

# Serum levels of per- and polyfluoroalkyl substances in relation to the length of residency in United States

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# Thousands of toxins from food packaging found in humans - research

Metals and PFAS linked to serious health issues are among compounds found, highlighting need for further scrutiny



Research found that among the worst offenders is plastic, a material that is largely unregulated and can contain thousands of chemicals. Photograph: Aleaimage/Getty Images/iStockphoto

## Cost to clean up toxic PFAS pollution could top £1.6tn in UK and Europe

Exclusive: Costs of UK cleanup will reach £9.9bn a year in UK if emissions of 'forever chemicals' remain uncontrolled

Industry using 'tobacco playbook' to fend off 'forever chemicals' regulation



PFAS can commonly be found in nonstick pans among other items like pizza boxes, cosmetics and waterproof clothing. Photograph: niunui/Getty Images/iStockphoto

# Notorious US chemical plant polluting water with toxic PFAS, lawsuit claims

Complaint says Chemours factory dramatized in Hollywood movie Dark Waters continues to pollute West Virginia river

INFO À la une En continu En bref Vidéos Mon fil

Enfouissement des PFAS : le Bloc québécois demande l'annulation d'un nouvel appel d'offres

CBC

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## High levels of 'forever chemicals' found in wells of 9 Hazelbrook homes

Federal government is making moves to add PFAS chemicals to toxic substances list



Connor Lamont - CBC News - Posted: Apr 23, 2025 5:00 AM EDT | Last Updated: April 23

HOME | SCIENCE

Canada will add PFAS, which are linked to cancer and other health problems, to toxic substances list



Minister of Environment and Climate Change Steven Guilbeault said the move to regulate PFAS as a whole class of chemicals puts Canada at the forefront of regulating the persistent chemicals. PHOTO: REUTERS / BLACK GABLE

LES DÉCODEURS • PFAS

## Revealed: The massive contamination of Europe by PFAS 'forever chemicals'






By Stéphane Horel

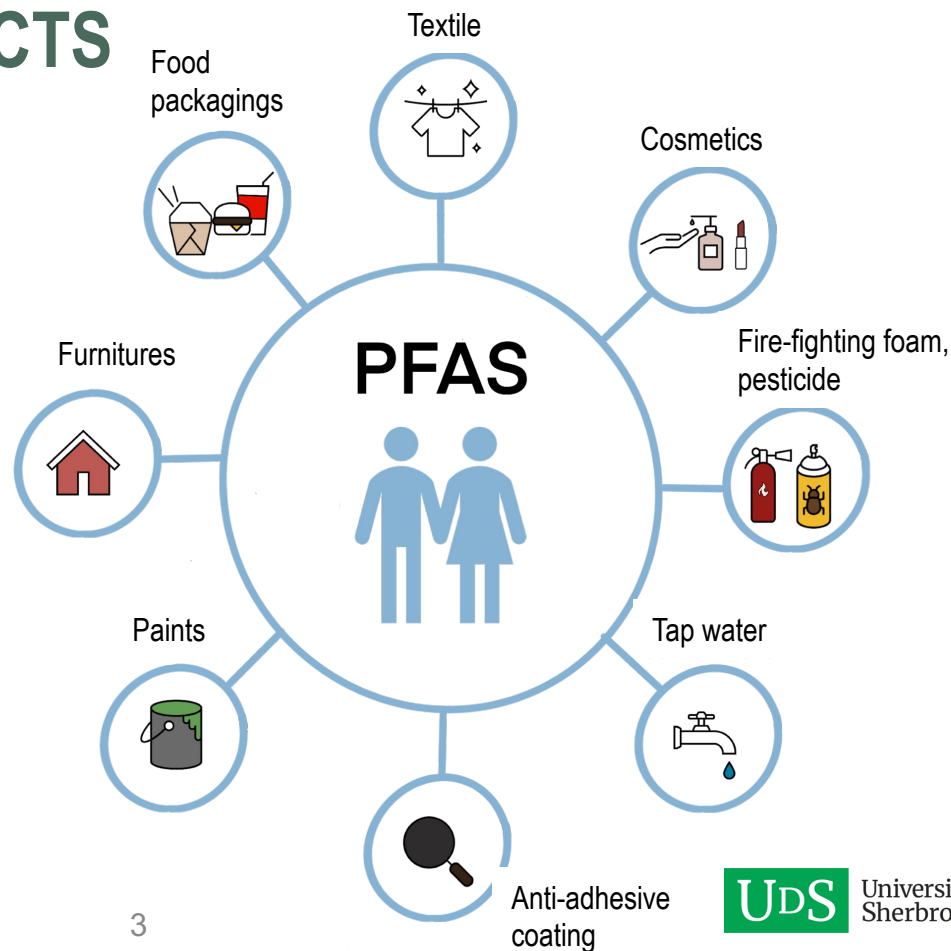
Published on February 23, 2023, at 5:50 am (Paris), updated on December 10, 2024, at 6:56 pm

