

*State of Alaska
Epidemiology*



Bulletin

**Recommendations
and
Reports**

Department of Health and Social Services
Joel Gilbertson, Commissioner

Division of Public Health
Karen Pearson, Director

Section of Epidemiology
John Middaugh, MD, Editor

3601 C Street, Suite 540, PO Box 240249, Anchorage, Alaska 99524-0249 (907) 269-8000
24-Hour Emergency Number 1-800-478-0084 <http://www.akepi.org>

Volume No. 7 Number 1
February 6, 2003

PCB Blood Test Results from St. Lawrence Island

Recommendations for Consumption of Traditional Foods

Statement from the Alaska Division of Public Health

Contributed by: Lori Verbrugge, Ph.D.
Tracey Lynn, D.V.M., M.S.
John Middaugh, M.D.
Scott Arnold, Ph.D.

Introduction

Recently, the Alaska Community Action on Toxics (ACAT) released a report entitled “Contaminants in Wildlife and People of St. Lawrence Island, Alaska: A Report to the Communities of Savoonga and Gambell.” ACAT issued a related press release on October 2, 2002, entitled “Elevated Levels of Harmful PCB’s Found in People of Saint Lawrence Island, Attributed to Exposure at Military Site.” This resulted in a front page article in the Anchorage Daily News (“Toxic PCB levels soar above norm in St. Lawrence Island Natives,” Anchorage Daily News, October 3, 2002) and other media coverage.

Researchers for the project from the State University of New York shared their data from human blood tests with the Alaska Division of Public Health (ADPH), enabling us to examine their results. Our review of the data has led us to conclude that the polychlorinated biphenyl (PCB) concentrations detected in St. Lawrence Island village residents are similar to other Alaska Native populations that have been assessed, as well as to other arctic populations (AMAP, 1998).

The ADPH is concerned that the media coverage associated with ACAT’s report may lead St. Lawrence Island residents and other Alaska residents to fear that their traditional foods are contaminated and unsafe to eat. Subsistence diets rich in fish and marine mammals offer numerous health, social, cultural, and economic benefits. Proven health benefits include protection from cardiovascular disease and diabetes, and improved maternal nutrition and neonatal and infant brain development. In the judgment of the ADPH, as well as the larger international arctic scientific community (AMAP, 1998), the known benefits of fish and marine mammal consumption far outweigh the controversial potential adverse health effects from contaminants found in those foods. We have also reviewed the wildlife data presented in the ACAT report and agree with the report’s statement that “St. Lawrence Island foods are generally much less contaminated than foods from other areas of the Arctic.”

The ADPH supports the clean-up of military contamination on Northeast Cape. The purpose of this Bulletin is to provide a balanced and thorough evaluation of the PCB blood test results from St. Lawrence Island residents to clarify issues related to the public health interpretation of the data.

Public Health Evaluation

The ADPH assembled a team of scientists including medical epidemiologists and toxicologists to review the data from the study and to provide interpretation and public health advice to the communities on St. Lawrence Island.

Due to the known characteristics of PCBs, higher concentrations are expected in older individuals compared to younger persons. In order to provide the appropriate context for the PCB concentrations detected in residents of St. Lawrence Island, comparisons must be made between persons of the same sex and age. Media statements that PCBs “soar above norm” in St. Lawrence residents were based on comparisons to dissimilar populations. For example:

- The ACAT report states that “women from St. Lawrence Island had significantly higher PCB concentrations (7–9 ppb) than women from the Aleutian and Pribilof Islands (2 ppb).” It is important to note that the cited Aleutian/Pribilof Island data were from women of childbearing age, while the St. Lawrence Island study focused on older people (the women’s ages were 38–75 years). Therefore, no scientifically sound comparison can be made between these particular groups;
- Similarly, the St. Lawrence Island data cannot be directly compared with the United States national average of 0.9–1.5 ppb (parts per billion). The national average encompassed a younger age distribution and did not include groups that rely on subsistence foods.

