Exposure of Skilled Trades and Maintenance Workers: Are They ONUs?

TSCA Occupational Condition of Use and Exposure Scenario Workshop

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Occupational Non-Users (ONUs)

- Many TSCA risk evaluations assume the exposure of all so called “occupational non-users” ONUs is similar and always less than the exposures of workers who directly handle the substance whose risk is being evaluated.
- In fact, the exposure of ONUs may vary greatly and how many similar exposure groups (SEGs), they should be classified into needs to be addressed on a case=by-case basis

Some ONUs may have higher peak or average exposures than production workers

- Workers engaged in maintenance, repair and/or cleaning of machines and/or containers with the substance being evaluated are likely (at least for purposes of risk evaluation which should not take controls such as PPE into account) to have higher peak or even average exposures than production workers who work directly with the substance under evaluation.
- Regardless of whether or not EPA calls these workers ONUs, their exposures need to be analyzed separately from both production workers and from those whose exposures are merely incidental.

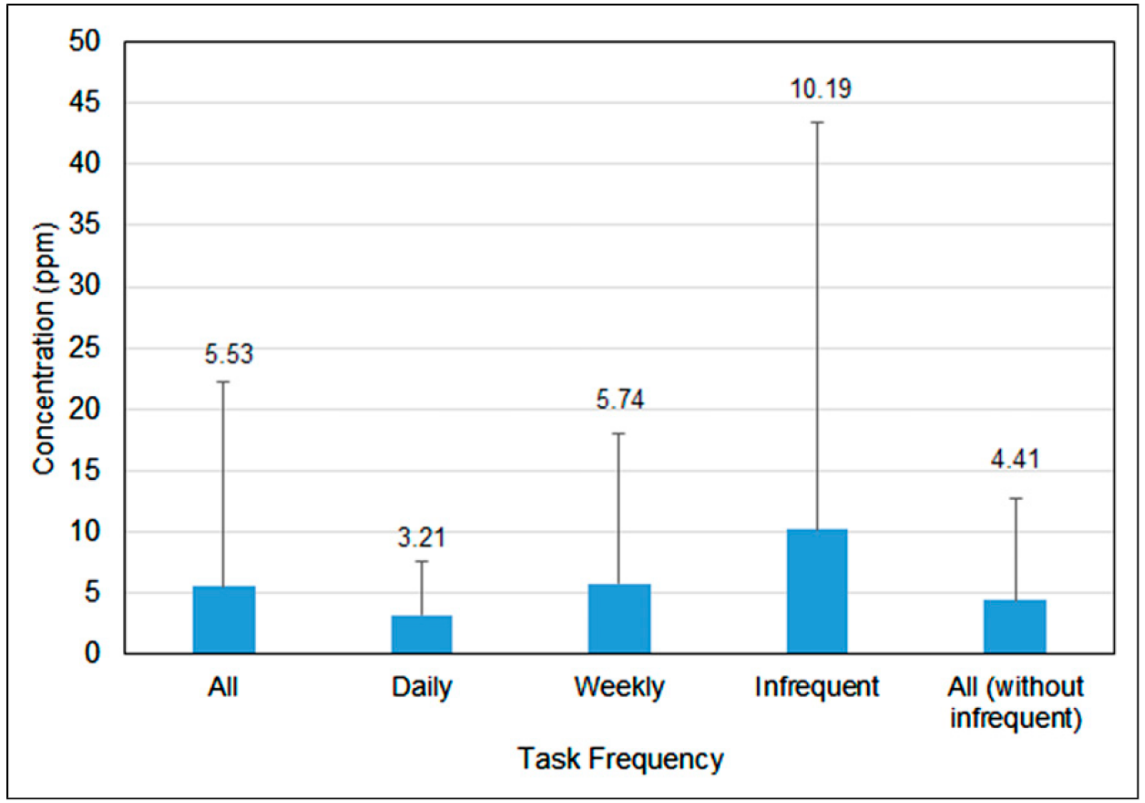
Some ONUs may have higher peak or average exposures than production workers

- Office workers may be highly exposed if ventilation systems carry contaminants
- EPA should obtain, examine, and present data related to the occupational exposures of workers engaged in maintenance, cleaning, and/or repair and other ONUs.

Infrequent Tasks Often Have Higher Exposures

This graph, based on data used in the TSCA Perchloroethylene (PCE) risk evaluation shows that infrequent tasks often have higher central and high end exposures than other tasks.

Source: Lynch HN, Allen LH, Hamaji CM, Maier A. Strategies for refinement of occupational inhalation exposure evaluation in the EPA TSCA risk evaluation process. *Toxicology and Industrial Health*. 2023;39(3):169-182. doi:10.1177/07482337221145988



Infrequent Tasks

- Some of these infrequent tasks may be such things as repair, maintenance and/or cleaning.
- They are often performed by skilled trades or specialized maintenance personnel and not by production workers.

