

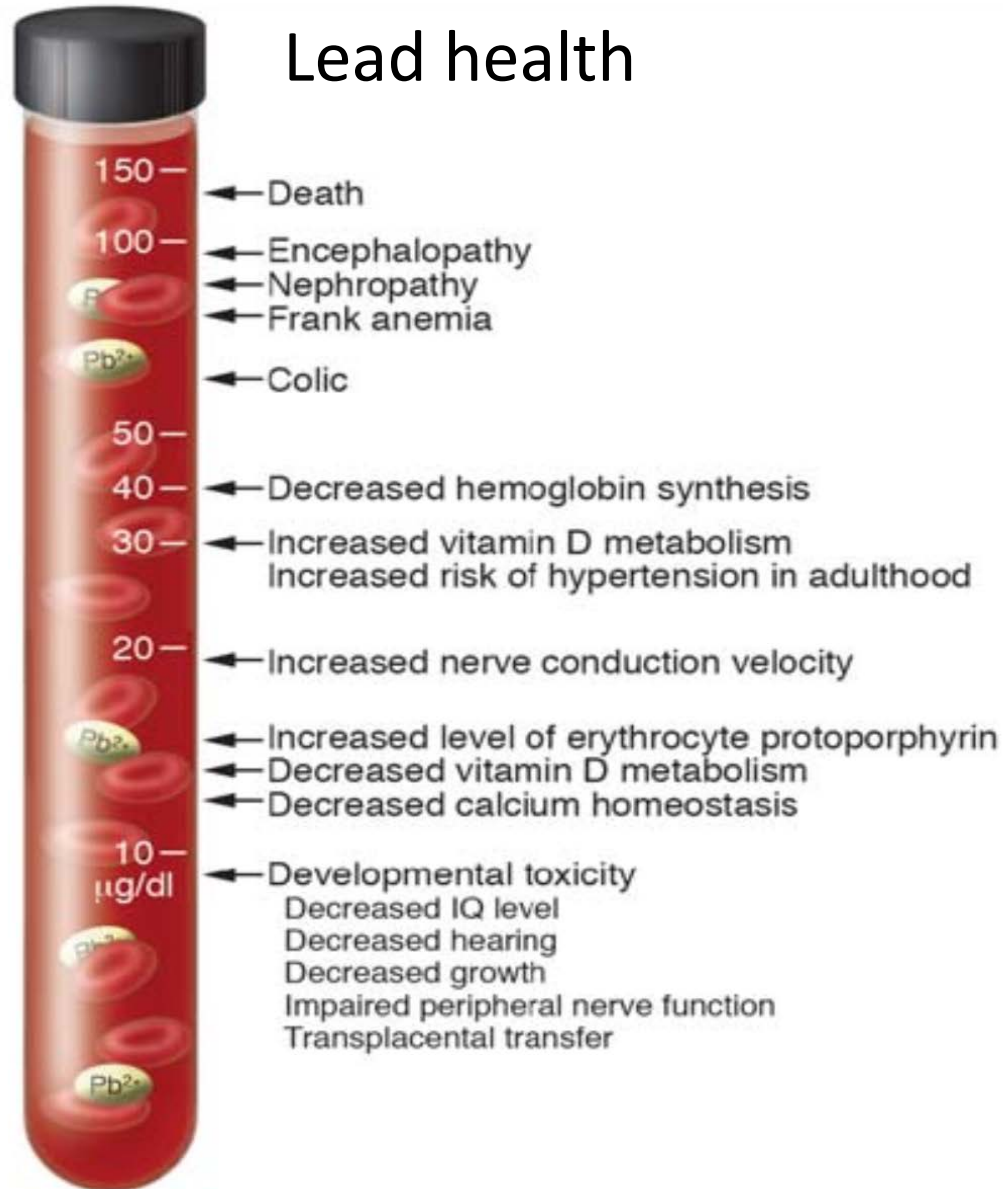
Lead and Adverse Health Effects

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Lead health

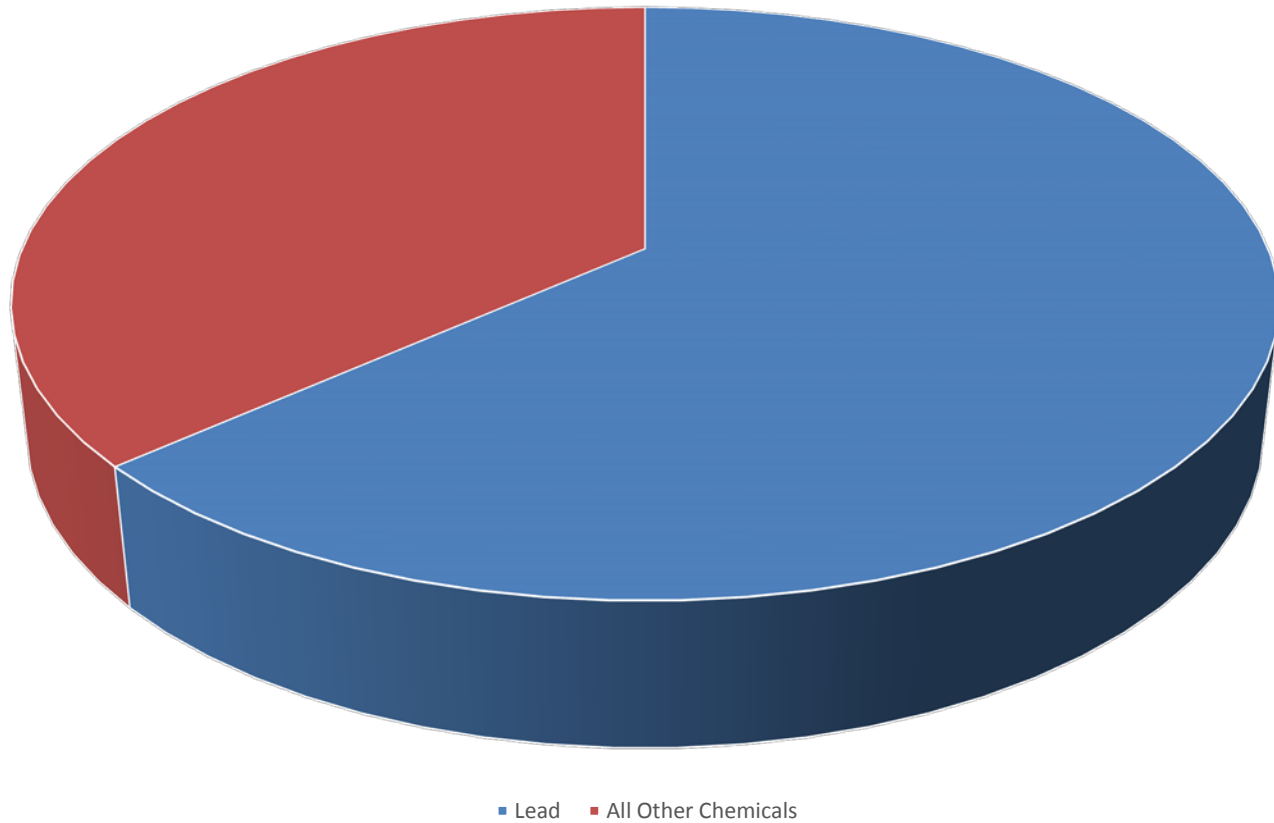


What are the most common sources of Lead in Children's Environments Today?

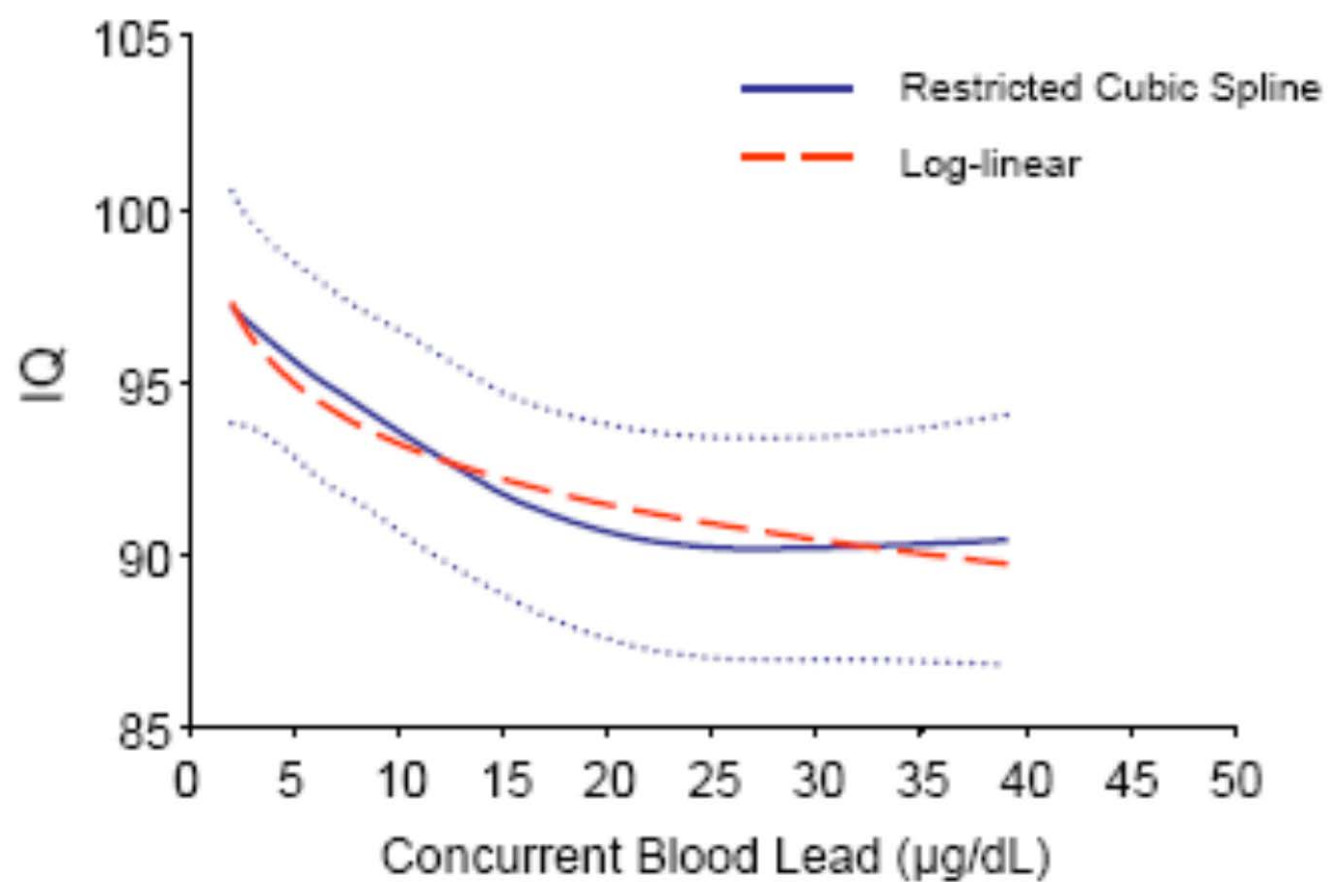
- Worldwide, eight products account for most cases of childhood lead exposure:
- Gasoline additives,
- Lead solder in food cans,
- Lead-based paints,
- Ceramic glazes,
- Drinking water systems – lead solder and lead pipes,
- Herbal medicine products / traditional / folk remedies.
- Aviation gasoline
- Lipstick and a wide range consumer products (see Proposition 65 data)

