

# Cerro Grande Fire and Heavy Metals: What does it mean?

Patrick McKinney, MD  
New Mexico Poison Center  
University of New Mexico Health Sciences Center

## What are they?

- Nickel: may be an essential nutrient. Found in foods, water, air, work exposures
- Chromium: an essential nutrient. Found in foods, beer, wood preservatives, stainless steel, work exposures
- Uranium: found naturally in West US, nuclear facilities, found in food, water and air
- Cesium: found naturally and in nuclear facilities

## Study Synopsis

- Smoke exposure was not associated with increase in urinary heavy metals compared to non-exposed persons
- An unexpected finding:
  - people in both groups had elevated levels of nickel, uranium, cesium and chromium in their urine.

## Are these levels associated with health effects?

- Test must be reliable and reproducible.
- CDC lab does these tests as a research tool
- A few other clinical labs do them too, but...
  - Testing procedures may be different from lab to lab
  - Common to get different results when sending to same specimen to different labs
- Follow testing should use the same lab
- Use caution when looking at numbers coming from other labs

## Are these levels associated with health effects?

- Do we know what “normal” is?
- Do we know the lowest levels that cause health effects?

## What does “above normal” mean?

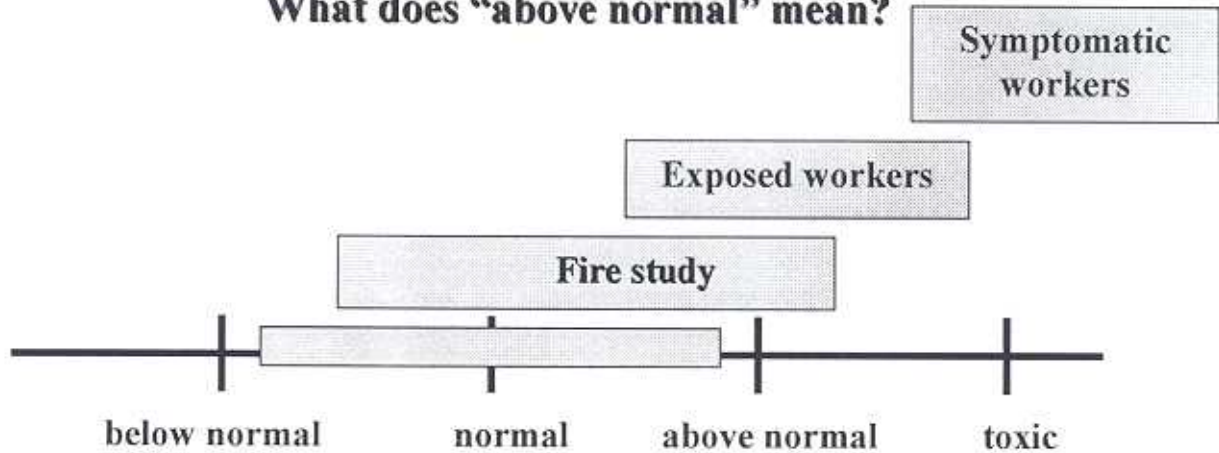
- “Normal” comes from a small number of people from 12 sites around the US

**We don't know if normal values in New Mexico are the same as “normal” in other parts of the country.**

## Where do comparison numbers come from

- Normal range for unexposed people in the US and other countries
- Normal range for workers exposed to these metals with no health effects
- Workers exposed to these metals that have health effects

## What does "above normal" mean?



## Urine metal levels

### Are there concerns about short-term toxic effects?

- Most people had levels similar to normal ranges for unexposed people
- The elevated levels are consistent with those seen with low level work exposures.
  - These levels do not appear to be associated with short-term toxicity in workers.
- There is not enough information about low level environmental exposures.

	CDC	Cerro Grande	Workers	Action Level
<b>Cesium</b> high= 20	11.8	3.89	?	?
<b>Chromium</b> high=23	2.0	0.18	0.16-7.74	Over 30
<b>Nickel</b> high=116	5.0	4.69	4.5-43.2	30-50
<b>Uranium</b> high=105	0.03	0.04	0-0.05	Over 15

## Are there concerns about long term toxicity?

- Cesium: irritating, radiation
- Uranium: kidney effects, lung problems
- Chromium: kidney effects, lung cancers
- Nickel: rashes, lung and nasal cancers
- Some forms of nickel and chromium are associated with cancers in people who are heavily exposed to them as dust.
- In cases of low-grade work exposures, the relationship of these metals to cancer is not conclusive.
- There are no good studies looking at these low levels in the general population.

## If smoke isn't the source, what is?

- Uranium: water and food?
- Chromium:
  - Food, supplements
  - water (chrome fixtures)
  - occupation (welder, chrome plater)
  - Soil, air
- Nickel
  - food (cocoa, dried beans, oatmeal, soy)
  - Water, soil, air
- Cesium: ?

## Cancer risk

- Chromium: lung cancers
- Nickel: lung and nasal cancers
- New Mexico has lower than average rates for all of these cancers

Rates of lung, nasal, larynx cancers in New Mexico are below average for the nation.

## Why measure metals?

- We know that they were present in the area
- They may still be present in the urine several days after exposure
- We have the technology
- Some of them have known health effects

### **What should I do if I have high levels?**

- High levels should be repeated, and more information should be collected about diet, work, drinking water, residence and other variables that could explain elevated levels for specific metals.

### **Do I need to see a doctor?**

- These levels are not usually associated with toxicity.
- Other tests or an examination may be recommended after the initial group is re-tested.

### **Bottom Line Points**

- Urine heavy metal levels were elevated in some people
  - “Above reference” doesn’t necessarily mean toxic
- Elevated levels not likely to cause short-term effects. Not enough information about long term effects and low-level exposures
- People with elevated levels should be re-tested and other sources of exposure should be looked into
- No medical treatments for metal exposure are indicated at this time

### **More information**

- **New Mexico Poison Center**
  - **1-800-432-6866**
- **Agency for Toxic Substances and Disease Registry**  
**web site**
  - **[www.atsdr.cdc.gov](http://www.atsdr.cdc.gov)**
  - **go to (ToxFAQs)**

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### Recap

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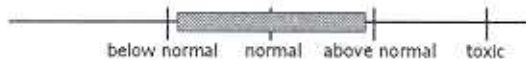
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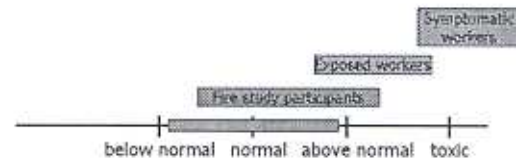
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## Urine metal levels, cont

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  - ToxFAQs

### Highest Metal Levels

- Nickel: 59.9, 46.9, 41.4, 37.6, 29.9
- Chromium: 5.47, 2.44, 2.15
- Uranium: 3.34, 1.54, 1.30, 1.11
- Cesium: 20.4, 16.4, 16.4, 12.3, 12.1
- Cadmium: 10.8, 3.0
- Arsenic: 243.8, 109.8
- Mercury: 44.8, 43.5, 42.1, 32.9, 28.8

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