Michigan's PFAS Exposure and Health Studies

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MDHHS
Michigan Department of Health & Human Services

Overview

- What have we learned on PFAS exposure and health effects from some communities in Michigan.
  - Are we finding PFAS in the body of people that live in areas with PFAS contamination?
  - What are the main sources of exposure?
  - Are there other factors that influence how much PFAS there is in the body?
  - What are the health effects from this PFAS exposure?

MDHHS PFAS Research*

Data Collection from:

*More work is being conducted but not shown here

2018 to 2019

North Kent County Exposure Assessment

2020 to 2025

MiPEHS Michigan PFAS Exposure & Health Study

PFAS Exposure and Antibody Response to COVID-19 Vaccine Study

2021 to 2022

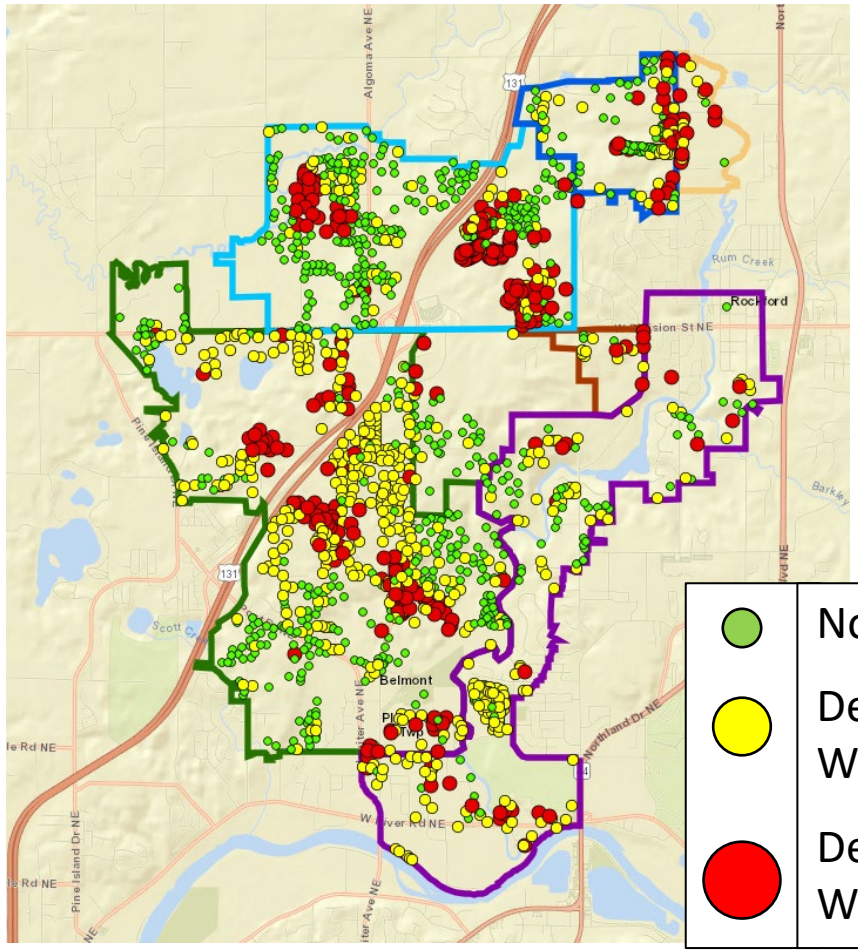
Multi-site Health Study

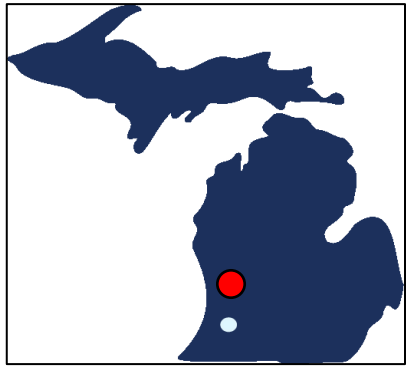
1. **Belmont/Rockford area of Kent County**
2. **The City of Parchment and Cooper Township in Kalamazoo County**

