

2026 PFAS Summit

Recent Scientific Findings

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Declarations

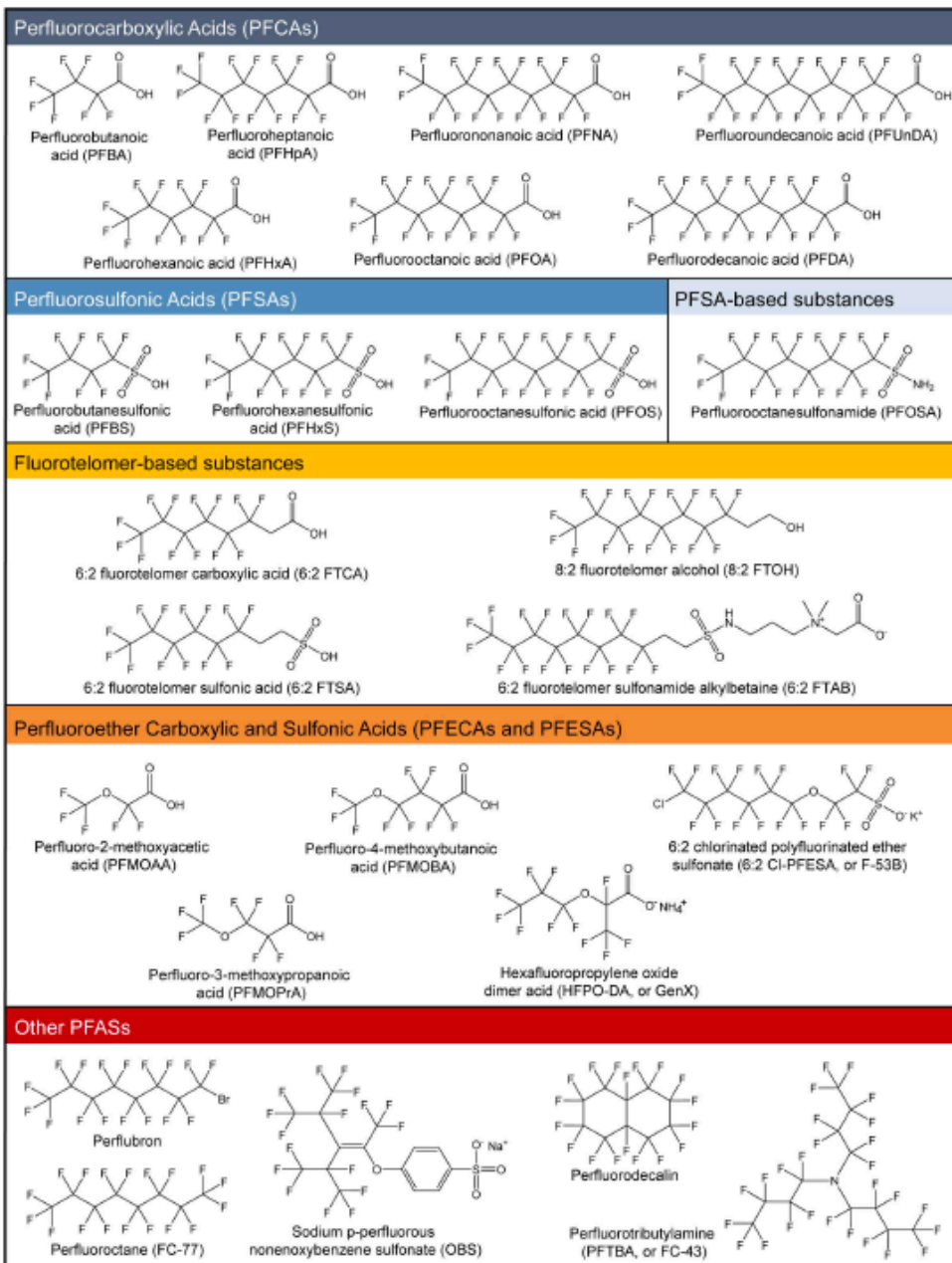
I currently am funded to study immune system effects of PFAS.

I was a member of the U.S. EPA PFAS Science Advisory Board for the MCLs/MCLGs for six PFAS regulated in drinking water in the US.

I was a PFAS Fellow at the NC Department of Environmental Quality in 2022 and worked with staff on PFAS-related scientific issues.

I often speak publicly about my understanding of PFAS toxicity, serve/have served as a plaintiff's expert witness in PFAS cases, advocate for the need to protect human health from their exposures to PFAS, and am a proponent of the essential use concept and the class approach for PFAS management.

