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Blood Lead Surveillance in Children Aged <18 Years — Alaska, 1995–2012

Introduction

Young children who incur even low levels of lead exposure are at risk for lifelong intellectual and behavioral deficits.¹ In May 2012, the Centers for Disease Control and Prevention (CDC) adopted 5 µg/dL (micrograms per deciliter) as a reference level for blood lead follow-up for children aged <6 years, lowering it from the previous 10 µg/dL threshold level of concern.² Since then, and in the absence of formal CDC guidelines for blood lead reference levels in exposed children and adolescents aged >6 years, the Section of Epidemiology (SOE) has used the 5 µg/dL level for lead exposure investigations for all persons aged <18 years. Alaska regulations require laboratories and health care providers to report all blood lead level (BLL) results to SOE.³

Methods

We reviewed BLLs reported from all years in the SOE lead database (1995–2012) for children aged <18 years. To avoid duplication, only the highest BLL per person was included in the analysis (sampling methods included both venous and capillary testing). Unless otherwise reported, BLL ≥10 µg/dL reported prior to June 1, 2012, and BLL ≥5 µg/dL reported after June 1, 2012 were considered elevated and investigated for an exposure source. “Unknown exposures” refers to exposures that did not have follow-up conducted or were undetermined during follow-up. We calculated crude and age-adjusted elevated BLL rates ≥5 µg/dL for children aged <6 years using 2010 U.S. Census data.⁴

Results

Children aged <6 years

During 1995–2012, SOE received BLL reports on 5,610 children aged <6 years. Of the 53 (0.9%) cases of elevated BLL, 27 (51%) were in boys. The median elevated BLL was 12 µg/dL (range: 5.0–35.9 µg/dL). Exposure sources included being foreign-born or an international adoptee for nine (17%), eating non-nutritive substances (pica) for three (6%), and multiple possible exposures for three (6%). An exposure source was not identified for 35 (66%) of the children.

In 2012, 1.4% (911/65,846) of Alaska children aged <6 years were screened for BLL; the age-adjusted rate of elevated BLL (≥5 µg/dL) among Alaska children aged <6 years was 23 cases per 100,000 children (the 3-year average rate during 2010–2012 was 35 cases per 100,000 children).

Children aged 6–17 Years

During 1995–2012, SOE received BLL reports on 1,324 children aged 6–17 years; the median BLL was 3 µg/dL. Of the 85 (6.4%) who had an elevated BLL, 55 (65%) were male. The median elevated BLL was 15 µg/dL (range: 5–37 µg/dL). Exposure sources included visiting indoor firing ranges for 62 (73%), being an international adoptee for four (5%), and bodily retention of a bullet for one (1%). An exposure source was not identified for 18 (21%) of the children.

BLL Rates among Children Aged <18 Years

During 2007–2012, SOE received BLL reports on 5,035 Alaska children aged <18 years; of these, 180 (3.6%) had an elevated BLL (Table). Elevated BLL rates by region were highest in the Southwest and Southeast (Table). Additional BLL data by census area and borough, as well as trends from 1995 through 2012, are available online.⁷

Discussion

In 2012, the rate of elevated BLL (≥5 µg/dL) among Alaska children aged <6 years was considerably lower than the 2012 national rate (23 vs. 565 cases per 100,000 persons,

respectively).⁶ Reasons for this discrepancy likely include both lower true exposure incidence, since some common sources of lead exposure that exist in the contiguous U.S. are not frequently encountered in Alaska,⁵ and the lower lead screening rate in Alaska compared to the U.S. overall (1.4% vs. 10% in 2012, respectively).⁶

Reasons for the higher prevalence of elevated BLL among children aged <18 years in the Southwest region are unknown, but might include higher routine screening rates and/or more frequent use of bullets containing lead shot for hunting game. This information gap is due largely to the fact that the Alaska lead surveillance system is passive—it tracks and characterizes testing results from patients who are screened by providers for clinical or policy-related reasons. Moreover, it is often difficult for surveillance staff to obtain exposure information necessary for performing regional risk analyses because many of the BLL reports SOE receives lack key reportable information, such as community of residence and provider’s name.

Table. Median and Elevated (≥5 µg/dL) BLLs among Children Aged <18 Years, by Region — Alaska, 2007–2012

Region	% Pop. ⁷ Tested (#)	Median BLL in µg/dL (Range)	Elevated BLL Rate per 100,000 ⁷ (#)
Anch/Mat-Su	1.6% (1631)	3.0 (0–14)	66 (67)
Gulf Coast	0.8% (165)	1.9 (0.3–10.3)	31 (6)
Interior	3.3% (961)	2.0 (0–26.7)	73 (21)
Northern	1.6% (134)	1.8 (0.4–5.3)	12 (1)
Southeast	4.3% (726)	2.0 (0–33.2)	84 (14)
Southwest	7.9% (1008)	1.6 (0.3–19.6)	281 (36)
Unknown	410	2.0 (0.1–36.9)	19 (35)
Total	2.7% (5035)	3.0 (0–36.9)	96 (180)

Recommendations

1. Health care providers should assess all children aged <18 years, particularly those <6 years, for potential exposures to lead and offer BLL testing to those with ≥1 risk factor; a lead exposure tool is available on the EPHP website.⁷
2. Health care providers and laboratories are required to report all BLLs to SOE and *include the patient’s date of birth, sex, race, and community of residence, as well as the provider’s name*. Reporting of levels above 5 µg/dL in children aged <18 years and levels above 10 µg/dL for adults ≥18 years of age is required within 1 week of receiving the result. All other levels are required within 4 weeks of receiving the result. The report form is available at: <http://www.epi.alaska.gov/pubs/conditions>

References

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