NACCHO
National Association of County & City Health Officials
The National Connection for Local Public Health

[FACT SHEET]
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Per- and Poly-fluoroalkyl Substances (PFAS)

Per- and Poly-fluoroalkyl substances (PFAS) are a family of thousands of man-made chemicals that have been manufactured and used in a variety of industries since the 1940s.[1] Since most PFAS do not break down easily, they can build up in living organisms with repeated exposure and have been linked to health effects.[2] As a result, the Environmental Protection Agency (EPA) considers PFAS an emerging contaminant and is in the process of setting enforceable Maximum Contaminant Levels (MCLs) for specific categories of PFAS.[3] This document provides an overview of PFAS, the issue of PFAS in drinking water, and how local health departments (LHDs) are responding to the issue.

Background on PFAS

PFAS are a group of man-made chemicals that include Perfluorooctanoic acid (PFOA), Perfluorooctanesulfonic acid (PFOS), and other chemicals. PFAS molecules consist of a chain of linked carbon and fluorine atoms.[4] Since carbon-fluorine bonds are one of the strongest, PFAS do not degrade easily in the environment and have been shown to migrate into soil and water.[2,4] They are used in industrial, commercial, and consumer applications to make coatings that enable products to resist heat, oil, stains, grease, and water.[1,2] PFOA and PFOS were the most extensively produced chemicals within the PFAS family until they were phased out by U.S. manufactures in the early 2000s.[1]

Where are PFAS chemicals found?

PFAS have been used in a variety of products and applications, including the following:[1,5]

- Food packaging;
- Non-stick cookware;
- Water- and stain-resistant fabrics;
- Firefighting foams;
- Cleaning products;
- Shampoo and cosmetics;
- Paint, varnishes, and sealants;
- Pesticides; and
- Drinking water and soil.

Potential Health Effects From PFAS Exposure

Since PFAS are used in a variety of consumer and industrial products and applications, exposure is widespread. Consuming contaminated drinking water, fish sourced from contaminated waters, food packaged in material containing PFAS, and inhalation of products are common ways individuals are exposed.[19] A study by the Centers for Disease Control and Prevention (CDC) suggested that nearly all Americans have PFAS in their blood.[6] Scientists are still examining the health effects of exposures to PFAS, but the EPA reports that there is evidence that exposure to PFAS, primarily PFOA and PFOS, can lead to adverse health outcome in humans, including the following:[1,2]

- Low infant birth weights;
- Immune system effects;
- Increased cholesterol levels;
- Increased risk of some cancers; and
- Reproductive problems.

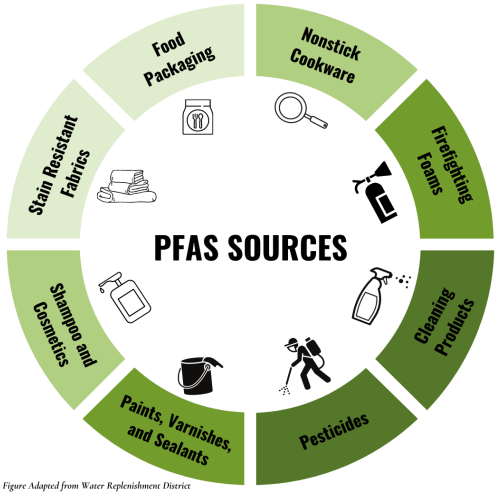

Figure Adapted from Water Replenishment District

PFAS and Drinking Water

PFAS have been detected in surface water, groundwater, and in public water systems around the nation due to the widespread use of PFAS.[7] In 2016, a study detected PFAS in water systems that serve over 16 million people across 33 states, three American territories, and a tribal community.[8] Since PFAS do not breakdown easily in the environment, levels of PFAS contamination are especially high in regions where products containing PFAS have been used, manufactured, or disposed of.[2,8]

Runoff water from these sites can contain PFAS and contaminate water sources nearby. Many regions surrounding airports and military trainings areas have been contaminated with PFAS due to the heavy use of firefighting foams that contain PFAS.[8] Additionally, groundwater and surface water have been contaminated through the practice of spreading treated sewage contaminated with PFAS onto farm fields.[8] Additional research is needed on levels of PFAS in water systems around the nation to understand the extent of PFAS exposure to the general public.

