State of Alaska Epidemiology **Bulletin**

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Adult Blood Lead Epidemiology and Surveillance: Occupational Exposures — Alaska, 2007–2014

Background

Occupational lead exposure is an important public health problem in the United States. Adults who are chronically exposed to lead are at risk for developing cardiovascular, central nervous, hematologic, renal, and reproductive system damage. In Alaska, health care providers are required to report all blood lead levels (BLL) ≥5 µg/dL for persons aged <18 years and ≥10 µg/dL for adults to the Section of Epidemiology (SOE); laboratories are required to report all BLLs to SOE. Similar to nationwide observations, the vast majority of elevated BLLs in Alaska have occurred in occupationally-exposed adults.[1] The Occupational Safety and Health Administration (OSHA) requires biannual BLL testing for employees potentially exposed to lead in the workplace, and those employees having a BLL ≥40 µg/dL are required to be tested every 2 months, until two consecutive analyses show a BLL <40 µg/dL.[2] OSHA advises that BLLs of all workers who intend to have children should be maintained below 30 µg/dL to minimize adverse reproductive health effects to the parents and developmental health effects to the fetus.[3]

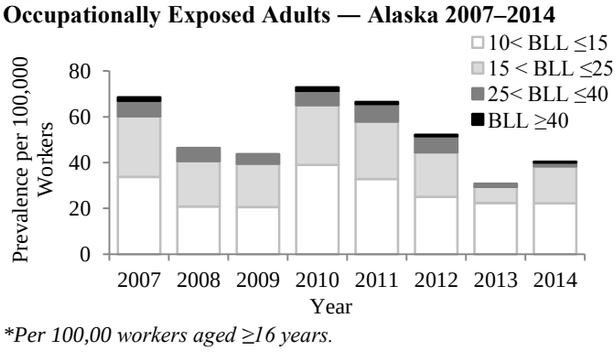
Methods

Reports were reviewed on all persons aged ≥16 years with a BLL ≥10 µg/dL for whom occupational status was known during 2007–2014. To avoid duplication, only the highest BLL per worker for each calendar year was included in the analysis. Data from women of childbearing age (WCBA; i.e., women aged 16–45 years) were analyzed as a subset. Follow-up interviews were performed by SOE staff on adults with BLLs ≥25 µg/dL when no place of employment was listed in the report and for adults with BLLs ≥40 µg/dL when tested by an employer. The type of occupational exposure was determined by place of work listed on the laboratory report or as identified during follow-up interviews. We calculated prevalence rates for workers having BLLs ≥10, 15, 25, and 40 µg/dL. Alaska prevalence rates were calculated based on U.S. Bureau of Labor Statistics (BLS) population data.

Results

During 2007–2014, SOE received 8,927 adult BLL reports involving 5,163 persons; of whom, 1,715 (33%) worked in settings that put them at risk for lead exposure. A total of 3,408 BLL measurements were obtained on these 1,715 workers. Of the 3,408 measurements, 1,412 (41%) were ≥10 µg/dL, 153 (4%) were ≥25 µg/dL, and 16 (0.5%) were ≥40 µg/dL. Of the 1,412 measurements ≥10 µg/dL, 1,288 (91%) were from men (representing 671 different men), and 31 (2%) were from WCBA (representing 19 different women). There was no clear trend in the prevalence rates of elevated BLLs over time (Figure). Almost 80% of BLLs ≥25 µg/dL were obtained from persons working in the mining industry (Table). Of the 16 workers with BLLs ≥40 µg/dL, 12 worked in mining and four worked in laboratories. After retesting, all 16 workers were found to have BLLs <40 µg/dL.

Figure. Prevalence* of Elevated BLL (µg/dL) for Occupationally Exposed Adults — Alaska 2007–2014



**Per 100,00 workers aged ≥16 years.*

Table. Industry Sectors with Blood Lead Levels ≥25 µg/dL — Alaska, 2007–2014

Occupational Setting	No. of BLLs	%
Lead ore and zinc ore mining	107	70
Silver ore mining	12	8
Test laboratories	12	8
Firing Ranges	11	7
Remediation services	3	2
Other automotive, mechanical, electrical repair and maintenance	3	2
Gold mining	2	1
Port and harbor operations	2	1
Dental office/clinic	1	1
Total	153	100

Discussion

During 2007–2014, the vast majority of occupational BLLs ≥25 µg/dL were in males working in the mining industry.

Under the current OSHA regulations, BLLs <40 µg/dL do not warrant any type of follow-up or protective measures, even though they could still cause adverse health effects.[4] This is particularly concerning for WCBA because lead readily crosses the placental barrier, causing maternal and fetal BLLs to be nearly identical, and in utero exposure to maternal BLLs <10 µg/dL has been associatied with risk of preterm birth and subsequent childhood developmental problems.[4,5] In the current review, 19 Alaska WCBA had a BLL ≥10 µg/dL.

Because some workers with lead exposure might not be tested or their tests might not be reported to SOE, these data are a minimum estimate of the true magnitude of elevated adult BLLs from occupational exposure in Alaska. Moreover, lack of denominator data for occupational categories precluded our ability to determine job-specific elevated BLL rates.

Recommendations

1. Health care providers should offer BLL testing to patients with potential occupational exposure to lead (Table) who are not being regularly tested by their employer.
2. Health care providers should offer BLL testing to WCBA who may become pregnant if they have any risk factors for lead exposure.
3. Employers should work to minimize lead exposures leading to BLLs >10 µg/dL and to eliminate lead exposures leading to BLLs ≥25 µg/dL, especially in WCBA.
4. Employers should provide workers with information on how to prevent carrying lead dust into their home, which could result in the secondary exposure of their families.
5. Health care providers and laboratories should report all BLLs to SOE by phone (800-478-1700) or regular mail (3601 C St, Suite 540, Anchorage, AK 99503).

References

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