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## The Epidemiology of Non-Occupational Adult Blood Lead Levels — Alaska, 1996–2015

### Background

Adults can be exposed to lead through multiple non-occupational pathways, such as shooting firearms with lead shot, casting lead bullets or fishing weights, applying unregulated cosmetics, and consuming contaminated food or water. The Centers for Disease Control and Prevention (CDC) recommends that adult blood lead levels (BLLs) remain <10 µg/dL; however, BLLs <10 µg/dL can also result in adverse health outcomes, including decreased renal function, increased blood pressure, and tremors.<sup>1</sup> In addition, maternal BLLs <5 µg/dL have been associated with reduced fetal growth.<sup>1</sup> This *Bulletin* provides an overview of BLL trends among non-occupationally exposed adults in Alaska during 1996–2015.

### Methods

The Alaska Section of Epidemiology (SOE) evaluated all BLL reports for adults aged ≥16 years from 1996 (when BLL surveillance began in Alaska) through 2015. Adults get tested for lead if they or their provider suspects lead exposure. Persons without a North American Industry Classification System code in their record are classified as having non-occupational lead exposure. Only the highest BLL per person *per year* was included in calculations for median BLLs, and the regional numbers (Table). Only the highest BLL per person *per time period* was included to calculate the number of unique adults tested. SOE conducted follow-up investigations for adults with BLLs ≥25 µg/dL to determine the primary source of their lead exposure.<sup>2</sup>

### Results/Discussion

The biggest change in BLL reports between the two time periods was a dramatic decline in the number of persons with BLLs ≥10 µg/dL (from 400 to 193; Table); however, because lead testing in Alaska is not done systematically, time-period comparisons should be interpreted with caution.

During 2006–2015, the vast majority of people reported with elevated BLLs were men; however, more men than women were screened (3,274 vs. 1,313, respectively). The regional differences in the number of elevated BLL reports appear to be largely driven by population density. Rate comparisons were not calculated because of the unsystematic nature of lead testing in Alaska. Lastly, regional differences in exposure sources are poorly understood because exposure information is

only gleaned from a subset of persons with elevated BLLs (Table).

During both time periods, the most commonly identified non-occupational source of lead exposure in Alaska was shooting guns at indoor firing ranges, followed by loading one's own ammunition (Table). By comparison, the most common non-occupational sources of lead exposure in the United States are shooting firearms (i.e., target shooting), remodeling of older homes, and retained bullets.<sup>3</sup> Education about safe practices at firing ranges, loading ammunition, and making lead fishing weights could further reduce lead exposures in Alaska.

### Recommendations

1. Firing ranges should ensure that ventilation systems are operating correctly and follow industry cleaning standards.<sup>4</sup>
2. Persons who shoot at firing ranges should wash their hands and change clothing before leaving the facility or eating.
3. People should wear protective gloves, be in a well ventilated area, and wear a respirator mask while making their own lead fishing weights or loading their own ammunition.
4. Health care providers should offer BLL testing to pregnant and lactating women with at least one lead exposure risk factor,<sup>5</sup> and inform women who are pregnant or plan to become pregnant to take added care to avoid lead exposure due to the potentially severe adverse health effects of lead to the developing fetus.<sup>1</sup>
5. Providers and laboratories should report all BLLs to SOE by fax (907-561-4239), phone (800-478-1700), or regular mail (3601 C St, Suite 540, Anchorage, AK 99503).

### References

1. 2012 NTP Monograph on Health Effects of Low-Level Lead. Available at: <http://ntp.niehs.nih.gov/pubhealth/hat/noms/lead/index.html>
2. State of Alaska, Section of Epidemiology, Lead Surveillance Program. <http://dhss.alaska.gov/dph/Epi/eph/Pages/lead/default.aspx>
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4. Navy Environmental Health Center. Indoor firing ranges industrial hygiene technical guide. Available at: <http://www.med.navy.mil/sites/nmcphc/Documents/policy-and-instruction/ih-indoor-firing-ranges-technical-guide.pdf>
5. American College of Obstetricians and Gynecologists. Lead Screening during Pregnancy and Lactation. 2014. Available at: <http://www.acog.org/Resources-And-Publications/Committee-Opinions/Committee-on-Obstetric-Practice/Lead-Screening-During-Pregnancy-and-Lactation>

**Table. Characteristics of Adult BLL testing from 1996–2005 and 2006–2015**

	1996–2005	2006–2015
Number of BLL reports received	13,469	12,213
# of unique adults with non-occupational exposures who had a BLL ≥10 µg/dL	400	193
# of unique adults with non-occupational exposures who had a BLL ≥25 µg/dL	50	19
Median BLL ≥10 µg/dL (range)	15 (10–133)	15 (10–48)
<b>Characteristics of Persons with a BLL ≥10 µg/dL</b>	<b>n=400</b>	<b>n=193</b>
Number who were male (percent)	373 (93%)	174 (90%)
Mean age in years (range)	42 (16–84)	45 (16–84)
<b>Region</b>	<b># of BLL ≥10 µg/dL Reports Received (n/state total, %)</b>	
Anchorage/Mat-Su	Data Not Available (NA)	143/277 (52%)
Gulf Coast	NA	29/277 (10%)
Interior	NA	71/277 (26%)
Northern	NA	2/277 (1%)
Southwest	NA	27/277 (10%)
Southeast	NA	5/277 (2%)
<b>Exposures among Those with BLL ≥25 µg/dL</b>	<b>n=50</b>	<b>n=19</b>
Number (%) for whom exposure information available	14 (28%)	8 (42%)
-Shooting guns at indoor firing ranges	10	4
-Loading own ammunition	2	2
-Making own fishing weights	1	0
-Having a bullet lodged in the body	1	0
-Lead casting	0	1
-Shooting guns at an outdoor firing range	0	1