11 min read Lire en français

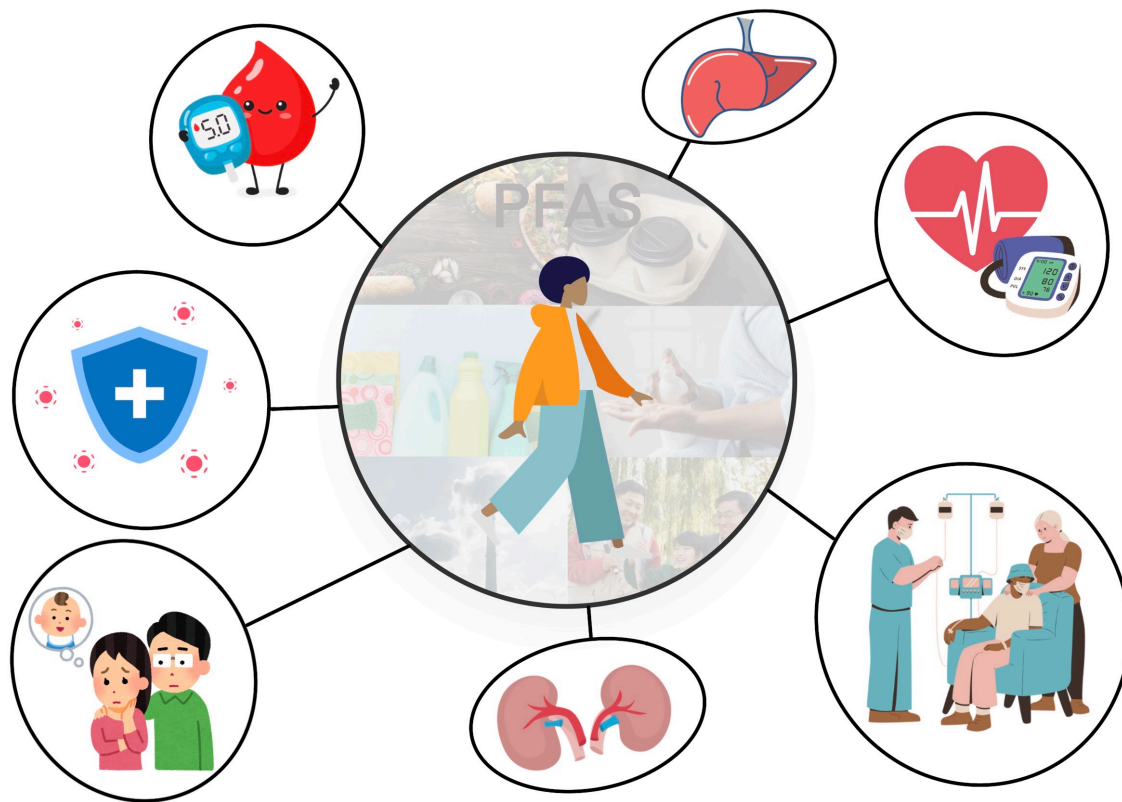
# PFAS : MOLECULES OF SERIOUS CONCERN

# PFAS AND ADVERSE EFFECTS

PFOA	
PFOS	
PFHxS	
PFNA	
PFDaA	



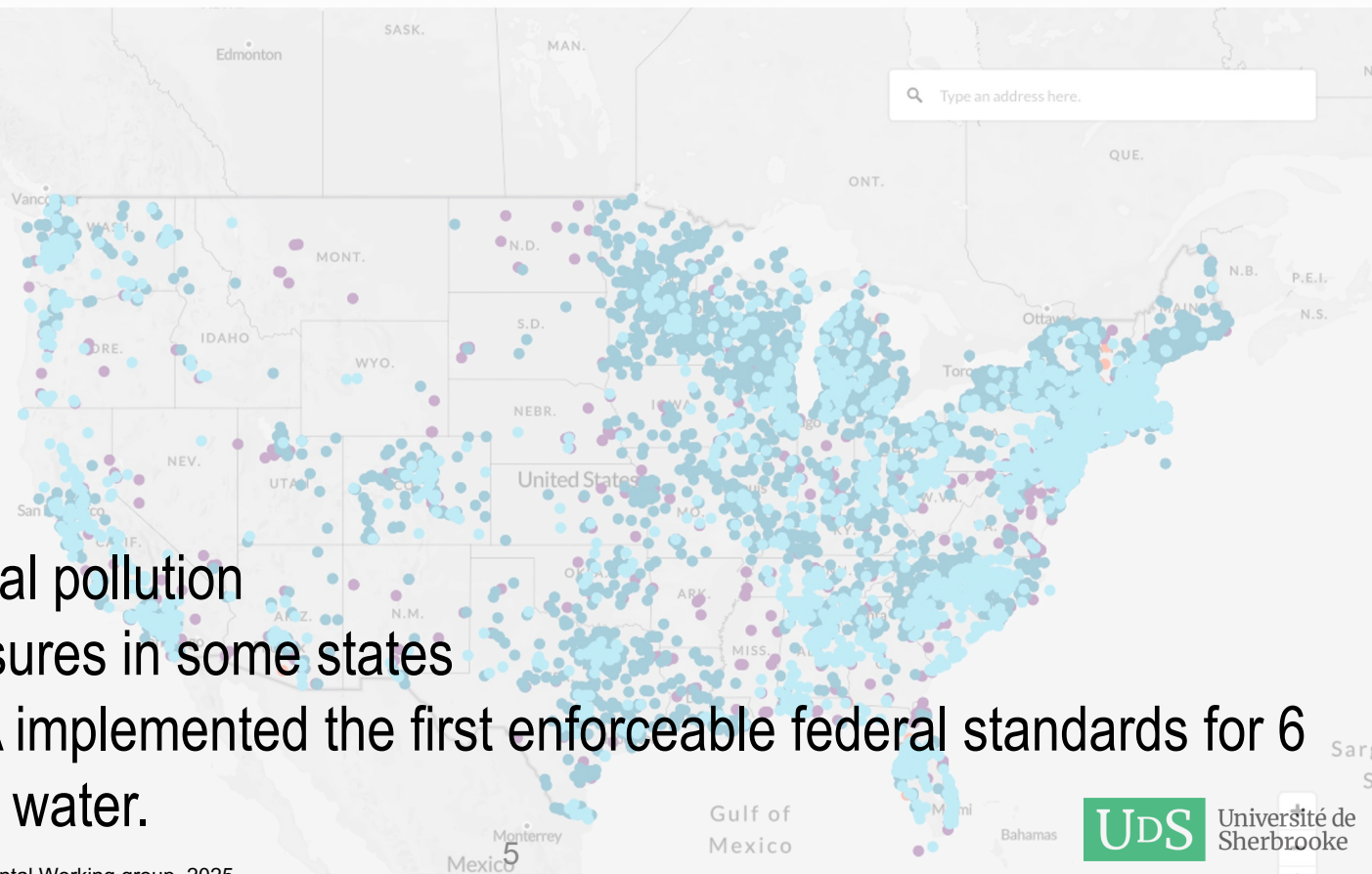
# PFAS AND ADVERSE EFFECTS



# PFAS IN USA

PFAS contamination in the U.S. (March 24, 2025)

- On Drinking Water ABOVE PROPOSED LIMIT
- On Drinking Water BELOW PROPOSED LIMIT
- On Military Sites
- On Other Known Sites



- Significant internal pollution
- Regulatory measures in some states
- In 2024, the EPA implemented the first enforceable federal standards for 6 PFAS in drinking water.



# PFAS IN USA

## EPA rolls back part of PFAS drinking water standards

The agency will continue regulating PFOA and PFOS in drinking water, but will extend compliance timelines. It has rescinded rules for four other PFAS chemicals.

