Mercury

Health Effects and Reducing Exposure
Learning Objectives

- Identify sources of mercury
- Discuss health effects of mercury
- Determine actions for reducing exposures to mercury
Description and Sources: Elemental Mercury

- Shiny silver liquid at room temperature
- Vaporizes to colorless, odorless gas
- Organic (methyl mercury) more harmful than inorganic form
- Found at 714 National Priority List sites
Uses

- Switches
- Thermometers
- Barometers
- Batteries
- Fluorescent lights
- Chlorine gas production
- Blood pressure cuffs
- Fungicides
- Industrial uses
Ingestion Exposure

- Bioaccumulation (build-up) in food chain
  - Old large fish and shellfish (swordfish, tuna, king mackerel, shark, and tilefish)
  - Drinking water
  - Cereals
  - Vegetables (mushrooms)
  - Meats

- Silver dental fillings - especially with chewing gum
Skin Exposure

- Spills
- Home remedies
- Cosmetics
- Cultural practices that use mercury
Inhalation Exposure

- Breathing air from combustion or spills
- Mining
- Coal-burning power plants (1/3 of US releases)
- Natural deposits
- Disposal and incineration of solid wastes containing mercury
  - Municipal
  - Hospital or medical
Health Effects: Contact

- Irritation of skin and eyes
- Skin allergy with itching and rash
- May cause graying of the skin
Exposure

Regardless of what route of exposure – once inside the body mercury is eliminated very slowly and builds up over time.
Health Effects: Inhalation

- Irritate lungs
- Cough
- Shortness of breath
- Chest pain
- Nausea/vomiting
- Diarrhea
- High blood pressure

- Repeated low exposure or single does high exposure:
  - Tremors
  - Impaired memory and concentration
  - Mood changes
  - Weight loss
  - Decreased appetite
Health Effects: Nervous System

- Irritability
- Shyness
- Tremors
- Altered vision or hearing
- Impaired memory

- Language and attention deficits
- Delayed nerve conduction and pins and needle feeling
- Seizures
- Brain damage
Health Effects: Reproductive/Developmental

- Increased miscarriages
- Infant deafness
- Blindness
- Mental retardation
- Cerebral Palsy
- Low birth weight
Health Effects: Other

- Possibly causes cancer
- Kidney damage
- Cardiovascular effects
- Cumulative effect – increased toxicity when combined with other contaminants such as PCBs
Indications of Exposure

- Urine – test for exposure to metallic mercury vapor and inorganic mercury
- Blood – test for recent exposure to methyl mercury
- Hair – detect exposure to methyl mercury from longer ago
- Breast milk
How to Reduce Risk

- **Work exposure**
  - Proper protective equipment and ventilation.
  - Wash immediately after exposure and before going home.
  - Change clothes at work and launder separately.

- **Reduce use**
  - in manufacturing, products, and incineration.
  - Buy mercury-free alternatives.

- **Prevent exposure**
  - Careful handling and disposal of mercury products such as thermometers and fluorescent lights.
  - Do not vacuum spilled mercury because it will vaporize.
  - Do not incinerate mercury containing products.
How to Reduce Risk

- Choose non-mercury containing dental fillings. It is not recommended to replace metal fillings just to remove mercury because will increase exposure.
- Selenium and Vit. E may be protective against methyl mercury.
How to Reduce Risk

- Follow FDA/EPA fish advisories
  
  www.epa.gov/waterscience/fishadvice/advisory.pdf

  - Pregnant women, nursing mothers and young children should not eat shark, king mackerel, tile fish or swordfish
  
  - NOTE: Although the current federal fish advisory suggests that 6 oz of White/albacore tuna or 12 oz of chunk light tuna per week is acceptable, other public health groups recommend vulnerable populations avoiding them altogether. (Got to www.ewg.org/issues/mercury/index.php for more information).

  - Limit intake of other types of fish to 12 ounces a week (3-4 servings depending on size)
Policy

- EPA maximum intake level of 0.1 mcg/kg/day may not be protective enough
- EPA and FDA drinking water limit for inorganic mercury is 2 ppb
- FDA limit for methyl mercury in seafood is 1 ppm
- OSHA 8 hour shift 40 hour work week limit for organic mercury is 0.1 mg/cubic meter and 0.05 mg/cubic meter for metallic mercury vapor
- NIOSH recommends 10 hour shift average air limit of 0.05 mg/cubic meter
Resources

- ATSDR ToxFAQs [www.atsdr.cdc.gov/tfacts46.pdf](http://www.atsdr.cdc.gov/tfacts46.pdf)
- NJ Fact Sheet [www.state.nj.us/health/eoh/rtkweb/1183.pdf](http://www.state.nj.us/health/eoh/rtkweb/1183.pdf)
- EPA Chemical Fact Sheet [www.epa.gov/OGWDW/dwh/t-ioc/mercury.html](http://www.epa.gov/OGWDW/dwh/t-ioc/mercury.html)
In Review

- What is mercury and how are we exposed to it
- How does mercury effect our health
- How can we reduce our exposure to mercury
References

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