Infrequent Tasks:

- An individual may perform the same “infrequent task” often:
  - if a company has 26 tanks, each of which needs to be cleaned twice a year and one person does the cleaning, that individual will clean a tank every week
- As a result, maintenance and skilled trades workers are likely to have higher peak exposures and, in some cases, may have higher average exposures than production workers

Bisphenol-A in Urine

Table shows that maintenance workers had higher pre-shift concentrations of BPA than many other workers in industries that manufacture or use BPA, specifically higher, than flaker operators, kettle operators and mold assembly.

Table 3. Creatinine-adjusted total BPA by industry and job (a) for all urine samples, $N = 525$, (b) for baseline (Day 1 pre-shift) samples, $n = 77$, and (c) post-baseline (Day 1 mid-shift to Day 2 end-shift) samples, $n = 448$. The 525 samples represent 77 workers and 151 worker-days.

Group	All samples ($N = 525$)			Baseline[a]			Post-baseline[b]		
				Time Point 1			Time Points 2–7		
				$n = 77$			$n = 448$		
	n	GM (GSD)	Range	n	GM (GSD)	Range	n	GM (GSD)	Range
		μg g^{-1}	μg g^{-1}		μg g^{-1}	μg g^{-1}		μg g^{-1}	μg g^{-1}
Industry[c]									
Phenolic resin mfg	186	26.4 (4.91)	0.78–1230	28	6.56[d,e,f] (2.90)	0.78–112	158	33.8[n,o] (4.68)	1.15–1230
BPA and PC resin mfg	122	184 (3.72)	6.56–4720	18	69.4[d] (4.12)	6.56–553	104	218[n] (3.41)	17.8–4720
BPA-filled wax mfg/reclaim	98	373 (4.70)	14.5–5400	14	111[e] (4.66)	14.5–1580	84	457[o,p] (4.31)	22.2–5400
BPA mfg	49	102 (8.71)	9.94–18 900	7	37.4[f] (4.01)	9.94–441	42	121 (9.36)	11.5–18 900
BPA-filled wax mfg, casting patterns/ molds, wax melt/burnout	70	71.2 (5.44)	2.54–5790	10	25.4 (5.14)	2.54–257	60	84.5[p] (5.23)	6.24–5790
Job[c]									
Flaker operator—resins	80	18.3 (4.47)	0.78–521	12	4.81[g,k,l,m] (2.07)	0.78–11.0	68	23.2[q,r,s] (4.38)	1.32–521
Make/load BPA	80	156 (8.83)	6.56–18 900	12	49.1[g] (5.38)	6.56–553	68	192[q] (9.04)	11.5–18 900
Kettle operator—resin mfg	148	53.0 (5.19)	1.15–2720	22	11.3[h,i,j] (3.42)	1.73–112	126	69.5 (4.77)	1.15–2720
Maintenance—BPA and PC resin mfg	49	156 (1.61)	57.1–453	7	157[h,k] (1.79)	89.8–453	42	156 (1.59)	57.1–348
Molten BPA-filled wax work: reclaim, melt/burnout	42	354 (10.6)	2.54–5400	6	94.9[i,l] (18.1)	2.54–1580	36	441[r] (9.30)	8.78–5400
Make BPA-filled wax	98	208 (4.46)	3.29–5790	14	63.0[i,m] (3.46)	3.29–273	84	254[s] (4.25)	6.24–5790
Solid BPA-filled wax work: wax patterns, mold assembly, lab QC	28	49.4 (2.84)	10.9–351	4	25.2 (1.94)	11.3–55.4	24	55.3 (2.90)	10.9–351

mfg, manufacturing; PC, polycarbonate.

[a]Day 1 pre-shift sample.

[b]Day 1 mid-shift through Day 2 end-shift samples.

[c]Differences between GMs between industries or between jobs were using the PROC MIXED procedure, with a first-order autoregressive covariance structure used for Time Points 2–7. Values with the same letter are significantly different. Tukey's method was used to adjust P-values for multiple comparisons.

[d,e,k,o]$P < 0.0001$; [f]$P = 0.0257$; [g,s]$P = 0.0019$; [h]$P = 0.0008$; [i]$P = 0.0219$; [j]$P = 0.0092$; [l]$P = 0.0010$; [m]$P = 0.0002$; [n]$P = 0.0003$; [p]$P = 0.0387$; [q]$P = 0.0130$; [r]$P = 0.0027$.

Source: Hines CJ, Jackson MV, Deddens JA, Clark JC, Ye X, Christianson AL, Meadows JW, Calafat AM. Urinary Bisphenol A (BPA) Concentrations among Workers in Industries that Manufacture and Use BPA in the USA. Ann Work Expo Health. 2017 Mar 1;61(2):164-182. doi: 10.1093/annweh/wxw021. PMID: 28395354; PMCID: PMC5577557.

Take Home Message

- The exposures of maintenance, skilled trades and other workers who do “infrequent tasks” frequently need to be analyzed separately from other ONUs and from production workers.
- The exposure of other ONUs cannot be assumed to be similar. This must be assessed on a case-by-case basis