Key Summary of Published Article

Individual and Community Factors Associated With Detectable and Elevated Blood Lead in US Children: Results From a National Clinical Laboratory

Background

- Blood lead levels (BLLs) have declined in the last 50 years, but accumulating evidence indicates that any level of lead in children is potentially harmful.[1]
- Although risk factors for lead exposure in children have been extensively investigated, studies usually focus on "elevated" (≥5 µg/dL) as opposed to detectable (≥1 µg/dL) levels.
- **Objective:** As part of an ongoing effort to assess trends of pediatric lead exposure in the United States, this study examined risk factors for the presence of detectable blood lead in more than 1 million young children.

Methods

- The investigators retrospectively analyzed BLLs of children <6 years old who were tested by Quest Diagnostics from October 2018 through February 2020.
  - All 50 states and the District of Columbia were represented.
- The proportions of children with detectable and elevated BLLs were determined directly for sociodemographic factors (age groups, gender, insurance type) and states.
  - Associations with race/ethnicity, pre-1950s housing, and poverty-income level were analyzed using demographic data by zip code. Poverty and old housing were grouped into quintiles for analysis
  - The associations of all factors with detectable (≥1 µg/dL) and elevated (≥5 µg/dL) blood lead were adjusted using multivariable logistic regression analyses.

Results

- Of the 1,141,441 children tested during the study period, 50.5% (n=576,092) had a detectable BLL and 1.9% (n=21,172) had an elevated BLL.
- The following risk factors for detectable and elevated BLLs were identified:
  - Having Medicaid (vs private) insurance coverage
    - Detectable BLL: adjusted odds ratio (AOR) = 2.01 (95% CI, 1.99-2.04)
    - Elevated BLL: AOR = 1.08 (95% CI, 1.04-1.12)
  - Living in pre-1950s housing construction (highest vs lowest quintile)
    - Detectable BLL: AOR = 1.65 (95% CI, 1.62-1.68)
    - Elevated BLL: AOR = 3.06 (95% CI, 2.86-3.27)
    - For both thresholds, risk increased stepwise with housing level quintiles.
  - Poverty-income ratio (highest vs lowest quintile)
    - Detectable BLL: AOR = 1.89 (95% CI, 1.86-1.93)
    - Elevated BLL: AOR = 1.99 (95% CI, 1.88-2.11)
    - For both thresholds, risk increased stepwise with poverty level quintiles.
  - Odds of detectable BLL were higher for children from predominantly Black, non-Hispanic/non-Latinx zip codes compared to those from predominantly White zip codes; however, odds of elevated BLL were lower:
    - Detectable BLL: AOR = 1.13 (95% CI, 1.11–1.15)
    - Elevated BLL: AOR = 0.84 (95% CI, 0.80-0.88).

Conclusions

- These data show that over 50% of tested children <6 years old have detectable lead levels. Although efforts to lower childhood lead exposure have led to fewer children having elevated BLLs,[2] significant exposure still exists.
- Moreover, this study shows that lead exposure disproportionately affects children with certain community-level factors. The risk factors identified herein may help target efforts to mitigate lead exposure.

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