When the St. Lawrence Island data are compared with data from other studies of Alaska Natives of the same sex and age, the results are similar. For example:

- When the PCB concentrations detected in the blood of St. Lawrence Island residents are individually plotted by age, they fall within the range of values measured in Aleutian/Pribilof Island residents (Middaugh et al, 2001) (Figure 1). The mean concentration of PCBs in St. Lawrence Island residents over 35 years of age is not significantly different from the mean concentration of PCBs in Aleutian/Pribilof Island residents over 35 years of age ($p = 0.08$, t-test with unequal variances; Figure 2). Descriptive statistics for the two studies are presented in Table 1.
- PCB concentrations detected in St. Lawrence Island women (mean age 54 years; mean PCB concentration 6.84 ppb) were similar to the mean PCB concentration reported for 131 Alaska Native women of comparable age from throughout the state (mean age 57 years; mean PCB concentration 7.56 ppb) (Rubin et al, 2001) (Figure 3).

Figure 1. Comparison of PCB blood test results from 5 Aleutian/Pribilof Island Villages (1999) and St. Lawrence Island (2002).

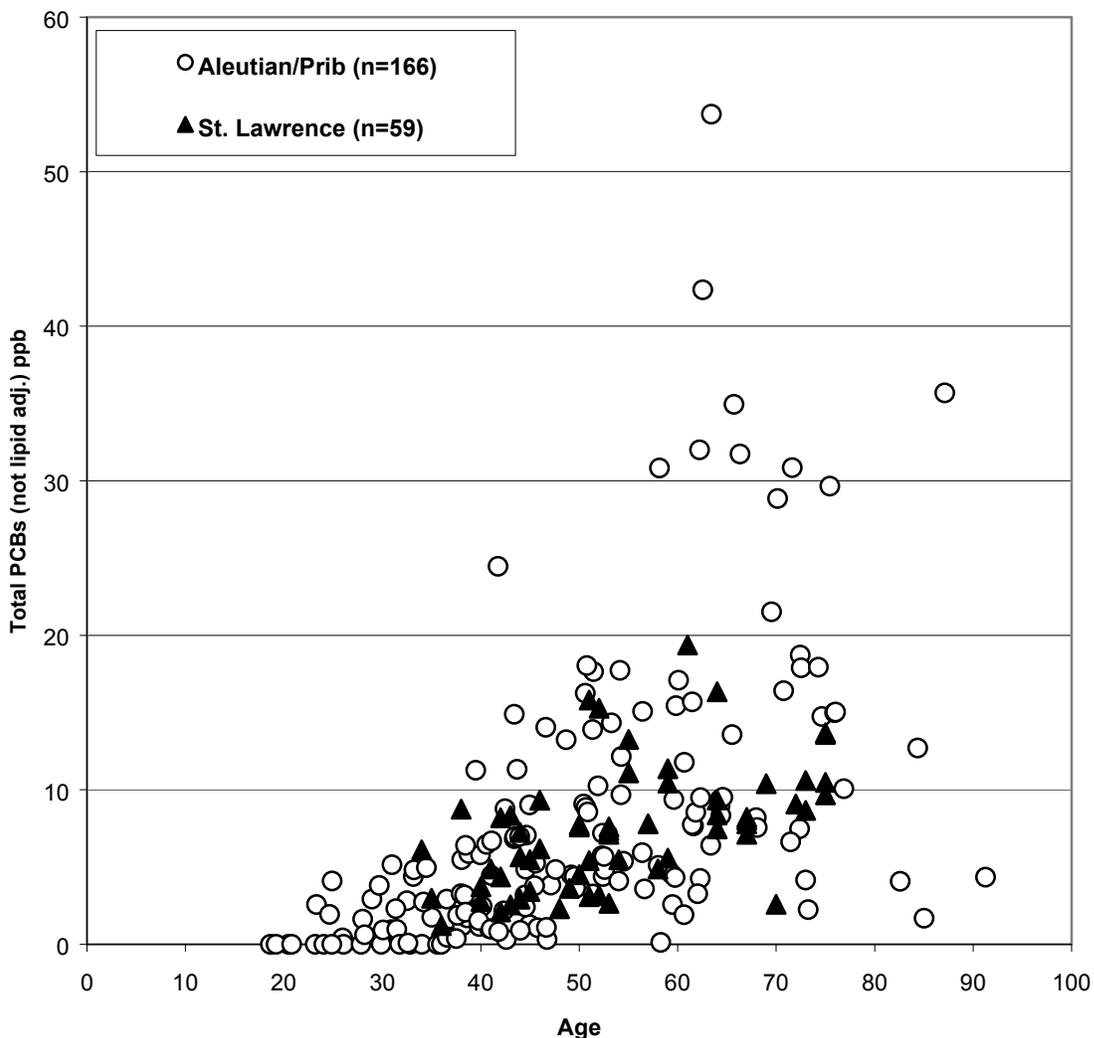


Figure 2. Comparison of PCB blood test results from persons 35 years and older from 5 Aleutian/Pribilof Island Villages (1999) and St. Lawrence Island (2002).

