study groups.	
	Metric 9: Reporting of Doses/Concentrations	Medium	Chamber concentration was measured using an infrared spectrophotometer and regulated to produce a nominal concentration of 7000 ppm. Analytical concentrations were not reported. Recorded concentration with standard error was not reported.	
	Metric 10: Exposure Frequency and Duration	Medium	There were minor limitations in exposure frequency and duration (3 hours a day), but this is unlikely to substantially impact results.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Low	Only a single dose group was used in the study. A NOAEL was not obtained. The concentration studied was based on a pilot study.	
	Metric 12: Exposure Route and Method	Medium	Whole body dynamic chamber was used. The overall flow rate was 10 liters/min in a 20.8 liter chamber.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	High	Animal characteristics were adequately reported.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	High	Husbandry conditions were adequately reported.	
	Metric 15: Number of Animals per Group	Low	The number of animals/group (n=9-10) was lower than the recommended number of litters in the OECD 414 guideline (i.e., 20 female animals with implantation sites at necropsy).	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	High	The outcome assessment methodology addressed the intended outcomes.	

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Study Citation:	Coleman, C. N., Mason, T., Hooker, E. P., Robinson, S. E. (1999). Developmental effects of intermittent prenatal exposure to 1,1,1-trichloroethane in the rat. <i>Neurotoxicology and Teratology</i> 21(6):699-708.
Health Outcome(s):	Clinical signs
Reported Health Effect(s):	Clinical signs: Maternal salivation, lacrimation, piloerection, behavior (gait abnormalities, ability to locomote, clonic movements)
Duration:	Reproductive/Developmental 1,1,1-Trichloroethane
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	196341

Domain	Metric	Rating	Comments
	Metric 17: Consistency of Outcome Assessment	High	Outcomes were assessed consistently across study groups.
	Metric 18: Sampling Adequacy	High	Sampling was adequate.
	Metric 19: Blinding of Assessors	Low	The study did not report whether assessors were blinded to treatment group for subjective outcomes.
	Metric 20: Negative Control Response	High	The negative control response was appropriate.
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	Low	Test substance is a respiratory irritant and therefore respiratory rate should be reported. Authors did not measure/report respiration rate.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.
	Metric 23: Data Presentation and Analysis	High	Statistical analysis was appropriate.
	Metric 24: Reporting of Data	Low	Data for exposure-related findings were indicated in text as significant (not shown).

Additional Comments: None

Overall Quality Determination**Medium**

Study Citation:	George, J. D., Price, C. J., Marr, M. C., Sadler, B. M., Schwetz, B. A., Birnbaum, L. S., Morrissey, R. E. (1989). Developmental toxicity of 1,1,1-trichloroethane in CD rats. Toxicological Sciences 13(4):641-651.			
Health Outcome(s):	Mortality; Nutritional/Metabolic; Clinical signs (Clinical signs of toxicity);			
Reported Health Effect(s):	Mortality: mortality in parental animals; Nutritional/Metabolic: Body weight, body weight gain, feed consumption, water consumption; Clinical signs (Clinical signs of toxicity): Clinical signs of toxicity;			
Duration:	Reproductive/Developmental 14 days premating, up to 13 days throughout mating, to PND 21			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5365			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	All Outcomes: 1,1,1-trichloroethane (71-55-6); isomer of 1,1,2-trichloroethane
	Metric 2:	Test Substance Source	High	All Outcomes: source of test substance identified with lot number
	Metric 3:	Test Substance Purity	High	All Outcomes: 97% purity stabilized with 3% 1,4-dioxane
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	High	All Outcomes: untreated water control and vehicle control (0.05% tween 80 and 0.9 ppm 1,4-dioxane) were tested
	Metric 5:	Positive Controls	N/A	All Outcomes: not applicable
	Metric 6:	Randomized Allocation of Animals	Medium	All Outcomes: male and females were randomly distributed into 3 cohorts and then assigned to dose groups in cohorts based on pre-mating body weight.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	Medium	All Outcomes: preparation of test substance preparation was reported. formulations were analytically verified. test substance was unstable (decreased 82-90% of nominal concentration after 72 hours). Formulations were adjusted to allow the formulations to be at target concentrations during period of administration; 81% of formulations were within 90-100% of target concentrations
	Metric 8:	Consistency of Exposure Administration	High	All Outcomes: exposures were administered consistently across study groups (ad libitum) throughout the study
	Metric 9:	Reporting of Doses/Concentrations	Medium	All Outcomes: Target concentrations of 3, 10, and 30 ppm were reported. Water consumption rates were reported, though body weight data was not. Time-weighted averages (TWA) for males during premating were reported to be 0.3, 0.9, and 2.6 mg/kg/day. TWA for females during premating were reported to be 0.3, 1.3, and 3.3 mg/kg/day. Maternal TWA from GD0 to parturition was estimated as 0.3, 1.2, and 3.5 mg/kg/day. Maternal TWA from PND1-PND21 was estimated as 0.6, 2.0, and 5.9 mg/kg/day
	Metric 10:	Exposure Frequency and Duration	High	All Outcomes: The exposure frequency and duration of exposure were reported and appropriate for this study type and outcome. Exposure through water consumption was ad libitum throughout study; 14 days premating, up to 13 days mating; continuing through PND21 for sperm-positive females.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	High	All Outcomes: The number of exposure groups is sufficient; the chosen concentration spacing was based on a previous developmental study that observed effects (cardiac abnormalities) at 10 ppm.
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Study Citation:	George, J. D., Price, C. J., Marr, M. C., Sadler, B. M., Schwetz, B. A., Birnbaum, L. S., Morrissey, R. E. (1989). Developmental toxicity of 1,1,1-trichloroethane in CD rats. Toxicological Sciences 13(4):641-651.			
Health Outcome(s):	Mortality; Nutritional/Metabolic; Clinical signs (Clinical signs of toxicity);			
Reported Health Effect(s):	Mortality: mortality in parental animals; Nutritional/Metabolic: Body weight, body weight gain, feed consumption, water consumption; Clinical signs (Clinical signs of toxicity): Clinical signs of toxicity;			
Duration:	Reproductive/Developmental 14 days premating, up to 13 days throughout mating, to PND 21			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5365			
Domain	Metric	Rating	Comments	
	Metric 12:	Exposure Route and Method	Medium	All Outcomes: exposure via the water consumption route is limited due to the instability of the test substance; however, researchers took steps to mitigate.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	Medium	All Outcomes: The test animal species, strain, sex, and age were reported; however, starting body weight was not. The test animals were obtained from a commercial source. The test species and strain were an appropriate animal model.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	High	All Outcomes: All husbandry conditions (temperature, humidity, light- dark cycle, diet, water availability) were reported, were adequate, and the same for control and exposed populations.
	Metric 15:	Number of Animals per Group	Medium	All Outcomes: > 30/sex/group
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	High	All Outcomes: The outcome assessment methodology addressed the intended outcomes of interest and was appropriate
	Metric 17:	Consistency of Outcome Assessment	High	All Outcomes: The outcome of interest was assessed and reported consistently across study groups
	Metric 18:	Sampling Adequacy	High	All Outcomes: Reported information indicates the study used adequate sampling for the outcome of interest (mortality); observations on all breeder males and sperm-negative females through cohabitation, and sperm-positive females through gestation.
	Metric 19:	Blinding of Assessors	N/A	All Outcomes: not applicable
	Metric 20:	Negative Control Response	Medium	Mortality: Study authors indicate no mortality in any test group including controls.; Nutritional/Metabolic: Study authors indicate no significant effects of treatment on body weight, body weight gain, or food consumption; however, data for these observations were not reported for any test group including controls. The negative and vehicle control means for water consumption are reported and adequate.; Clinical signs (Clinical signs of toxicity): Study authors indicate no mortality in any test group including controls.
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Medium	All Outcomes: The study noted that there were no changes in body weight, body weight change, and food consumption; however, body weight data was not reported. The study did report water consumption data.
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	All Outcomes: health outcomes unrelated to exposure were not reported for each study group.
	Metric 23:	Data Presentation and Analysis	High	All Outcomes: statistical methods were clearly described.
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Study Citation:	George, J. D., Price, C. J., Marr, M. C., Sadler, B. M., Schwetz, B. A., Birnbaum, L. S., Morrissey, R. E. (1989). Developmental toxicity of 1,1,1-trichloroethane in CD rats. Toxicological Sciences 13(4):641-651.
Health Outcome(s):	Mortality; Nutritional/Metabolic; Clinical signs (Clinical signs of toxicity);
Reported Health Effect(s):	Mortality: mortality in parental animals; Nutritional/Metabolic: Body weight, body weight gain, feed consumption, water consumption; Clinical signs (Clinical signs of toxicity): Clinical signs of toxicity;
Duration:	Reproductive/Developmental 14 days premating, up to 13 days throughout mating, to PND 21
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	5365

