

ET Summit 2023

Presented by



PFAS and Refrigerants

A rapidly evolving legal and liability landscape



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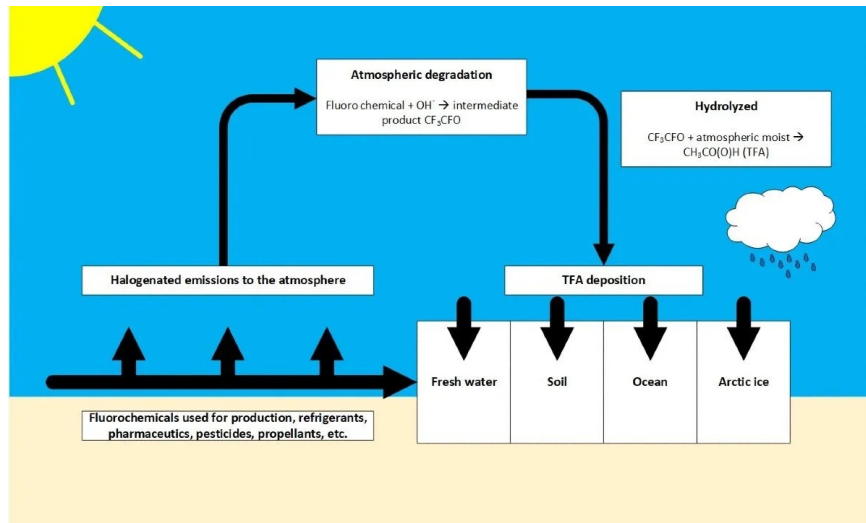
What are PFAS?

- Per-and polyfluoroalkyl substances
- *Thousands* of substances
- All have carbon-fluorine backbone
- All are persistent (nicknamed “forever chemicals”); many are bioaccumulative; all that have been tested are toxic
- Used as water and stain repellants; as surfactants; to resist heat
- They are ubiquitous! Firefighting foam, plastics, clothing, makeup, fertilizers, pesticides, paints