Proposition 65-Warnings Required 17,763 Law Suits-Lead is ubiquitous

Companies - Alleged Lead Violations



Relationship of Concurrent Blood Lead Concentration with Children's Intellectual Function



Lead and IQ

- Search for a threshold for lead effects in relation to IQ levels.
- Metaanalysis: Schwartz, J. (Harvard University)

Conclusion:

- “There was no evidence of a threshold down to a blood lead concentrations down to 1 ug/dl.”

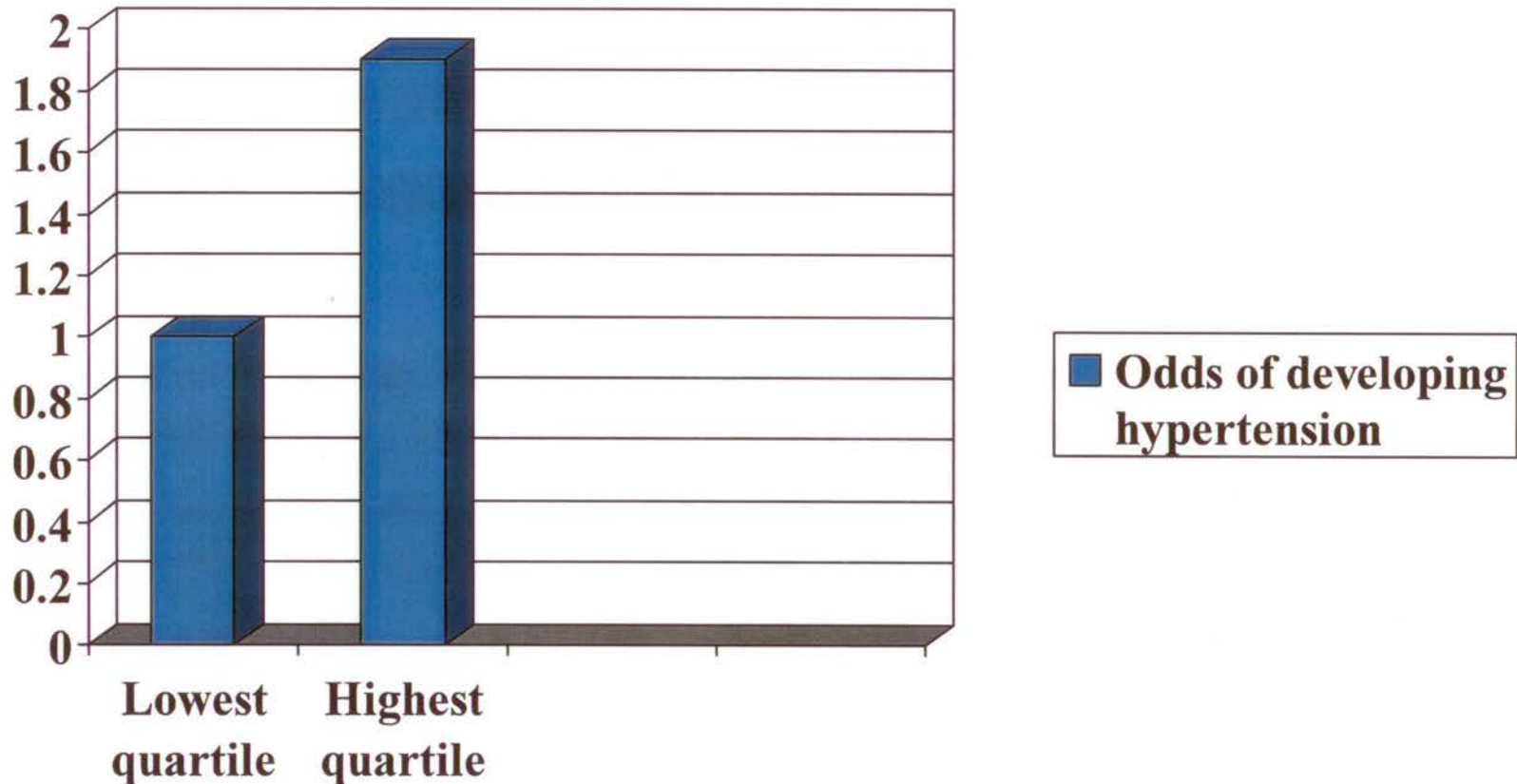
Effects of aviation gasoline on childhood blood lead levels

