

State and EPA Drinking Water Guidelines for Per- and Polyfluoroalkyl Substances (PFAS)



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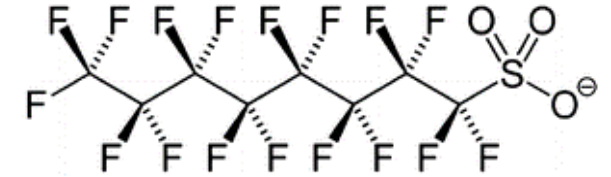
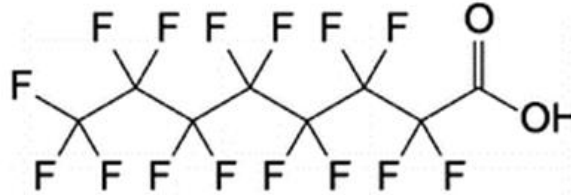
How States and Communities Are Using Science to Address PFAS

National Governors Association and AAAS EPI Center

June 10, 2021

Why are PFAS of particular concern as drinking water contaminants?

- Widespread occurrence.
- Do not break down.
- Numerous toxic effects in animal studies.
- PFOA, PFOS, and other long-chain PFAS:
 - Bioaccumulate, remain in the body for many years after exposure ends.
 - Evidence for human health effects even at general population exposures.
 - Higher exposure from drinking water at low levels (e.g., ~20 ng/L for PFOA) than from generally prevalent sources (food, consumer products).
- Infants (a sensitive subpopulation) have higher exposure from contaminated drinking water.
- **Overall - indicates need for caution for drinking water exposure.**



EPA & State Guidelines for Drinking Water Contaminants

Include:

- Standards: *EPA and state Maximum Contaminant Levels (MCLs)*
- Guidance: *EPA Health Advisories; state guidance values*

State Drinking Water Standards (MCLs)

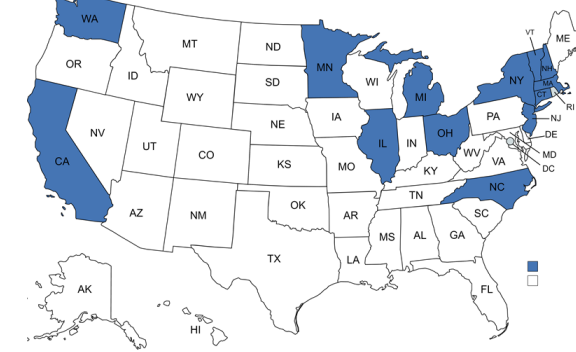


- May address contaminants with **no federal MCLs**, such as PFAS.
- May be **more stringent** than federal MCLs.
- Some states have developed their own MCLs for many years.
- Other states developed MCLs for the first time for PFAS.
- Many states do not develop their own MCLs.
 - *May be precluded from doing so by state law.*
 - *May not have expertise and resources to do so.*

EPA & State PFAS Drinking Water Guidelines

(ng/L, ppt; includes standards & guidance values - proposed, recommended, & final)

	PFOA	PFOS	PFNA	PFHxS	PFHpA	PFDA	Total?	PFBA	PFHxA	PFBS	GenX
EPA	70	70	---	---	---	---	<i>Yes (2)</i>	---	---	---	---
CA*	5.1/ 10	6.5/ 40	---	---	---	---	<i>No</i>	---	---	500/ 5000	---
CT	70	70	70	70	70	---	<i>Yes (5)</i>	---	---	---	---
IL	2	14	---	140	---	---	<i>No</i>	---	160,000	---	---
MA	20	20	20	20	20	20	<i>Yes (6)</i>	---	---	2000	---
MI	8	16	6	51	---	---	<i>No</i>	---	400,000	420	370
MN	35	15	---	47	---	---	<i>No</i>	7000	---	2000	---
NH	12	15	11	18	---	---	<i>No</i>	---	---	---	---
NJ	14	13	13	---	---	---	<i>No</i>	---	---	---	---
NY	10	10	---	---	---	---	<i>No</i>	---	---	---	---
NC	---	---	---	---	---	---	---	---	---	---	140
OH	70	70	21	140	---	---	---	---	---	140,000	---
VT	20	20	20	20	20	---	<i>Yes (5)</i>	---	---	---	---
WA	10	15	13	65	---	---	<i>No</i>	---	---	345	---

