



Polychlorinated Biphenyls and Metabolic Diseases on St. Lawrence Island, Alaska

## Journal of Health Disparities Research and Practice

Volume 9  
Issue 5 *Special Issue - NIDDK STEP UP*

Article 91

© Center for Health Disparities Research, School of Public Health, University of Nevada, Las Vegas

2016

### Polychlorinated Biphenyls and Metabolic Diseases on St. Lawrence Island, Alaska

Jasmine Jemewouk

Pamela Miller, MS, PhD , *Alaska Community Action on Toxics*

Follow this and additional works at: <https://digitalscholarship.unlv.edu/jhdrp>



Part of the [Bilingual, Multilingual, and Multicultural Education Commons](#), [Community College Leadership Commons](#), [Higher Education Commons](#), [Immune System Diseases Commons](#), [Public Health Commons](#), [Translational Medical Research Commons](#), and the [Virus Diseases Commons](#)

#### Recommended Citation

Jemewouk, Jasmine and Miller, MS, PhD, Pamela (2016) "Polychlorinated Biphenyls and Metabolic Diseases on St. Lawrence Island, Alaska," *Journal of Health Disparities Research and Practice*: Vol. 9: Iss. 5, Article 91.

Available at: <https://digitalscholarship.unlv.edu/jhdrp/vol9/iss5/91>

This Article is protected by copyright and/or related rights. It has been brought to you by Digital Scholarship@UNLV with permission from the rights-holder(s). You are free to use this Article in any way that is permitted by the copyright and related rights legislation that applies to your use. For other uses you need to obtain permission from the rights-holder(s) directly, unless additional rights are indicated by a Creative Commons license in the record and/or on the work itself.

This Article has been accepted for inclusion in Journal of Health Disparities Research and Practice by an authorized administrator of Digital Scholarship@UNLV. For more information, please contact [digitalscholarship@unlv.edu](mailto:digitalscholarship@unlv.edu).

---

## Polychlorinated Biphenyls and Metabolic Diseases on St. Lawrence Island, Alaska

### Abstract

Polychlorinated Biphenyls (PCBs) are industrial chemicals that were used from 1929 until 1979 as a plasticizer in paints, plastics, and rubber products. However, PCBs continue to persist in the Arctic. They enter the Arctic environment through air and ocean currents. Sunlight and weathering help break down chemicals, so the Arctic's lack of sunlight and precipitation during the winter allows PCBs to more readily accumulate. These chemicals settle either on organic films or water and are consequently absorbed by the Arctic food web. PCBs then bioaccumulate in fatty tissues like omega-3 fatty acids. The higher the animal is in the food web, the greater the accumulation of PCBs in its fatty tissue.

The Yupik people of St. Lawrence Island, Alaska rely on a diet that largely consists of bowhead whales, walruses, and seals, all of which are high in omega-3 fatty acids and are near the top of the Arctic food web. Humans occupy the top of the food web and so therefore accumulate the highest concentration of PCBs in their omega-3 fatty acids. Research has shown that high intake of omega-3 fatty acids should promote a healthy endocrine system, therefore protecting against metabolic diseases. However, in recent years, St. Lawrence Island residents have seen a predominate increase in metabolic diseases.

A great number of recent scientific evidence suggests a link between exposure to PCBs and endocrine disruption. We hypothesize that consumption of subsistence foods contaminated with PCBs puts these residents at an uncommonly high risk for metabolic diseases.

### Keywords

PCBs; omega-3 fatty acids; metabolic diseases



**Journal of Health Disparities Research and Practice**  
**Volume 9, Special Edition 1, Summer 2016, pp. 130**  
© 2011 Center for Health Disparities Research  
School of Community Health Sciences  
University of Nevada, Las Vegas

## **Polychlorinated Biphenyls and Metabolic Diseases on St. Lawrence Island, Alaska**

Jasmine Jemewouk

Pamela Miller, M.S., Ph.D., Alaska Community Action on Toxics

**Coordinating Center:** University of Nevada Las Vegas

### **ABSTRACT**

Polychlorinated Biphenyls (PCBs) are industrial chemicals that were used from 1929 until 1979 as a plasticizer in paints, plastics, and rubber products. However, PCBs continue to persist in the Arctic. They enter the Arctic environment through air and ocean currents. Sunlight and weathering help break down chemicals, so the Arctic's lack of sunlight and precipitation during the winter allows PCBs to more readily accumulate. These chemicals settle either on organic films or water and are consequently absorbed by the Arctic food web. PCBs then bioaccumulate in fatty tissues like omega-3 fatty acids. The higher the animal is in the food web, the greater the accumulation of PCBs in its fatty tissue.

The Yupik people of St. Lawrence Island, Alaska rely on a diet that largely consists of bowhead whales, walruses, and seals, all of which are high in omega-3 fatty acids and are near the top of the Arctic food web. Humans occupy the top of the food web and so therefore accumulate the highest concentration of PCBs in their omega-3 fatty acids. Research has shown that high intake of omega-3 fatty acids should promote a healthy endocrine system, therefore protecting against metabolic diseases. However, in recent years, St. Lawrence Island residents have seen a predominate increase in metabolic diseases.

A great number of recent scientific evidence suggests a link between exposure to PCBs and endocrine disruption. We hypothesize that consumption of subsistence foods contaminated with PCBs puts these residents at an uncommonly high risk for metabolic diseases.

**Key Words:** PCBs, omega-3 fatty acids, metabolic diseases

### **ACKNOWLEDGEMENTS**

The STEP-UP HS program is supported by the National Institute of Diabetes and Digestive and Kidney Diseases of the National Institutes of Health, Grant number: 1R25DK098067-01.