- Duke University Study (2011)
- Children living within 500 m of an airport at which planes use avgas have higher blood lead levels than other children
- Significant associations between potential exposure to lead emissions from avgas and blood lead levels in children
- Directly relevant to policy debate surrounding the regulation of leaded gasoline.
 - Miranda et al. EHP, 119, 1513 (2011)

Lead – Jobs versus public health

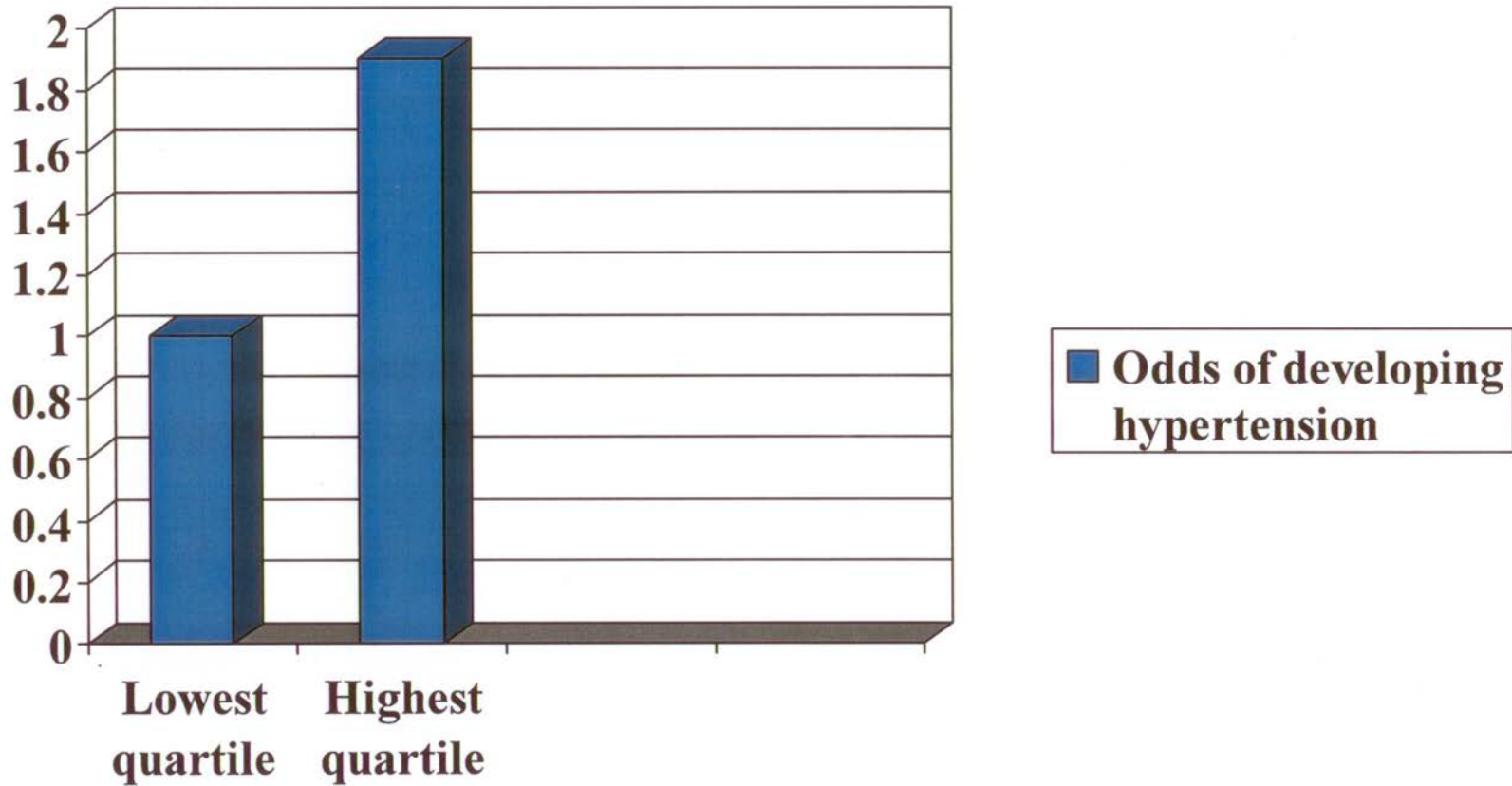
- Half-life for lead in the bone is approximately 32 years
- Long term lead exposure will result in a significant body burden
- Because of lead storage in the bone; effects may occur if the blood lead was zero
- Lead may be mobilized from bone stores during pregnancy
- If there is no safe level for lead exposure in terms of developmental neurotoxic effects, how to protect the fetus?