U.S. Environmental Protection Agency (EPA) PFAS Advisories and Regulations

- In 2016, the EPA established a lifetime health advisory for PFOA and PFOS at a combined concentration of 70 parts per trillion (PPT).[9] This health advisory was established to provide a margin of protection for all Americans, especially sensitive populations, from the potential adverse health effects due to long-term exposure.[9]
- In February 2020, the EPA PFAS Action Plan: Program Update announced a proposed decision to regulate PFOA and PFOS in drinking water and set enforceable maximum contaminant levels. Additionally, the Action Plan outlined strategies to identify and clean up PFAS contamination, expand monitoring of PFAS in manufacturing processes, and increase PFAS scientific research.[10]

Current Options for Treating PFAS-Contaminated Water

Since traditional water treatment technologies are not capable of removing PFAS from drinking water, the EPA suggests the use of the following system-level treatment technologies:

- **Activated Carbon Treatment:** Activated carbon treatment is the most studied and common method of PFAS removal in water systems.[11] Granular activated carbon (GAC) treatment involves the use of a flow-through filter and powdered activated carbon (PAC) treatment involves adding the PAC directly to the water.[11]
- **Ion Exchange Treatment**: For ion exchange treatment, small beads, called resins, are made up of hydrocarbons that act as magnets to attract PFAS as water passes through the system.[11,12]
- **High-Pressure Membranes**: Water treatment using high-pressure membranes, such as nanofiltration or reverse osmosis, involves passing water through a membrane with small pores.[11] The membrane is only permeable to water molecules, so PFAS will be restricted.[11]

Role of LHDs in Addressing PFAS Contamination

LHDs play a significant role in addressing the issue of PFAS contamination in their communities. Considering their close ties to the communities they serve, LHDs can assist with different aspects of the response, including by:[13]

- Working collaboratively with the state health department on PFAS monitoring and response;
- Creating procedures to address drinking water contaminated with PFAS;
- Working with local officials and regional partners to communicate important information to the general public;
- Assisting with the planning of community events and town halls;
- Helping coordinate blood testing for members within the community; and
- Helping coordinate and facilitate PFAS research studies and exposure assessments.

Current LHD Acitivities Related to PFAS

PFAS Exposure Assessment Technical Tools (PEATT)

The Agency for Toxic Substances and Disease Registry (ATSDR) developed the PEATT for LHDs and state agencies to help conduct PFAS biomonitoring activities.[14] According to ATSDR, "PEATT includes a protocol for statistically-based representative sampling, risk communication materials, questionnaires, and EPA's water sampling protocol to help characterize PFAS exposure in communities."[14] Additionally, ATSDR can provide assistance to LHDs to develop and carry out PFAS exposure assessments.

Pease Study

The Pease Study is the first site of the Multi-site Study and is examining the human health effects of exposure to PFAS-contaminated water at the Pease International Tradeport, in Portsmouth, New Hampshire.[15] This region was chosen for the pilot study because residents and individuals who worked at the Tradeport were exposed to drinking water containing PFAS. The CDC and ATSDR are recruiting individuals who worked at or went to daycare at the Pease International Tradeport.[15]

Multi-Site Health Study

The Multi-Site Health Study (MSS) is a coordinated study by the CDC and ATSDR to examine the potential health effects associated with drinking water that contains PFAS.[16] The MSS is expanding on the work of the Pease Study by examining seven additional locations around the nation.[16] According to ATSDR, "the goal of the multi-site health study is to learn more about the relationship between PFAS exposure and health outcomes among differing populations. It will also compare different levels of PFAS exposure from different sites and health outcomes."[16]

PFAS Exposure Assessments

The ATSDR and CDC are conducting exposure assessments in communities near current or former military bases that have detected PFAS in their drinking water.[17] These exposure assessments will help provide information to communities about the levels of PFAS detected in their bodies.[17] In 2019, the CDC and ATSDR announced they would begin exposure assessments at the Barnes Air National Guard Base site in Westfield, MA, and near the Shepherd Field Air National Guard Base in the city of Martinsburg, West Virginia.[18] The findings of these studies will help public health professionals guide members of the community to help reduce or stop their exposure.[17]

How NACCHO Offers Support to Local Health Departments

The National Association of County and City Health Officials (NACCHO) works to help improve the health of communities by strengthening and advocating for the nation's nearly 3,000 local health departments. To assist LHDs with addressing PFAS, as well as other issues, some of NACCHO's efforts include the following:

- Advocating on behalf of LHDs at congressional briefings;
- Promoting national policy;
- Advocating for funding to support LHD activities;
- Supporting LHDs through the development of resources and programs; and
- Facilitating Workgroup calls between NACCHO members from LHDs around the nation.

Resources

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For more information, visit www.naccho.org.

Contact WASH@naccho.org with any questions or comments.

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Public Health
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The mission of the National Association of County and City Health Officials (NACCHO) is to improve the health of communities by strengthening and advocating for local health departments.

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