Children's Environmental Health
Case Studies

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Lead-Objectives

- Lead Anthropology
  - High blood lead levels
- Cases
- Current State
  - Low blood lead levels & morbidity
- Denver Health data
  - Screening and results

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Governmental Restrictions on lead based paint

1922 - Australia, Greece, Tunisia

1922 - 1930 England, Sweden, Belgium, Poland (?US)

1930-1935 Cuba, Yugoslavia, Spain

1971 - USA .5% lead permissible in paint

1978 - USA .06% lead permissible in paint

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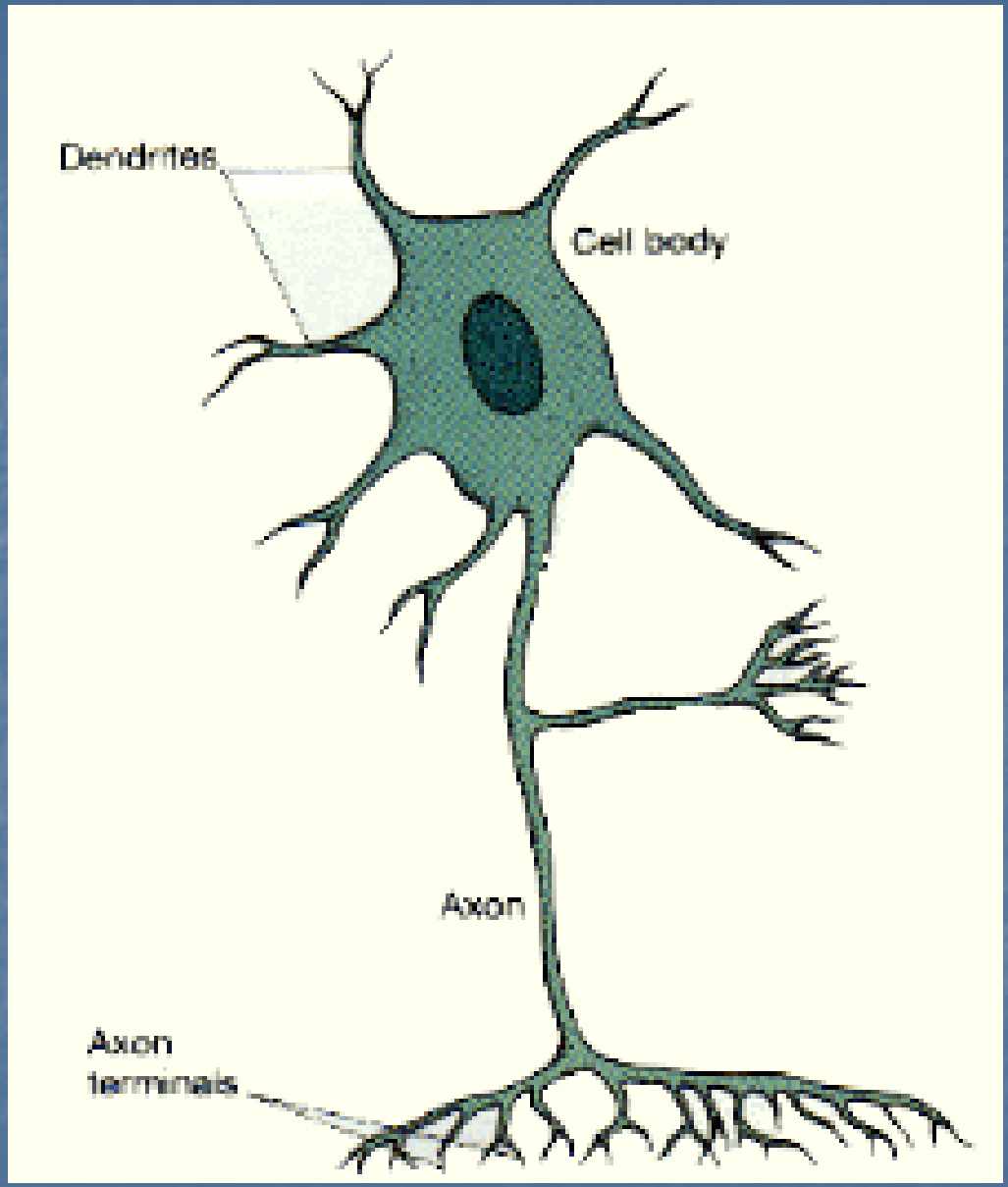