Hu et al. (JAMA, 1996). Bone lead and odds of hypertension in the NAS.*



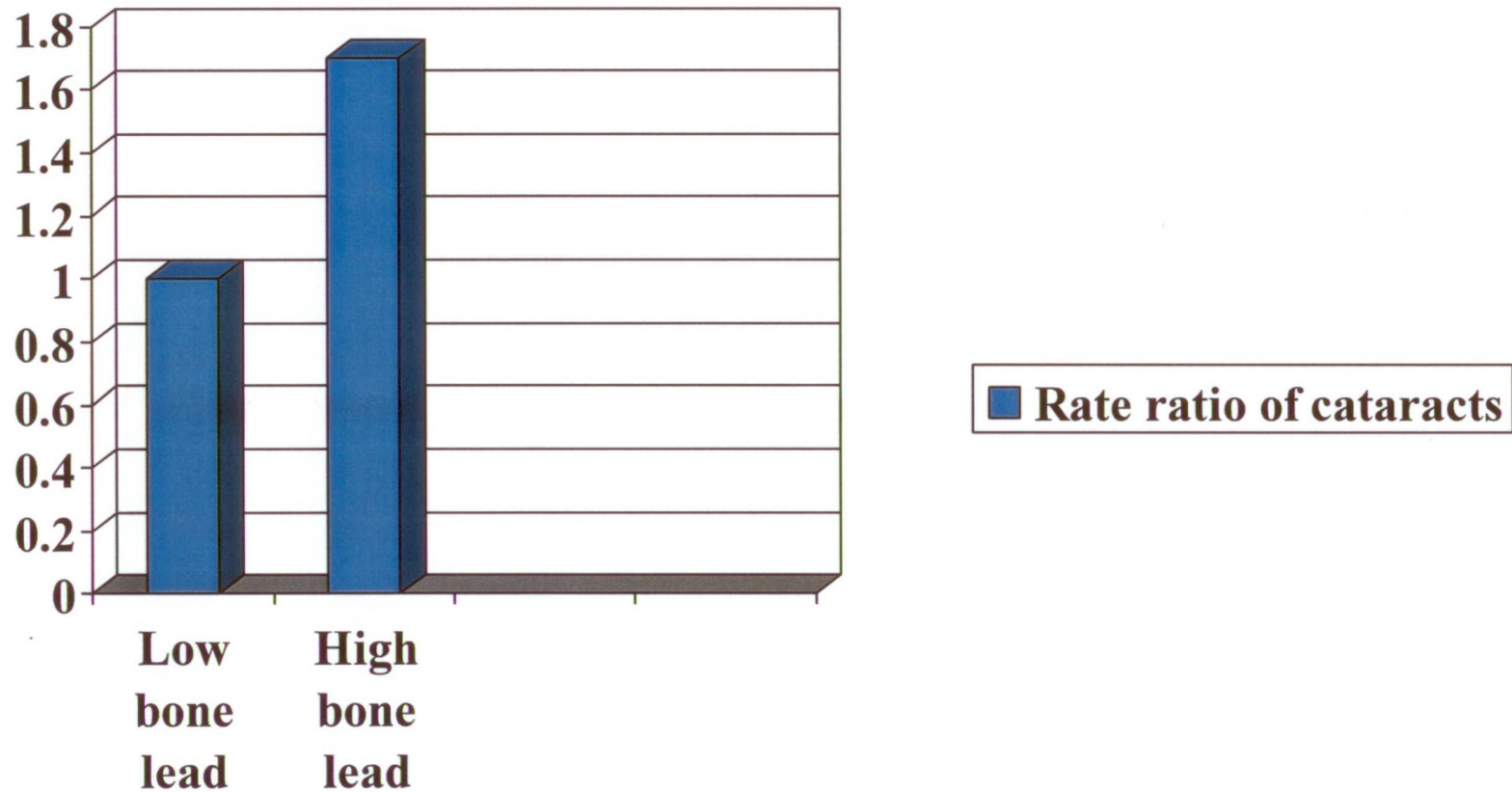
*Adjusted for age, body mass index, family history of hypertension, smoking, alcohol ingestion, dietary calcium, dietary sodium