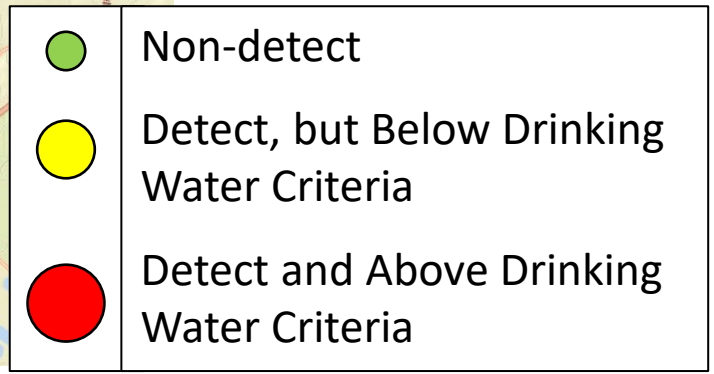
Michigan.gov/DEHBio

Belmont and Rockford Area

PFAS Testing Results for PFNA, PFOA, PFHxA, PFOS, PFHxS, and HFPO-DA



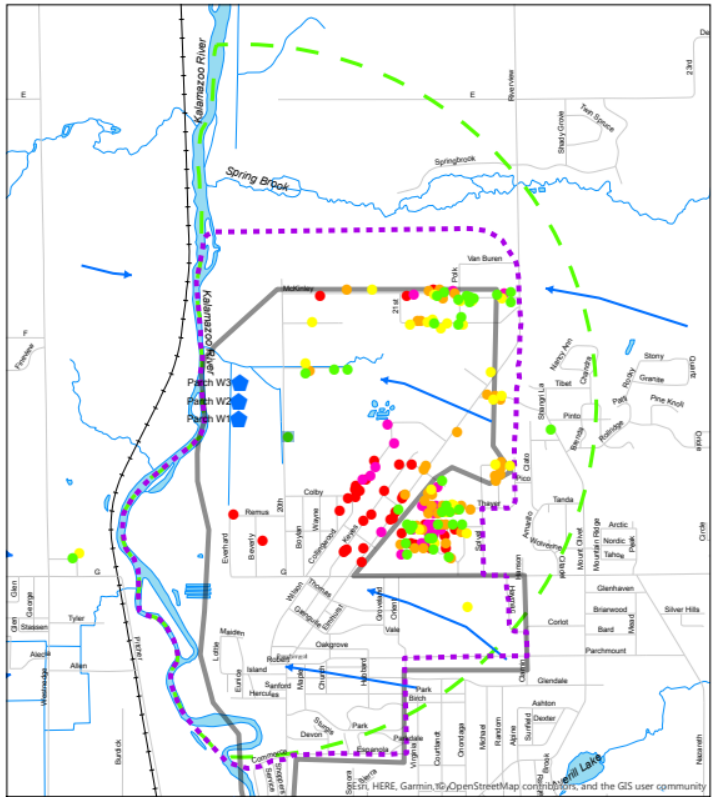




- In 2017, PFAS, including PFOA and PFOS, were measured in **groundwater** used as drinking water in the Belmont/Rockford Area
- ~1500 private drinking water wells in the area were investigated
  - Total measured PFAS ranged from below **the detectable limit (ND) to above 50,000 parts per trillion** (ppt)
- Homes with PFAS in their drinking water were provided filters or bottled water

City of Parchment and Cooper Township

- PFAS was discovered in the City of Parchment municipal water in 2018.
  - This supply served approximately 3,200 people.
  - The combined **PFOA+PFOS concentration was 1,410 ppt**.
- PFAS was also discovered in approximately 300 homes with private drinking water wells near the municipal water system



North Kent County Exposure Assessment

- The North Kent County community's exposure to PFAS was investigated by **blood testing, water testing,** and **questionnaires**

- Eligible households were stratified based on the PFAS lifetime health advisory for drinking water at the time. All or a subset of households were selected to participate. Not all selected households had someone participate.

Selected

<70 ppt Total PFAS

235 households (40% of whole group)

≥70 ppt Total PFAS

182 households (100% of whole group)

Total Households that Participated
183 (44%)

Demographics of NKCEA Participants

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- Individuals who provided a blood specimen and were eligible = **413**

- Average age was **50 years**

- Slightly **more females** than males participated (52% vs. 48%)