They are Found in Certain Refrigerants

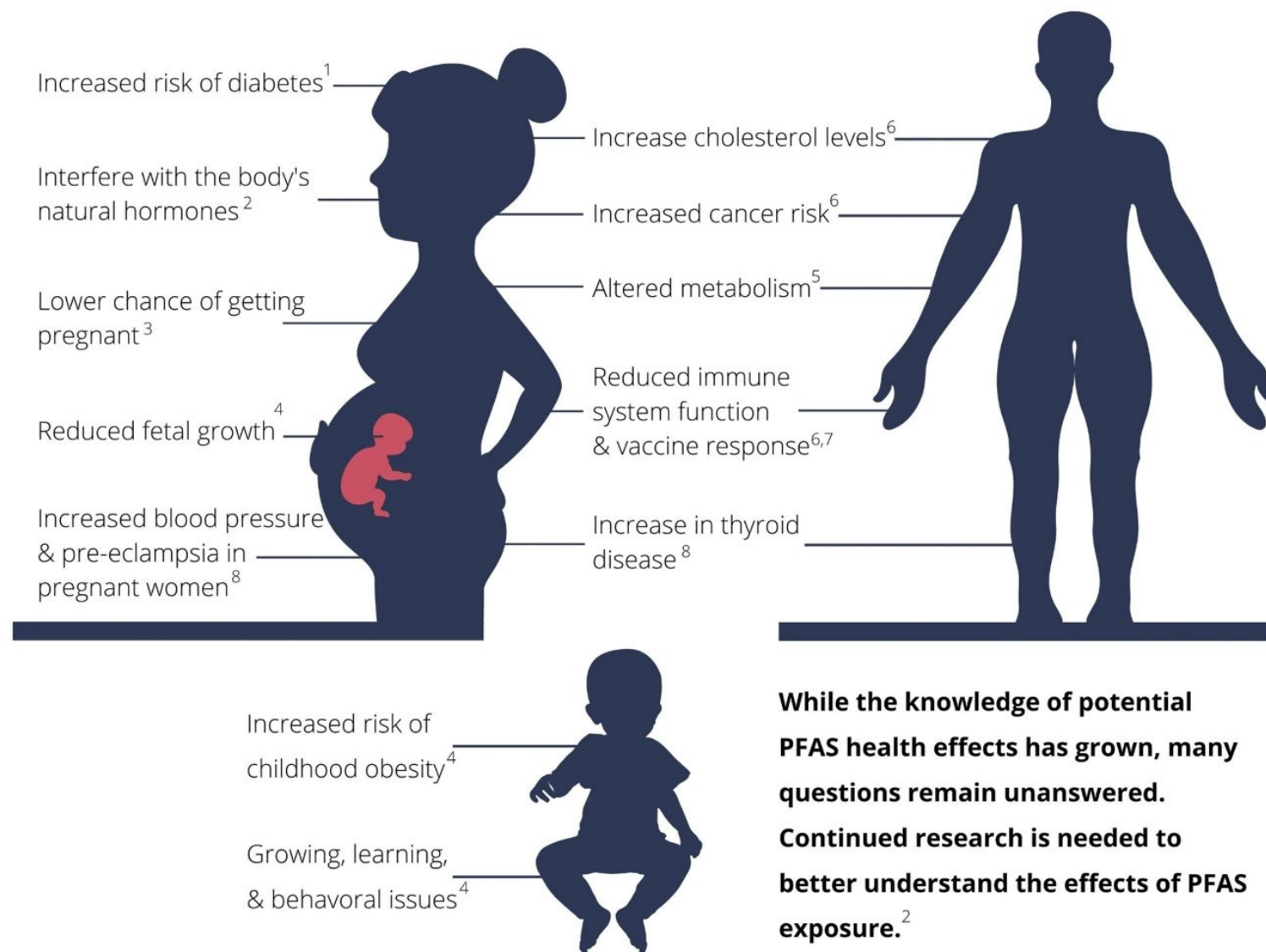


Concerns about TFA and Refrigerants



- Some fluorinated refrigerants degrade into Trifluoroacetic Acid (TFA)
- TFA is an ultra short-chain PFAS
- It is highly persistent in the environment
- Growing concerns about health impacts of TFA

A Growing Awareness of Health Risks of PFAS at Extremely Low Levels of Exposure



While the knowledge of potential PFAS health effects has grown, many questions remain unanswered. Continued research is needed to better understand the effects of PFAS exposure.²

How Toxic are They?

- Currently, some U.S. states regulate PFAS in **parts per trillion (ppt)**
- **How to grasp the concept of a ppt?**
 - 1 droplet of water in an Olympic-size swimming pool
- EPA is proposing to regulate 4 parts per trillion (ppt) in drinking water for two PFAS, PFOA and PFOS, respectively
- EPA is also proposing to limit any mixtures containing one or more of PFNA, PFHxS, PFBS, and Gen X, if the specific combination pose a potential risk