Bone lead and hypertension in nurses.*



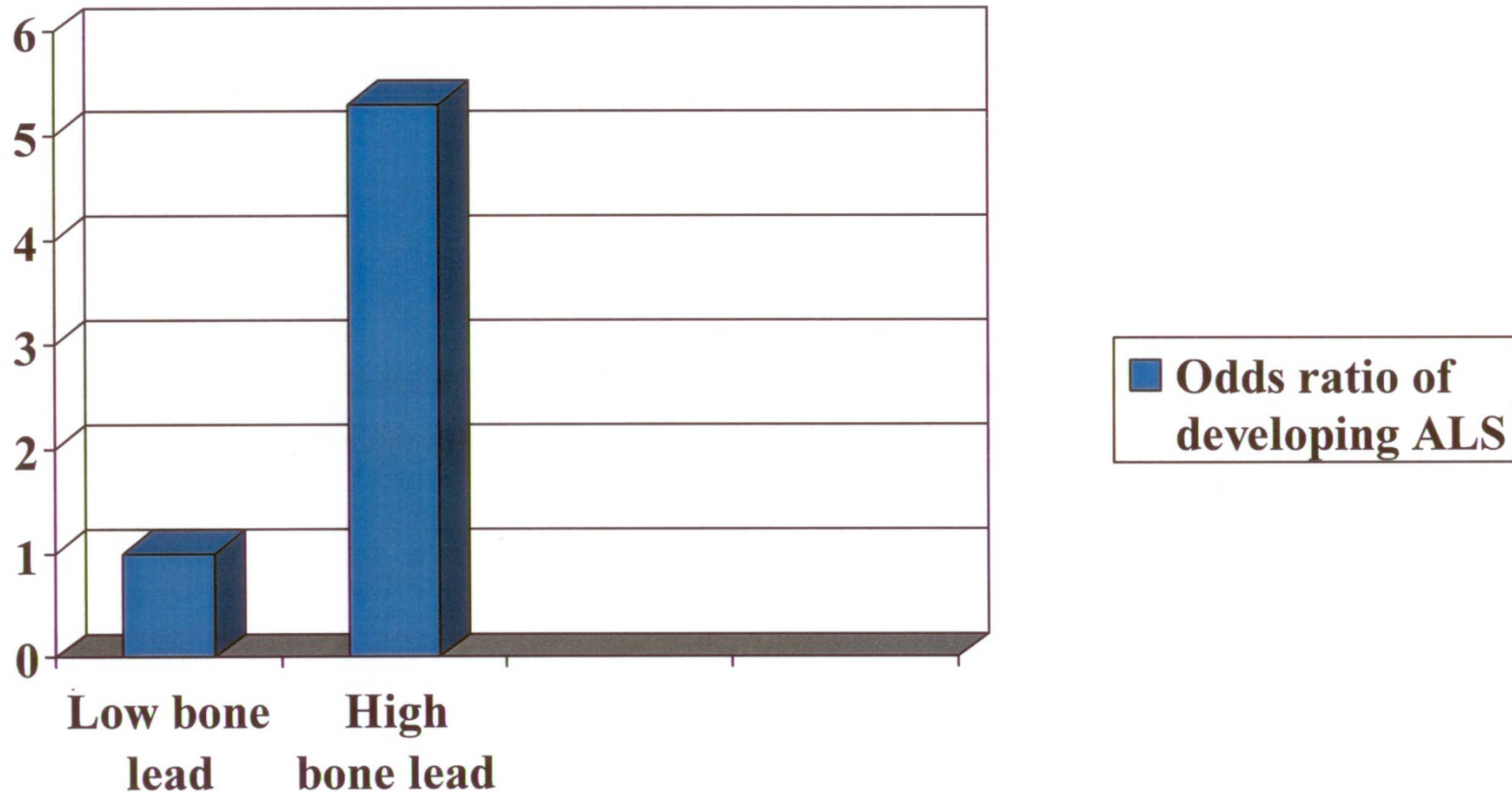
*Adjusted for age, body mass index, family history of hypertension, smoking, alcohol ingestion, dietary sodium, dietary calcium

