

## ***Webinar Highlights***

### **PFAS in the Arctic**

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Per- and polyfluoroalkyl substances (PFAS) travel north on oceanic and atmospheric currents and bioaccumulate in wildlife species that live in the Arctic, including marine mammals, fish, and caribou. This wildlife is an important food source for Arctic Indigenous Peoples living across the Arctic and is an essential part of their cultural identity.

In this webinar, **Dr. Amira Aker** presents some of her latest research into these traditional food sources and PFAS exposures. Dr. Aker has conducted community-based participatory research with her Inuit colleagues to identify exposure sources and health effects of PFAS in Nunavik, Quebec.

**Featured Speaker: Amira Aker, PhD**, Postdoctoral Fellow at the Université Laval and the Centre de recherche du CHU de Québec, speaking February 28, 2023.

*This fact sheet has been created by CHE based on information presented in a CHE Alaska webinar. Selected quotes in bold are from the webinar speaker(s). For the full set of resources provided by the webinar presenters, see the [webinar page](#), where you'll also find associated Slides & Resources.*

### **The Problem**

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Because of their toxicity and environmental persistence, the presence and transportation of PFAS is a concern all over the world. PFAS have been shown to be associated with cancer, heart disease, birth defects, liver disease, and decreased immunity.

Dr. Aker's presentation focused on perfluoroalkyl acids (PFAAs) in the Arctic. PFAAs, a subset of PFAS, are a group of chemicals used in industrial production, firefighting foams and food packaging materials. These chemicals are used for commercial and residential applications to repel water and oil.

There are four main ways that PFAAs arrive in the Arctic:

- Through long-range atmospheric and oceanic transport from the south

- Through the degradation of fluorotelomer alcohols (FTOHs) into PFAAs
- Through market food and consumer product contamination
- Through water contamination.

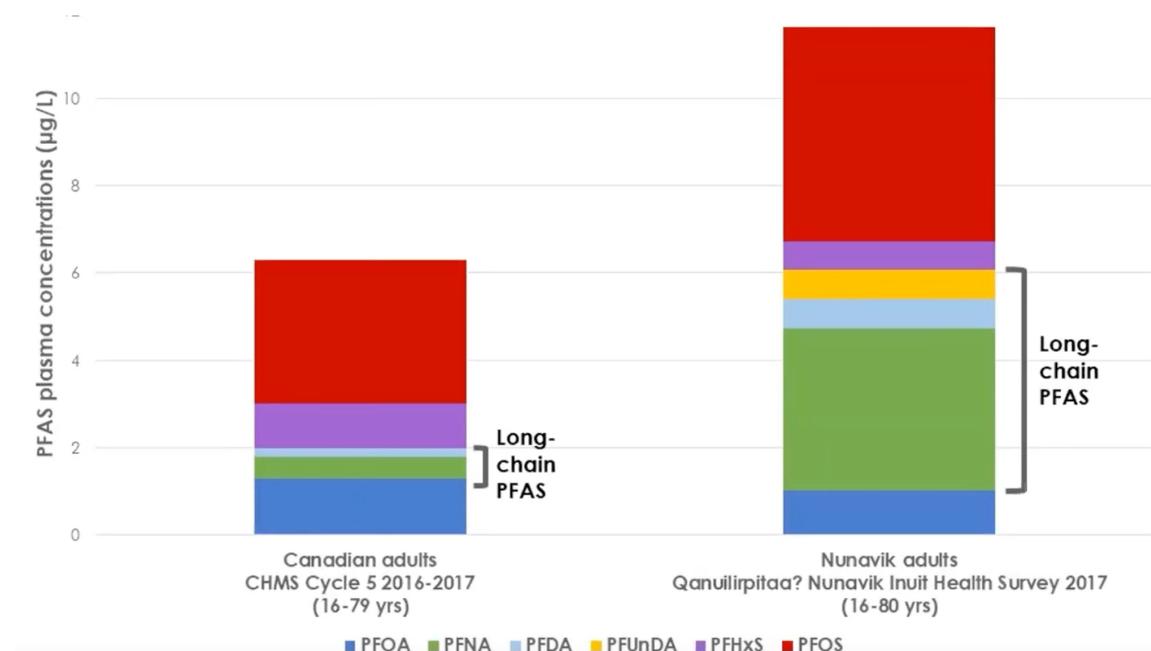
**“Due to the persistent nature of these compounds and the unique environmental conditions in the Arctic, this creates a sink where these chemicals arrive in the Arctic and then get stuck. They then bioaccumulate in marine and terrestrial food webs.”**