The many structures of PFAS



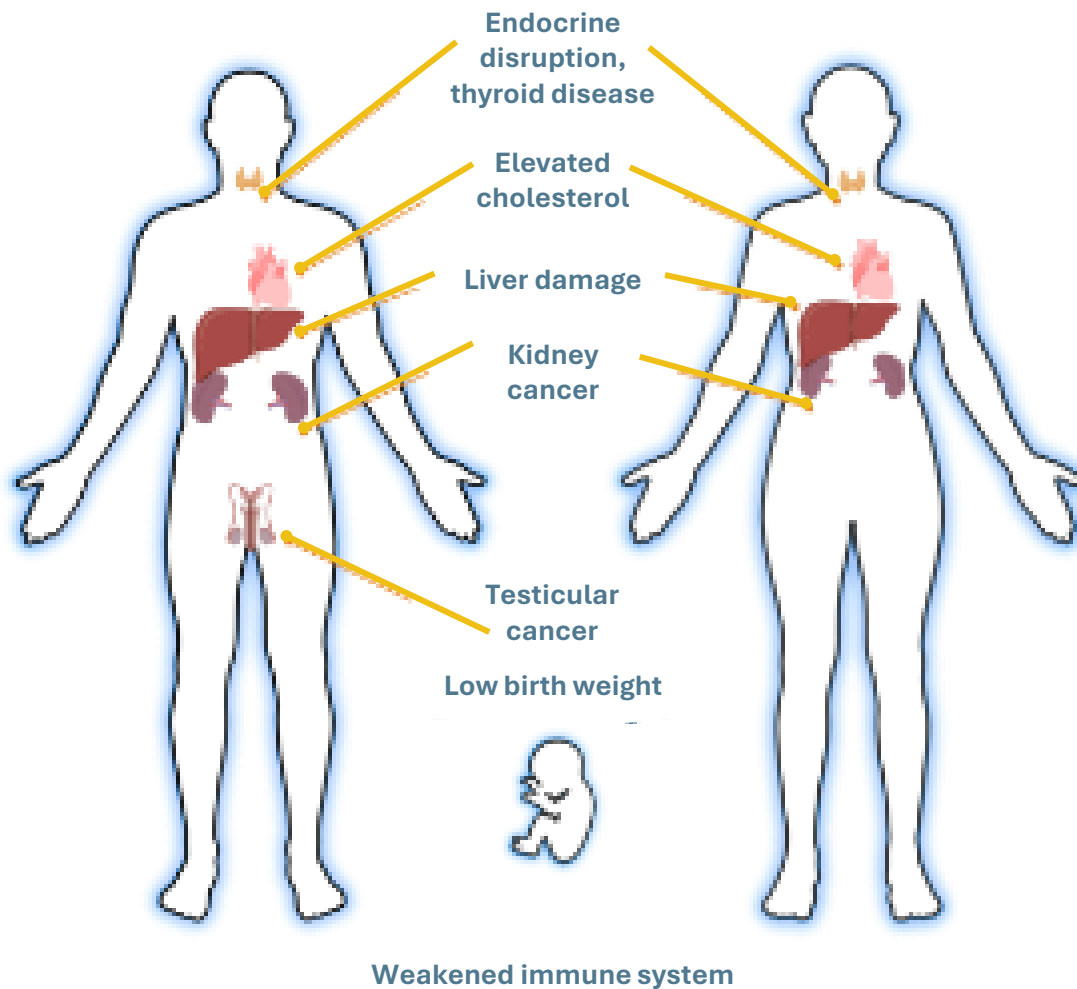
Most epidemiological & toxicological data come from studies of these PFAS such as PFOA and PFOS.

These often are called “precursor PFAS.” They can degrade to other PFAS such as PFOA and PFOS.

These are some of the “replacement” PFAS that have been found in specific geographic areas.