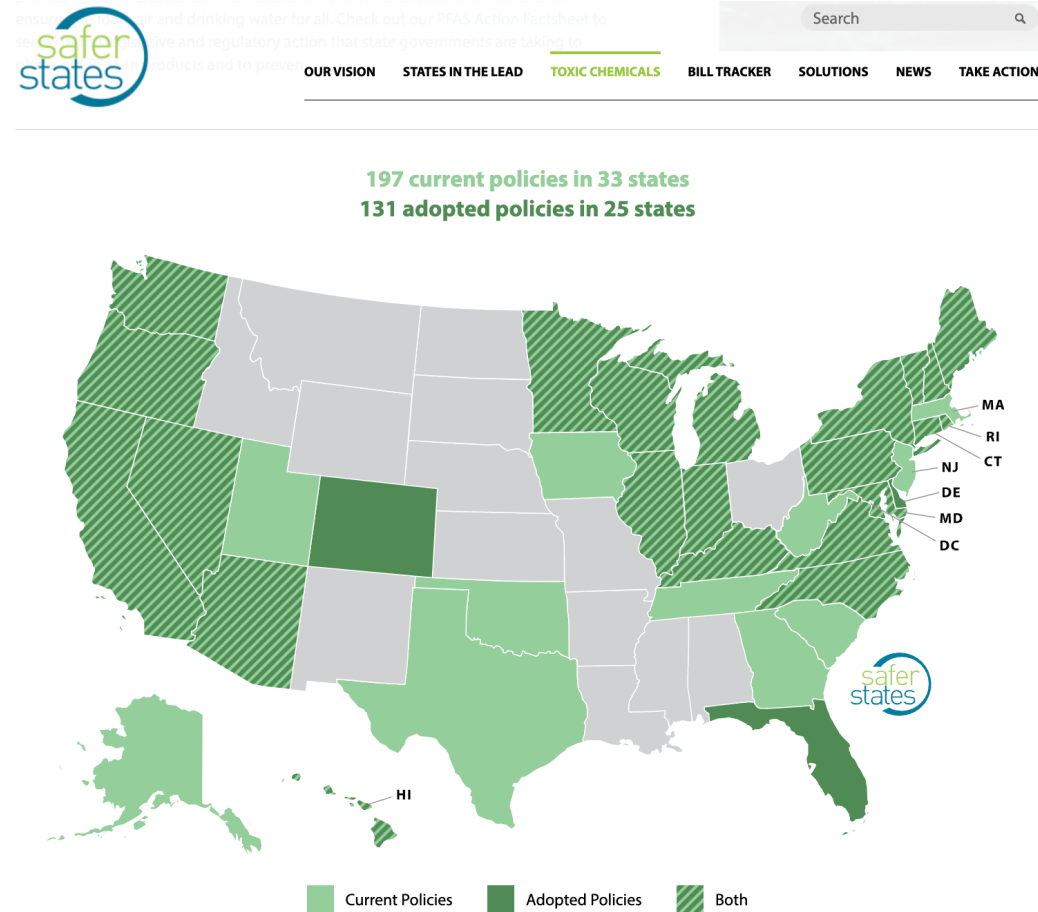
How are PFAS Defined?

- **European Union Approach** – Proposing to define PFAS as having one carbon-one fluorine bond
- This would cover around 10,000 different kinds of PFAS across the European Union (EU) and would affect single-component refrigerants such as R-125, R-134a, and R-1234yf, which are used in many lower-GWP HFC/HFO blends
- If approved, the proposal will become effective in 2025, with a transition period of 18 months for switching to alternative options
- The proposal contains some limited exemptions

How are PFAS Defined?

- **U.S. Environmental Protection Agency** – Case-by-case approach
- EPA's Office of Pollution Prevention and Toxics (OPPT) recently stated it *“is no longer using a ‘working definition’”* for PFAS and will identify specific PFAS covered in each regulatory action it takes
- In 2021, EPA released a PFAS Roadmap indicating a gradual tightening of legal restrictions and reporting requirements on PFAS

Rapidly Evolving Legal Landscape at the State Level



<https://www.saferstates.org/toxic-chemicals/pfas/>

What this Means for Immediate Future in U.S.

- No universal definition of PFAS
- Piecemeal legislation at the federal, state, and local level and increased litigation and consumer pressures
- Piecemeal approach is an unworkable solution
 - No capacity to evaluate all PFAS
 - PFAS doesn't know different EPA offices (water, air, solid waste, etc.)
 - Pollution doesn't know political boundaries
 - Precursors turn into terminal end products



PEER's Perspective

- PFAS is an issue of great concern for employees at all levels of government
- PFAS contamination destroys livelihoods, is very costly, and builds distrust
- There is a general feeling that the federal government and Congress are not acting with the urgency the moment requires
- Natural refrigerants are part of the solution



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