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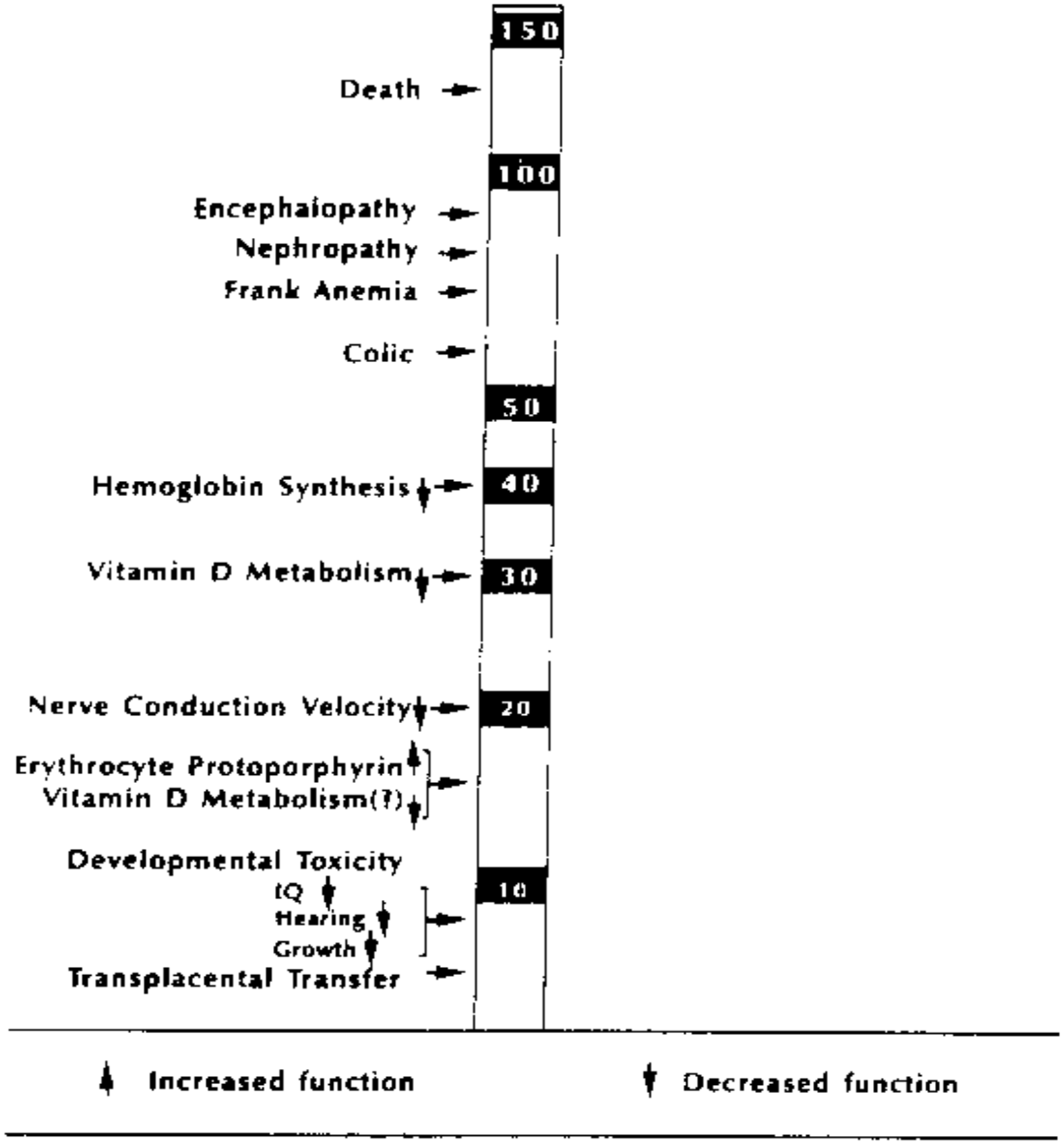
Figure 2-1. Lowest observed effect levels of inorganic lead in children*



Where is the lead coming from? How do you find out?

- Paint/soil
- Bullets, Lead sinkers,
- Ingested objects made of lead
- Lead plumbing
- Hobbies/work exposure: stained glass, batteries
- Pottery
- Folk remedies/cosmetics/food/spices: greta, azarcon, kohl and others

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Treatment of lead poisoning for children with Pb > 45 ug/dL

- Remove the child from the source of lead
- Treat with medication
- Evaluate for iron deficiency, treat with Iron

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Medications used for treatment of Pb poisoning

- Edetate disodium calcium –CaEDTA
- Dimercaperol - BAL – British Anti-Lewisite
- 2 -3 Dimercaptosuccinic acid – DMSA/Succimer/Chemet

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FIGURE. Heart-shaped charm bracelet that is the subject of the voluntary recall announced March 23, 2006, by Reebok International Ltd. and the Consumer Product Safety Commission

Photo/Consumer Product Safety Commission

Death during Chelation, 2005

- 2 yr old with venous Pb of 48 ug/dL
- Order for IV Na_2EDTA was changed to IV CaEDTA
- After 12 hrs of IV drip of CaEDTA, received IV Na_2EDTA
- 1 hr later Ca was 5.2mg/dL
- 2 hrs later, apneic and limp

