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## Lead Exposure among High School Rifle Team Members — Interior Alaska, 2007

### Background

In March 2007, the Environmental Public Health Program received a report that a high school student from an interior Alaska community (Community A) had an elevated blood lead level (BLL). The student participated on the school's rifle team, and could have been exposed to lead at the local indoor firing range.

CDC recognizes BLLs  $\geq 10 \mu\text{g/dL}$  in children aged  $\leq 6$  years (1) and  $\geq 25 \mu\text{g/dL}$  in adults (2) as levels of concern, although no similar level has been set by CDC for older children and adolescents. The Alaska Section of Epidemiology uses  $\geq 10 \mu\text{g/dl}$  as the level of concern for all children and adolescents in Alaska.

### Methods

On March 29, 2007, a health assessor and a public health nurse visited Community A to conduct an onsite investigation. Free blood lead testing was offered to all of the rifle team shooters. Each person tested was asked to complete a short questionnaire. The Alaska State Public Health Laboratory in Anchorage performed the lead analyses.

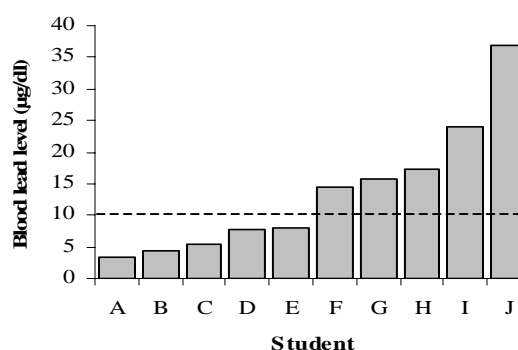
### Results

Ten of the 13 rifle team members agreed to participate, and five (50%) had an elevated BLL (Figure). Four students who had not shot at the range since late November 2006 or earlier had an average BLL of  $5.3 \mu\text{g/dL}$ ; by comparison, the six students who had shot at the range more recently had an average BLL of  $19 \mu\text{g/dL}$  (2-tailed t-test;  $p=0.03$ ). All 10 students reported that they helped clean the range and engaged in dry sweeping.

### Discussion

This investigation demonstrates that recent exposure to an indoor firing range was associated with higher BLLs among adolescent student rifle team members from Community A. A previous study in Alaska found that participation on a school rifle team increased the risk of lead exposure, and dry sweeping increased the risk of having an elevated BLL (3). One indoor shooting range with a modern, well-maintained ventilation system, a written maintenance protocol and no dry sweeping did not have BLL elevations among student shooters, while four ranges without these best practices did have student shooters with elevated BLLs (3). Dry sweeping disperses lead dust into the air where it can remain suspended for hours. Standard industrial hygiene practices for indoor firing range maintenance indicate that dry sweeping should be prohibited (4).

**Figure. Blood Lead Levels of Ten Community A High School Rifle Team Members** (The dashed line below represents the level of concern for children and adolescents in Alaska.)



### Recommendations

1. The Community A school district should hire a lead risk assessor to evaluate the ventilation system, maintenance practices, and extent of lead contamination at the range.
2. All indoor shooting ranges in Alaska should prohibit dry sweeping. Instead, adult employees should clean ranges using appropriate practices for the industry (4).
3. Children aged  $<18$  years should not assist with cleaning indoor shooting ranges (3).
4. All student shooters in Alaska using lead ammunition at indoor firing ranges should have their blood lead level tested at the beginning, middle and end of each shooting season every year, as standard practice for the sport.
5. Health care providers should consider chelation therapy for young children with BLLs  $\geq 45 \mu\text{g/dl}$  (5).

### References

1. Centers for Disease Control and Prevention. Screening young children for lead poisoning: guidance for state and local public health officials. Atlanta, GA: US Department of Health and Human Services, CDC; 1997.
2. Centers for Disease Control and Prevention. Adult blood lead epidemiology and surveillance - United States, 1998-2001. In: Surveillance Summaries, December 13, 2002. MMWR 2002; 51 (No. SS-11):1-10.
3. Lynn T, Arnold S, Wood C, Castrodale L, Middaugh J, Chimonas M. Lead exposure from indoor firing ranges among students on shooting teams - Alaska, 2002-2004. MMWR. 2005;54:577-579.
4. Navy Environmental Health Center. Indoor firing ranges industrial hygiene technical guide. Portsmouth, VA: Department of the Navy, Navy Environmental Health Center; 2002. TM6290.99-10 Rev. 1.
5. Centers for Disease Control and Prevention. Managing elevated blood lead levels among young children: Recommendations from the Advisory Committee on Childhood Lead Poisoning Prevention. Atlanta, GA: US Department of Health and Human Services, CDC; 2002.