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No Lead Problem in Port Graham

Elevated blood lead levels among children in Alaska have been found infrequently. Because high lead concentrations were detected in water samples from the school in Port Graham, the Section of Epidemiology conducted an investigation to determine if any residents of the village had an elevated blood lead level.

Background: Port Graham had a 1990 census of 166 persons. The predominantly Alaska Native village is located on the lower Cook Inlet, south of Homer. In December 1993, routine water testing found that the lead level in the school water sample was 0.77 mg/L. The U.S. Environmental Protection Agency (EPA) "action level" for lead in drinking water is 0.015 mg/L. The lead concentrations of follow-up water samples collected at the school gymnasium and kitchen during January 1994 were 1.75 mg/L and 0.18 mg/L, respectively. After being notified of the elevated lead levels, the school obtained water for drinking and cooking from a source known to have a lead level less than the EPA action level.

Methods: On March 8, staff from the Section of Epidemiology and Chugachmiut (the Alaska Native health corporation for the region) travelled to Port Graham to collect blood specimens for lead testing from interested villagers. An information letter had previously been sent to all parents encouraging them to have their children tested. Venous blood specimens were collected using standard techniques with lead-free blood tubes. All specimens were submitted to ESA Laboratories, Inc. (Bedford, MA) for determination of blood lead using the graphite furnace method. In order to calculate mean blood lead levels, we considered the blood lead level of persons who had a reported blood lead level of <1 µg/dL to be 0.9 µg/dL.

During our visit, an Environmental Health Specialist from the Indian Health Service collected five serial water samples from a kitchen faucet at the school. After taking the first sample, the faucet was allowed to run continuously and a sample was taken every 30 minutes. Specimens were sent to Northern Testing Laboratories, Inc. (Fairbanks) for determination of the lead concentration.

Results: Overall, 82 residents--including 30 (77%) of the 39 children enrolled in the school, all 9 full-time school employees, and 2 of 3 part-time school employees--were tested. Blood lead levels were low; the highest levels among children and school employees were 5 µg/dL and 6 µg/dL, respectively (Table 1). One adult (not a school employee) had a blood lead level of 22 µg/dL; no specific source for this person's exposure was identified. The water tests demonstrated a high initial lead level (0.128 mg/L) which dropped to much lower levels in serial samples (0.002-0.005 mg/L).

Group	Number tested	Geometric mean (µg/dL)	Mean (µg/dL)
Children (<18 years)			
Enrolled in school	30	1.4	1.6
Other	10	2.6	2.8
Subtotal	40	1.6	1.9
Adults (≥18 years)			
School employees	11	3.2	3.5
Other	31	3.2	4.2
Subtotal	42	3.2	4.0
Total	82	2.3	3.0

For children less than 6 years old, the U.S. Centers for Disease Control and Prevention recommends that a blood lead level of ≥ 10 µg/dL be considered elevated. For adults, blood lead is not considered elevated until the level is at least 25 µg/dL.

Discussion: Elevated lead levels in the water at Port Graham School did not result in elevated blood lead levels. Approximately half of the town's population were tested. No children or school employees had a blood lead level greater than 6 µg/dL.

There are at least two explanations for these findings. First, elevated lead levels in water were transient and present only after the system was unused for a period of time. A very low lead concentration was reached after 30 minutes of flow. It is likely that low lead levels are reached much sooner than this. Second, the EPA "action level" was deliberately set very conservatively in order to reduce the contribution of drinking water to human ingestion of lead. Other sources--such as paint, soil, air, dust, and food--are

probably much more important contributors to blood lead.

Our findings should provide reassurance to persons living in other communities in Alaska where the EPA "action level" for lead in drinking water has been exceeded. According to the Alaska Department of Environmental Conservation (DEC), numerous water systems exceed the EPA lead standard--although none are as high as the levels measured at the Port Graham School. DEC data suggest that background lead concentrations in source water supplies are low. Contamination results from leaching of lead from pipes, fixtures, or other components of building plumbing systems. High lead levels probably occur only transiently and, as we demonstrated in Port Graham, do not constitute a health risk.

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