PFAS Health Advisories for PFAS – Public FAQs for EPA Website

1. **What is a drinking water health advisory?**
   A health advisory provides information on a contaminant that can cause negative human health effects and is known or anticipated to occur in drinking water. EPA's health advisories are non-enforceable and non-regulatory. They provide technical information to drinking water system operators, as well as federal, state, Tribal, and local officials, on the health effects, analytical methods, and treatment technologies associated with drinking water contaminants. This health effects information includes the concentrations of such drinking water contaminants (the health advisory "levels" or "values") at which adverse health effects are not anticipated to occur over specific exposure durations, such as one-day, 10-days or a lifetime.

   EPA's health advisory levels offer information that may be used to protect people from adverse health effects resulting from exposure throughout their lives to contaminants in drinking water.

2. **What are PFAS? What are PFOA, PFOS, GenX chemicals, and PFBS?**
   Per- and poly-fluoroalkyl substances (PFAS) are a large and diverse group of chemicals used in many commercial applications due to their unique properties, such as resistance to high and low temperatures, resistance to degradation, and nonstick characteristics. Although PFAS have been manufactured and used broadly in commerce since the 1940s, concern over potential adverse effects on human health grew in the early 2000s with the detection of perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) in human blood. Since that time, hundreds of different PFAS have been found in water, soil, and air. Many PFAS are made up of long chains of carbon-fluorine bonds, such as PFOA and PFOS, are environmentally persistent, bioaccumulative, and remain in human bodies for a long time.

   Most uses of PFOA and PFOS were voluntarily phased out by U.S. manufacturers in the mid-2000s, although there are a limited number of ongoing uses, and these chemicals remain in the environment due to their persistence and lack of degradation. In addition, some newer PFAS in use break down into PFOA and PFOS.

   PFAS made up of fewer carbon atoms, such as hexafluoropropylene oxide (HFPO) dimer acid and its ammonium salt (together referred to as "GenX chemicals") and perfluorobutane sulfonic acid and its related compound potassium perfluorobutane sulfonate (together referred to as "PFBS"), were developed to replace PFOA and PFOS, respectively, and are used to make various consumer products and in industrial applications because they confer the similar desired properties and characteristics but are more quickly eliminated from the human body than PFOA and PFOS.

3. **What health effects are the basis for these health advisories?**
   The interim updated health advisories for **PFOA** and **PFOS** are based on human epidemiology studies in populations exposed to these chemicals. Based on the new data

and EPA's draft analyses, the levels at which negative health effects could occur are much lower than previously understood when EPA issued the 2016 health advisories for PFOA and PFOS (70 parts per trillion or ppt) – including near zero for certain health effects.

Human studies have found associations between PFOA and/or PFOS exposure and effects on the immune system, the cardiovascular system, human development (e.g., decreased birth weight), and cancer. The most sensitive non-cancer effect and the basis for the interim updated health advisories for PFOA and PFOS is suppression of vaccine response (decreased serum antibody concentrations) in children. (If you have questions about PFAS and COVID-19 vaccines please see question 13, below.) EPA has not derived a cancer risk concentration in water for PFOA or PFOS at this time because the cancer analyses are ongoing.

The final health advisories for **GenX chemicals** and **PFBS** are based on animal toxicity studies following oral exposure to these chemicals. GenX chemicals have been linked to health effects on the liver, the kidney, the immune system, and developmental effects, as well as cancer. The most sensitive non-cancer effect and the basis for the final health advisory for GenX chemicals is a liver effect (constellation of liver lesions). There is suggestive evidence of carcinogenic potential of oral exposure to GenX chemicals, but there are not sufficient data to calculate a cancer risk concentration in water for GenX chemicals at this time. Animal studies following oral exposure to PFBS have shown health effects on the thyroid, reproductive organs and tissues, developing fetus, and kidney. The most sensitive non-cancer effect and the basis for the final health advisory for PFBS is a thyroid effect (decreased serum total thyroxine). There are no known studies evaluating potential cancer effects of PFBS so the potential for cancer effects after PFBS exposure could not be evaluated.