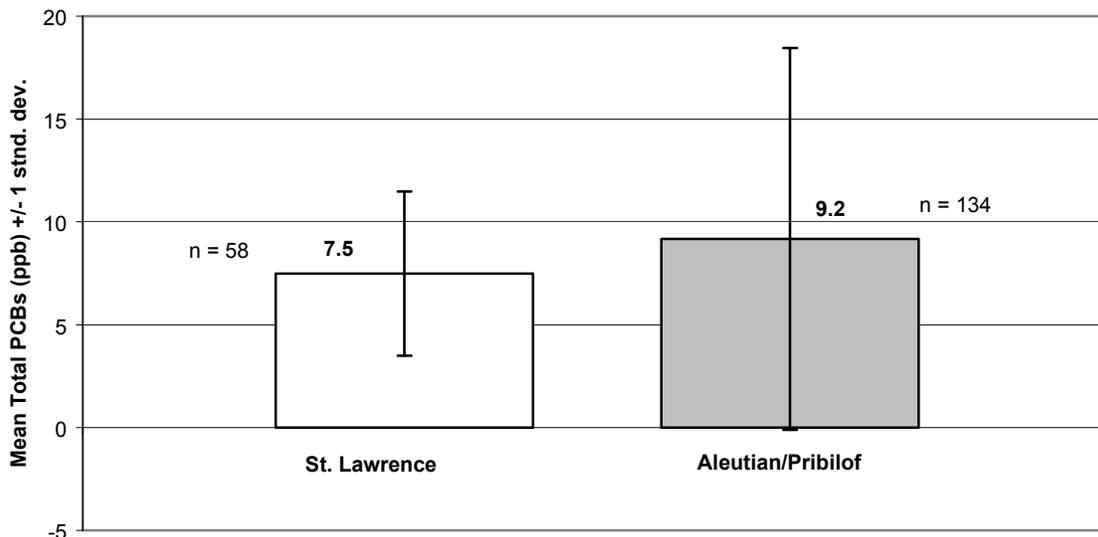


Figure 3. Comparison of PCB blood test results in St. Lawrence Island women and other Alaska Native women of similar age.

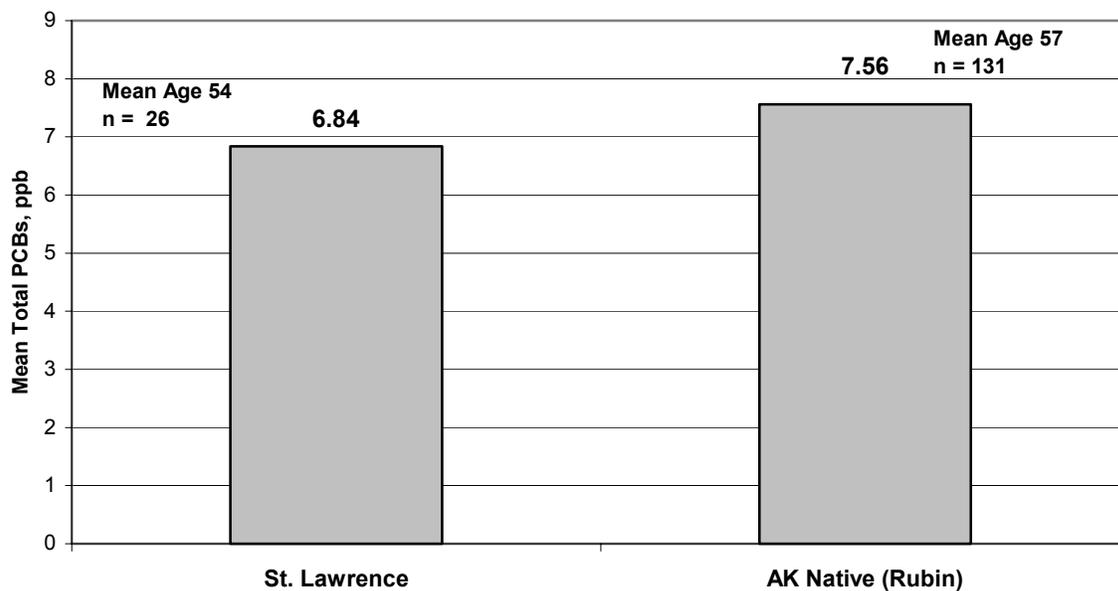


Table 1. Summary of Total PCBs (ppb, not lipid adj.) from St. Lawrence Island and 5 Aleutian/Pribilof Island Villages.