Domain	Metric	Rating	Comments
	Metric 24: Reporting of Data	High	Mortality: Data for exposure-related finding were reported all outcomes. Some negative findings (mortality, body weight, body weight gain, and food consumption) were qualitatively reported to not be significantly different. Means were reported with associated standard errors.; Nutritional/Metabolic: Data for exposure-related finding were reported all outcomes. Some negative findings (mortality, body weight, body weight gain, and food consumption) were qualitatively reported to not be significantly different. Means for water consumption were reported with associated standard errors.; Clinical signs (Clinical signs of toxicity): Data for exposure-related finding were reported all outcomes. Some negative findings (mortality, body weight, body weight gain, and food consumption) were qualitatively reported to not be significantly different. Means were reported with associated standard errors.

Additional Comments: Exposure in this study is for the isomer 1,1,1- trichloroethane; This evaluation is for effects of treatment on mortality of parental animals that was evaluated during the premating through cohabitational (mating) periods for males and sperm-negative females and through gestation for pregnant females.

Overall Quality Determination

High

Study Citation:	George, J. D., Price, C. J., Marr, M. C., Sadler, B. M., Schwetz, B. A., Birnbaum, L. S., Morrissey, R. E. (1989). Developmental toxicity of 1,1,1-trichloroethane in CD rats. Toxicological Sciences 13(4):641-651.
Health Outcome(s):	Reproductive/Developmental
Reported Health Effect(s):	Reproductive/Developmental: pregnant dams with live litters, number of implantation sites/dam, length of gestation, number of live pups/litter, pup mortality, pup body weight, pup malformations (external and visceral), hydronephrosis, small kidney, cardiac malformations
Duration:	Reproductive/Developmental 14 days premating, up to 13 days throughout mating, to PND 21
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	5365

Domain	Metric	Rating	Comments
Domain 1: Test Substance			
	Metric 1: Test Substance Identity	High	1,1,1-trichloroethane (71-55-6); isomer of 1,1,2-trichloroethane
	Metric 2: Test Substance Source	High	source of test substance identified with lot number
	Metric 3: Test Substance Purity	High	97% purity stabilized with 3% 1,4-dioxane
Domain 2: Test Design			
	Metric 4: Negative and Vehicle Controls	High	untreated water control and vehicle control (0.05% tween 80 and 0.9 ppm 1,4-dioxane) were tested
	Metric 5: Positive Controls	N/A	not applicable
	Metric 6: Randomized Allocation of Animals	Medium	male and females were randomly distributed into 3 cohorts and then assigned to dose groups in cohorts based on pre-mating body weight. Pups were culled to a litter size of 10 to achieve equal sex distribution.
Domain 3: Exposure Characterization			
	Metric 7: Preparation and Storage of Test Substance	Medium	preparation of test substance preparation was reported. formulations were analytically verified. test substance was unstable (decreased 82-90% of nominal concentration after 72 hours). Formulations were adjusted to allow the formulations to be at target concentrations during period of administration; 81% of formulations were within 90-100% of target concentrations
	Metric 8: Consistency of Exposure Administration	High	exposures were administered consistently across study groups (ad libitum) throughout the study
	Metric 9: Reporting of Doses/Concentrations	Medium	Target concentrations of 3, 10, and 30 ppm were reported. Water consumption rates were reported, though body weight data was not. Time-weighted averages (TWA) for males during premating were reported to be 0.3, 0.9, and 2.6 mg/kg/day. TWA for females during premating were reported to be 0.3, 1.3, and 3.3 mg/kg/day. Maternal TWA from GD0 to parturition was estimated as 0.3, 1.2, and 3.5 mg/kg/day. Maternal TWA from PND1-PND21 was estimated as 0.6, 2.0, and 5.9 mg/kg/day
	Metric 10: Exposure Frequency and Duration	High	The exposure frequency and duration of exposure were reported and appropriate for this study type and outcome. Exposure through water consumption was ad libitum throughout study; 14 days premating, up to 13 days mating; continuing through PND21 for sperm-positive females.
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	High	The number of exposure groups is sufficient; the chosen concentration spacing was based on a previous developmental study that observed effects (cardiac abnormalities) at 10 ppm.
	Metric 12: Exposure Route and Method	Medium	exposure via the water consumption route is limited due to the instability of the test substance; however, researchers took steps to mitigate.

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Study Citation:	George, J. D., Price, C. J., Marr, M. C., Sadler, B. M., Schwetz, B. A., Birnbaum, L. S., Morrissey, R. E. (1989). Developmental toxicity of 1,1,1-trichloroethane in CD rats. Toxicological Sciences 13(4):641-651.		
Health Outcome(s):	Reproductive/Developmental		
Reported Health Effect(s):	Reproductive/Developmental: pregnant dams with live litters, number of implantation sites/dam, length of gestation, number of live pups/litter, pup mortality, pup body weight, pup malformations (external and visceral), hydronephrosis, small kidney, cardiac malformations		
Duration:	Reproductive/Developmental 14 days premating, up to 13 days throughout mating, to PND 21		
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane		
HERO ID:	5365		
Domain	Metric	Rating	Comments
Domain 4: Test Animals			
Metric 13:	Test Animal Characteristics	Medium	The test animal species, strain, sex, and age were reported; however, starting body weight was not. The test animals were obtained from a commercial source. The test species and strain were an appropriate animal model.
Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	High	All husbandry conditions (temperature, humidity, light- dark cycle, diet, water availability) were reported, were adequate, and the same for control and exposed populations.
Metric 15:	Number of Animals per Group	Medium	24-29 sperm-positive females/group
Domain 5: Outcome Assessment			
Metric 16:	Outcome Assessment Methodology	High	The outcome assessment methodology addressed the intended outcomes of interest and was appropriate
Metric 17:	Consistency of Outcome Assessment	Low	Most outcomes were consistently assessed across study groups; however, for post-natal reproductive outcomes, it was noted that the number of animals was 18-25 for each group because some data were inadvertently not collected or available. It is unclear why this data was not available.
Metric 18:	Sampling Adequacy	High	Reported information indicates the study used adequate sampling for for the reproductive and developmental endpoints. litters were culled to 10 pups/litter.
Metric 19:	Blinding of Assessors	N/A	not applicable
Metric 20:	Negative Control Response	Medium	The biological response of negative and vehicle controls groups were reported and adequate.
Domain 6: Confounding / Variable Control			
Metric 21:	Confounding Variables in Test Design and Procedures	Medium	The study noted that there were no changes in body weight, body weight change, and food consumption; however, body weight data was not reported. The study did report water consumption data.
Metric 22:	Health Outcomes Unrelated to Exposure	Medium	health outcomes unrelated to exposure were not reported for each study group.
Metric 23:	Data Presentation and Analysis	High	statistical methods were clearly described.
Metric 24:	Reporting of Data	High	Reproductive and developmental outcomes were reported by exposure group with quantal and/or continuous presentation. Means were reported with associated standard errors.
Additional Comments: Exposure in this study is for the isomer 1,1,1- trichloroethane; This evaluation is for reproductive and developmental endpoints.			