- Most adults attended at least four years of college

- Most adults reported a household income above $75,000

- >95% of participants were white and non-Hispanic

Comparison of Average and Maximum PFAS Blood level to other groups

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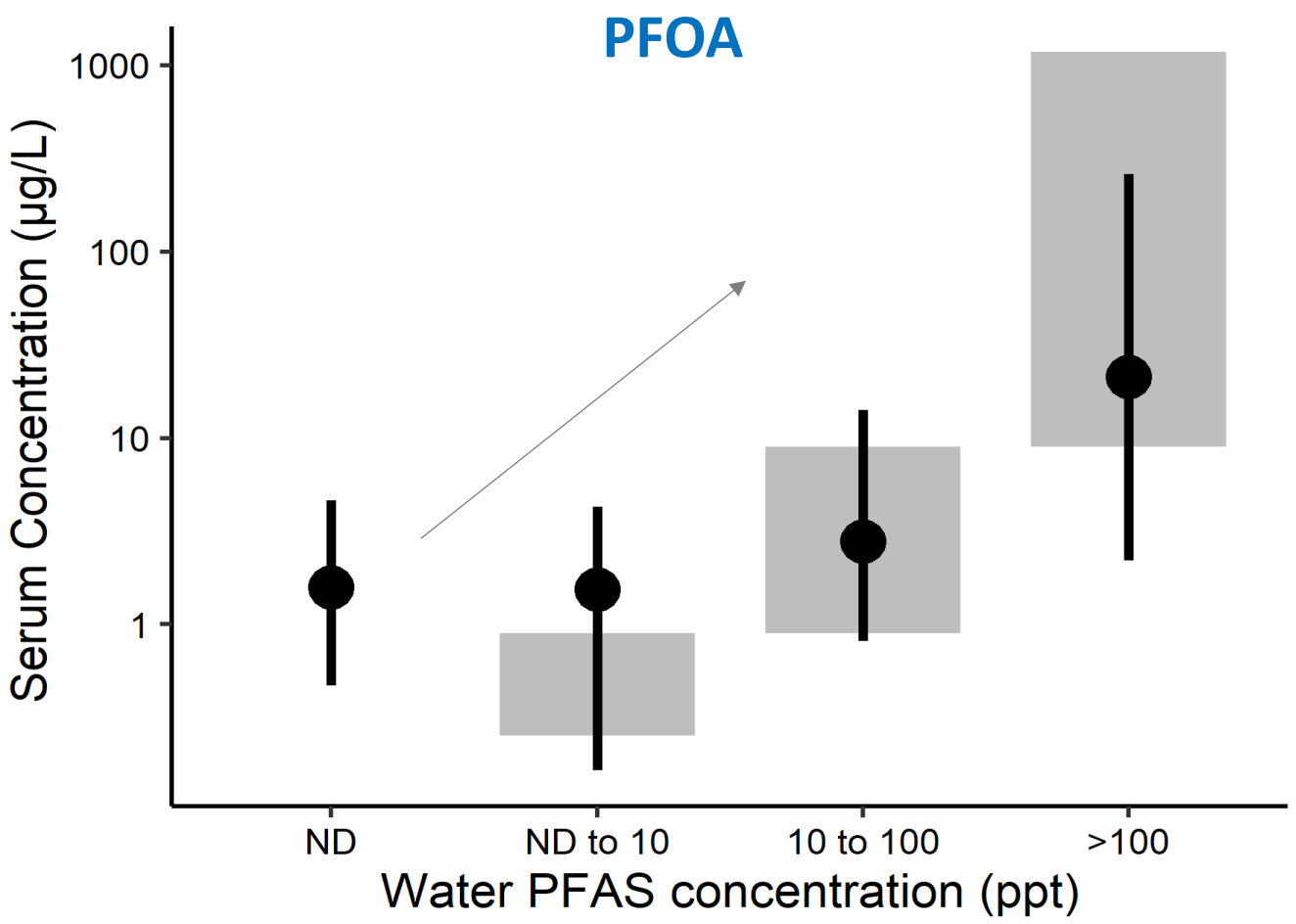
PFAS Blood Levels in Different Groups of People (µg/L)

	Total-PFHxS		Total-PFOA		Total-PFOS	
	Average	Maximum	Average	Maximum	Average	Maximum
Workers in PFAS industries[1]	65	1,880	1,231	92,030	692	10,600
Communities with contaminated drinking water[2]	6	116	23	17,557	18	759
NKCEA Study Participants	**2**	**884**	**2**	**433**	**6**	**3,173**
NHANES Participants	1	23	2	20	5	110

[1] Studies of workers in PFAS industries measured PFAS among 1) workers in fluorochemical production and 2) firefighters.
[2] Studies of other populations with PFAS in their drinking water include: Ohio River Valley (C8); Minnesota East Metro; New Hampshire PEAS; Bennington and North Bennington, Vermont; Hoosick Falls, New York; Ronneby, Sweden; and northern Alabama (Anniston).

Measured and Estimated Serum (Blood) PFAS Concentrations in Unfiltered Drinking Water



* ND = Non-detect

= Expected serum concentration

Second Report **Page 26 to 29 (Figure 3)** for full results.

