State of Alaska Epidemiology Bulletin

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Adult Blood Lead Testing Trends — Alaska 2019–2023

Background

Lead exposure in adults is associated with acute and chronic health effects, primarily affecting the nervous system.[1] Pregnant and lactating women can also transmit harmful levels of lead to developing fetuses and infants.[2]

In 2021, the Centers for Disease Control and Prevention (CDC) revised the blood lead reference value (BLRV) for children and adults, based on updated data from the National Health and Nutrition Examination Survey (NHANES). CDC calculated the 97.5th percentile level in adults, which resulted in a decrease in the adult BLRV from 5.0 µg/dL to 3.5 µg/dL.[3]

Lead testing for adults is typically initiated when lead exposure is suspected or when required by an employer. In Alaska, common sources of adult lead exposure include occupational settings, consumption of game meat harvested with lead ammunition, casting lead for ammunition. This *Bulletin* outlines trends in blood lead level (BLL) testing among adults in Alaska during 2019–2023 and offers screening, testing, and reporting guidance.

Methods

The Alaska Section of Epidemiology (SOE) National Electronic Disease Surveillance System Base System (NBS) was queried to obtain BLL test results for adults aged ≥18 years during 2019–2023. To supplement these data, records from a local historical database were also included. The historical database contains reports submitted prior to October 2019, before SOE transitioned to using NBS for managing reportable conditions data. Urine lead samples and data from patients residing outside Alaska or patients with unknown state of residence were excluded from the analysis.

Results

During 2019–2023, a total of 9,953 blood lead level (BLL) tests were conducted among Alaska adults. The highest number of tests occurred in 2019 (2,776 tests completed). This was followed by a decline in testing during the next 3 years: 1,551 tests in 2020, 1,536 in 2021, and 1,673 in 2022. In 2023, testing levels began to approach pre-pandemic levels, with 2,417 tests conducted. Among those tested, the percentage of individuals with elevated blood lead levels (EBLL; tests at or above 3.5 µg/dL) decreased from 35% (n=718) in 2019 to 30% (n=484) in 2023. Testing volume varied by region, with the Anchorage/Matanuska-Susitna and Southeast regions accounting for 86% of all BLL tests conducted. Most (5,163; 74%) BLL tests were conducted on males; 70% (n=5,227) of tests were on males aged 18–50 years (Table).

Discussion

Lead testing decreased in Alaska during the COVID-19 pandemic and rebounded in 2023. The decline in testing during the pandemic was primarily driven by disruptions in healthcare access, prioritization of COVID-related care, and changes in patient behavior.

During 2019–2023, testing was predominantly carried out by facilities in the Anchorage/Matanuska-Susitna and Southeast regions, mostly among working-age males. This resulted in a notable gender gap in the available adult blood lead data. The gender disparity is likely influenced by the fact that more males are employed in industries with a known history of occupational lead exposure, such as resource extraction.[4] For people working in lead-exposure-prone jobs, the Occupational Safety and Health Administration (OSHA) mandates that employers conduct regular blood lead testing.[5] However, this focus on male workers highlights a gap in understanding regarding lead exposure among women, particularly given the significant risks that lead exposure poses to fetuses and infants.

To better understand the various pathways of lead exposure, the Alaska Environmental Health Program updated the Confidential Heavy and Toxic Metals Reporting Form to include an occupation field. Previous investigations revealed instances where blood lead tests were misclassified as occupation-related, even when the exposure was non-occupational. To enhance the accuracy of the data, further validation of coding practices is needed, along with targeted investigations into the blood lead tests conducted during 2019–2023. This will help ensure a more complete and accurate picture of lead exposure in Alaska's adult population.

Recommendations

1. Clinicians should offer BLL screening to patients with potential lead exposure who are not regularly tested by their employers.
2. Clinicians should follow the American College of Obstetricians and Gynecologists guidelines, which recommend evaluating lead exposure risk factors as part of a comprehensive health assessment during pregnancy and while lactating. Lead screening should be conducted if one or more risk factors are identified through the assessment.
3. Clinicians should ensure appropriate coding when submitting BLL tests to SOE and include occupation or relevant notes with specimen submissions.
4. Report all BLL results (positive and negative) to SOE electronically or via fax (907-561-4239).[6]

References

1. Agency for Toxic Substances and Disease Registry. Toxicological Profile for Lead. Last reviewed August 9, 2024.
2. CDC. Guidelines for the identification and management of lead exposure in pregnant and lactating women. (2021)
3. Council of State and Territorial Epidemiologists. (2022). Public health reporting and national notification for elevated blood lead levels.
4. U.S. Bureau of Labor Statistics. *Geographic profile*. https://www.bls.gov/opub/geographic-profile/home.htm Last reviewed September 5, 2024.
5. Occupational Health and Safety Administration (OSHA). Lead. Last reviewed August 9, 2024.
6. SOE. Heavy Metal and Toxic Exposure Report Form. Available at: https://health.alaska.gov/dph/Epi/eph/Documents/lead/frmHeavyMetals.pdf

Table. Number of Male Adult BLL Reports Received and Percentage of the Annual Total, by Age — Alaska, 2019–2023

Year	18–28	29–39	40–50	51–61	62–72	72+	Total
2019	401 (19.7%)	651 (31.9%)	405 (19.9%)	389 (19.1%)	160 (7.8%)	34 (1.7%)	2040
2020	223 (18.3%)	363 (29.9%)	259 (21.2%)	257 (21.2%)	86 (7.1%)	25 (2.1%)	1213
2021	212 (17.7%)	366 (30.5%)	260 (21.7%)	199 (16.6%)	129 (10.7%)	35 (2.9%)	1201
2022	206 (16.4%)	385 (30.7%)	266 (21.2%)	243 (19.4%)	108 (8.6%)	48 (3.8%)	1256
2023	289 (16.2%	501 (28.1%)	440 (24.7%)	330 (18.5%)	175 (9.8%)	52 (2.9%)	1781
Total	1331 (17.6%)	2266 (30.2%)	1630 (21.7%)	1418 (18.9%)	658 (8.8%)	194 (2.6%)	7497

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