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)

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</table>

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?

- Human Epidemiology Data
- Animal Toxicology Data

**TOXICITY FACTOR**

HEALTH-BASED GOAL
(EPA MCLG; NJ Health-based MCL)

**EXPOSURE ASSUMPTIONS**

CAN IT BE ANALYZED TO BELOW THE HEALTH-BASED LEVEL?
(PRACTICAL QUANTITATION LEVEL; PQL)

CAN TREATMENT TECHNOLOGY REMOVE TO BELOW HEALTH-BASED LEVEL?

How much water do people drink?

How much exposure from other sources (e.g. food, consumer products, air)?
**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.
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.

<table>
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<th>(Units are ng/L, ppt)</th>
<th>New Jersey Health-based MCL</th>
<th>Analytical Limit</th>
<th>Treatment Removal Limit</th>
<th>New Jersey Drinking Water Standard (MCL)</th>
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Resources:

- Interstate Technology & Regulatory Council (ITRC) PFAS Water and Soil Values Table Excel file (updated monthly)


For questions or additional information:

gloria.post@dep.nj.gov