Overall Quality Determination**High**

Study Citation:	Lane, R. W., Riddle, B. L., Borzelleca, J. F. (1982). Effects of 1,2-dichloroethane and 1,1,1-trichloroethane in drinking water on reproduction and development in mice. Toxicology and Applied Pharmacology 63(3):409-421.			
Health Outcome(s):	Reproductive/Developmental			
Reported Health Effect(s):	Reproductive/Developmental: Fertility, gestation, viability, litter size, sex ratio, pup weight gain and teratology			
Duration:	Reproductive/Developmental multigenerational- Isomer 1,1,1-trichloroethane			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	62609			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	Test substance was identified as 1,2-dichloroethane.	
	Metric 2: Test Substance Source	Low	The source of 1,2-dichloroethane was Aldrich Chemical Co, Milwaukee, Wis. The batch/lot number was not provided.	
	Metric 3: Test Substance Purity	High	The purity was reported at 99+%.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	High	Appropriate negative controls were used.	
	Metric 5: Positive Controls	Low	For the dominant lethal portion of the study, OECD test guideline 478 requires inclusion of a positive control or demonstration of laboratory competence in this assay. The study authors report that "frequency of dominant lethal factors was minimal when compared to the results in females mated to males receiving 0.05 mg/ml cycophosphamide in drinking water 14 weeks, data not shown". Details of this positive control treatment or response were not further described.	
	Metric 6: Randomized Allocation of Animals	Medium	Animals were randomly allocated by computer into test groups.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	High	Preparation and storage conditions of test substance was adequate.	
	Metric 8: Consistency of Exposure Administration	High	Exposure was consistent across study groups	
	Metric 9: Reporting of Doses/Concentrations	Low	Dose was calculated based on average fluid consumption for a 35-g mouse and not based on actual water consumed or weight of mouse. Concentrations in water were not analytically confirmed.	
	Metric 10: Exposure Frequency and Duration	High	Exposure and frequency were appropriate for outcome studied.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	High	The number of exposure groups and doses administered were appropriate and based on acute LD50 data.	
	Metric 12: Exposure Route and Method	High	Exposure route and method were appropriate.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Medium	Initial body weights were not provided.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	High	All husbandry conditions were reported.	
	Metric 15: Number of Animals per Group	Medium	The number of animals/group were appropriate for outcomes studied.	

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Study Citation:	Lane, R. W., Riddle, B. L., Borzelleca, J. F. (1982). Effects of 1,2-dichloroethane and 1,1,1-trichloroethane in drinking water on reproduction and development in mice. Toxicology and Applied Pharmacology 63(3):409-421.
Health Outcome(s):	Reproductive/Developmental
Reported Health Effect(s):	Reproductive/Developmental: Fertility, gestation, viability, litter size, sex ratio, pup weight gain and teratology
Duration:	Reproductive/Developmental multigenerational- Isomer 1,1,1-trichloroethane
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	62609

Domain	Metric	Rating	Comments
Domain 5: Outcome Assessment			
	Metric 16: Outcome Assessment Methodology	High	The outcome assessment and methodology were appropriate.
	Metric 17: Consistency of Outcome Assessment	High	Outcomes were assessed consistently across study groups.
	Metric 18: Sampling Adequacy	Low	The sampling was adequate for the outcomes of interest. In the dominant lethal study, OECD guidelines recommend including enough dams to produce at least 400 implants to provide sufficient power, but some groups produced fewer than 200 implants.
	Metric 19: Blinding of Assessors	N/A	Not necessary for this study design.
	Metric 20: Negative Control Response	Low	The fertility index of control animals appeared to be low relative to historical control ranges of 80-100 reported by Charles River (https://www.crj.co.jp/cms/crj/pdf/product/rm/information/icr/CRL_Reproductive_behavioral_evaluations_ICR_2007). In control F/1B litters, authors report fertility index of 73.3. In the dominant lethal study, the fertility index in controls was as low as 56.7. There were also some differences between naive control and vehicle controls for some endpoints. In two cases (out of four) the ratio of dead fetus: live fetuses was higher in control than exposed groups.
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	Not all potential confounders were reported. Authors state that there was no aversion (decreased fluid consumption) to either the vehicle or test substance.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.
	Metric 23: Data Presentation and Analysis	High	Statistics analysis were performed and appropriate.
	Metric 24: Reporting of Data	High	All outcome data was reported.
Additional Comments: None			

Overall Quality Determination**High**

Study Citation:	Lane, R. W., Riddle, B. L., Borzelleca, J. F. (1982). Effects of 1,2-dichloroethane and 1,1,1-trichloroethane in drinking water on reproduction and development in mice. Toxicology and Applied Pharmacology 63(3):409-421.			
Health Outcome(s):	Nutritional/Metabolic; Mortality;			
Reported Health Effect(s):	Nutritional/Metabolic: Body weight of F0 generation, fluid consumption; Mortality: Mortality of exposed adults;			
Duration:	Reproductive/Developmental multigenerational- Isomer 1,1,1-trichloroethane			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	62609			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	All Outcomes: Test substance was identified as 1,2-dichloroethane.	
	Metric 2: Test Substance Source	Low	All Outcomes: The source of 1,2-dichloroethane was Aldrich Chemical Co, Milwaukee, Wis. The batch/lot number was not provided.	
	Metric 3: Test Substance Purity	High	All Outcomes: The purity was reported at 99+%.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	High	All Outcomes: Appropriate negative controls were used.	
	Metric 5: Positive Controls	N/A	All Outcomes: Not applicable for this study.	
	Metric 6: Randomized Allocation of Animals	Medium	All Outcomes: Animals were randomly allocated by computer into test groups.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	High	All Outcomes: Preparation and storage conditions of test substance was adequate.	
	Metric 8: Consistency of Exposure Administration	High	All Outcomes: Exposure was consistent across study groups	
	Metric 9: Reporting of Doses/Concentrations	Low	Nutritional/Metabolic: Dose was calculated based on average fluid consumption for a 35-g mouse and not based on actual water consumed or weight of mouse. Concentrations were not analytically confirmed.; Mortality: Dose was calculated based on average fluid consumption for a 35-g mouse and not based on actual water consumed or weight of mouse. Concentrations in water were not analytically confirmed.	
	Metric 10: Exposure Frequency and Duration	High	All Outcomes: Exposure and frequency were appropriate for outcome studied.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	High	All Outcomes: The number of exposure groups and doses administered were appropriate and based on acute LD50 data.	
	Metric 12: Exposure Route and Method	High	All Outcomes: Exposure route and method were appropriate.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	Medium	All Outcomes: Initial body weights were not provided.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	High	All Outcomes: All husbandry conditions were reported.	
	Metric 15: Number of Animals per Group	Medium	All Outcomes: The number of animals/group were appropriate for outcomes studied.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	High	All Outcomes: The outcome assessment and methodology were appropriate.	
	Metric 17: Consistency of Outcome Assessment	High	All Outcomes: Outcomes were assessed consistently across study groups.	
	Metric 18: Sampling Adequacy	High	All Outcomes: The sampling was adequate for the outcomes of interest.	
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Study Citation:	Lane, R. W., Riddle, B. L., Borzelleca, J. F. (1982). Effects of 1,2-dichloroethane and 1,1,1-trichloroethane in drinking water on reproduction and development in mice. Toxicology and Applied Pharmacology 63(3):409-421.
Health Outcome(s):	Nutritional/Metabolic; Mortality;
Reported Health Effect(s):	Nutritional/Metabolic: Body weight of F0 generation, fluid consumption; Mortality: Mortality of exposed adults;
Duration:	Reproductive/Developmental multigenerational- Isomer 1,1,1-trichloroethane
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	62609