Published May 14, 2025

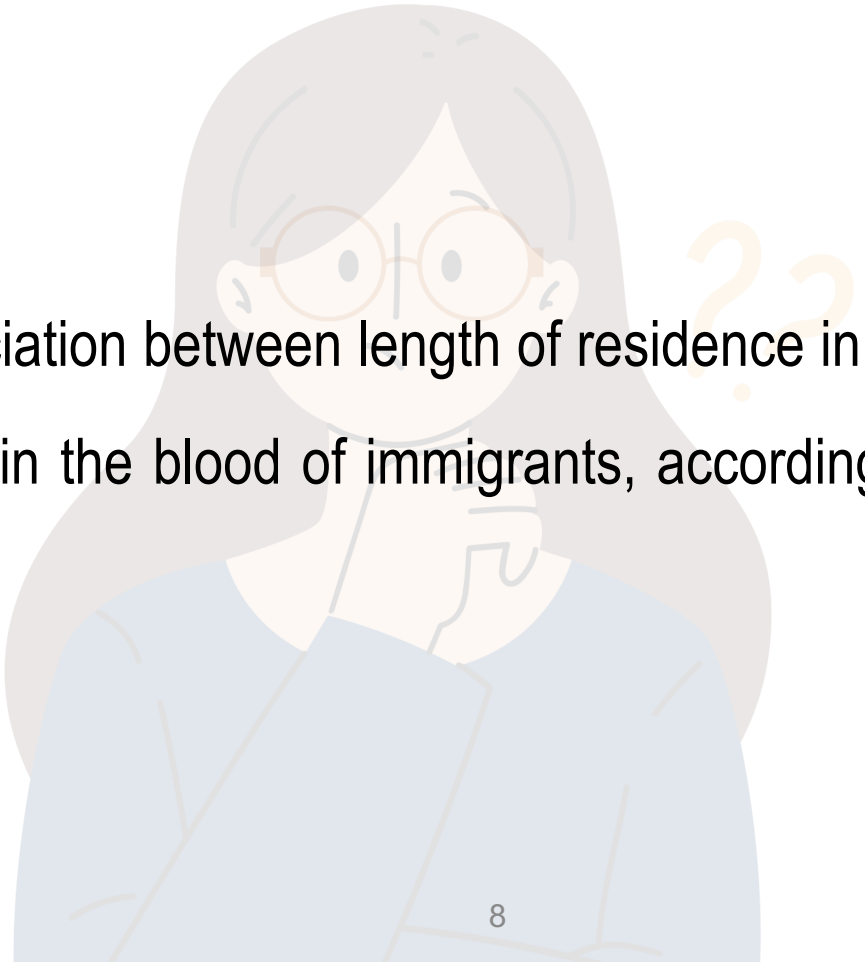


[Megan Quinn](#)  
Senior Reporter

But this regulation is now abolished !

# A PUBLIC HEALTH ISSUE



A faint, stylized illustration of a person with long brown hair and round glasses, wearing a blue shirt. A large, light orange question mark is positioned to the right of the person's head.

What is the association between length of residence in the United States and PFAS levels in the blood of immigrants, according to their racial or ethnic group?

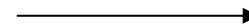
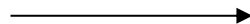


# METHODS

Time : 2003 - 2018



## National Health and Nutrition Examination Survey



- 11 040 adults  $\geq 18$  years, including 2 768 immigrants
- Length of residency

