Exposures to per-and polyfluoroalkyl substances (PFAS): Reducing potential risks to reproductive and children's health

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Why is this important?

- Widespread human exposure
- "contaminant of emerging concern" – EPA
- May bioaccumulate in people
- May affect developing fetus and child
- Long half-lives in humans
- May increase cancer risk
- PFAS levels exceed EPA’s LTHA in drinking water in several states
PFAS Basics

- **Uses**
  - Non-stick cookware
  - Carpet and clothing treatments
  - Paper and cardboard packaging
  - AFFF fire-fighting foam

- **Sources**
  - Waste from manufacturing facilities
  - Fire-fighting foam run-off
  - PFC-containing sludge used as soil amendment

- **Exposure Pathways**
  - Drinking water
    - Private residential wells, municipal systems
  - Air and dust
  - Fish (in contaminated areas)
  - Consumer products
    - Food containers/wrapping
    - Clothing
    - Cookware
  - Produce
What other potential exposure points and pathways exist for PFAS?
Other Exposure Sources

- Cord Blood
- Occupational Settings
- Breast Milk
Health Effects (ATSDR, 2021)

- Increased cholesterol levels
- Changes in liver enzymes
- Small decreases in infant birth weights
- Decreased vaccine response in children
- Increased risk of high blood pressure or pre-eclampsia in pregnant women
- Increased risk of kidney or testicular cancer
Blood testing for PFAS
Blood Testing for PFAS

- Human exposure to PFAS is ubiquitous in both U.S. and globally
- No specific biomarkers of clinical effects caused by PFAS
- Presence of PFAS in blood confirms past exposure (distant or recent), but does not indicate development of adverse health effects and does not identify source of exposure

When is biomonitoring for PFAS exposure helpful?

- Identifying baseline levels
- Confirming exposures
- Identifying the prevalence of people above known toxicity levels
- Identifying temporal trends
- Assessing the effectiveness of public health efforts for reducing chemical exposures
- Informing occupational safety measures needed to prevent future exposures
- Setting priorities for future research efforts
What Serum PFAS Levels Cannot Do Alone
What Serum PFAS Levels CANNOT Do Alone

- Provide specific information about the sources of the PFAS
- Provide information about the frequency, duration, or pathway of exposure.
- Predict whether the presence of PFAS in the body will result in biological alterations or adverse health effects
Clinical Implications
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- The best strategy is prevention of exposure
- Therapies intended to reduce body burden by enhancing elimination of PFAS are not recommended
- Mitigating risk of disease involves reducing PFAS exposure and minimizing other disease risk factors
Clinical Implications

- Perform routine diagnostic/screening tests based on a thorough history, physical exam, and assessment – Clinician should use clinical judgement to determine appropriate uses of diagnostic tests and screenings.

- Currently, no specific testing or screening is recommended based on PFAS levels

- Cannot connect specific health problems to PFAS

- Repeat PFAS testing not medically indicated
Reducing Exposures to PFAS
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Drinking water filters
- Granular activated carbon (AC)
- Reverse osmosis (RO)

Baby formula - mixing with non-PFAS water

- Local fish advisories
- Consumer products
- Garden Soil
### Key Messages for Providers

1. Most people in the United States have some PFAS in their body.

2. Reducing exposures to PFAS is the most important step for families with concerns about PFAS. A home water filtration system can reduce the contaminant levels in drinking water. Reducing exposures from certain consumer products is also advisable.

3. If your patient presents with health concerns that might be associated with PFAS exposure, it is appropriate to discuss these concerns and perform a thorough exposure history and a physical exam relative to any symptoms reported.
Thank you!!