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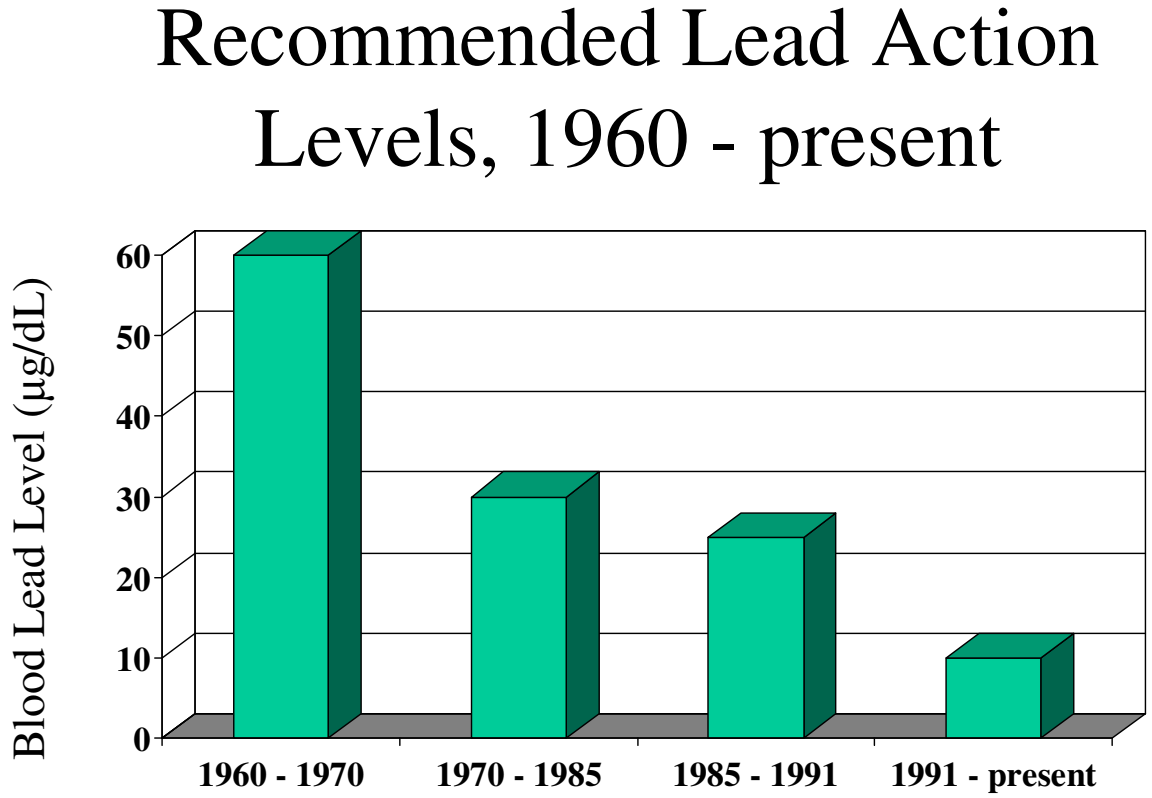
History of Lead Action Levels



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First Large-Scale Suggestion of Toxicity at "low" level

For every 1 µg/dL increase in blood lead:

- 0.7-point decrement in mean arithmetic scores
- 1-point decrement in mean reading scores
- 0.1-point decrement in non-verbal reasoning
- 0.5-point decrement in short-term memory scores

An inverse relationship between blood lead concentration and arithmetic and reading scores

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Lanphear, et al. *Public Health Reports* 2000 (115); 521-529.

Additional Suggestions of Toxicity at "low" levels

- Prospective
  - 172 children < 60 months
- Each 10 µcg increase saw a 4.6 point IQ decrease (p=0.004)
- For children increasing from 1 µcg to 10 µcg, average IQ decrease = 7.4 (p=0.003)
- Are we looking at the correct epidemiology?

