



# 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



**Minnesota Pollution Control Agency**

# 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



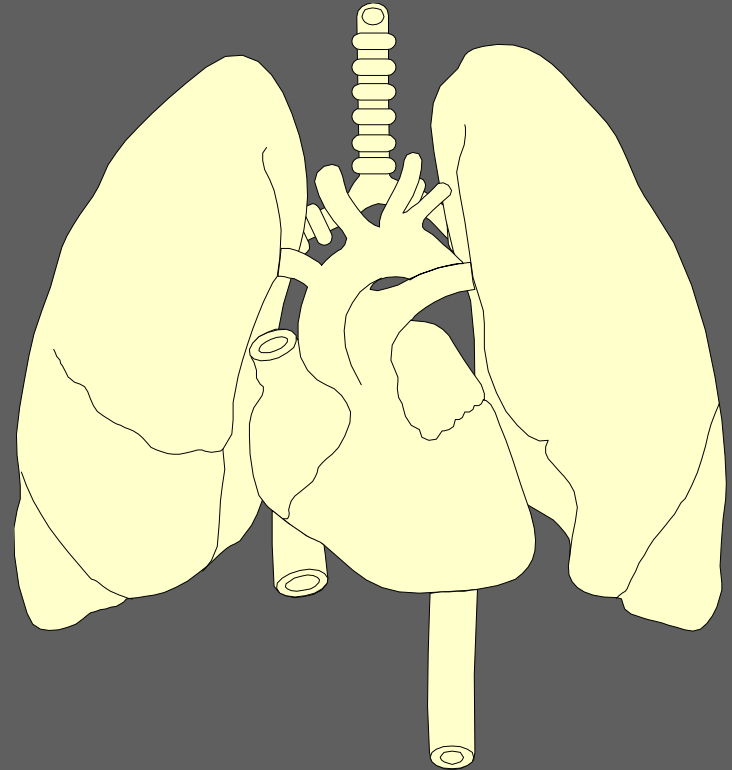
# Skin Exposure

- ⇒ Spills
- ⇒ Home remedies
- ⇒ Cosmetics
- ⇒ Cultural practices that use mercury

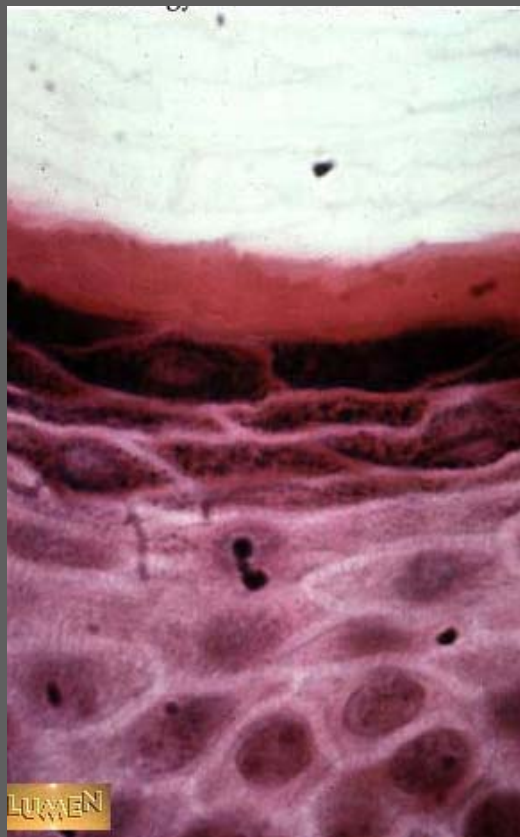


# Inhalation Exposure

- ⇒ 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

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# 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](http://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](http://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)
- ⇒ Scorecard [www.scorecard.org/chemical-profiles/summary.tcl?edf\\_substance\\_id=7439-97-6](http://www.scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=7439-97-6)

# 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

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