PFAS exposure and health risks:

Risks with high certainty

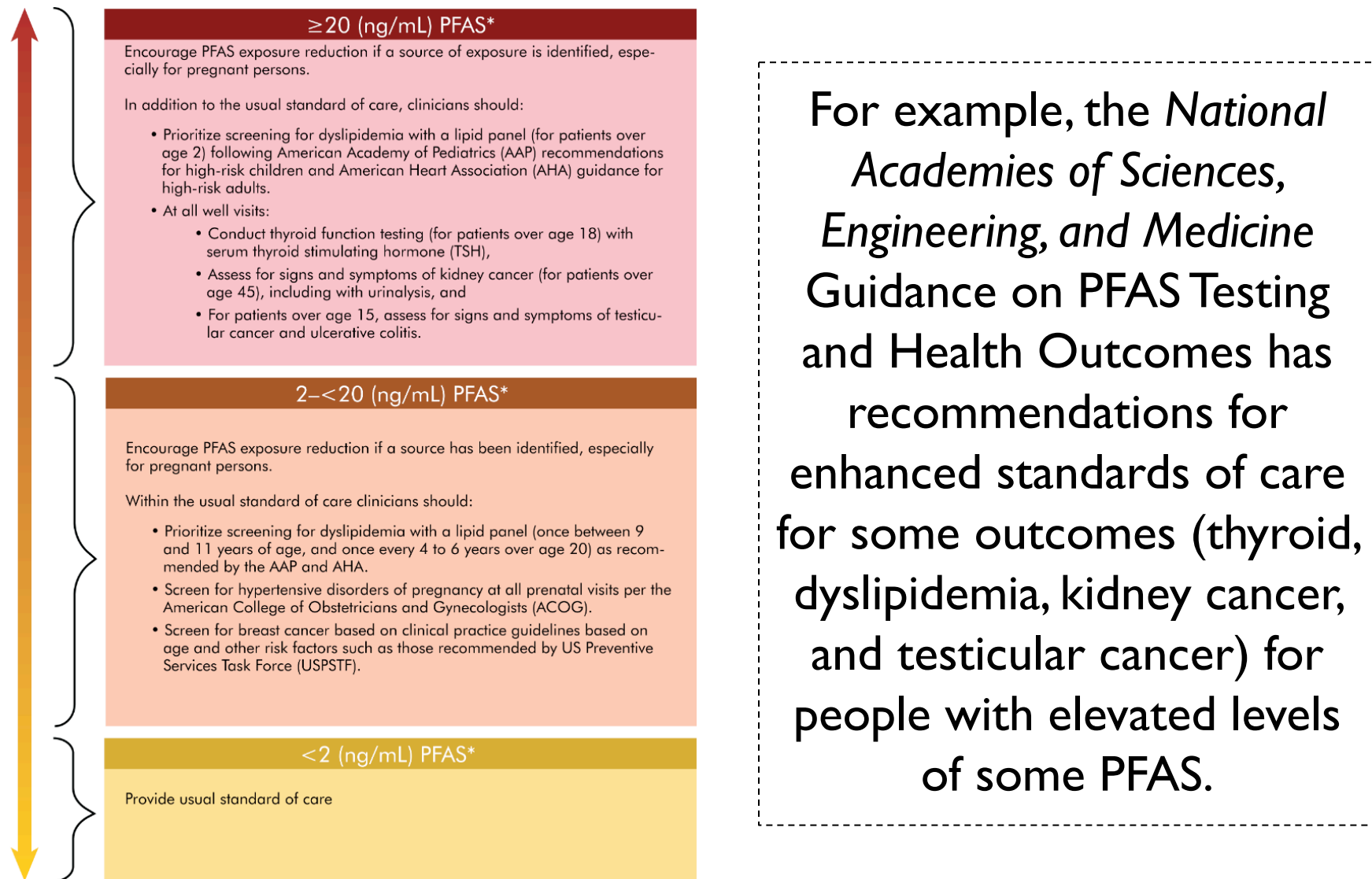


High certainty:
Agreement on strength of evidence of health risks* by majority of agencies/entities that have conducted systematic reviews and analyses of data.

*Health risks are mostly attributed to PFOA, PFOS, and a few other similar PFAS.