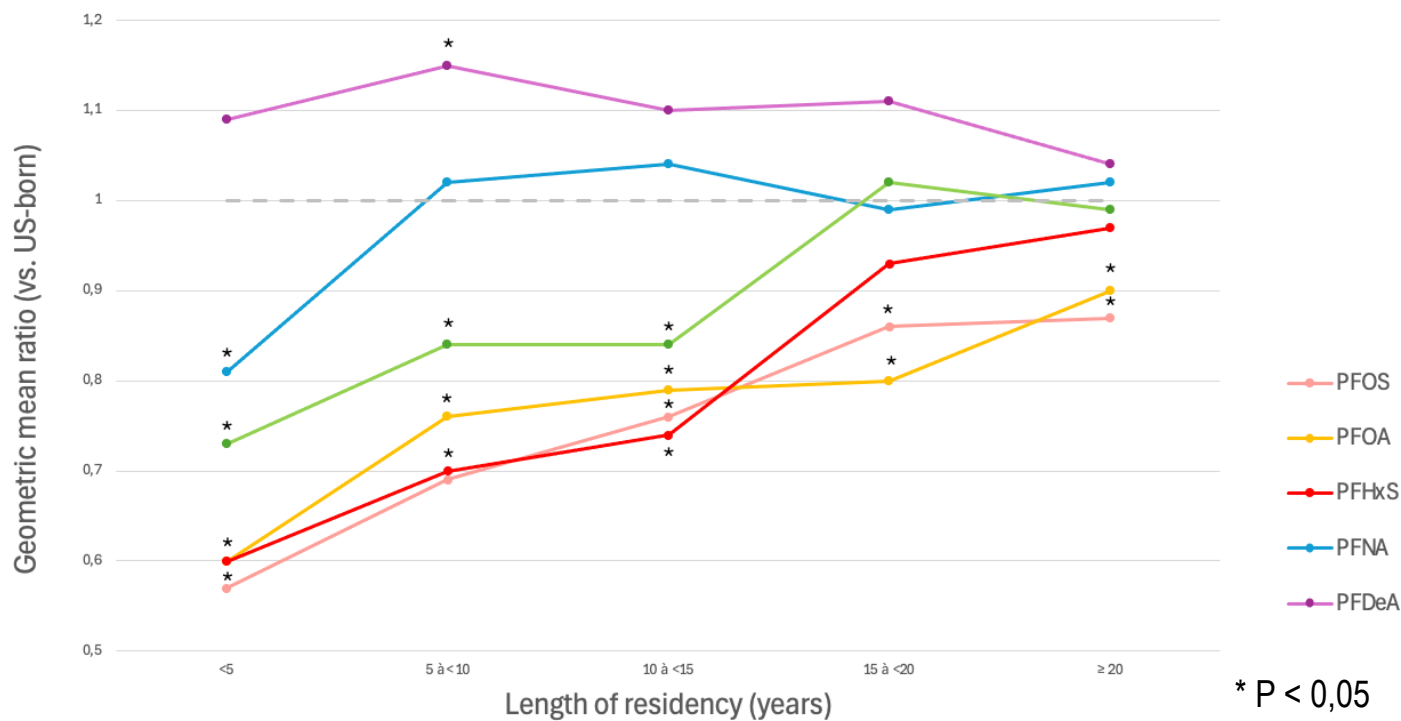
PFOS, PFOA, PFHxS,  
PFNA, PFDeA and  $\Sigma$ PFAS

Adjusted multivariate  
linear models

Confounding : age at interview, sex, race/ethnicity, and NHANES cycles

# RESULTS

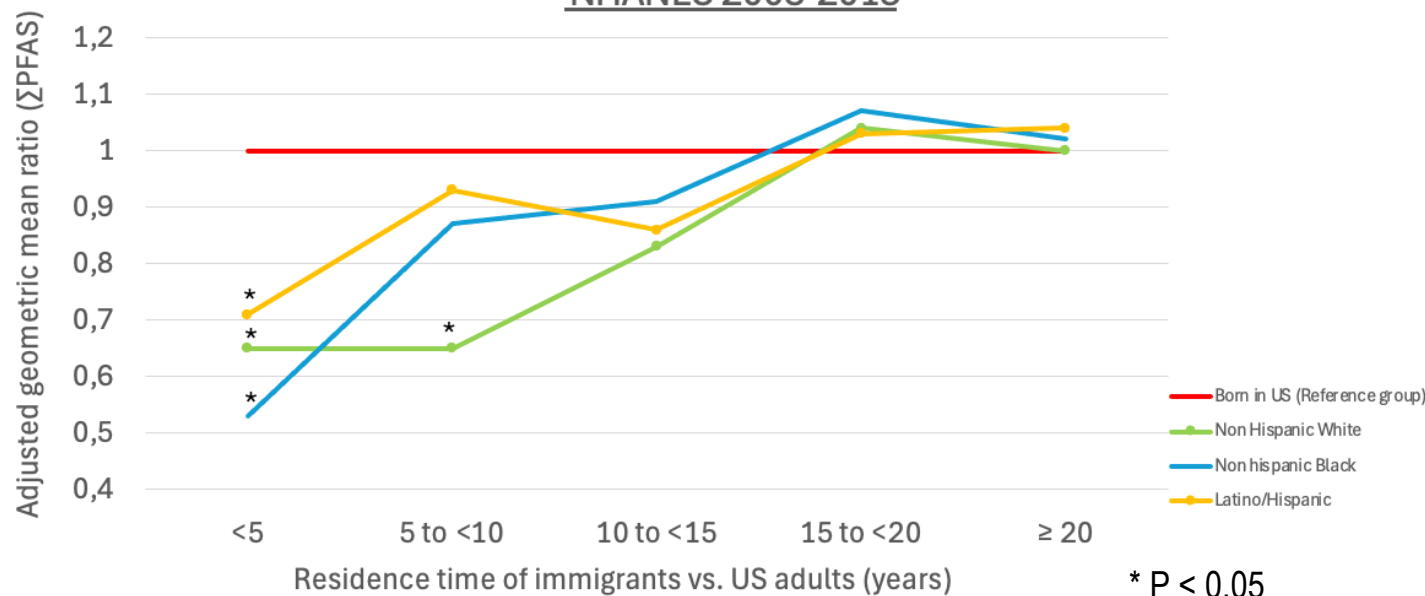
Evolution of PFAS levels according to length of residence in the United States