Domain	Metric	Rating	Comments
	Metric 19: Blinding of Assessors	N/A	All Outcomes: Not necessary for this study design.
	Metric 20: Negative Control Response	Medium	All Outcomes: There were differences between naive control and vehicle control. These differences are unlikely to substantially impact results.
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	All Outcomes: Not all potential confounders were reported. Authors state that there was no aversion (decreased fluid consumption) to either the vehicle or test substance.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	All Outcomes: There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.
	Metric 23: Data Presentation and Analysis	High	All Outcomes: Statistics analysis were performed and appropriate.
	Metric 24: Reporting of Data	High	All Outcomes: All outcome data was reported.

Additional Comments: None

Overall Quality Determination**High**

Study Citation:	Run., Bushy (1987). Initial submission: Developmental toxicity study with inhaled 1,1,1-trichloroethane in New Zealand white rabbits with cover letter dated 08/28/92.			
Health Outcome(s):	Hepatic/Liver; Nutritional/Metabolic; Mortality;			
Reported Health Effect(s):	Hepatic/Liver: maternal liver weight; Nutritional/Metabolic: Maternal body weight; Mortality: Maternal mortality;			
Duration:	Reproductive/Developmental 1,1,1-trichloroethane			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5467064			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
Metric 1:	Test Substance Identity	High	All Outcomes: Test substance was identified as 1,1,1-trichloroethane, CAS No. 71-55-6.	
Metric 2:	Test Substance Source	High	All Outcomes: The source of the test substance was reported to Dow Chemical Company (Freeport, TX); Lot No. TAB 606182.	
Metric 3:	Test Substance Purity	High	All Outcomes: The test substance was 99.9% pure.	
Domain 2: Test Design				
Metric 4:	Negative and Vehicle Controls	High	All Outcomes: The negative control group was appropriate (air).	
Metric 5:	Positive Controls	N/A	All Outcomes: A positive control group was not necessary.	
Metric 6:	Randomized Allocation of Animals	Low	All Outcomes: Study reports animals were randomly assigned to study groups.	
Domain 3: Exposure Characterization				
Metric 7:	Preparation and Storage of Test Substance	High	All Outcomes: Preparation and storage of test substance was adequately reported.	
Metric 8:	Consistency of Exposure Administration	High	All Outcomes: Test substance was administered consistently across study groups.	
Metric 9:	Reporting of Doses/Concentrations	High	All Outcomes: Concentrations were reported without ambiguity.	
Metric 10:	Exposure Frequency and Duration	High	All Outcomes: The exposure frequency and duration were appropriate for the study type.	
Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	High	All Outcomes: The number of study groups and concentrations gave a full range of responses.	
Metric 12:	Exposure Route and Method	Medium	All Outcomes: A dynamic whole-body chamber was used with 14 air changes/hour.	
Domain 4: Test Animals				
Metric 13:	Test Animal Characteristics	High	All Outcomes: Test animal characteristics were fully reported.	
Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Medium	All Outcomes: Temperature and humidity were not reported (although they were recorded continuously).	
Metric 15:	Number of Animals per Group	Medium	All Outcomes: The number of animals/group were reported and appropriate (n=24).	
Domain 5: Outcome Assessment				
Metric 16:	Outcome Assessment Methodology	High	All Outcomes: Outcome assessment methodology addressed the intended outcome of interest.	
Metric 17:	Consistency of Outcome Assessment	High	All Outcomes: Outcome was assessed consistently across study groups.	
Metric 18:	Sampling Adequacy	High	All Outcomes: Sampling was adequate.	

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Study Citation:	Run., Bushy (1987). Initial submission: Developmental toxicity study with inhaled 1,1,1-trichloroethane in New Zealand white rabbits with cover letter dated 08/28/92.
Health Outcome(s):	Hepatic/Liver; Nutritional/Metabolic; Mortality;
Reported Health Effect(s):	Hepatic/Liver: maternal liver weight; Nutritional/Metabolic: Maternal body weight; Mortality: Maternal mortality;
Duration:	Reproductive/Developmental 1,1,1-trichloroethane
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	5467064

Domain	Metric	Rating	Comments
	Metric 19: Blinding of Assessors	N/A	All Outcomes: Blinding was not necessary.
	Metric 20: Negative Control Response	High	All Outcomes: The negative control response was appropriate.
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	Low	All Outcomes: Test substance is a respiratory irritant therefore respiratory rate should be reported.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	All Outcomes: There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure that could influence the outcome assessment.
	Metric 23: Data Presentation and Analysis	High	All Outcomes: Statistical methods were appropriate.
	Metric 24: Reporting of Data	High	All Outcomes: Data were adequately reported.

Additional Comments: Not Applicable

Overall Quality Determination**High**

Study Citation:	Run., Bushy (1987). Initial submission: Developmental toxicity study with inhaled 1,1,1-trichloroethane in New Zealand white rabbits with cover letter dated 08/28/92.			
Health Outcome(s):	Reproductive/Developmental			
Reported Health Effect(s):	Reproductive/Developmental: Gravid uterine weight; number of corpora lutea, uterine implantation sties, resorptions, dead fetuses and live fetuses, fetal body weight, sex ratio,All live fetuses were examined for external malformations and variations (including cleft palate), visceral malformations and variations (including craniofacial alterations); 50% of fetuses in each litter were examined for skeletal malformation and variations.			
Duration:	Reproductive/Developmental 1,1,1-trichloroethane			
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane			
HERO ID:	5467064			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1:	Test Substance Identity	High	Test substance was identified as 1,1,1-trichloroethane, CAS No. 71-55-6.
	Metric 2:	Test Substance Source	High	The source of the test substance was reported to Dow Chemical Company (Freeport, TX); Lot No. TAB 606182.
	Metric 3:	Test Substance Purity	High	The test substance was 99.9% pure.
Domain 2: Test Design				
	Metric 4:	Negative and Vehicle Controls	High	The negative control group was appropriate (air).
	Metric 5:	Positive Controls	N/A	A positive control group was not necessary.
	Metric 6:	Randomized Allocation of Animals	Low	Study reports animals were randomly assigned to study groups.
Domain 3: Exposure Characterization				
	Metric 7:	Preparation and Storage of Test Substance	High	Preparation and storage of test substance was adequately reported.
	Metric 8:	Consistency of Exposure Administration	High	Test substance was administered consistently across study groups.
	Metric 9:	Reporting of Doses/Concentrations	High	Concentrations were reported without ambiguity.
	Metric 10:	Exposure Frequency and Duration	High	The exposure frequency and duration were appropriate for the study type.
	Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	High	The number of study groups and concentrations gave a full range of responses.
	Metric 12:	Exposure Route and Method	Medium	A dynamic whole-body chamber was used with 14 air changes/hour.
Domain 4: Test Animals				
	Metric 13:	Test Animal Characteristics	High	Test animal characteristics were fully reported.
	Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	Medium	Temperature and humidity were not reported (although they were recorded continuously).
	Metric 15:	Number of Animals per Group	Medium	The number of animals/group were reported and appropriate (n=24).
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	High	Outcome assessment methodology addressed the intended outcome of interest.
	Metric 17:	Consistency of Outcome Assessment	High	Outcome was assessed consistently across study groups.
	Metric 18:	Sampling Adequacy	High	Sampling was adequate.
	Metric 19:	Blinding of Assessors	N/A	Blinding was not necessary.
	Metric 20:	Negative Control Response	High	The negative control response was appropriate.