4. **What is a *lifetime* health advisory?**
   EPA's lifetime health advisories identify levels to protect all people, including sensitive populations and life stages, from adverse health effects resulting from exposure throughout their lives to these PFAS in drinking water. The health advisory levels were calculated to offer a margin of protection against adverse health effects. EPA's lifetime health advisories also take into account other potential sources of exposure to these PFAS beyond drinking water (for example, food, air, consumer products, etc.), which provides an additional layer of protection.

5. **What are the interim updated health advisory levels for PFOA and PFOS and the final health advisory levels for GenX chemicals and PFBS?**
   EPA's lifetime health advisory levels, measured in parts per trillion (ppt), offer protection for people from adverse health effects resulting from exposure throughout their lives to these individual PFAS in drinking water:

   - Interim updated health advisory for PFOA = 0.004 ppt
   - Interim updated health advisory for PFOS = 0.02 ppt
   - Final health advisory for GenX chemicals = 10 ppt

- Final health advisory for PFBS = 2,000 ppt

6. **My water has measurable levels of PFOA/PFOS or GenX chemicals/PFBS in it at levels above the health advisory:**

Should I be concerned about my health? EPA's lifetime health advisory levels offer information that indicates the safe levels of exposure to these individual PFAS (PFOA, PFOS, GenX Chemicals, and PFBS) through drinking water over the course of a person's lifetime, to avoid adverse health effects. It is important to note that lifetime health advisories are calculated to offer a margin of protection that also takes into account exposure through other sources beyond drinking water. If you are concerned about potential health effects from exposure to these PFAS above the health advisory level, EPA encourages you to contact your doctor or health care professional.

Should I stop breastfeeding my infant? The World Health Organization, U.S. Surgeon General, and the American Academy of Pediatrics, among others, believe the advantages of breastfeeding greatly outweigh the potential risks in nearly every circumstance. EPA encourages women and people who are currently pregnant, nursing, or bottle feeding an infant with formula to consult with their physician regarding concerns related to breastfeeding and potential exposure to chemicals such as PFAS. For more information about PFAS and breastfeeding, visit the CDC's (Agency for Toxic Substances and Disease Registry) webpage on PFAS and Breastfeeding.

Is my water safe for bathing/showering? EPA's health advisories are primarily focused on drinking water ingestion, not exposure through skin or breathing. However, they account for a margin of safety for other potential exposure sources, such as through skin (dermal), breathing (inhalation), dietary exposure, consumer products, etc. Studies have shown that only a small amount of PFAS can get into your body through skin.

Can PFAS be boiled out of my water? No. PFAS cannot be removed by heating or boiling water.

Should I drink bottled water? At this time, EPA is not recommending bottled water for communities based solely on concentrations of these chemicals in drinking water that exceed the health advisory levels. If you are concerned about PFAS in your tap water, EPA recommends you contact your local water utility to see whether they can provide any specific recommendations for your community. EPA notes that the U.S. Food and Drug Administration has not established standards for PFAS in bottled water at this time. If you have questions about bottled water, please contact the FDA.

We know that the lower the levels of PFOA and PFOS, the lower the risk. Therefore, EPA recommends that communities and water systems that measure any levels of PFOA or PFOS or that measure Gen X chemicals or PFBS at levels higher than the health advisory levels inform their customers and consider taking actions to reduce PFAS levels in their drinking

water by installing treatment technologies or obtaining a new uncontaminated source of drinking water, if available.

Individuals who are concerned about PFAS in their wells or in their homes may consider in-home water treatment filters that are certified to lower the levels of PFAS in water. You can find more about these filters at: https://www.epa.gov/sciencematters/epa-researchers-investigate-effectiveness-point-usepoint-entry-systems-remove-and. If you are concerned about potential health effects from exposure to these PFAS above the health advisory level, contact your doctor or health care professional.