Bone lead and risk of developing cataracts



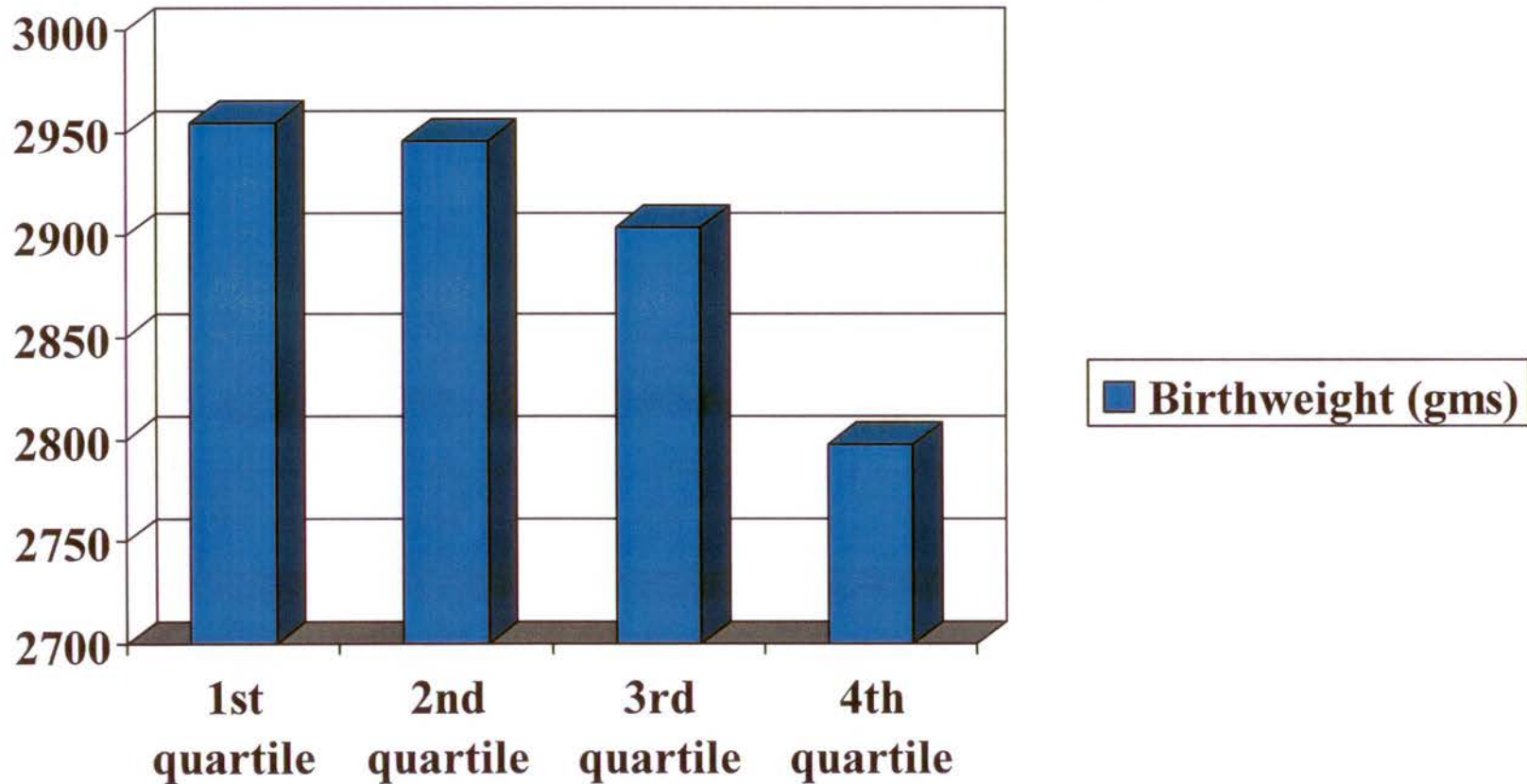
*Adjusting for age, smoking

Bone lead and Amyotrophic Lateral Sclerosis



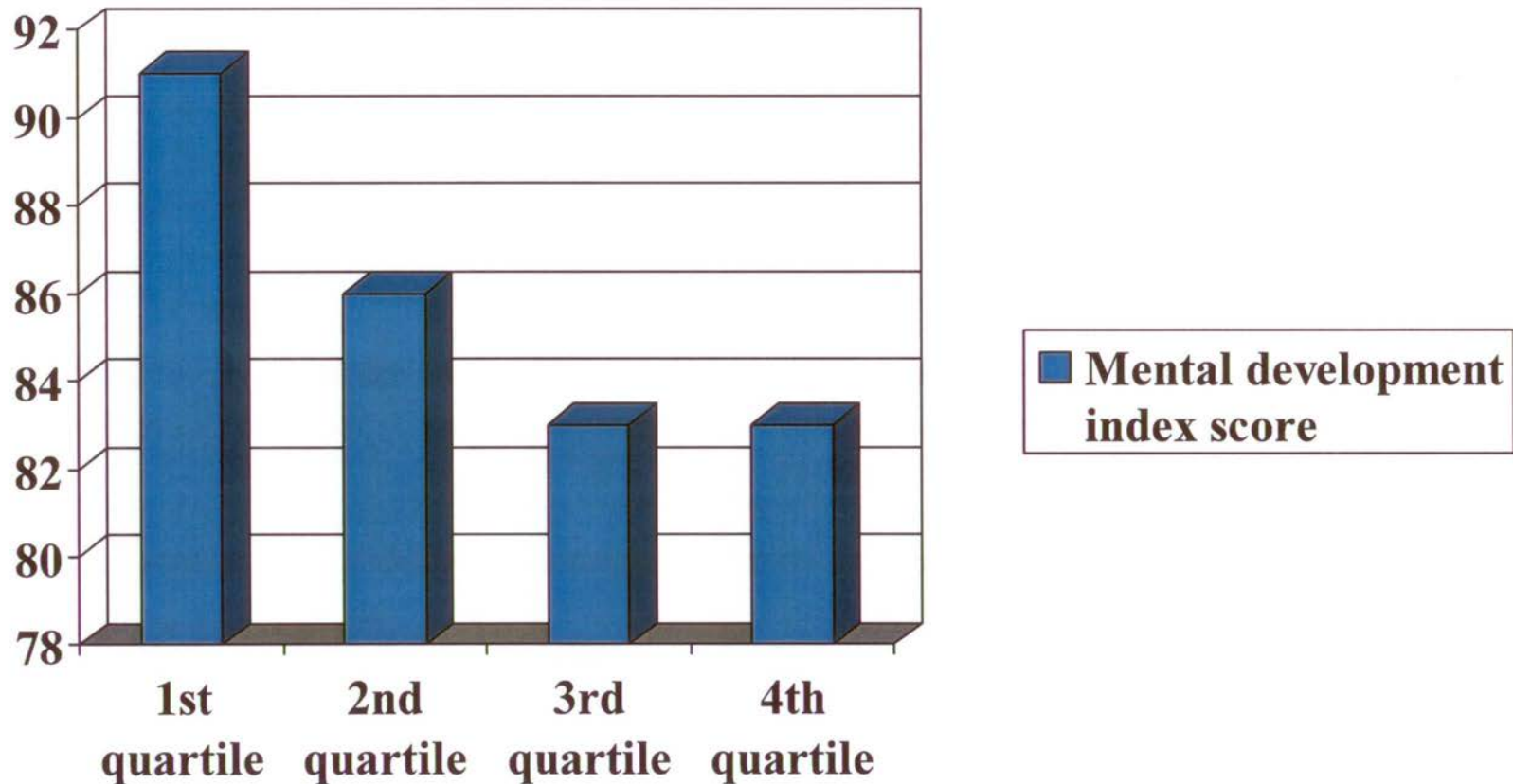
*Case control study; adjusted for age, sex, region.