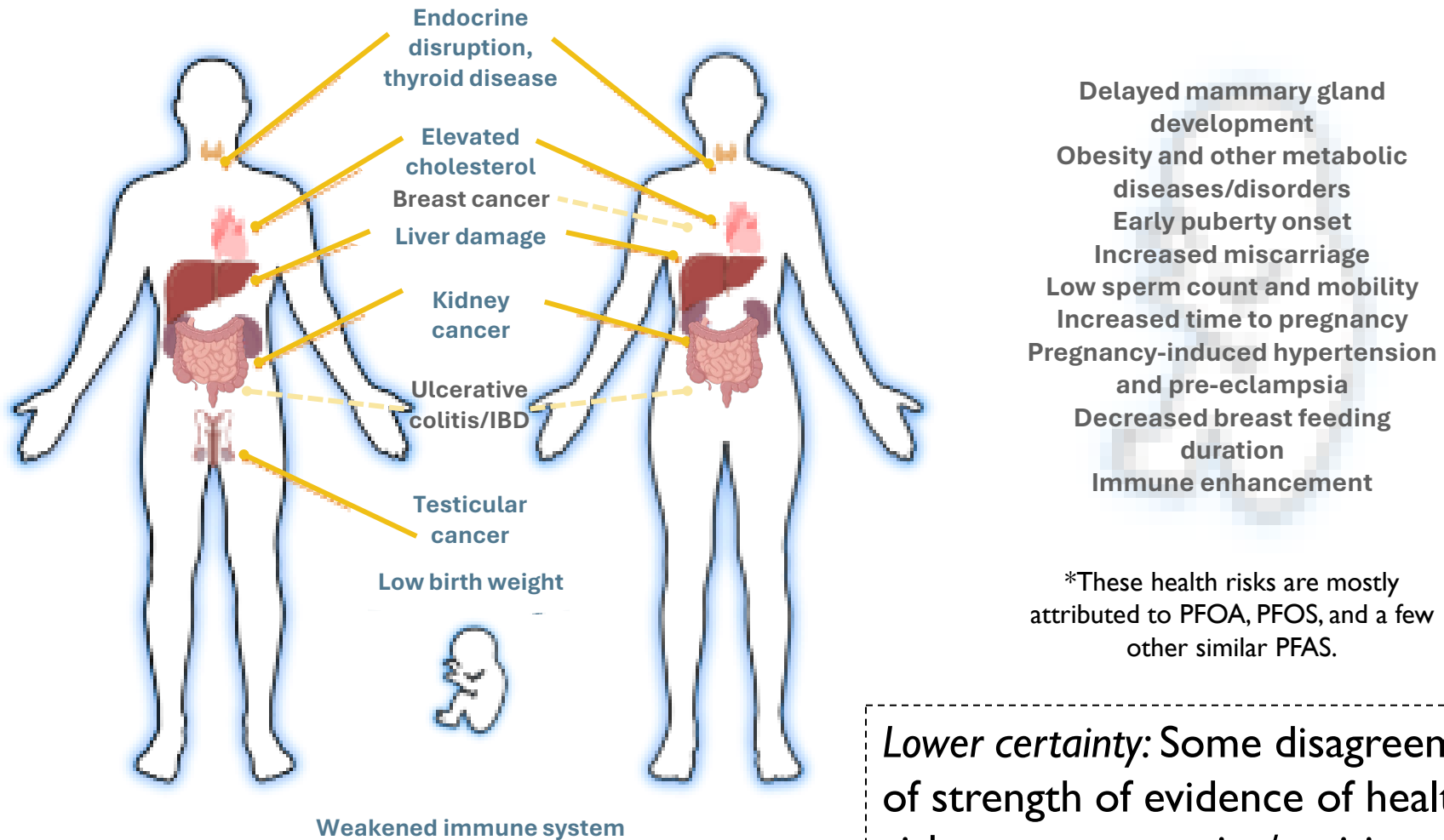
PFAS exposure and health risks:

Risks with high certainty



PFAS exposure and health risks:

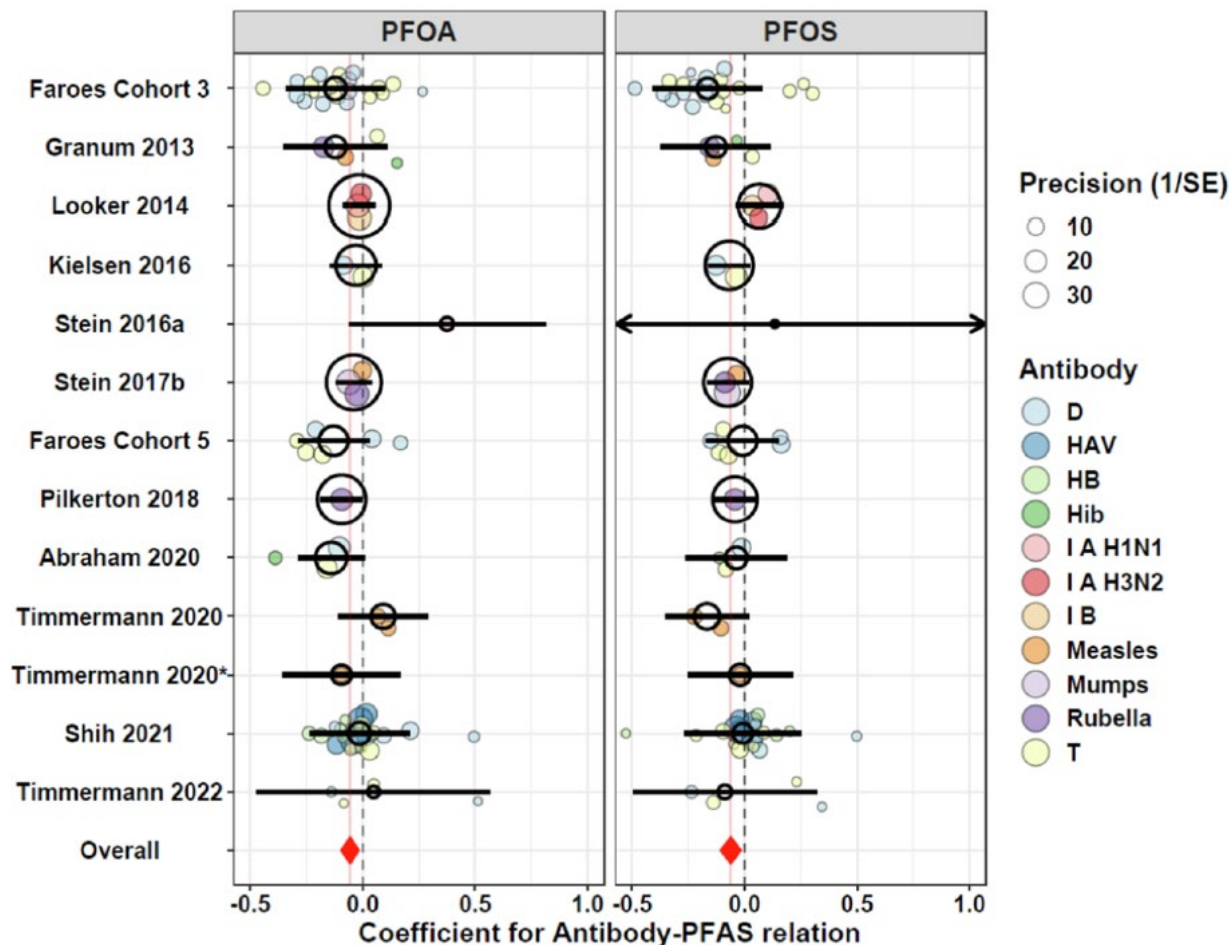
Risks with lower certainty



*These health risks are mostly attributed to PFOA, PFOS, and a few other similar PFAS.

Lower certainty: Some disagreement of strength of evidence of health risks among agencies/entities.

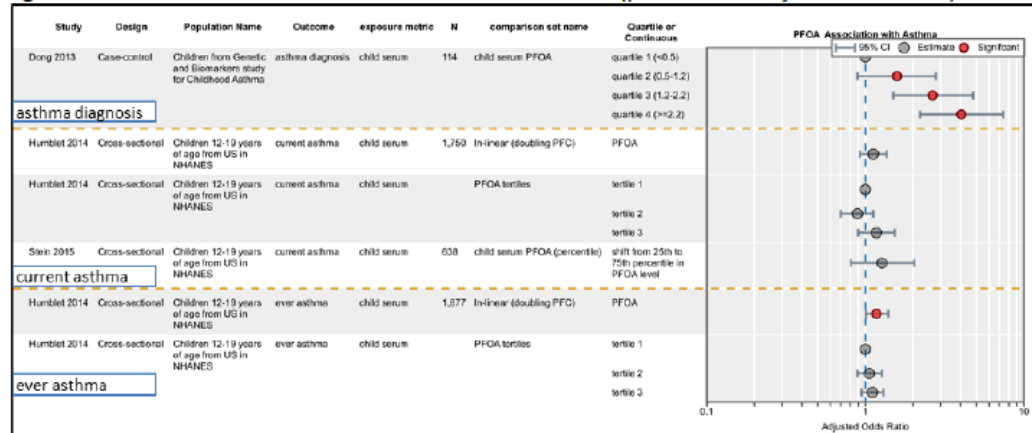
High certainty: Immune suppression



Overall, vaccine responses are suppressed following exposure to PFOA or PFOS. This is across different vaccines and studies.