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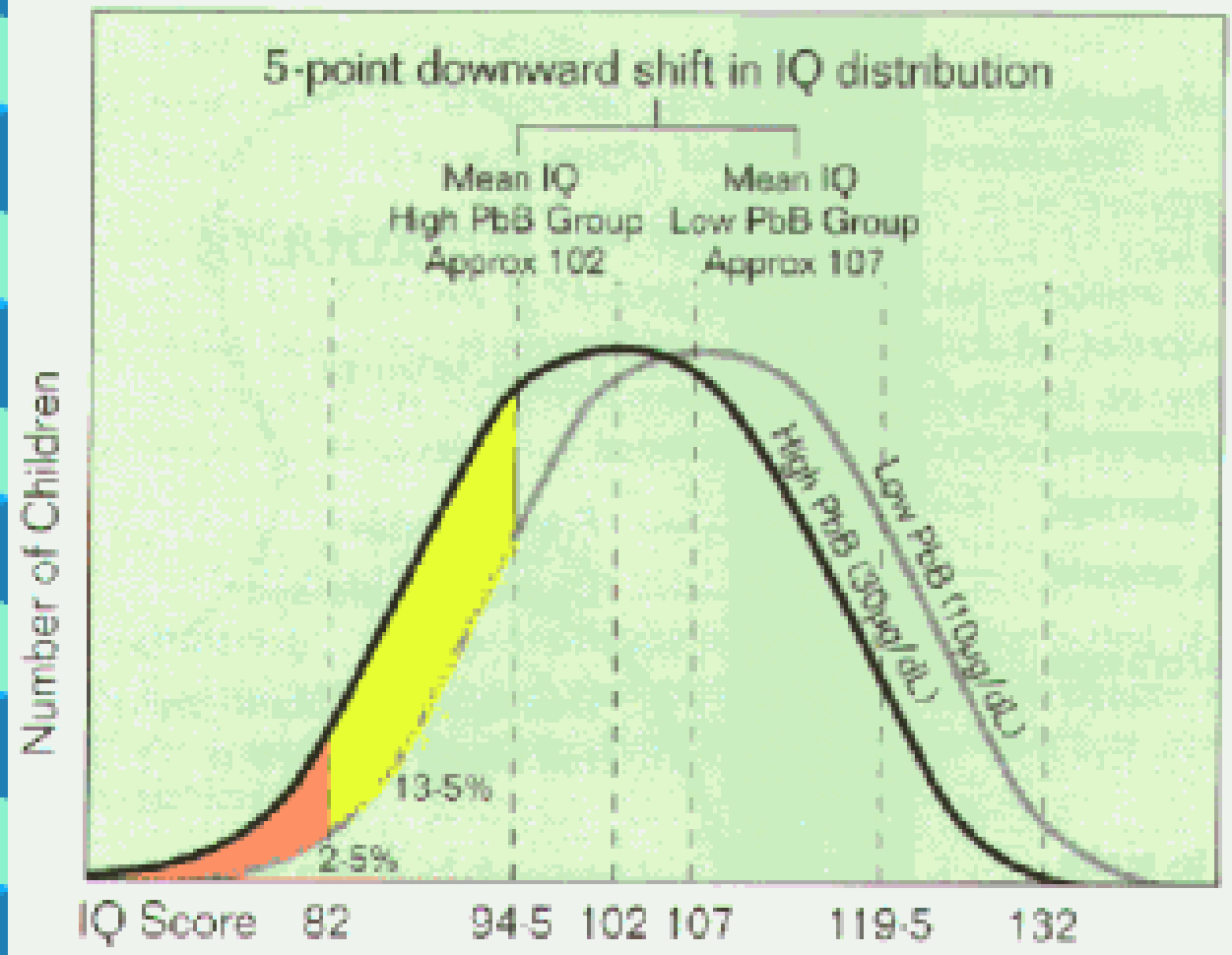
Canfield, et al. *New England Journal of Medicine.* 348 (16): 1517-1526.

Lead and IQ



Approx. twice as many children here in High PbB Group (increased from 2·5% to 5·5%)

Approx. twice as many children here in High PbB Group (increased from 13·5% to 25·5%)

NOTE PbB = Lead in blood

When to Screen

- Screen blood lead at ages 1 and 2 years, or once before age 6 years

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Denver Health Data

- 400,000 outpatient visits
- 10 clinics, 12 school-based clinics
- Specific resources for home visits
- For children: Medicaid, S-CHIP, uninsured
  - CMS requires screening for Pb

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Summary

- Lead in Children
  - Screen for lead exposure
  - High and Low lead levels
  - DH and Denver epidemiology
- Resources

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Asthma-Objectives

- National Consensus Guidelines
  - Effective
  - Case Finding, classification, control, follow-up
- Why do the guidelines not work?
  - Disparities
  - ? complexity

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Asthma Guidelines

- Recognize asthma as an environmental disease
  - Must address environmental triggers
- Patient-provider partnership
- Decrease disease severity
  - ? Missed work and school days
  - Hospital-based utilization
  - Associated morbidity

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A Case

- 12 year old African-American male with asthma
- Worsening asthma, despite increasing therapy with controller agents and oral steroids
- Family had recently moved into a new home

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Healthy Homes Initiative

- Federal HUD
- Homeowners
- Poor
- “Loan” for repairs

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Case : asthma follow up

Environmental abatement

Patient compliant on controllers

Doing well

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Asthma-Summary

- National Guidelines (that work)
- A true 'environmental' disease
- Mitigate environmental factors (ask first)
- Disease control: proactive, not reactive

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