

Blood Lead Levels in Young Children: United States, 2009-2015

Article Publication

What is already known?

- Lead toxicity among children in the United States is a serious environmental disease that causes adverse cognitive and behavioral effects.¹
- There is no safe blood lead level (BLL), as even low BLLs are associated with intellectual deficits, attention deficit behaviors, and poor academic achievement.²⁻⁴
- With the advent of public health initiatives such as removing lead from gasoline, BLLs in children have markedly declined in the United States in recent decades. The 2007-2010 National Health and Nutrition Examination Survey (NHANES) estimated a 90% decrease in average BLL of children compared to reports of levels in 1976-1980 (12.8 µg/dL to 1.3 µg/dL).^{1,5}
- However, the NHANES data have limitations in terms of geographic information and sample size for certain populations (eg, children with high BLLs); thus, confirmatory studies are warranted.

What was done in this study?

- The investigators of this Quest Diagnostics Health Trends™ study evaluated trends in BLLs in children <6 years old living throughout the United States.
- BLLs were determined for >3.8 million de-identified blood samples that were submitted from May 2009 through April 2015.
- BLLs were stratified by age, gender, pre-1950s housing construction, poverty income ratios, Medicaid enrollment status, and geographic regions.
- Multivariable logistic regression analyses were used to determine characteristics associated with high BLLs (≥5 µg/dL).

What were the new findings in this study?

- Based on testing results from >3.8 million blood samples:
 - 0.6% had BLLs ≥10 µg/dL (very high BLL)
 - 3.0% had BLLs ≥5 µg/dL (high BLL, includes very high BLL)
 - 2.2% had BLLs between 3.0 and 4.9 µg/dL
- The proportion of boys (3.1%) with high BLLs was only slightly higher than that of girls (2.8%), although the difference was but statistically significant ($P<0.01$).
- Certain US geographic regions, states, and ZIP code areas had higher proportions of children with high BLLs than others. For example, the proportion of children with high BLLs ranged from 10.28% in Minnesota to 1.09% in Florida.
- For the majority of subgroups, proportions of children with high BLLs declined from May 2009 to April 2015.
- Areas with a high amount of pre-1950s housing construction and low income were associated with larger proportions of children with high BLLs.

What were the conclusions from the study?

- The decline of BLLs among children in the United States is a public health success story. However, high BLLs are still present in a substantial proportion of children living in certain communities and socioeconomic conditions.
- The large size and comprehensive geographical representation of this study allowed for analyses that were not possible with NHANES data.

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