

# Study shows need for national breast milk monitoring programs for PFAS

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Perfluoroalkyl and polyfluoroalkyl substances (PFAS) are a large family of synthetic organic chemicals that do not occur naturally in the environment. Used extensively in everyday products like non-stick coatings, food-contact surfaces, stain-resistant fabrics and personal care

products, they are often referred to as "forever chemicals" because they remain in the environment for a very long time. Production of some "legacy" PFAS (e.g., PFOA and PFOS) has been banned or voluntarily discontinued in many countries, but other PFAS variations have taken their place, and their effects on health and the environment are poorly understood.

While there is over 20 years of biomonitoring data on PFAS in human serum and urine, scientists and physicians have a limited understanding of the level of these chemicals in [breast milk](#). Now, in a study published in *Environmental Health Perspectives* a group of U.S. and Canadian scientists have analyzed the studies on this subject.

"As often happens in the field of toxicology, it was the communities that are most exposed to these chemicals"—people living or working close to airports, military bases, landfills and industries that produce PFAS—"and who are most concerned about their possible effects on breastfed infants and their families that asked the scientists for help," said the study's sole Canadian co-author, Marc-André Verner, a toxicology expert and professor at the Université de Montréal School of Public Health.

## **Small sample Sizes; Modeling Levels in Breast Milk**

To initiate their study, the research team first conducted a literature search and found only three papers in the U.S. and Canada that included data that measured levels of PFAS in breast milk. These data included 129 samples from three U.S. states and 13 samples from one Canadian province.

To compensate for the scarcity of data, the team developed a model using global maternal serum to milk concentration ratios in the published literature to estimate the breastmilk concentrations of four PFAS:

perfluorooctanoic acid (PFOA), perfluorooctane sulfonate (PFOS), perfluorohexane sulfonate (PFHxS) and perfluorononanoic acid (PFNA). They then compared the measured and estimated breast milk concentrations to Environmental Media Evaluation Guides (EMEGs)—children's drinking water screening values developed by the U.S. Agency for Toxic Substances and Disease Registry. EMEGs for children were selected because children consume proportionately more water than adults.

The authors reported that the measured and estimated mean concentrations of PFOA and PFOS in breast milk exceeded the screening values, sometimes by more than two orders of magnitude. However, for PFHxS and PFNA, most measured and estimated mean breast milk concentrations were lower than the children's drinking-water screening values.

"First and foremost, we want to be sure that women and their [health care providers](#) have the information they need to make important decisions, when necessary," said Suzanne Fenton, lead author and a toxicologist at the National Institute of Environmental Health Sciences, part of the U.S. National Institutes of Health, "We know very little about PFAS levels in breast milk. Our approach provided estimated breast milk concentrations of PFAS that are both nationally representative of women in the U.S. and Canada, as well as women living in areas of the U.S that are known to be contaminated with PFAS."

## Screening values

Screening values, such as the ATSDR EMEGs selected for comparison in this study, are used by public-health professionals to decide whether current environmental exposures warrant a more in-depth evaluation to determine if they could harm people's health (i.e., exposures below these levels are not expected to cause adverse effects).

"There are currently no screening values for PFAS in breast milk, which seriously limits our ability to interpret these data in terms of the risk to infants' health," Verner noted. Without them, he said, even if the PFAS concentrations in breastmilk exceed the values for drinking water, it's impossible to predict if harmful health effects will result.

## **To breastfeed or not to breastfeed?**

The members of the research team point out that the benefits of breastfeeding for infant health are well established.

"This study was an exploratory analysis, and it had several limitations because of the scarcity of data," noted co-lead author Judy LaKind, environmental health consultant and former president of the International Society of Exposure Science. "Our research team wants to underscore that there are major gaps in the data on PFAS in breast milk and this is an area where more research and more monitoring are urgently needed".

## **Need for a national breast-milk monitoring program**

In order to provide credible advice to pregnant or breastfeeding women, scientists, health professionals and breastfeeding counsellors need information; national breastmilk monitoring programs (e.g., in the U.S. or Canada) over the long term could provide that information. Additionally, more data and resources would help to support decision-making about the risks and benefits of breastfeeding and to enable public-health agencies to make recommendations to individuals, health care providers, and communities.

For instance, studies that measure PFAS in milk and serum samples taken at the same time from breastfeeding women would be of great

value to validate the new analysis and refine the assessment of breastfeeding infants' exposure, the study's authors maintain. "It is past time to have a better understanding of environmental chemical transfer to—and concentrations in—an exceptional source of infant nutrition" they note in their report.

Several national government agencies, including Health Canada and the U.S. Environmental Protection Agency, are now working to develop or review risk assessments for various individual PFAS. Meanwhile, a National Academies of Sciences, Engineering, and Medicine committee, of which Verner is a member, is considering guidelines for physicians treating patients who have been exposed to PFAS.

Several of the study's authors, including Fenton and Verner, have started working on new research to measure concentrations of PFAS in breast milk, in collaboration with Université de Montréal chemistry professor Sébastien Sauvé. The researchers will measure a wide range of PFAS in samples from breast-milk biobanks.

## About PFAS

PFAS are a large class of more than almost 11,000 structurally different compounds, many of which have been used in industry and in consumer products since the 1950s. PFAS do not exist in the natural state but are widespread and persistent in the environment. They have been detected in drinking water, dust, and food sources throughout the world. Many PFAS were measured in human serum and first reported in the 1999-2000 national survey on [health](#) and nutrition conducted by the [U.S. Centers for Disease Control and Prevention](#). According to the US Environmental Protection Agency (EPA) and the [Toxic Substances Control Act \(TSCA\)](#), there are over 600 PFAS in U.S. commerce.

"Current breast [milk](#) PFAS levels in the US and Canada: After all this

time why don't we know more?" by Judy S. LaKind, Marc-André Verner et al, was published Feb. 23, 2022 in *Environmental Health Perspectives*.

**More information:** Current breast milk PFAS levels in the US and Canada: after all this time why don't we know more? *Environmental Health Perspectives* (2022). [DOI: 10.1289/EHP10359](https://doi.org/10.1289/EHP10359)

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