Ethylene Oxide-
Information about Health
Concerns

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Accreditation & Disclosures

• Drs Geller and Mutic have no conflicts of interest to disclose relative to this topic. Both are employees of Emory University.

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• Neither EPA nor ATSDR endorse the purchase of any commercial products or services mentioned in PEHSU publications
What is a PEHSU?

• Grant funded

• Provide an independent source of information and education to professionals and community members

• Regarding effects of environmental exposures of all kinds on children and women of child-bearing age

• Housed for the Southeast US (Federal Region 4) at Emory since the program’s inception in 2000
EtO - Chemical Structure
Background Information- EtO

• Most EtO used for precursor for industrial chemicals (e.g., ethylene glycol), plastics, PVC pipes

• Less than 1% used for sterilization of medical equipment, consumer products, certain foods (e.g., spices) that can’t be steam sterilized

• Used as a fumigant for some agricultural products
EtO Background

Physical properties:

- High Vapor Pressure- gas at 20°C
- Colorless, tasteless vapor
- Odor-threshold is 500 ppm
- Sweet, ether-like odor
- Flammable, explosive
- Reacts with water, strong acids, alkalis, and oxidizers
- Atmospheric persistence: 50-60 day half-life; degrades to hydroxyl radicals

How long does EtO stay in the body?

• Physiological half life: 45-60 minutes

• Exhaled as EtO or metabolized and excreted in urine

• Completely eliminated within hours to a day after exposure has ended

Routes of Exposure to EtO

- Inhalation – most likely exposure pathway, due to high vapor pressure
- Dermal- liquid EtO
Occupational High Level EtO Exposure

**ACUTE Effects**

- Respiratory, skin, eye irritant

- Causes bronchospasm (asthma-like effects); at high levels, ? immediate or delayed effects on the lung

- ? Seizures, CNS depression, ? delayed 6+ hours
  - Nausea/ vomiting- ? Delayed 6+ hours

- Kidney damage

- Increased risk of pregnancy miscarriage

Occupational High Level EtO Exposure

CHRONIC Health Effects

• Cancer
• Reproductive effects, fetal effects
• Impaired cognitive function, seizures
• Damage to liver and kidneys
• Skin allergy
• Cataracts and corneal burns
• Peripheral and central neuropathy

Low Level EtO Exposure – Health Effects

• Acute - none likely

• Chronic
  • Increased risk of certain cancers
  • Risk likely increases with higher intensity and longer duration of exposure
EtO Metabolites

• Conjugates with glutathione – nontoxic

• Ethylene glycol – level produced is much too low ( < 0.001% ) to cause any discernable health effects
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