Bone lead and birth weight in 272 mothers in Mexico.*



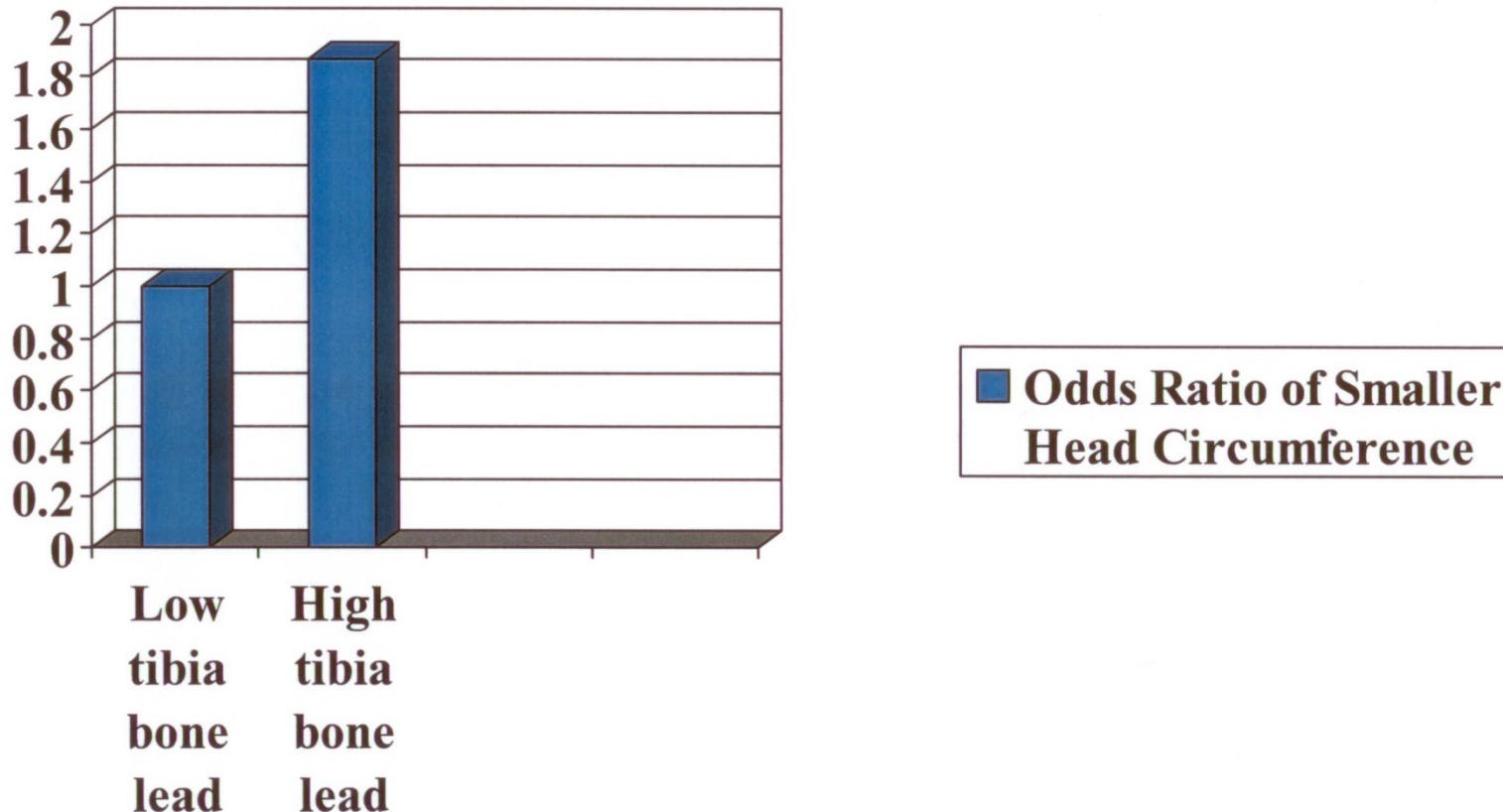
*Adjusted for gestational age, parity, smoking, maternal calf circumference, education

Maternal bone lead as a predictor of IQ (Bayley scales) at age 2.*



* Adjusted for maternal age, IQ, gender, maternal education, paternal education, parental marital status, breast feeding duration, cord blood lead.

Maternal bone lead as a predictor of head circumference at birth.*



*Adjusted for maternal age, cord blood lead, birth weight.

LEAD

- **No safe level of exposure to lead**
- **That is, no threshold**
- **Lead needs to be eliminated from consumer products, the environment and the workplace**
- **We need to pursue alternatives analysis and new technology**