\*  $P < 0,05$

# RESULTS

Adjusted geometric mean ratio for the relationship between length of residence in the US and blood PFAS sum levels in adults living in the US, NHANES 2003-2018



# DISCUSSION

- Immigrants progressively accumulate PFAS with length of residence.
- Importance of integrating migratory status into environmental health policies.

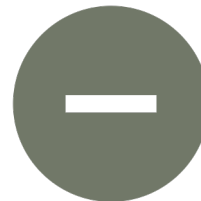
To be explored in future research for immigrant's context :

- Environment<sup>1</sup>
- Drinking water<sup>2</sup>
- Consumer products<sup>3</sup>
- Social conditions<sup>4,5</sup>

# STRENGTHS AND LIMITATIONS



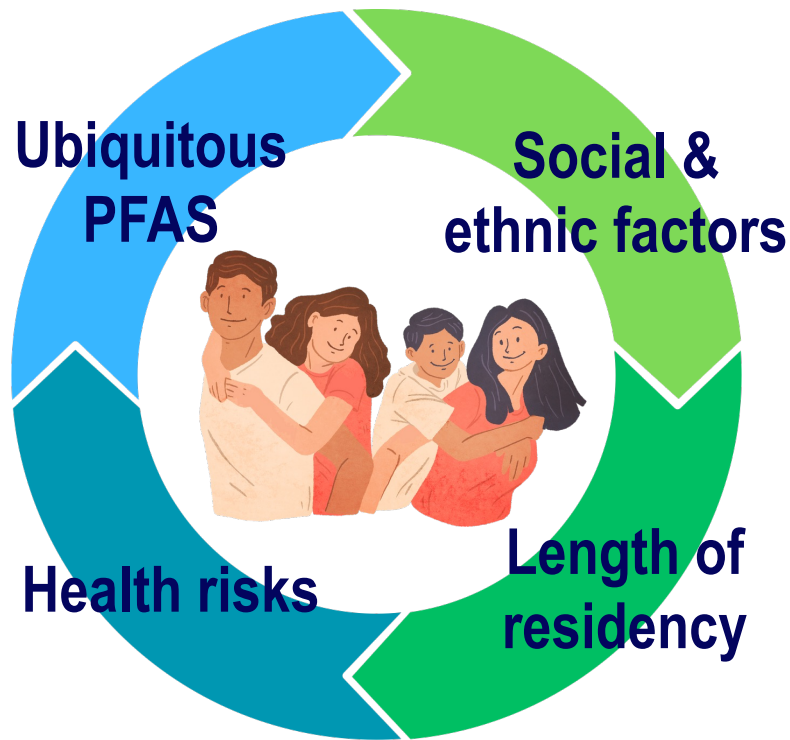
- Large national database (NHANES)
- Long study period (2003-2018)
- Analyses adjusted for several important covariates
- Direct comparison of immigrants vs. U.S. born



- Transversal design
- Self-reported length of residence
- No sex-specific analysis
- No other ethnic origins
- No precise information on place of residence in the U.S., nor on continent of origin.

## PFAS & immigration: an exhibition that accumulates over time

- Progressive
- Multifactorial
- Unequal exposure





# ACKNOWLEDGEMENT



## Subventionary organisms



My supervisors :

- Pr Gérard Ngueta, PhD
- Pr William Fraser, MD



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An aerial photograph of the Université de Sherbrooke Health Campus. The image shows several large, modern buildings with light-colored facades and blue accents. A large, multi-level parking lot filled with cars is visible in the center-left. The campus is surrounded by lush green trees and grassy areas. In the background, a dense forest covers a hillside.

*THANKS FOR YOUR LISTENING*

*WE RECOGNIZE THAT THE UNIVERSITÉ DE SHERBROOKE HEALTH CAMPUS IS LOCATED ON THE  
ANCESTRAL TERRITORY OF THE W8BANAKI NATION, THE NDAKINA.*

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