7. **What are the lowest levels that PFOA, PFOS, GenX chemicals and PFBS can be reliably measured in water, and how do those levels compare to the health advisories?**
Based on current methods, the health advisory levels for PFOA and PFOS are below the level of both detection (determining *whether* or not a substance is present) and quantitation (the ability to reliably determine *how much* of a substance is present). This means that it is possible for PFOA or PFOS to be present in drinking water at levels that exceed health advisories even if testing indicates no level of these chemicals.

Based on current methods, the health advisory levels for GenX chemicals and PFBS are above both the detection and quantitation levels, and therefore can be reliably measured using specified analytical methods in appropriate laboratory settings. Please see the below table for more information.

In EPA's fifth Unregulated Contaminant Monitoring Rule (UCMR 5), the agency established minimum reporting levels (MRLs) for the UCMR 5 contaminants, including 29 PFAS chemicals. EPA establishes MRLs to ensure consistency in the quality of the information reported to the agency. The MRL is the minimum quantitation level that, with 95 percent confidence, can be achieved by capable analysts at 75 percent or more of the laboratories using a specified analytical method (recognizing that individual laboratories may be able to measure at lower levels). The UCMR 5 MRLs for these four PFAS and the health advisories are summarized in the table below:

Chemical	Minimum Reporting Level (ppt)	Lifetime Health Advisory Level (ppt)
PFOA	4	0.004 (Interim)
PFOS	4	0.02 (Interim)
GenX Chemicals	5	10 (Final)
PFBS	3	2,000 (Final)

8. **Is EPA going to establish a national drinking water regulation for PFOA, PFOS and additional PFAS?**
EPA is developing a proposed National Drinking Water Regulation for publication by the end of 2022 for PFOA and PFOS. As EPA undertakes this action, the agency is also evaluating additional PFAS and considering regulatory actions to address groups of PFAS. EPA

anticipates finalizing the rule by the end of 2023. The proposal will include both a non-enforceable Maximum Contaminant Level Goal (MCLG) and an enforceable standard, or Maximum Contaminant Level (MCL) or Treatment Technique.

The MCLG is the maximum level of a contaminant in drinking water at which no known or anticipated adverse effect on the health of persons would occur, allowing an adequate margin of safety. The enforceable standard is set as close as feasible to MCLG. EPA considers the ability to measure and treat a contaminant as well as costs and benefits in setting the enforceable standard.

For more information visit: https://www.epa.gov/sdwa/how-epa-regulates-drinking-water-contaminants.

9. **What's the difference between an "interim" and a "final" health advisory?**
EPA issues an interim health advisory when a contaminant's associated health effects assessment is in draft form, but there is a pressing need to provide information to public health officials prior to finalization of the health effects assessment.

The PFOA and PFOS interim health advisories are intended to be in place during the time interval between initial understanding of health effects and publication of the final health advisory or maximum contaminant level goal (MCLG) and National Primary Drinking Water Regulation. EPA anticipates proposing a National Primary Drinking Water Regulation by the end of 2022 and finalizing it by the end of 2023. In contrast, final health advisories are based on final health effects assessments.

10. **Why is EPA issuing Interim updated health advisories based on draft health assessments for PFOA and PFOS instead of waiting until those assessments are final?**
Consistent with EPA's mission and responsibility to protect public health, EPA is issuing these interim health advisories for PFOA and PFOS to help inform the public of new scientific information on these chemicals' health effects.

EPA continues to conduct extensive evaluations of human epidemiological and experimental animal study data to support the development of a National Primary Drinking Water Regulation for PFOA and PFOS. In November 2021, EPA released draft updated health effects analyses for PFOA and PFOS; these analyses are undergoing Science Advisory Board (SAB) review. EPA evaluated over 400 peer-reviewed studies published since 2016 and used new approaches, tools, and models to identify and evaluate the information. Based on the new data and draft analyses, the levels at which negative health effects could occur are much lower than previously understood when EPA issued the 2016 Health Advisories for PFOA and PFOS (70 ppt) – including near zero for certain health effects.