Factors that influence PFAS levels

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	PFOA	L-PFOA	PFOS	L-PFOS	Br-PFOS	PFHxS	L-PFHxS	Br-PFHxS	PFHpA	PFBA	PFHpS	PFPeS
Daily Intake	■	■	■	■	■	■	■	■	■		■	■
Residence duration									■			
Age			■	■	■						■	
Sex	■	■	■	■	■	■	■				■	
Wild caught fish from anywhere			■	■						■		
Wild-caught fish from inside study area				■								
Deer hunted anywhere				■								
Deer hunted inside study area												

Significant Positive Association (meaning being older and/or male are linked to **higher** blood PFAS concentrations)

Significant Negative Association (meaning being older and/or male are linked to **lower** blood PFAS concentrations)

No Significant Association (meaning being older and/or male are **not linked** to PFAS concentrations at all)

Connection Between Eating Certain Foods within the NKCEA Study Area and Blood (Serum) PFAS Concentrations

- The following foods from **inside the NKCEA area** had no important effect on blood PFAS concentrations:
  - Hunted game.
  - Chicken eggs.
  - Vegetables grown.

Building on NKCEA

Exposure Assessment

2018 - 2019

North Kent County Exposure Assessment

Belmont/Rockford Area

Health Studies

2020 - 2025

MiPEHS
Michigan PFAS Exposure & Health Study

People in the Belmont/Rockford area and the Parchment/ Cooper Township area could be eligible!

✓ Blood sample ✓ Newborn blood spot
✓ Blood spot ✓ Water samples

3 study visits total
one every other year beginning in 2020

Blood testing on participants 12 years old and older

2021 - 2023

Multi-site Health Study

People from 7 states are eligible, including some Michiganders who are also eligible for MiPEHS!

✓ Blood sample
✓ Urine sample

1 study visit
in 2021-2022

Blood testing on participants 4 years old and older

Over 1,500 people participated in MiPEHS (2020-2025)

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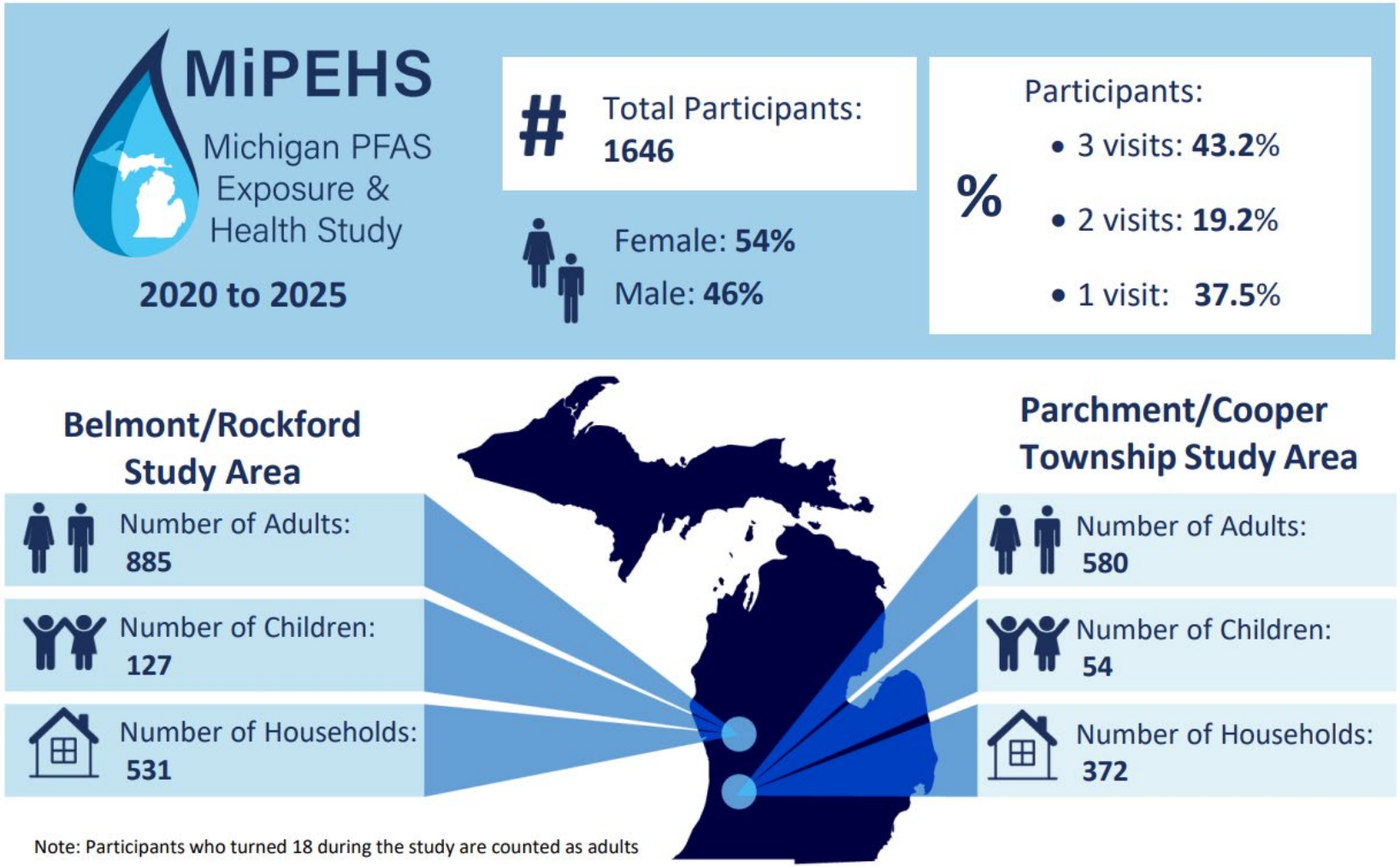

