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?

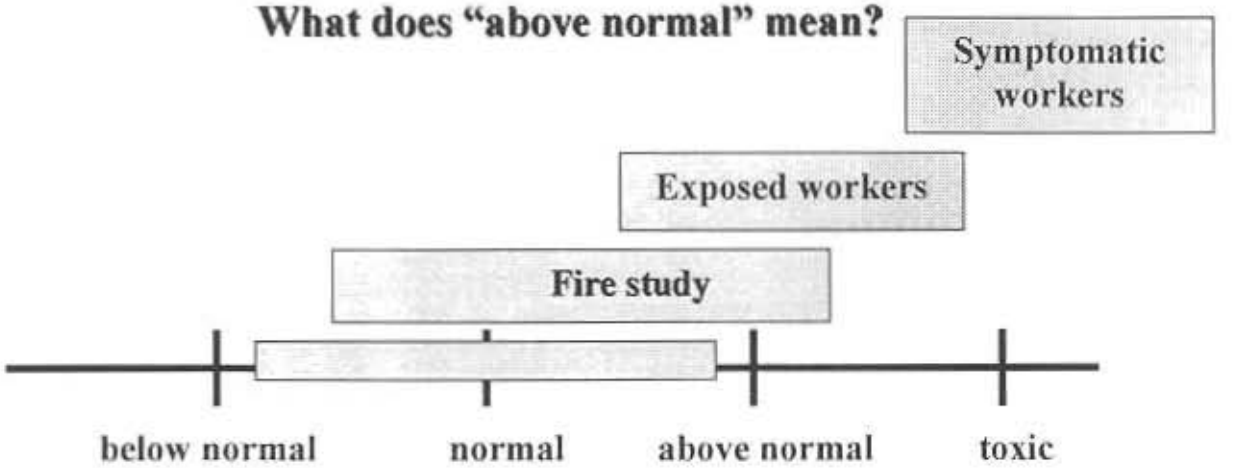
- "Normal" comes from a small number of people from 12 sites around the US

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
Cesium high= 20	11.8	3.89	?	?
Chromium high=23	2.0	0.18	0.16-7.74	Over 30
Nickel high=116	5.0	4.69	4.5-43.2	30-50
Uranium 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**
  - **go to (ToxFAQs)**

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Recap

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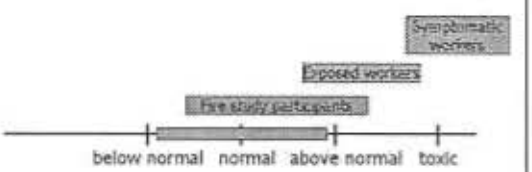

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Urine metal levels, cont

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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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