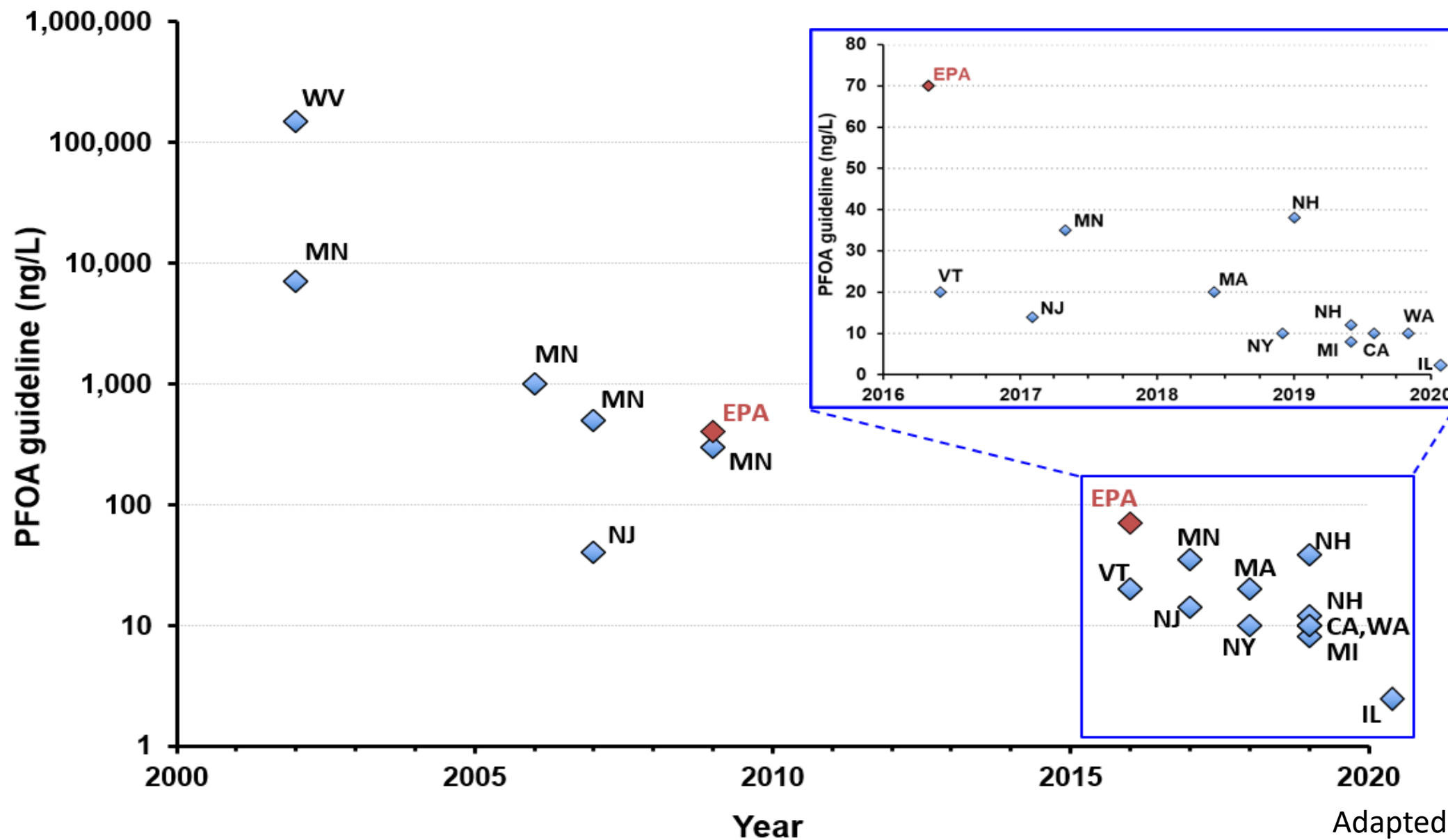


States not listed generally use EPA Health Advisories of 70 ng/L for PFOA and PFOS as guidance.