Note: Totals presented here do not always equal the total number of participants because some participants did not provide all their demographic information. Ages over 89 years are not reported to maintain participant privacy.

PFAS Detected in MiPEHS Phase 1 participants Versus US Population

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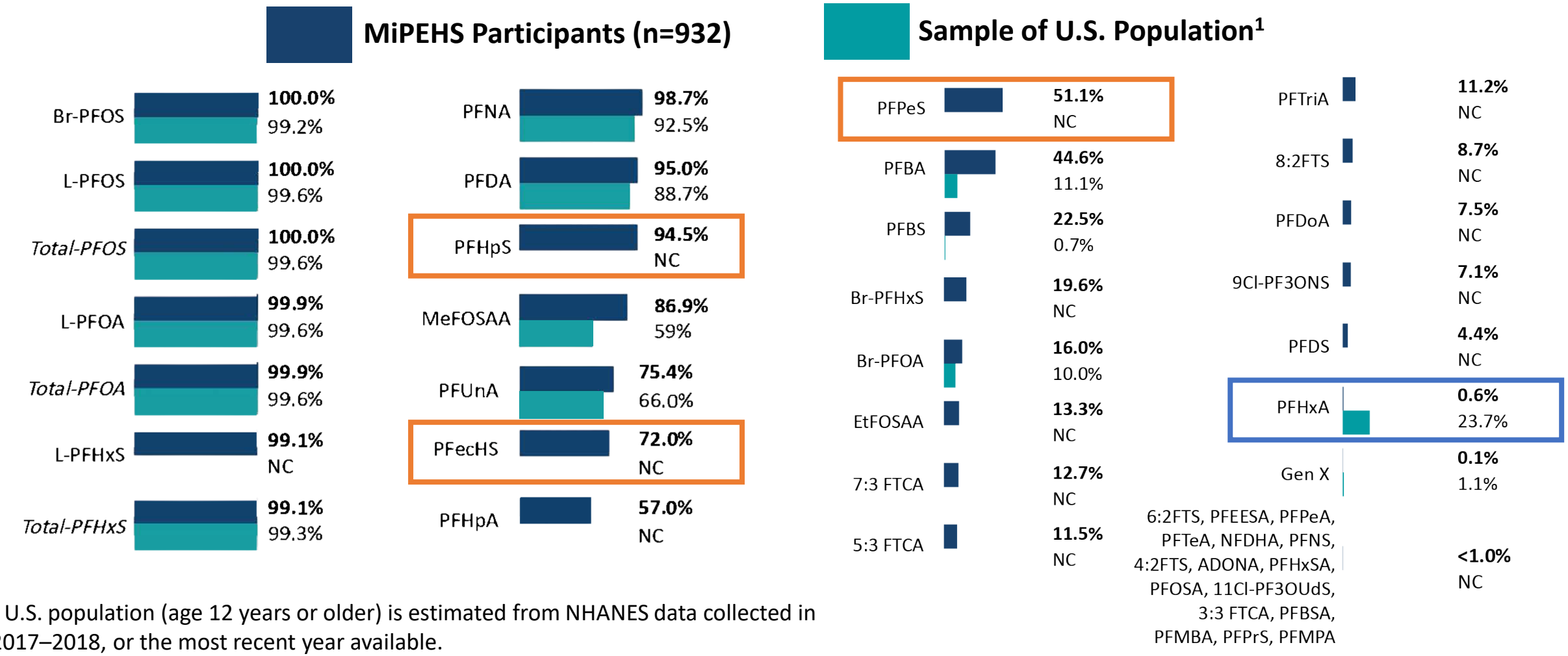