Lower certainty: Immune enhancement

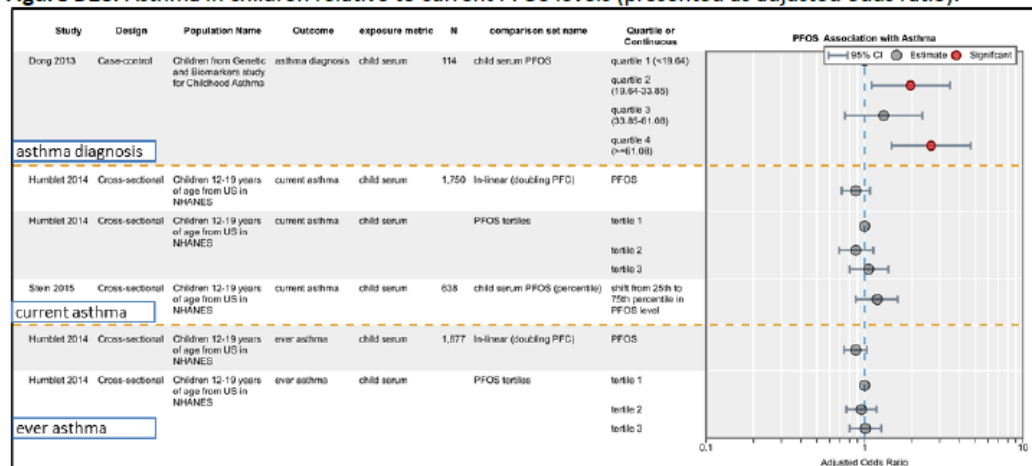
Figure D27. Asthma in children relative to current PFOA levels (presented as adjusted odds ratio)



(Interactive figure and additional study details in HAWC [Figure D27 - PFOA Asthma in children](#))

Enhanced responses appear to increase following exposure to PFOA or PFOS.

Figure D28. Asthma in children relative to current PFOS levels (presented as adjusted odds ratio).



(Interactive figure and additional study details in HAWC [Figure D28 - PFOS Asthma in children](#))

Lower certainty:
-Fewer studies
-Mix of endpoints
-Mixed results

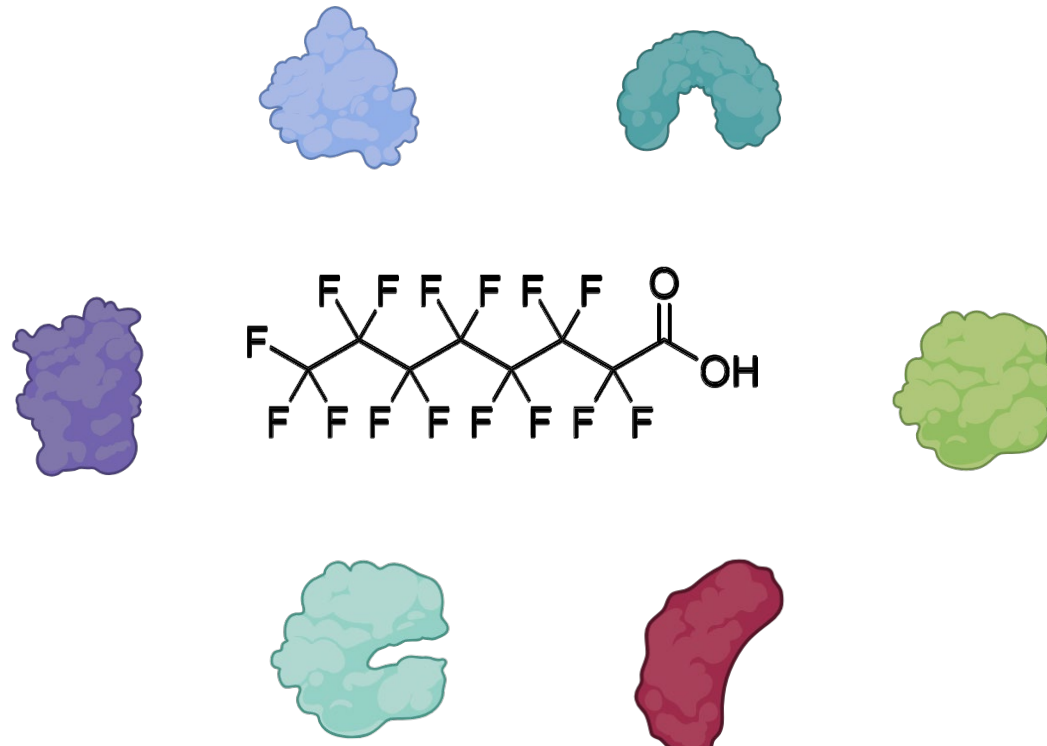
But wait...