* California Notification Level/Response Level

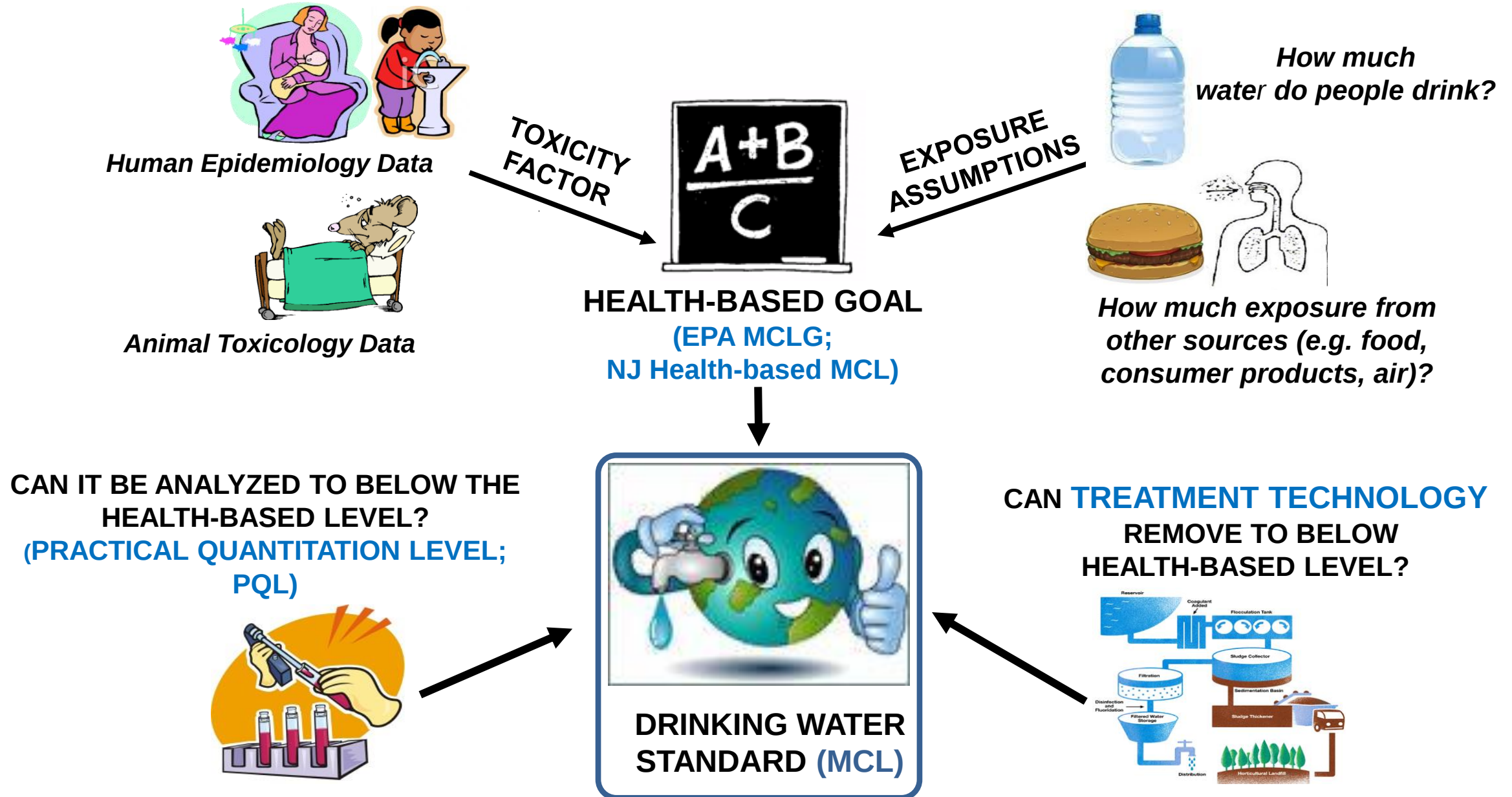
Adapted from Post (2021)

Decrease in PFOA Drinking Water Guidelines Over Time



Adapted from Post (2021)

How are drinking water standards developed?



Why are there differences among state PFAS drinking water guidelines?

All states used risk assessment approaches recommended by EPA.

However....