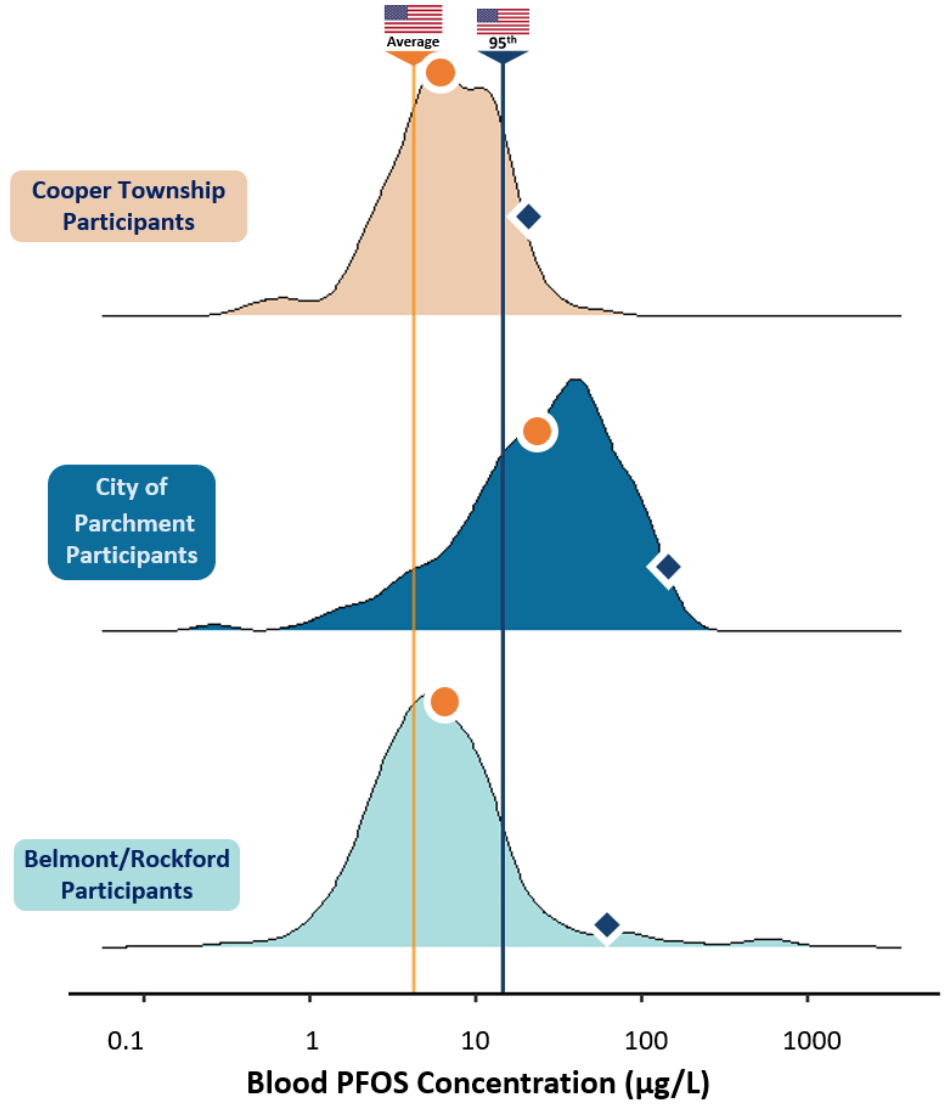
[1] U.S. population (age 12 years or older) is estimated from NHANES data collected in 2017–2018, or the most recent year available.

NC means no comparison and is used when PFAS were not tested or the percentage calculation is not yet available from NHANES.

For all results visit Michigan.gov/DEHBIO

Distribution of PFAS in Phase 1

- On average, MiPEHS participants have **higher blood PFOS and PFOA concentrations** than the general U.S. population.
- Not every MiPEHS participant has more PFOS and PFOA in their blood compared to the average from the U.S. Many have much less.
- More participants from the City of Parchment had elevated blood PFOS and PFOA concentrations compared to the other study areas



Average — Average blood PFOA and PFOS concentration in **U.S. population from 2017 to 2018**

95th — 95th percentile of blood PFOA and PFOS concentrations in **U.S. population from 2017 to 2018**

Average blood PFOA and PFOS concentrations in **MiPEHS**

95th percentile of blood PFOA and PFOS concentrations in **MiPEHS**

Change in PFAS among participants from each study area.

