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## Fish and Human Mercury Biomonitoring Evaluation — Homer and Seward, 2006

### Background

The current evaluation is an extension of the collaborative fish and human mercury biomonitoring programs of the Alaska Department of Environmental Conservation and the Alaska Section of Epidemiology, respectively. Before this evaluation, Alaska Human Biomonitoring Program participants had never been asked questions regarding their fish consumption rates.

### Methods

A non-randomized convenience sample was used with recruitment of participants from Homer and Seward during May to September 2006 from businesses, groups, and organizations. Any Alaskan resident over the age of 18 years was allowed to participate. In addition to donating a hair sample, participants were asked to complete a questionnaire regarding their consumption rates in meals per week or month for fish species most frequently consumed in Alaska (to request a copy of this questionnaire, call Dr. Verbrugge at 907-269-8000). Fish samples from Homer and Seward were collected from returning fishermen from May to September 2006. Hair and fish mercury analyses were conducted by the Alaska State Public Health Laboratory and the Department of Environmental Conservation Environmental Health Laboratory. This evaluation was approved by the University of Alaska Anchorage Institutional Review Board.

### Results

Among the 273 participants in the study, the mean hair mercury level was 0.80 ppm (range, 0.01–6.94). One participant had a hair mercury level above 5 ppm (the Section of Epidemiology cutoff level of concern for follow-up). For both salmon and halibut, the median category for number of meals eaten was one per week. The median categories for all other Alaska fish species evaluated (black rockfish, yelloweye rockfish, other rockfish, lingcod, salmon shark, dogfish shark, northern pike, dolly varden and rainbow trout) were zero meals per month. Fish consumption rates were higher among males than females for black rockfish ( $p < 0.01$ ) and dolly varden ( $p < 0.05$ ). The mean hair mercury level was higher for males (1.03 ppm vs. 0.70 ppm;  $p < 0.01$ ).

A total of 110 fish samples were collected. The mean mercury concentration within individual species sampled in this study ranged from 0.04 ppm

in silver salmon to 1.25 ppm in salmon shark (Figure). The elevated mercury concentration in salmon shark may not be representative of Alaska salmon shark in general because only one sample was collected during this study. Species type and fish size (regardless of species) were independently associated with fish tissue mercury concentrations. When stratified by species, the strongest correlations with size were seen for yelloweye rockfish, halibut, and lingcod, in that order.

### Discussion

This study suggests that among adults living in Homer and Seward, fish consumption during 2006 was not associated with mercury exposures of health concern. One individual had an elevated hair mercury level. Segmental hair sample analysis for this person determined that elevated levels corresponded to a time when the individual was living on a tropical island and eating local swordfish and marlin as dietary staples.

Compared to females, males had higher fish consumption rates and hair mercury levels. However, mean hair mercury levels among both sexes were well below the 5 ppm cutoff level of concern.

The observed correlations between fish size and fish tissue mercury concentration within species confirm that older fish and those that occupy the top of the food chain (such as salmon shark) have higher mercury concentrations than younger and prey-species fish. The Section of Epidemiology will release updated fish consumption guidelines for Alaska-caught fish this summer.

**Figure. Mean Total Mercury by Fish Species Sampled**

