Health Effects of Air Toxics

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What Are Air Toxics?

Air Toxics = HAPS (as defined by the CAA)

OR

Air Toxics = Your Own Special List

OR

Air Toxics = Anything that’s not a Criteria Pollutant + Lead
Air Toxics Cause All Kinds of Effects!

- Cancer
- Lung Damage
- Birth Defects
- Eye, Nose & Lung Irritation
- Neurological Damage
- Reproductive Damage
- Immune System Damage
- Liver Damage
Sources of Information:

HEALTH EFFECTS NOTEBOOK
http://www.epa.gov/ttn/atw/hlthef/hapindex.html

INTEGRATED RISK INFORMATION SYSTEM (IRIS)
http://www.epa.gov/iris/index.html
Type of Exposure
Type of Effect

Acute or chronic?

Chronic or Acute?
CANCER!!!
EPA’s WOE Scheme for Carcinogens

Old (but still around)

A - Known Human Carcinogen
B - Probable Human Carcinogen
C - Possible Human Carcinogen
D - Insufficient data available with which to evaluate the carcinogenicity of the chemical
E - No evidence for carcinogenic effects based on at least two technically adequate animal studies
EPA’s WOE Scheme for Carcinogens

NEW

- Weight of Evidence Narrative
  - Descriptors for Classifying Human Carcinogenic Potential
    - Carcinogenic to humans
    - Likely to be carcinogenic
    - Suggestive evidence
    - Inadequate data
    - Not likely
IARC: International Agency for Research on Cancer

**Group 1**  Carcinogenic to humans
**Group 2A**  Probably carcinogenic to humans
**Group 2B**  Possibly carcinogenic to humans
**Group 3**  Not classifiable as to carcinogenicity in humans
**Group 4**  Probably not carcinogenic to humans
KNOWN HUMAN CARCINOGENS

- Arsenic
- Asbestos
- Benzene
- Benzidine
- Bis(chloromethyl)ether
- Chloromethyl methyl ether
- Chromium VI
- Coke oven emissions
- Nickel refinery dust
- Nickel subsulfide
- Vinyl chloride
OTHER FAMOUS CARCINOGENS

- Benzo(a)pyrene
- Beryllium
- 1,3-Butadiene
- Cadmium
- Carbon Tetrachloride
- Chloroform
- Ethylene oxide

- Formaldehyde
- Methylene chloride
- Polychlorinated biphenyls
- Styrene
- 2,3,7,8-TCDD (Dioxin)
- Tetrachloroethylene
- Trichloroethylene
Respiratory Irritants

- Ammonia
- Hydrogen Chloride
- Hydrogen Sulfide
- Phosgene
BENZENE

- Acute Effects
  - Irritation of skin, eyes & upper respiratory tract
  - Drowsiness, dizziness, headaches

- Chronic Noncancer Effects
  - Blood Disorders
  - Immune System Damage

- Reproductive/Developmental Effects
  - Studies are inconclusive

- Cancer Risk
  - Group A Carcinogen
  - Causes Leukemia
LEAD

- Children are especially susceptible

- Acute Effects
  - Gastrointestinal Symptoms (such as colic) after very high acute exposures

- Chronic Noncancer Effects
  - Anemia
  - Neurological Effects

- Reproductive/Developmental Effects
  - Birth defects, such as low birthweight & impaired mental development

- Cancer Risk
  - Group B2 Probable Human Carcinogen
  - May cause respiratory tract, kidney or stomach cancer
CHROMIUM
- Only Hexavalent form is relevant for inhalation

- Acute Effects
  - Shortness of breath, coughing & wheezing from very high exposures

- Chronic Noncancer Effects
  - Damage to Respiratory Tract (such as perforated septum, bronchitis, asthma...)

- Reproductive/Developmental Effects
  - Limited studies suggest complications during pregnancy

- Cancer Risk
  - Group A Carcinogen
  - Causes Lung Cancer
TETRACHLOROETHYLENE (Perc)

- **Acute Effects**
  - Neurological, Kidney & Liver Damage

- **Chronic Noncancer Effects**
  - Neurological, Kidney & Liver Damage

- **Reproductive/Developmental Effects**
  - Effects reported after Occupational Exposure

- **Cancer Risk**
  - Group B2/2A Carcinogen
  - May Cause Liver Cancer, Kidney Cancer, or Leukemia

*Note: IRIS does Not include RfC or URF at the moment*
TRICHLOROETHYLENE (TCE)

- Acute Effects
  - CNS Effects such as dizziness, headaches
  - Effects on the liver, kidneys, GI also noted

- Chronic Noncancer Effects
  - Neurological endpoint seems to be most sensitive

- Reproductive/Developmental Effects
  - Effects reported after Occupational Exposure

- Cancer Risk
  - Group B2/2A Carcinogen
  - May Cause Liver, Kidney, Cervical or Lymphatic Cancer

Note: IRIS does Not include RfC or URF at the moment
METHYLENE CHLORIDE (Dichloromethane)

- **Acute Effects**
  - CNS Effects at high exposures

- **Chronic Noncancer Effects**
  - Liver effects seems to be most sensitive

- **Reproductive/Developmental Effects**
  - Limited evidence of possible harm in animals

- **Cancer Risk**
  - Group B2/2A Carcinogen
  - May Cause Liver or Lung Cancer

*Note: IRIS does Not include RfC at the moment*
FORMALDEHYDE

- Acute Effects
  - Eye, Nose & Throat Irritation

- Chronic Noncancer Effects
  - Eye, Nose & Throat Irritation
  - Effects on nasal epithelium in animals

- Reproductive/Developmental Effects
  - No evidence

- Cancer Risk
  - Group B1/2A Carcinogen
  - Lung & Nasopharyngeal Cancer

Note: IRIS does Not include RfC at the moment
POM (Polycyclic Organic Matter)  
-includes all PAH, the most famous being BaP

- Acute Effects  
  - None reported

- Chronic Noncancer Effects
  - None reported

- Reproductive/Developmental Effects
  - No evidence

- Cancer Risk
  - Group B2/2A Carcinogen
  - Lung Cancer