In light of this new information, including peer-reviewed scientific studies, EPA also announced in November 2021 that the agency would move quickly to update the 2016

Health Advisories for PFOA and PFOS to reflect the new science and draft EPA analyses. To deliver on this commitment, EPA is issuing interim updated health advisories based on the draft 2021 analyses that are undergoing review by the SAB. The interim health advisories replace the 2016 final health advisories for PFOA and PFOS. EPA is working hard to review and respond to the draft SAB comments as the agency moves forward to develop Maximum Contaminant Level Goals (MCLGs) to support the development of a National Primary Drinking Water Regulation for PFOA and PFOS. At that time, EPA may update or remove the interim health advisories for PFOA and PFOS based on the best available science. Because the available health effects data indicate a number of different adverse effects resulting from exposure to very low levels of PFOA or PFOS, the health-based water values (health advisories and MCLGs) are likely to remain below the detection limit.

11. **How can I find out if there are PFAS in my drinking water?**
    If you are concerned about PFAS in your drinking water, EPA recommends you contact your local water utility to learn more about your drinking water and to see whether they have monitoring data for PFAS or can provide any specific recommendations for your community.

    If you own a home drinking water well, EPA recommends learning more about how to protect and maintain your well for all contaminants of concern. For information on home drinking water wells visit: www.epa.gov/safewater. For more information about PFAS in home drinking water wells visit: https://www.epa.gov/pfas/meaningful-and-achievable-steps-you-can-take-reduce-your-risk

12. **If the health advisory levels for PFOA and PFOS are so low they cannot be measured, how will I know if there are health risks from drinking water in which these contaminants are not detected?**
    The lower the levels of PFOA and PFOS, the lower the risk. This means that while PFOA and PFOS may be present in drinking water in trace concentrations that cannot be measured, water provided by these systems that test but do not detect PFOA or PFOS is of lower risk than if they are found at measurable levels.

    EPA recommends that public water systems that find PFOA or PFOS in their drinking water take steps to inform customers, undertake additional sampling to assess the level, scope, and source of contamination, and examine steps to limit exposure. While water systems may not be able to eliminate all risks from PFOA and PFOS, they can successfully reduce those risks.

13. **The interim lifetime health advisories for PFOA and PFOS indicate that the most sensitive non-cancer effect, and the basis for the interim updated health advisories for PFOA and PFOS is suppression of vaccine response in children. Does this mean that vaccines for COVID-19 may be less effective for me or my child?**

The studies that were the basis for these health advisory levels investigated the impacts of PFOA and PFOS exposure on children's response to the tetanus and the diphtheria vaccines. It is important to note that these studies did not measure infection or illness rates, only response to vaccinations. The available studies suggest that PFOA or PFOS exposure at specific life stages and dose levels may affect the ability of children or adults to respond to vaccines, in general. However, the scientific literature review did not include studies that assessed the impact of these chemical exposures on response specifically to vaccines against COVID-19 infection or illness rates.

The Centers for Disease Control (CDC) Agency for Toxic Substances and Disease Registry (ATSDR) has released the following statement on the health effects of PFAS and COVID-19.

"CDC/ATSDR understands that many of the communities we are engaged with are concerned about how PFAS exposure may affect their risk of COVID-19 infection. We agree that this is an important question. CDC/ATSDR recognizes that exposure to high levels of PFAS may impact the immune system. There is evidence from human and animal studies that PFAS exposure may reduce antibody responses to vaccines (Grandjean et al., 2017, Looker et al., 2014), and may reduce infectious disease resistance (NTP, 2016). Because COVID-19 is a new public health concern, there is still much we don't know. More research is needed to understand how PFAS exposure may affect illness from COVID-19."