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Study Citation:	Run., Bushy (1987). Initial submission: Developmental toxicity study with inhaled 1,1,1-trichloroethane in New Zealand white rabbits with cover letter dated 08/28/92.
Health Outcome(s):	Reproductive/Developmental
Reported Health Effect(s):	Reproductive/Developmental: Gravid uterine weight; number of corpora lutea, uterine implantation sites, resorptions, dead fetuses and live fetuses, fetal body weight, sex ratio, All live fetuses were examined for external malformations and variations (including cleft palate), visceral malformations and variations (including craniofacial alterations); 50% of fetuses in each litter were examined for skeletal malformation and variations.
Duration:	Reproductive/Developmental 1,1,1-trichloroethane
Chemical:	1,1,2-Trichloroethane- Isomer: 1,1,1-Trichloroethane
HERO ID:	5467064

Domain	Metric	Rating	Comments
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	Low	Test substance is a respiratory irritant therefore respiratory rate should be reported.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure that could influence the outcome assessment.
	Metric 23: Data Presentation and Analysis	High	Statistical methods were appropriate.
	Metric 24: Reporting of Data	Medium	Most data were fully reported (incidence of extra thirteenth rib are not reported).

Additional Comments: Not Applicable

Overall Quality Determination**High**

Study Citation:	Al-Griw, M. A., Alghazeer, R. O., Al-Azreg, S. A., Bennour, E. M. (2016). Cellular and molecular etiology of hepatocyte injury in a murine model of environmentally induced liver abnormality. 6(3):150-157.			
Health Outcome(s):	Nutritional/Metabolic			
Reported Health Effect(s):	Nutritional/Metabolic: Body weights			
Duration:	Short-term (>1-30 days) Twice/week for 3 weeks			
Chemical:	1,1,2-Trichloroethane- Isomer: Trichloroethane			
HERO ID:	3501912			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
Metric 1:	Test Substance Identity	Low	The test substance was reported to be trichloroethane. A CASRN or source was not provided and the specific isomer used cannot be verified. This is likely to have a substantial impact on the study results.	
Metric 2:	Test Substance Source	Low	The test substance source was not reported	
Metric 3:	Test Substance Purity	Low	The test substance purity was not reported.	
Domain 2: Test Design				
Metric 4:	Negative and Vehicle Controls	High	Both sham and vehicle controls were included in the study.	
Metric 5:	Positive Controls	N/A	Positive controls were not necessary for the study type.	
Metric 6:	Randomized Allocation of Animals	Low	The study did not report how animals were allocated.	
Domain 3: Exposure Characterization				
Metric 7:	Preparation and Storage of Test Substance	Low	Details of dose preparation and storage were not provided. This could have a significant impact on the study results because the test substance is a volatile compound.	
Metric 8:	Consistency of Exposure Administration	Medium	Details of exposure administration were adequately described. The injection volumes ranged from 0.08 to 0.1 mL This is not expected to have a significant impact on the study results.	
Metric 9:	Reporting of Doses/Concentrations	Medium	The doses were clearly reported in mg/kg. There is some ambiguity due to the lack of details regarding the preparation of the doses in corn oil (e.g., whether there was proper mixing to achieve homogeneity). There was no indication that analytical measurements were taken.	
Metric 10:	Exposure Frequency and Duration	High	The study authors justified the exposure window as being critical for development. The frequency (twice per week rather than daily) was not justified but appeared to be appropriate for the purposes of the study.	
Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Medium	The dose spacing was appropriate for the purposes of the study but only two dose groups were used, limiting dose-response modeling.	
Metric 12:	Exposure Route and Method	High	Animals were dose i.p. The route of exposure was not justified by the study authors.	
Domain 4: Test Animals				
Metric 13:	Test Animal Characteristics	Low	Animal species, strain, age, starting body weights, and source were provided. The sex was not specified.	
Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	High	Animal husbandry conditions were reported and were appropriate.	
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Study Citation:	Al-Griw, M. A., Alghazeer, R. O., Al-Azreg, S. A., Bennour, E. M. (2016). Cellular and molecular etiology of hepatocyte injury in a murine model of environmentally induced liver abnormality. 6(3):150-157.			
Health Outcome(s):	Nutritional/Metabolic			
Reported Health Effect(s):	Nutritional/Metabolic: Body weights			
Duration:	Short-term (>1-30 days) Twice/week for 3 weeks			
Chemical:	1,1,2-Trichloroethane- Isomer: Trichloroethane			
HERO ID:	3501912			
Domain	Metric	Rating	Comments	
	Metric 15:	Number of Animals per Group	Medium	The methods indicated there were 6 animals per group; however, one data table indicated data were from 6-8 animals per group. The numbers were sufficient for statistical analysis.
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	High	The outcome assessment methodology was clearly reported.
	Metric 17:	Consistency of Outcome Assessment	High	The timing of the outcome assessment was reported and was consistent across study groups.
	Metric 18:	Sampling Adequacy	High	Sampling was adequate for the outcome(s) of interest and was sufficient for statistical analysis.
	Metric 19:	Blinding of Assessors	N/A	Blinding was not necessary for the outcome of interest.
	Metric 20:	Negative Control Response	High	The negative control response(s) were adequate.
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Medium	Although the study did not report all information to determine confounding, reported information did not identify differences (or identified only minor differences) among study groups in the above listed confounding factors.
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.
	Metric 23:	Data Presentation and Analysis	High	Statistical methods were adequately described and were appropriate for the datasets.
	Metric 24:	Reporting of Data	High	Data were reported for all groups as means $\pm$ SE.
Additional Comments:	Reported test substance: trichloroethaneNote: the study methods indicated that animals were observed for clinical signs of toxicity, but results for this endpoint were not reported.			

