

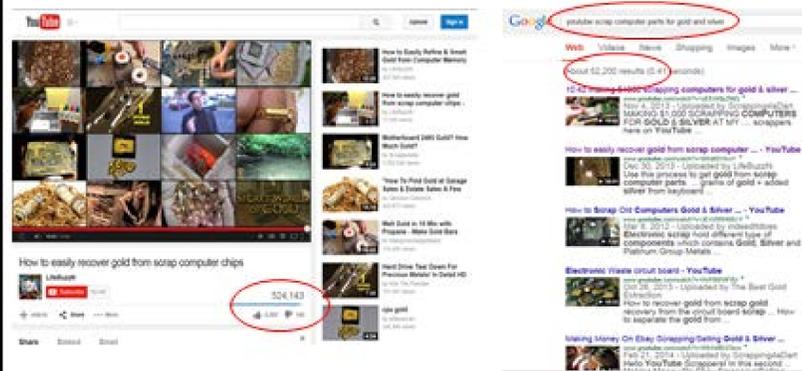
Background

- Mercury exists in elemental, inorganic, and organic forms.
- Adverse health effects of mercury exposure are dependent on chemical form, dose, exposure duration and route, and age and health of the person exposed.
- In the United States, mercury poisoning typically occurs from ingestion of contaminated fish or from inhalation or absorption through skin because of an occupational exposure.
- From 2010-2014, 13 cases of elevated mercury exposure have been reported in Iowa.
- Current Iowa code requires reporting of blood mercury results $\geq 2.8 \mu\text{g/dl}$ to Iowa Department of Public Health.
- Exposure to elemental mercury through vapor inhalation is the major cause of health concerns.
- Poisoning symptoms from acute exposures includes shortness of breath, tremors, nausea, vomiting, and weakness.
- Respiratory symptoms can progress to chemical pneumonitis, pulmonary edema, respiratory failure, and death.

Case Description

- In March 2014, a middle-aged man was admitted to a hospital with a diagnosis of acute respiratory failure secondary to chemical pneumonitis.
- His blood mercury level of $86 \mu\text{g/L}$ (reference value: $<10 \mu\text{g/L}$) was reported to Iowa Department of Public Health.
- Patient reported smelting old computer components by heating them with mercury and other chemicals in a frying pan to recover gold and silver.
- He learned the technique from YouTube® and the History® channel and purchased chemicals and mercury through the internet and locally.
- Performed smelting procedure in the kitchen.
- Developed throat irritation, shortness of breath, tremors and weakness.
- He was admitted in the intensive care unit for about two weeks and was ultimately discharged to a long-term-care facility on supplemental oxygen.

YouTube® Options Galore



Examples of Google Search

"In this video I'm recovering gold from computer Memory Chips (RAM). Use this process to get gold from scrap computer parts. DO NOT DO THIS AT HOME."

screen shots from online video - 1,107,730 views as of May, 2015



Online Examples Involving Mercury Use in Gold Extraction

Video showing use of propane torch to purify mercury-covered gold amalgam using heat



Video of "boiling off" mercury mixed with gold
"Do this outside and stand upwind of the vapors"

Video of gold extraction from soil using mercury



Public Health Action

- A month after exposure, an investigation of his house by the local fire department's hazardous materials team reported the kitchen's air mercury level at $0.8 \mu\text{g/m}^3$ (Environmental Protection Agency [EPA] reference concentration $<0.3 \mu\text{g/m}^3$).
- Remediation was performed by using chemical wipes on kitchen surfaces, and heating and ventilating the kitchen with a negative pressure fan venting outside until air levels of mercury were $<0.3 \mu\text{g/m}^3$.
- All contaminated materials and remaining liquid mercury and other chemicals were removed and disposed of by using EPA-recommended guidelines.
- No other person was reportedly exposed.

Information on smelting technique on internet

- More than 12,000 YouTube® videos exist demonstrating techniques to recover gold from computer parts.
- Documentary films have aired on cable television channels presenting the mining processes, which use mercury to recover gold from soil.
- Additionally, a Google® search displayed ~200,000 websites explaining how mercury can be used to extract gold from computer parts.
- Very few videos have mention about the warning signs and safety measures.

Recommendations

- Electronics recycling for gold and silver recovery exposes individuals to dangerous chemicals including mercury and concentrated acids, and when done in a nonindustrial or home setting without appropriate safeguards should be discouraged.
- Healthcare providers should include mercury poisoning in their differential diagnosis for patients presenting with heavy metal exposure symptoms and a history of smelting activities.
- Precautionary guidance should be provided by clinical and public health practitioners whenever they become aware of these practices in their communities.
- Clinicians are also encouraged to report known or suspected exposures to their local or state public health contacts to ensure timely intervention as appropriate.