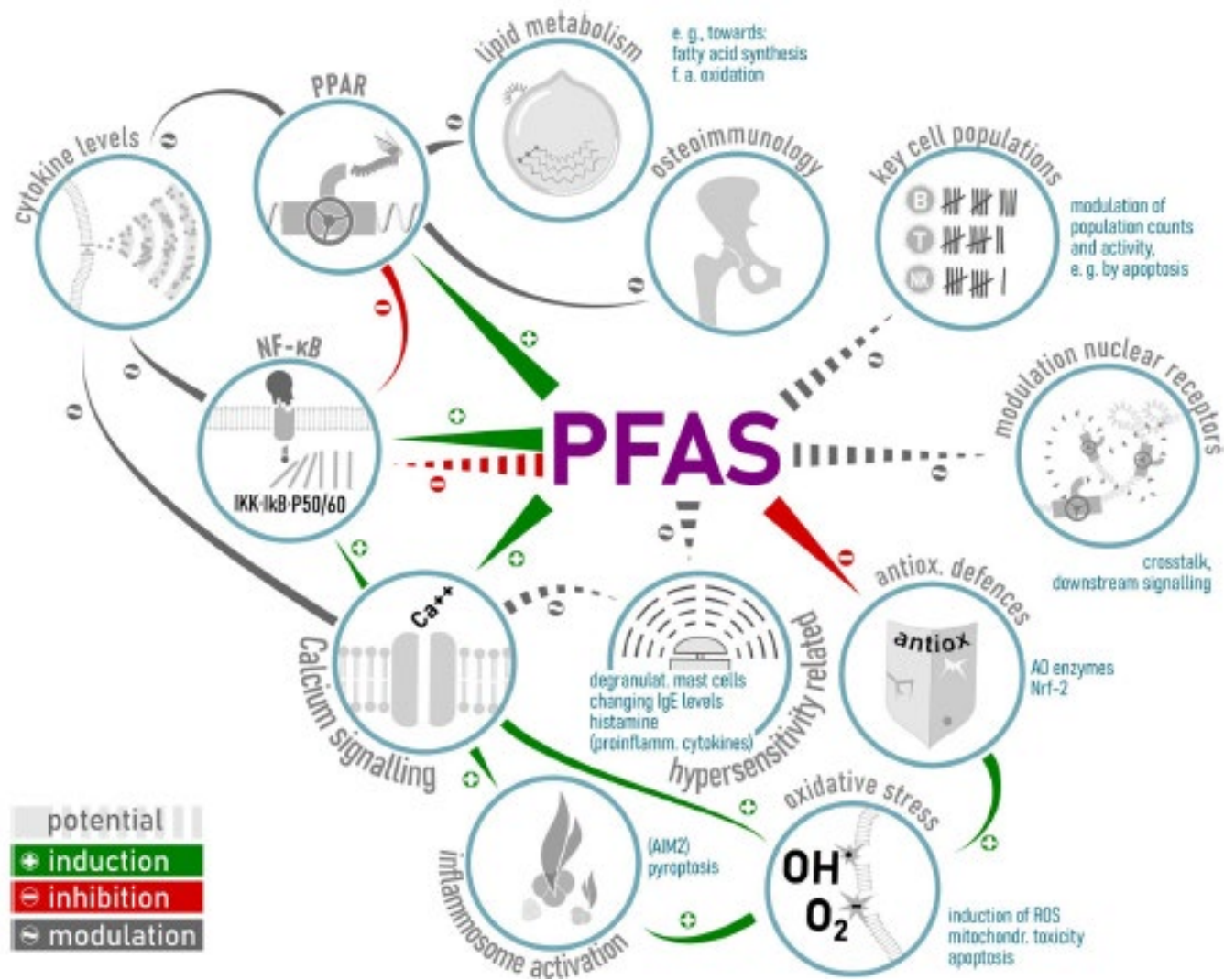
How can PFOA and PFOS produce immune suppression AND immune enhancement? Aren't these opposite effects?