Overall Quality Determination**Medium**

Study Citation:	Al-Griw, M. A., Alghazeer, R. O., Al-Azreg, S. A., Bennour, E. M. (2016). Cellular and molecular etiology of hepatocyte injury in a murine model of environmentally induced liver abnormality. 6(3):150-157.			
Health Outcome(s):	Mortality			
Reported Health Effect(s):	Mortality: Mortality/survival rate			
Duration:	Short-term (>1-30 days) Twice/week for 3 weeks			
Chemical:	1,1,2-Trichloroethane- Isomer: Trichloroethane			
HERO ID:	3501912			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
Metric 1:	Test Substance Identity	Low	The test substance was reported to be trichloroethane. A CASRN or source was not provided and the specific isomer used cannot be verified. This is likely to have a substantial impact on the study results.	
Metric 2:	Test Substance Source	Low	The test substance source was not reported	
Metric 3:	Test Substance Purity	Low	The test substance purity was not reported.	
Domain 2: Test Design				
Metric 4:	Negative and Vehicle Controls	High	Both sham and vehicle controls were included in the study.	
Metric 5:	Positive Controls	N/A	Positive controls were not necessary for the study type.	
Metric 6:	Randomized Allocation of Animals	Low	The study did not report how animals were allocated.	
Domain 3: Exposure Characterization				
Metric 7:	Preparation and Storage of Test Substance	Low	Details of dose preparation and storage were not provided. This could have a significant impact on the study results because the test substance is a volatile compound.	
Metric 8:	Consistency of Exposure Administration	Medium	Details of exposure administration were adequately described. The injection volumes ranged from 0.08 to 0.1 mL This is not expected to have a significant impact on the study results.	
Metric 9:	Reporting of Doses/Concentrations	Medium	The doses were clearly reported in mg/kg. There is some ambiguity due to the lack of details regarding the preparation of the doses in corn oil (e.g., whether there was proper mixing to achieve homogeneity). There was no indication that analytical measurements were taken.	
Metric 10:	Exposure Frequency and Duration	High	The study authors justified the exposure window as being critical for development. The frequency (twice per week rather than daily) was not justified but appeared to be appropriate for the purposes of the study.	
Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Medium	The dose spacing was appropriate for the purposes of the study but only two dose groups were used, limiting dose-response modeling.	
Metric 12:	Exposure Route and Method	High	Animals were dose i.p. The route of exposure was not justified by the study authors.	
Domain 4: Test Animals				
Metric 13:	Test Animal Characteristics	Low	Animal species, strain, age, starting body weights, and source were provided. The sex was not specified.	
Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	High	Animal husbandry conditions were reported and were appropriate.	
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Study Citation:	Al-Griw, M. A., Alghazeer, R. O., Al-Azreg, S. A., Bennour, E. M. (2016). Cellular and molecular etiology of hepatocyte injury in a murine model of environmentally induced liver abnormality. 6(3):150-157.
Health Outcome(s):	Mortality
Reported Health Effect(s):	Mortality: Mortality/survival rate
Duration:	Short-term (>1-30 days) Twice/week for 3 weeks
Chemical:	1,1,2-Trichloroethane- Isomer: Trichloroethane
HERO ID:	3501912

Domain	Metric	Rating	Comments
	Metric 15: Number of Animals per Group	Medium	The methods indicated there were 6 animals per group; however, one data table indicated data were from 6-8 animals per group. The numbers were sufficient for statistical analysis.
Domain 5: Outcome Assessment			
	Metric 16: Outcome Assessment Methodology	High	The outcome assessment methodology was clearly reported. The study text indicated that "two independent observers confirmed the cause of death to excluded TCE-nontreatment related mortality."
	Metric 17: Consistency of Outcome Assessment	Medium	Details of outcome assessment were limited to the statement that "animals were regularly observed", but this is not expected to have a significant impact on this outcome of interest.
	Metric 18: Sampling Adequacy	High	All animals were observed for the outcome of interest.
	Metric 19: Blinding of Assessors	N/A	Blinding was not necessary for the outcome of interest.
	Metric 20: Negative Control Response	Medium	Control responses were not explicitly reported, but based on the information provided, there is no indication that the control responses were unexpected.
Domain 6: Confounding / Variable Control			
	Metric 21: Confounding Variables in Test Design and Procedures	Medium	Although the study did not report all information to determine confounding, reported information did not identify differences (or identified only minor differences) among study groups in the above listed confounding factors.
	Metric 22: Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.
	Metric 23: Data Presentation and Analysis	High	Statistical methods were adequately described and were appropriate for the datasets.
	Metric 24: Reporting of Data	High	Negative results (no change in survival/mortality) were reported qualitatively in the text.
Additional Comments: Reported test substance: trichloroethane			

Overall Quality Determination**Low**

Study Citation:	Al-Griw, M. A., Alghazeer, R. O., Al-Azreg, S. A., Bennour, E. M. (2016). Cellular and molecular etiology of hepatocyte injury in a murine model of environmentally induced liver abnormality. 6(3):150-157.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: Liver weights, histopathology, and mechanistic endpoints: liver apoptosis and DNA content and integrity, and lipid peroxidation.			
Duration:	Short-term (>1-30 days) Twice/week for 3 weeks			
Chemical:	1,1,2-Trichloroethane- Isomer: Trichloroethane			
HERO ID:	3501912			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
Metric 1:	Test Substance Identity	Low	The test substance was reported to be trichloroethane. A CASRN or source was not provided and the specific isomer used cannot be verified. This is likely to have a substantial impact on the study results.	
Metric 2:	Test Substance Source	Low	The test substance source was not reported	
Metric 3:	Test Substance Purity	Low	The test substance purity was not reported.	
Domain 2: Test Design				
Metric 4:	Negative and Vehicle Controls	High	Both sham and vehicle controls were included in the study.	
Metric 5:	Positive Controls	N/A	Positive controls were not necessary for the study type.	
Metric 6:	Randomized Allocation of Animals	Low	The study did not report how animals were allocated.	
Domain 3: Exposure Characterization				
Metric 7:	Preparation and Storage of Test Substance	Low	Details of dose preparation and storage were not provided. This could have a significant impact on the study results because the test substance is a volatile compound.	
Metric 8:	Consistency of Exposure Administration	Medium	Details of exposure administration were adequately described. The injection volumes ranged from 0.08 to 0.1 mL This is not expected to have a significant impact on the study results.	
Metric 9:	Reporting of Doses/Concentrations	Medium	The doses were clearly reported in mg/kg. There is some ambiguity due to the lack of details regarding the preparation of the doses in corn oil (e.g., whether there was proper mixing to achieve homogeneity). There was no indication that analytical measurements were taken.	
Metric 10:	Exposure Frequency and Duration	High	The study authors justified the exposure window as being critical for development. The frequency (twice per week rather than daily) was not justified but appeared to be appropriate for the purposes of the study.	
Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	Medium	The dose spacing was appropriate for the purposes of the study but only two dose groups were used, limiting dose-response modeling.	
Metric 12:	Exposure Route and Method	High	Animals were dose i.p. The route of exposure was not justified by the study authors.	
Domain 4: Test Animals				
Metric 13:	Test Animal Characteristics	Low	Animal species, strain, age, starting body weights, and source were provided. The sex was not specified.	
Metric 14:	Adequacy and Consistency of Animal Husbandry Conditions	High	Animal husbandry conditions were reported and were appropriate.	