14. Is EPA working to develop laboratory methods able to quantify PFAS below 4ppt?

EPA continues to conduct research and monitor advances in testing technology, methods, and techniques that may improve our ability to measure PFAS at lower levels. A list of laboratories that met the fifth Unregulated Contaminant Monitoring Rule (UCMR 5) laboratory approval program application and proficiency testing criteria for methods 533 and 537.1 is available at https://www.epa.gov/dwucmr/list-laboratories-approved-epa-fifth-unregulated-contaminant-monitoring-rule-ucmr-5.

15. What treatment technologies exist to remove PFOA, PFOS, GenX chemicals, and PFBS?

Activated carbon, anion exchange and high-pressure membranes have all been demonstrated to remove PFAS from drinking water systems. These treatment technologies can be installed at a water system's treatment plant and are also available in-home filter options. Each of the four Health Advisory documents identifies the treatment technologies that have been demonstrated to remove the specific PFAS and the factors that impact performance of the technologies. Learn more about these treatment technologies.

16. My state currently has a different safety level for PFOA/PFOS or GenX chemicals/PFBS than EPA's health advisories. Why is this?

EPA's health advisories reflect our analysis of the best available, peer-reviewed science and provide non-regulatory and non-enforceable information to assist federal, state, Tribal and local officials, and managers of public or community drinking water systems in protecting public health when spills or contamination situations occur. States may issue different

values based on their own analyses. For more information about the science and process EPA used to determine its health advisory values, see EPA's Drinking Water Health Advisory Documents at: https://www.epa.gov/sdwa/drinking-water-health-advisories-has.

17. Besides drinking water, how else can people be exposed to [PFOA/PFOS/GenX chemicals/PFBS]?

PFOA and PFOS were widely used to make carpets, clothing, fabrics for furniture, paper packaging for food and other materials that are resistant to water, grease or stains. They were also used for firefighting at airfields and in a number of industrial processes. Many of these uses were phased out by U.S. manufacturers in the mid-2000s but some uses remain. GenX chemicals are replacements for PFOA, and PFBS is a replacement for PFOS.

Most people have been exposed to these chemicals through consumer products but drinking water can be an additional source of exposure in communities where these chemicals have contaminated water supplies.

18. What funding is EPA announcing today to address PFAS in drinking water?

To help communities on the frontlines of PFAS contamination, EPA is providing $1 billion in fiscal year 2022 grant funding through the Bipartisan Infrastructure Law Emerging Contaminants in Small or Disadvantaged Communities Grant Program. This is the first of $5 billion in grant funding through the Bipartisan Infrastructure Law that can be used to reduce PFAS in drinking water in underserved communities.

Today (June 15), EPA will be reaching out to states that wish to participate in this grant program with information on how to submit their letter of interest to the agency. EPA will solicit a Letter of Interest from states, Tribes, and territories annually to help determine allocations. EPA will award funding based on an allocation formula. Grants will be awarded as non-competitive grants to states and territories. It is then at the discretion of the state to administer the grants to water systems that meet the state's disadvantaged community definition or program size requirements (serving under 10,000 persons) to address emerging contaminants.

EPA has determined emerging contaminants to include any non-federally regulated contaminant listed on any of EPA's Contaminant Candidate Lists (i.e., CCL1 – draft CCL5), in addition to perfluoroalkyl and polyfluoroalkyl substances (PFAS), regardless of regulatory status at the state or federal level. State cost-share is not required for the emerging contaminant program. Eligible uses include efforts that benefit small or disadvantaged communities in testing and remediating emerging contaminants, including water filtration.

EPA will release program implementation guidance with additional details this summer.

19. What additional resources are available to address PFAS in water?

The Emerging Contaminants in Small or Disadvantaged Communities Grant Program complements nearly $1 billion in FY22 Bipartisan Infrastructure Law (BIL) State Revolving

Fund (SRF) funding dedicated specifically to addressing emerging contaminants like PFAS, the first of $5 billion between now and 2026. Communities can also use funding through the general and BIL supplemental SRF, totaling over $23 billion over the next 5 years to address emerging contaminants in water. For more information see: https://www.epa.gov/dwsrf/bipartisan-infrastructure-law-srf-memorandum.