PFAS-protein interactions

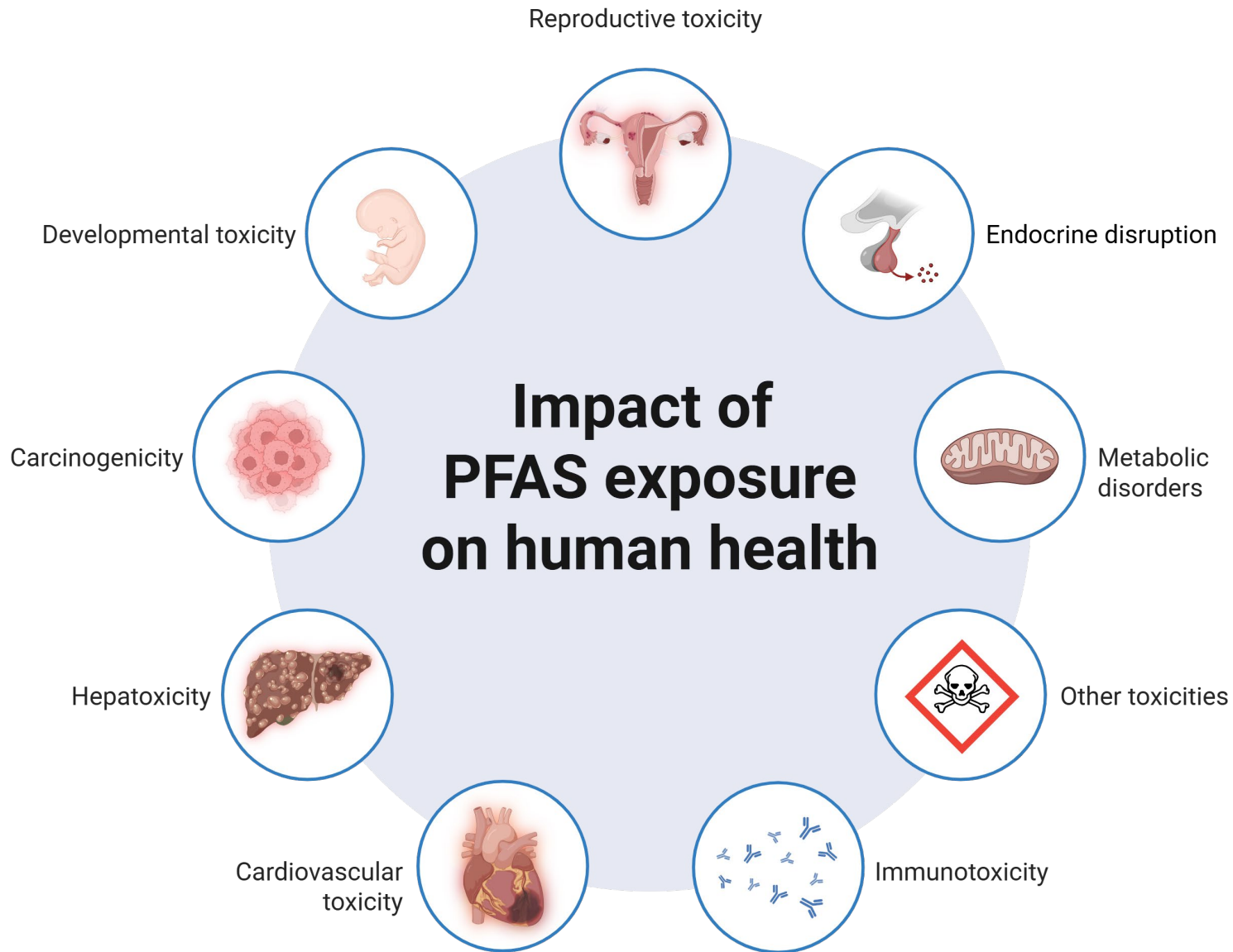
PFAS can interact with multiple proteins across systems, tissues, and cells, to produce a range to adverse health risks, even within the same system, tissues, or cells!



The immune system for example



Where should PFAS science go next?



Where should PFAS science go next?



Descriptive
Focus on
evaluating
understudied
PFAS to support
environmental
public health
decision-making.



Mechanistic
Focus on
identifying
molecular
mechanisms to
support
predictive
toxicity.



Therapeutic
Focus on
developing
approaches to
mitigate
exposures and
linked health
effects.

For more in-depth science



Interstate Technology Regulatory Council. Comprehensive overview of all things PFAS. Focus on detailed science.



PFAS Central (Green Science Policy Institute). PFAS news and policy. Focus on resources for consumers.



US Environmental Protection Agency. Describes agency actions on PFAS and includes toxicity assessments. Focus on science.



US Agency for Toxic Substances & Disease Registry. Overview of PFAS health effects. Focus on clinical/public health messages.



PFAS Exchange (Silent Spring Institute). Comprehensive resource center. Focus on resources for impacted populations.

Thank you for listening.

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- US EPA. <https://www.epa.gov/pfas>.
- ATSDR. <https://www.atsdr.cdc.gov/pfas/index.html>.
- PFAS Central. <https://pfascentral.org/>.
- PFAS Exchange. <https://pfas-exchange.org/>.