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Study Citation:	Al-Griw, M. A., Alghazeer, R. O., Al-Azreg, S. A., Bennour, E. M. (2016). Cellular and molecular etiology of hepatocyte injury in a murine model of environmentally induced liver abnormality. 6(3):150-157.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: Liver weights, histopathology, and mechanistic endpoints: liver apoptosis and DNA content and integrity, and lipid peroxidation.			
Duration:	Short-term (>1-30 days) Twice/week for 3 weeks			
Chemical:	1,1,2-Trichloroethane- Isomer: Trichloroethane			
HERO ID:	3501912			
Domain	Metric	Rating	Comments	
	Metric 15:	Number of Animals per Group	Medium	The methods indicated there were 6 animals per group; however, one data table indicated data were from 6-8 animals per group. The numbers were sufficient for statistical analysis.
Domain 5: Outcome Assessment				
	Metric 16:	Outcome Assessment Methodology	Medium	The outcome assessment methodology was clearly reported and most were sensitive to the endpoint. However, not all usual liver parameters were included (e.g., enzymes).
	Metric 17:	Consistency of Outcome Assessment	High	Details of the outcome assessment protocol were reported and outcomes were assessed consistently across study groups.
	Metric 18:	Sampling Adequacy	High	Sampling was adequate for the outcome(s) of interest and was sufficient for statistical analysis.
	Metric 19:	Blinding of Assessors	N/A	Blinding was not necessary for the outcome of interest.
	Metric 20:	Negative Control Response	High	The negative control response(s) were reported and were adequate.
Domain 6: Confounding / Variable Control				
	Metric 21:	Confounding Variables in Test Design and Procedures	Medium	Although the study did not report all information to determine confounding, reported information did not identify differences (or identified only minor differences) among study groups in the above listed confounding factors.
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure (e.g., infection) that could influence the outcome assessment.
	Metric 23:	Data Presentation and Analysis	Low	Statistical methods were adequately described and were appropriate for the datasets. Most of the outcomes of interest were statistically analyzed; however, it does not appear that histopathology data were statistically analyzed and incidence data were not provided for independent review.
	Metric 24:	Reporting of Data	Medium	Data were reported for most outcomes as means ± SE. Histopathology data were only showed as representative images. Incidence data were not provided and the text did not specify whether and increase in incidences were statistically significant.
Additional Comments:	Reported test substance: trichloroethane			
Overall Quality Determination			Medium	

Study Citation:	Al-Griw, M. A., Treesh, S. A., Alghazeer, R. O., Regeai, S. O. (2017). Environmentally toxicant exposures induced intragenerational transmission of liver abnormalities in mice. 7(3):244-253.			
Health Outcome(s):	Hepatic/Liver			
Reported Health Effect(s):	Hepatic/Liver: F0 and F1 generation: Liver weight, histopathology, cytoarchitecture, hepatocellular apoptotic cells, lipid peroxidationF1 livers: nitric oxide levels, carbonyl measurement in liver			
Duration:	Short-term (>1-30 days) 3 weeks			
Chemical:	1,1,2-Trichloroethane- Isomer: Trichloroethane			
HERO ID:	4333726			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	Test substance was identified as trichloroethane, no other information is provided.	
	Metric 2: Test Substance Source	Low	The source of the test substance was not reported.	
	Metric 3: Test Substance Purity	Low	The purity/grade of the test substance was not reported.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	High	The study included a vehicle control group and a sham-treated control group.	
	Metric 5: Positive Controls	N/A	Not applicable for this study.	
	Metric 6: Randomized Allocation of Animals	Low	The study does not report how animals were allocated to study groups.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	Test substance preparation and storage were not adequately described given the volatility of the test substance.	
	Metric 8: Consistency of Exposure Administration	Medium	Volume of test substance/vehicle injected was not reported.	
	Metric 9: Reporting of Doses/Concentrations	High	Doses were reported without ambiguity.	
	Metric 10: Exposure Frequency and Duration	High	The exposure frequency and duration were appropriate.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Medium	Only one exposure group was studied; a NOAEL was not obtained.	
	Metric 12: Exposure Route and Method	High	The route of exposure was appropriate.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	High	Animal characteristics were adequately reported.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Medium	Humidity was not reported.	
	Metric 15: Number of Animals per Group	Medium	The number of animals/group was appropriate.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	High	Outcome assessment methodology was appropriate for intended outcomes of interest.	
	Metric 17: Consistency of Outcome Assessment	High	Outcomes were assessed consistently across study groups.	
	Metric 18: Sampling Adequacy	Medium	Sampling was not reported for some hepatic parameters.	
	Metric 19: Blinding of Assessors	N/A	Blinding was not necessary.	

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Study Citation:	Al-Griw, M. A., Treesh, S. A., Alghazeer, R. O., Regeai, S. O. (2017). Environmentally toxicant exposures induced intragenerational transmission of liver abnormalities in mice. 7(3):244-253.
Health Outcome(s):	Hepatic/Liver
Reported Health Effect(s):	Hepatic/Liver: F0 and F1 generation: Liver weight, histopathology, cytoarchitecture, hepatocellular apoptotic cells, lipid peroxidationF1 livers: nitric oxide levels, carbonyl measurement in liver
Duration:	Short-term (>1-30 days) 3 weeks
Chemical:	1,1,2-Trichloroethane- Isomer: Trichloroethane
HERO ID:	4333726

Domain	Metric	Rating	Comments
	Metric 20: Negative Control Response	High	The negative control response was appropriate.

Domain 6: Confounding / Variable Control

Metric 21:	Confounding Variables in Test Design and Procedures	Medium	Although the study did not report all information to determine confounding, reported information did not identify differences among groups.
Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.
Metric 23:	Data Presentation and Analysis	High	Statistical analysis was performed and appropriate.
Metric 24:	Reporting of Data	High	Data were adequately reported.

Additional Comments: None

Overall Quality Determination**High**

Study Citation:	Al-Griw, M. A., Treesh, S. A., Alghazeer, R. O., Regeai, S. O. (2017). Environmentally toxicant exposures induced intragenerational transmission of liver abnormalities in mice. 7(3):244-253.			
Health Outcome(s):	Reproductive/Developmental			
Reported Health Effect(s):	Reproductive/Developmental: F1 litter weights, litter size, sex ratio, percentage of dead pups			
Duration:	Short-term (>1-30 days) 3 weeks			
Chemical:	1,1,2-Trichloroethane- Isomer: Trichloroethane			
HERO ID:	4333726			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
	Metric 1: Test Substance Identity	High	Test substance was identified as trichloroethane, no other information is provided.	
	Metric 2: Test Substance Source	Low	The source of the test substance was not reported.	
	Metric 3: Test Substance Purity	Low	The purity/grade of the test substance was not reported.	
Domain 2: Test Design				
	Metric 4: Negative and Vehicle Controls	High	The study included a vehicle control group and a sham-treated control group.	
	Metric 5: Positive Controls	N/A	Not applicable for this study.	
	Metric 6: Randomized Allocation of Animals	Low	The study does not report how animals were allocated to study groups.	
Domain 3: Exposure Characterization				
	Metric 7: Preparation and Storage of Test Substance	Low	Test substance preparation and storage were not adequately described given the volatility of the test substance.	
	Metric 8: Consistency of Exposure Administration	Medium	Volume of test substance/vehicle injected was not reported.	
	Metric 9: Reporting of Doses/Concentrations	High	Doses were reported without ambiguity.	
	Metric 10: Exposure Frequency and Duration	High	The exposure frequency and duration were appropriate for intended outcomes tested.	
	Metric 11: Number of Exposure Groups and Dose/Concentration Spacing	Medium	Only one exposure group was studied; a NOAEL was not obtained.	
	Metric 12: Exposure Route and Method	High	The route of exposure was appropriate.	
Domain 4: Test Animals				
	Metric 13: Test Animal Characteristics	High	Animal characteristics were adequately reported.	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Medium	Humidity was not reported.	
	Metric 15: Number of Animals per Group	Medium	The number of animals/group was appropriate.	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	High	Outcome assessment methodology was appropriate for intended outcomes of interest.	
	Metric 17: Consistency of Outcome Assessment	High	Outcomes were assessed consistently across study groups.	
	Metric 18: Sampling Adequacy	Medium	Sampling was not reported for some hepatic parameters.	
	Metric 19: Blinding of Assessors	N/A	Blinding was not necessary.	
	Metric 20: Negative Control Response	High	The negative control response was appropriate.	
Domain 6: Confounding / Variable Control				