Age group	MEN						WOMEN					
	St. Lawrence			Aleutian/Pribilof			St. Lawrence			Aleutian/Pribilof		
	Mean	Median	n	Mean	Median	n	Mean	Median	n	Mean	Median	n
25-34	6.1	6.1	1	2.2	1.6	13			0	1.2	0.4	9
35-44	4.3	4.4	7	4.7	3.2	21	5.0	3.7	7	4.0	2.3	25
45-54	6.6	5.8	10	8.7	7.9	14	6.4	5.4	9	7.5	5.4	19
55-64	11.1	10.8	8	13.4	8.5	17	9.1	8.9	4	10.6	8.3	12
65-74	9.4	9.5	4	12.1	14.7	9	7.0	8.0	5	21.8	23.8	8
75+	11.3	10.5	3	16.6	15.0	5	13.6	13.6	1	11.4	7.1	4

The atmospheric transport and deposition of man-made pollutants to the circumpolar region is well documented (AMAP, 1998). As described above, the PCB blood concentrations detected in the tested St. Lawrence Island residents are similar to other subsistence-reliant people throughout Alaska. Therefore, it is likely that a major source of PCB exposure at St. Lawrence Island is from global contamination through the food chain. The ADPH does not find sufficient evidence in the ACAT report to support its conclusion that the concentrations of PCBs detected in the blood of St. Lawrence Island residents are a result of exposures specifically at Northeast Cape.

ACAT’s study was designed to be a preliminary assessment of PCB concentrations in older residents of St. Lawrence Island. As such, it cannot support generalized comparisons among the three St. Lawrence Island groups studied for the following reasons:

- The subjects were not randomly selected, and older persons were preferentially tested. Conclusions can not be extrapolated to the younger age groups that were not sampled;
- The number of persons studied is very small. In many of the location-specific age-groups, there were no persons, or only one or two, and the maximum number tested in any location-, age- and sex-specific group was only 6 persons;
- The magnitude of the mean differences between the 3 location-specific groups is small, and therefore unlikely to be of biological significance.

The press release of October 2, 2002 reported that “the presence of a non-persistent PCB congener in the blood of several people with camps at Northeast Cape indicates on-going exposure.” While intriguing, the identity of the detected chemical, tentatively identified as PCB 22, has not yet been confirmed by definitive mass spectrometry methods; in addition environmental media have not been examined for this chemical in order to investigate potential sources or pathways of exposure. More information is needed, including verification of the chemical’s identity, before anyone can draw conclusions about the public health implications of its presence in some members of the Northeast Cape group. If the chemical’s identity is verified to be PCB 22, it should be noted that this congener has been identified in water and zooplankton in other areas of the Alaskan and Canadian Arctic (Hoekstra et al. 2002).

One goal of public health is to evaluate the potential for adverse health effects in the most sensitive members of the population. As with many chemicals, the developing fetus is the most sensitive to the potentially harmful effects of PCBs. In the Aleutian/Pribilof Islands, we found low concentrations of PCBs in women of childbearing age (median 2 ppb), and we would predict that concentrations in younger women (and men) on St. Lawrence Island would be similarly low.

Breast-feeding provides optimal infant nutrition, enhances the infant immune system, and promotes strong mother-child bonding (WHO, 2002). The ADPH agrees with the World Health Organization and other health experts that the known benefits of breast-feeding far outweigh the theoretical risks associated with exposure to trace contaminants in breast milk. The results of a recent study of Alaska Native infants living in the Yukon-Kuskokwim River Delta, where traditional foods are heavily used, highlights one of the many benefits of breastfeeding. The risk of severe respiratory syncytial virus disease was significantly reduced in infants who were breast-fed (Bulkow et al. 2002). ADPH strongly encourages the women of St. Lawrence Island to breast-feed their babies.