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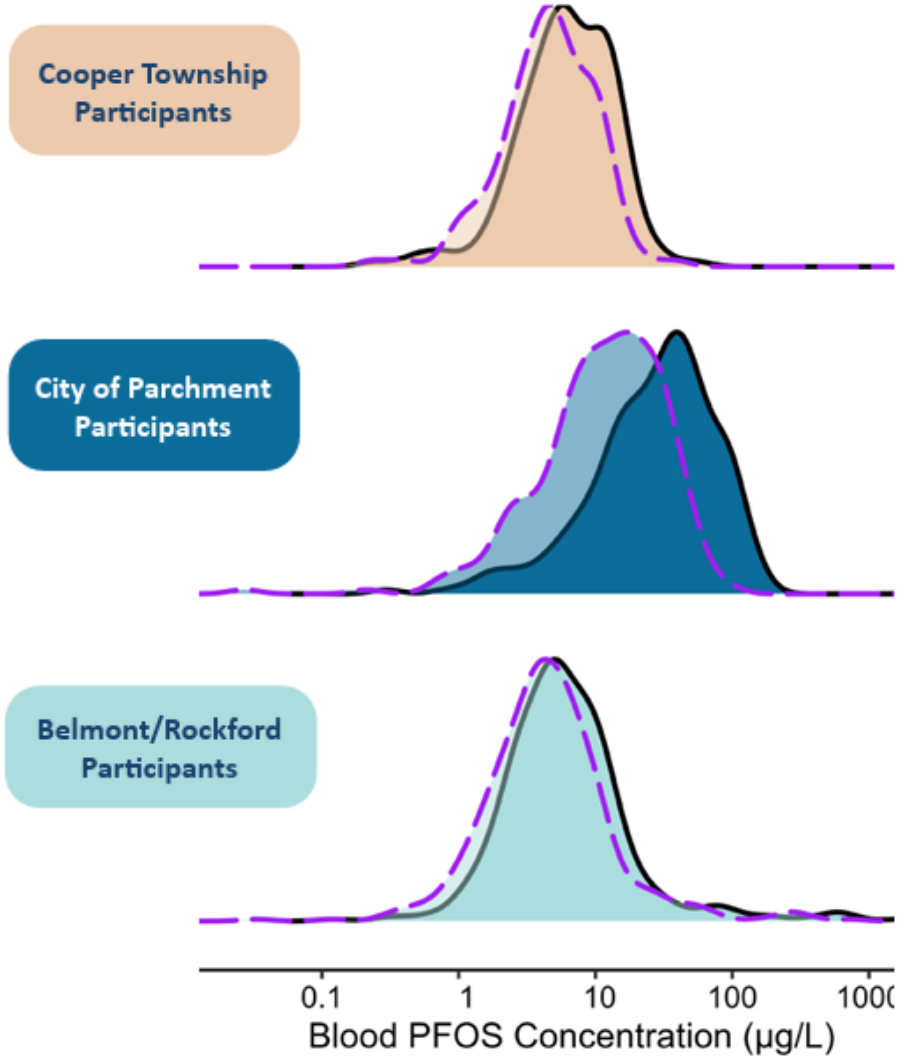
Key Conclusions

- Overall, the amount of PFOA and PFOS in participants **decreased** between Phase 1 and Phase 2.
- The largest decrease was seen in the City of Parchment participants who previously used water from the City of Parchment before PFAS contamination was discovered and addressed.



Legend

Blood concentrations of PFAS for MiPEHS participants from Phase 1 are shown with the solid black lines

Blood concentrations of PFAS for MiPEHS participants from Phase 2 are shown with the purple dashed lines

Health summary from findings

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PFAS and COVID-19 antibodies

- Higher PFAS levels were **NOT** associated with a lower overall antibody response to the COVID-19 vaccine.

Bailey, J.M., et al., J Expo Sci Environ Epidemiol (2023). https://doi.org/10.1038/s41370-023-00564-8

PFAS and Thyroid Hormones

- People with more PFAS in their blood tended to have slightly lower levels of the thyroid hormone, total triiodothyronine (TT3).
- TT3 levels were not low enough to need medical intervention.

Noyes T.S., et al., Scientific Reports (2025). https://doi.org/10.1038/s41598-025-91977-y

Much more to come…

A special thanks

The research team thanks the hundreds of Michiganders who generously shared their time, health information, and blood samples. The summaries shared in this presentation and the ongoing knowledge gained about PFAS exposure and health would not be possible without the generosity of participants, dedication of the research staff, and funding from the State of Michigan and Federal Partners.