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Study Citation:	Al-Griw, M. A., Treesh, S. A., Alghazeer, R. O., Regeai, S. O. (2017). Environmentally toxicant exposures induced intragenerational transmission of liver abnormalities in mice. 7(3):244-253.			
Health Outcome(s):	Reproductive/Developmental			
Reported Health Effect(s):	Reproductive/Developmental: F1 litter weights, litter size, sex ratio, percentage of dead pups			
Duration:	Short-term (>1-30 days) 3 weeks			
Chemical:	1,1,2-Trichloroethane- Isomer: Trichloroethane			
HERO ID:	4333726			
Domain	Metric		Rating	Comments
	Metric 21:	Confounding Variables in Test Design and Procedures	Medium	Although the study did not report all information to determine confounding, reported information did not identify differences among groups.
	Metric 22:	Health Outcomes Unrelated to Exposure	Medium	There was no information either to support or dismiss the suggestion that there were differences among groups in animal attrition or health outcomes unrelated to exposure.
	Metric 23:	Data Presentation and Analysis	Low	Statistical analysis methods were described but it is not clear clearly stated whether they were applied to reproductive and developmental endpoints.
	Metric 24:	Reporting of Data	Uninformative	Results for sex ratios and litter size were very briefly summarized in the text but no data were provided. No results were reported for litter weights or pup survival. Reporting of data is not sufficient for interpretation or to support independent analysis.

Additional Comments: Results for reproductive and developmental endpoints were not sufficiently reported to be informative.

Overall Quality Determination

Uninformative

Study Citation:	Kronevi, T., Wahlberg, J. E., Holmberg, B. (1981). Skin pathology following epicutaneous exposure to seven organic solvents. International Journal of Tissue Reactions 3(1):21-30.			
Health Outcome(s):	Skin/Connective Tissue			
Reported Health Effect(s):	Skin/Connective Tissue: Localized microscopic examinations of the skin (at the application site)			
Duration:	Acute (less than or equal to 24 hr) 15 minutes, and 1, 4, and 16 hours			
Chemical:	1,1,2-Trichloroethane- Metabolite: 1,1,1-Trichloroethane			
HERO ID:	58151			
Domain	Metric	Rating	Comments	
Domain 1: Test Substance				
Metric 1:	Test Substance Identity	High	The test substance was clearly identified using standard nomenclature. A CASRN was not provided.	
Metric 2:	Test Substance Source	Low	The test substance source was reported, but a lot and batch number were not provided and the substance identity was not analytically verified.	
Metric 3:	Test Substance Purity	Low	The test substance purity was not reported. It was specified to be "certified, inhibited"	
Domain 2: Test Design				
Metric 4:	Negative and Vehicle Controls	High	Adjacent un-exposed skin served as the negative control.	
Metric 5:	Positive Controls	N/A	A positive control was not necessary for the study type	
Metric 6:	Randomized Allocation of Animals	N/A	There was only one group, randomization was not necessary	
Domain 3: Exposure Characterization				
Metric 7:	Preparation and Storage of Test Substance	Medium	The test substance was applied undiluted; no preparation was necessary. It was not specified how the undiluted samples were stored. This is not expected to have a significant impact on the study results.	
Metric 8:	Consistency of Exposure Administration	High	The exposure details were clearly described. Consistency is NA because there was only one study group.	
Metric 9:	Reporting of Doses/Concentrations	Uninformative	A dose (in mg/kg) was not specified but the volume applied and a range of animal body weights was provided which could allow a rough estimate of the dose. However, due to insufficient study details, there is significant ambiguity because it is unknown whether multiple exposure chambers were applied to a single animal.	
Metric 10:	Exposure Frequency and Duration	High	The exposure times selected allowed the demonstration of an increase in the severity of effects with exposure time, and appeared to be appropriate for the purposes of the study.	
Metric 11:	Number of Exposure Groups and Dose/Concentration Spacing	N/A	This study altered the time of exposure instead of testing multiple doses. There was only one exposure concentration.	
Metric 12:	Exposure Route and Method	High	The route of exposure (dermal) was appropriate for the purposes of the study, and the study authors took measures to mitigate possible exposure via other routes (e.g., inhalation or oral)	
Domain 4: Test Animals				
Metric 13:	Test Animal Characteristics	Low	The species, sex, and a range of body weights were provided. No further animal details were provided (e.g., strain, age, and source).	

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Study Citation:	Kronevi, T., Wahlberg, J. E., Holmberg, B. (1981). Skin pathology following epicutaneous exposure to seven organic solvents. International Journal of Tissue Reactions 3(1):21-30.			
Health Outcome(s):	Skin/Connective Tissue			
Reported Health Effect(s):	Skin/Connective Tissue: Localized microscopic examinations of the skin (at the application site)			
Duration:	Acute (less than or equal to 24 hr) 15 minutes, and 1, 4, and 16 hours			
Chemical:	1,1,2-Trichloroethane- Metabolite: 1,1,1-Trichloroethane			
HERO ID:	58151			
Domain	Metric	Rating	Comments	
	Metric 14: Adequacy and Consistency of Animal Husbandry Conditions	Low	Animal husbandry conditions were not reported.	
	Metric 15: Number of Animals per Group	Low	The number of animals used was not reported. The study indicates that 17 animals were included and the study tested 7 different chemicals. It is likely only 1 or 2 animals were tested for each chemical; although, this is not specified. It was not clearly indicated if the same animals had multiple application sites (one for each timepoint).	
Domain 5: Outcome Assessment				
	Metric 16: Outcome Assessment Methodology	Medium	The purposes of the study were not clearly reported; the study examined histopathological changes to the skin at the administration site, which is considered to be a sensitive method for identifying damage to the skin. The number of slides examined was not specified.	
	Metric 17: Consistency of Outcome Assessment	High	Consistency of outcome assessment is not applicable to this study because only a single exposure group was included; however, the same method was applied across time points.	
	Metric 18: Sampling Adequacy	Low	The study does not specify how many animals were exposed or how many slides from each site were examined.	
	Metric 19: Blinding of Assessors	N/A	Blinding was not necessary for this study.	
	Metric 20: Negative Control Response	High	The study indicated that no lesions were observed at the un-exposed control sites.	
Domain 6: Confounding / Variable Control				
	Metric 21: Confounding Variables in Test Design and Procedures	High	Possible confounding between groups was not an issue for this study because only a single group was tested.	
	Metric 22: Health Outcomes Unrelated to Exposure	High	Confounding among groups due to health outcomes is not applicable to this study.	
	Metric 23: Data Presentation and Analysis	N/A	Statistical analysis was not relevant (single exposure group)	
	Metric 24: Reporting of Data	High	A clear description of histopathological findings at each time point was provided with an indication of severity. The data tables do not indicate the number of animals the data were obtained from.	
Additional Comments:	This form is for 1,1,1-trichloroethane			
Overall Quality Determination		Uninformative		