Cadmium

Health Effects and Reducing Exposure
Learning Objectives

- Describe characteristics and identify sources of cadmium
- Discuss health effects of cadmium
- Determine actions for reducing exposures to cadmium
Uses and Sources

- Naturally occurring element
- Blue – white solid or gray – black powder
- Found at 776 National Priority List sites
- Found in soil, rocks, coal and mineral fertilizers
- Used in batteries, silver solder, pigments, metal coatings, plastics, and electroplating
How Are We Exposed?

- Inhaling air emissions from industrial processes or incineration (ex. during production of zinc, lead, and copper)
- Eating contaminated food (such as shellfish, liver, kidney, vegetables, cereal)
- Ingestion of contaminated soil
- Ingestion of contaminated water
Health Effects: Inhalation

- Acute: flu-like symptoms with headache, chill, aching, and fever, “Metal-fume fever”
- Loss of smell
- Injure lungs, coughing, shortness of breath
- Fluid in the lungs
- Death
Health Effects: Ingestion

- Stomach irritation
- Nausea/vomiting
- Diarrhea
Health Effects: Kidney

- Cadmium is stored in the body for a very long time, mostly in the kidneys
- Damages kidney tubules
- Kidney stones
- End Stage Renal Disease

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Health Effects: Bone Changes

- Osteoporosis due to depletion of calcium
- Fractures
- Effects of Cadmium are increased if person is iron-deficient
Health Effects: Cancer

- “Probable carcinogen” meaning it is likely to cause cancer in humans
  - Prostate
  - Kidney
  - Testes
  - Lung

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Health Effects: Reproductive

- Harms developing baby
- Damage testes
- Interrupts female cycle
Indication of Exposure

- Blood – indicates recent exposures
- Urine – can identify both recent and past exposures
- Hair and nails – unknown value of test results
- Monitor kidney function to evaluate recovery
What to Do?

- Eat a balanced diet to minimize intake of any one source that may be contaminated
- Wash vegetables thoroughly and limit intake of food grown in contaminated soil
- If exposed at work
  - Wash hands immediately and before going home
  - Change clothes at work, launder work clothes separately
  - Handle products safely - use proper protective equipment and adequate ventilation
Policy

- EPA Maximum Contaminant Level for water is 5 parts per billion (ppb)
- FDA limit for food colors is 15 parts per million (ppm)
- OSHA limit for air concentration is 5 mcg/cubic meter
  - Workers must be monitored for exposure and if elevations are found, actions must be taken to remove them from source of exposure
Resources

- ATSDR fact sheet

- EPA fact sheet on Drinking Water
  www.epa.gov/OGWDW/dwh/t-ioc/cadmium.html

- NJ fact sheet
  www.state.nj.us/health/eoh/rtkweb/0305.pdf
In Review

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


- Alonso, E., Cambra, K., & Martinez, T. (). Lead and Cadmium exposure from contaminated soil among residents of a farm area near and industrial site. Archives of Environmental Health, 56U(3):278-282.
References


References