Conclusions and Recommendations

After reviewing (a) the available information on the benefits of traditional foods, (b) the controversial potential adverse health effects from contaminants at the concentrations found in those foods, and (c) the scientific evidence for health effects associated with PCB blood concentrations in the range detected in St. Lawrence Island residents, the ADPH provides the following conclusions and recommendations:

1. The ADPH supports the clean-up of military contamination on Northeast Cape as an important priority. As the State's regulatory authority, the Alaska Department of Environmental Conservation should continue to direct and guide clean-up activities at the site, including risk assessments, clean-up decisions, and remediation activities, with the continued collaboration of the communities of Gambell and Savoonga and the Norton Sound Health Corporation.
2. While the ADPH recognizes that it is ultimately up to each individual to make his or her own dietary choices, our goal is to provide balanced scientific information and public health expertise to help people make informed choices.

After reviewing the available information, the ADPH has determined that the PCB concentrations measured in St. Lawrence Island residents are unlikely to cause adverse health effects. While clear toxic effects have been demonstrated at high PCB doses, scientific controversy remains regarding possible subtle effects at low doses. However, the overall weight of evidence supports the conclusion that no adverse health effects would be expected at the PCB concentrations measured in this study. These concentrations are in the expected range for a population with a healthy northern subsistence lifestyle centered on fish and marine mammal consumption (AMAP, 1998). No further medical evaluation or follow-up associated with PCB exposure is warranted for any of the persons tested.

Subsistence diets rich in fish and marine mammals offer numerous health, social, cultural, and economic benefits. Proven health benefits include protection from cardiovascular disease and diabetes, and improved maternal nutrition and neonatal and infant brain development. Changes or restrictions in the subsistence diet of the villages are not justified or recommended. We recommend that St. Lawrence Island residents continue to consume their subsistence foods. The known benefits of fish and marine mammal consumption far outweigh the controversial potential adverse health effects from contaminants at the concentrations found in those foods.

3. The women of St. Lawrence Island are strongly encouraged to breast-feed their babies. Breast-feeding provides optimal infant nutrition, enhances the infant immune system, and promotes strong mother-child bonding (WHO, 2002). The ADPH agrees with the World Health Organization and other health experts that the known benefits of breast-feeding far outweigh the theoretical risks associated with exposure to trace contaminants in breast milk.

This statement has been endorsed by the following agencies and organizations:

Alaska Department of Environmental Conservation
Alaska Department of Health and Social Services
Alaska Native Tribal Health Consortium
Aleutian/Pribilof Islands Association, Inc.
North Slope Borough
University of Alaska Fairbanks

References

AMAP, 1998. AMAP Assessment Report: Arctic Pollution Issues. Arctic Monitoring and Assessment Programme (AMAP), Oslo, Norway. xii+859 pp.

Bulkow LR, Singleton RJ, Karron RA, and Harrison LH. 2002. Risk Factors for Severe Respiratory Syncytial Virus Infection Among Alaska Native Children. *Pediatrics* 109:210-216.

Department of Child and Adolescent Health and Development, World Health Organization. 2002. Child and Adolescent Health and Development Progress Report, 2000-2001. Available online at http://www.who.int/child-adolescent-health/New_Publications/Overview/WHO_FCH_CAH_02.19pdf (accessed January 29, 2003)

Hoekstra PF, O'Hara TM, Teixeira C, Backus S, Fisk AT, Muir DCG. 2002. Spatial trends and bioaccumulation of organochlorine pollutants in marine zooplankton from the Alaskan and Canadian Arctic. *Env Tox Chem* 21:575-583.

Middaugh J, Verbrugge L, Haars M, Schloss M, Yett G. Assessment of Exposure to Persistent Organic Pollutants (POPs) in 5 Aleutian and Pribilof Villages. Final Report, amended as of 12/27/01. State of Alaska Epidemiology *Bulletin*, Recommendations and Reports Vol. 5 No. 5, December 27 2001.

Rubin CH, Lanier A, Socha M, Brock JW, Kieszak S, Zahm S. 2001. Exposure to persistent organochlorines among Alaska Native women. *Int J Circumpolar Health* 60:157-169.

State of Alaska
Epidemiology



Bulletin

Recommendations
and
Reports

State of Alaska, Section of Epidemiology
PO Box 240249
Anchorage, AK 99524-0249

PRSR STD
U.S. POSTAGE
PAID
ANCHORAGE, AK
PERMIT NO. 1034