North Kent County Exposure Assessment

MiPEHS Michigan PFAS Exposure & Health Study

Multi-site Health Study

PFAS Exposure and Antibody Response to COVID-19 Vaccine Study

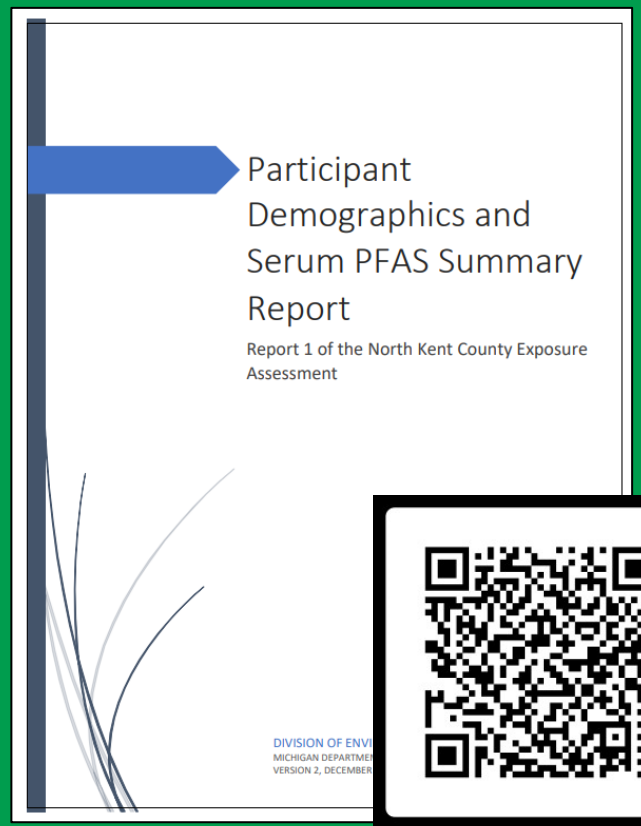
Data Collection Contract with: RTI INTERNATIONAL

MDHHS Michigan Department of Health & Human Services

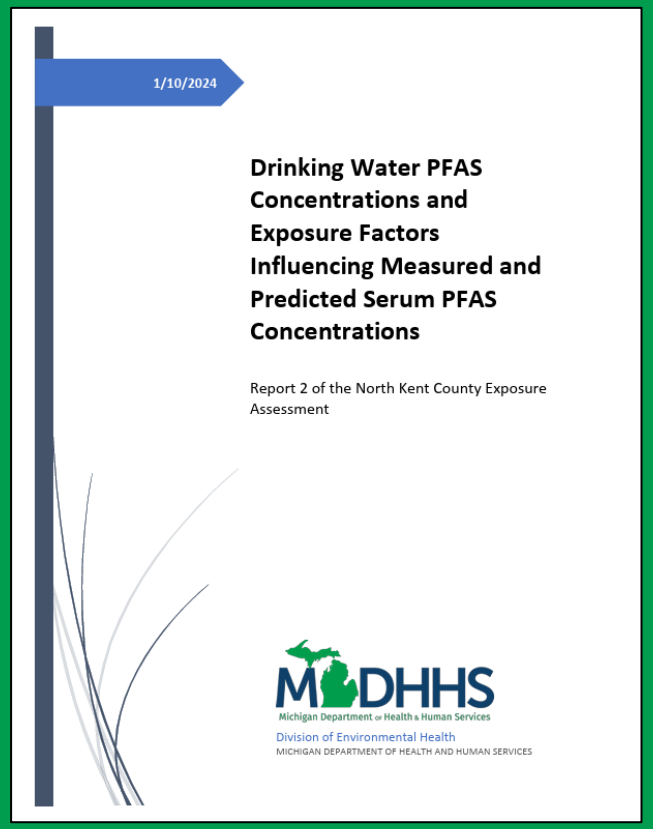
Michigan.gov/DEHBio

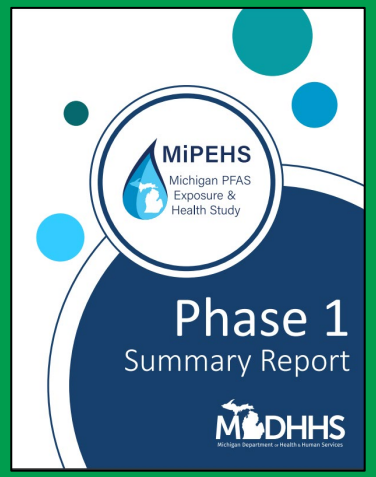
Laboratory: MDHHS Bureau of Laboratories

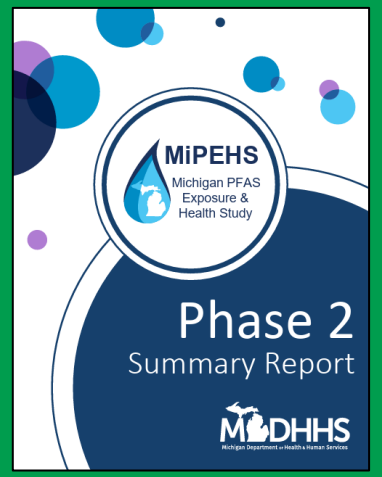
THANK YOU



SCAN ME







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