The highest concentrations of these compounds are found in apex animals such as beluga whales, seals, and Arctic birds, all of which are consumed by Inuit populations.

Dr. Aker’s study sought to determine how the Inuit living in Nunavik were being exposed to PFAAs and what the associated health effects were. The study included 1,326 participants, aged 16-80 years, from all 14 Nunavik regions across three ecological areas. The study used a community-based participatory approach that gives Inuit control over the data and how that data is used.

### Key findings:

- As shown in the graph below, blood plasma concentrations of PFAS in Nunavik adults are double those of the general Canadian population.



Two of the PFAAs studied, PFNA and PFDA, were 7-fold higher in Nunavik. This is likely from the degradation of FTOHs.

- The study found a strong association between the consumption of traditional country foods (foods harvested/hunted from the land) and PFAAs exposure. Individuals whose diets included more country food have the highest concentrations of PFAAs. More analysis is currently underway to identify specific market and country foods that are associated with PFAAs.

Previous studies have linked PFAAs exposure with cardiometabolic diseases, immunological effects, respiratory diseases, and endocrine disruption. Dr. Aker's study analyzed PFAAs mixtures in relation to diabetes, prediabetes, and high blood pressure. They found a positive association between PFAAs and pre-diabetes, but not diabetes or high blood pressure. Future studies will include similar analyses to look for associations with immune outcomes, respiratory outcomes, and effects on thyroid function.

## Recommendations

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Country foods are integral to Inuit culture, subsistence, food security, and nutrition. They are exceptional sources of nutrients and are free from industrial contamination from food packaging. Dr. Akers stressed that this study was not intended to prevent people from eating country foods, but rather to show the importance of protecting these foods. Country foods remain highly nutritious and best adapted for living in northern climates.

Regulations, such as those of the Stockholm convention, are an important and effective way of protecting the environment and human health.

**“Environmental health research and policies can have an incredible impact to drive change and reduce exposures.”**

- Long-chain PFAAs, their salts and precursors (including FTOHs) should be added to the Stockholm Conventions list of persistent chemicals.
- Rather than regulating specific, individual PFAS, PFAS should be regulated as a class of chemicals.
- During the formulation of chemicals, we need more effort to protect the health of people and the environment (such as through green chemistry initiatives and through the application of the precautionary principle).

## To Find Out More

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- Watch the February 28, 2023 webinar: [PFAS in the Arctic: Identifying exposure sources & health effects in Nunavik, Canada](#)

- Read the study [Associations between dietary profiles and perfluoroalkyl acids in Inuit youth and adults](#)
- Read the study [Plasma concentrations of perfluoroalkyl acids and their determinants in youth and adults in Nunavik, Canada](#)
- Watch the CHE webinar about [Making the Invisible Visible: The PFAS Project Lab](#)

## About the Speaker

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**Dr. Amira Aker** is a Postdoctoral Fellow at the Université Laval and the Centre de recherche du CHU de Québec. She is an environmental epidemiologist and her research centers around protecting systematically and structurally excluded populations from contaminants of emerging concern, with a particular interest in Arctic communities. She is currently studying the exposure sources of perfluoroalkyl substances and their health effects on cardiometabolic outcomes and immunological function in Inuit communities in Nunavik.

Dr. Aker received her PhD in Environmental Health Sciences from the University of Michigan, Ann Arbor, and completed a postdoctoral fellowship at the University of Toronto Scarborough focused on chronic disease.