- *Guidelines are based on scientific data available at the time.*
- *Risk assessment is not a “cookbook” – it involves scientific judgement.*

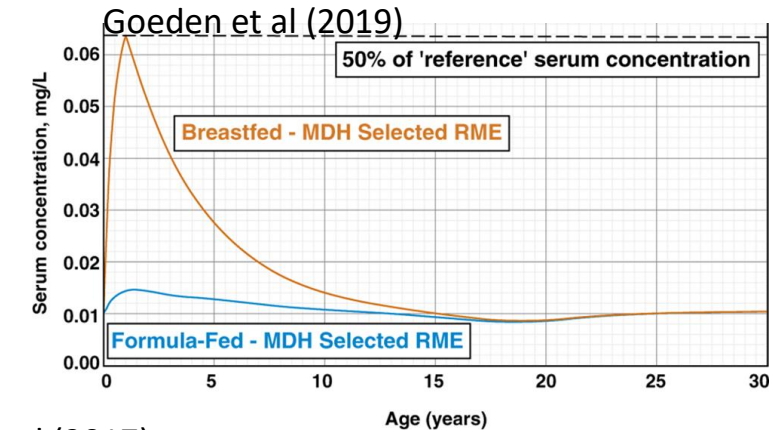
Numerical differences among state values are not large or unexpected:

- In the context of independently derived risk-based values.*
- Especially as compared to older values that were generally **100s to 1000s of times higher.***

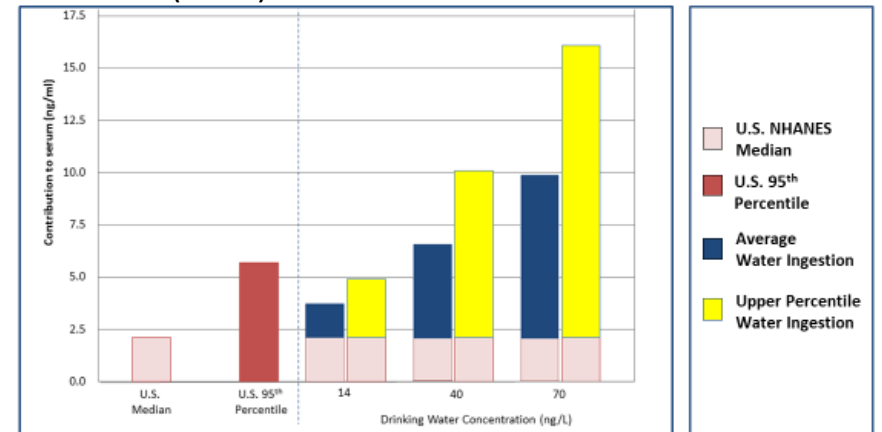
Why are state drinking water guidelines lower than EPA Health Advisories?

These states conclude that EPA PFOA and PFOS Health Advisories of 70 ng/L are **not sufficiently protective** for one or more of the following reasons:

1. Most states consider **more sensitive toxicological effects** than EPA Health Advisories.
 - e.g., immune system suppression, mammary gland development.
2. Some states model **higher exposures to breastfed infants** via contaminated water.
 - Model not available when EPA Health Advisories developed in 2016.
3. Some states consider **increase in blood serum PFAS levels** from contaminated drinking water.
 - Blood serum levels from drinking water at EPA Health Advisory (70 ng/L) are associated with multiple human health effects.
 - Not considered in EPA Health Advisories.



Post et al (2017)



Why are drinking water standards for PFAS lower than for many other contaminants?

Some major reasons:

- 1. Health-based levels** are low because PFAS are highly bioaccumulative in humans.
- 2. Analytical and treatment removal technology** considerations do not prevent setting PFAS standards at health-based levels.
 - For some other contaminants, standard must be set higher than health-based level.

<i>(Units are ng/L, ppt)</i>	New Jersey Health-based MCL	Analytical Limit	Treatment Removal Limit	New Jersey Drinking Water Standard (MCL)
PFOA	14	6	Not limiting	14
Chlordane	13	500	Not limiting	500
Arsenic	3	3000	5000	5000

Resources:

- Interstate Technology & Regulatory Council (ITRC) [PFAS Water and Soil Values Table Excel file](#) (updated monthly)
- Environmental Council of the States (ECOS) White Paper: Processes and Considerations for Setting State PFAS Standards, 2021 update.
<https://www.ecos.org/documents/ecos-white-paper-processes-and-considerations-for-setting-state-pfas-standards-2021-update/>
- Post G. B. (2021). Recent US State and Federal Drinking Water Guidelines for Per- and Polyfluoroalkyl Substances. Environmental Toxicology & Chemistry 40: 550–563.
Open access at: <https://setac.onlinelibrary.wiley.com/doi/epdf/10.1002/etc.4863>

For questions or additional information:

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