

Executive Summary: Public Health Evaluation of PFAS in Drinking Water

Former Naval Air Station Joint Reserve Base & Air Reserve Station Willow Grove, PA

The Agency for Toxic Substances and Disease Registry (ATSDR) is evaluating per- and polyfluoroalkyl substances (PFAS) levels in drinking water and related public health concerns near military bases in Bucks and Montgomery Counties, Pennsylvania. Firefighting foam that contained PFAS was used at these bases in the past. ATSDR evaluated PFAS levels in drinking water and the possibility of health effects from exposure. Read this executive summary to learn more details about ATSDR's evaluation of PFAS in drinking water near the Former Naval Air Station Joint Reserve Base & Air Reserve Station Willow Grove, in Horsham, Montgomery County, PA.

Key Findings from the ATSDR Willow Grove Drinking Water Evaluation

PFAS are a large group of man-made chemicals used worldwide since the 1950s. Most people have measurable amounts of PFAS in their blood. PFAS can stay in the environment and people's bodies for a long time.

- Residents exposed to PFAS contaminated drinking water in the site area before 2014 could be at increased risk for harmful health effects.
- The Navy, Air National Guard and local water authorities have been reducing PFAS levels in drinking water since 2014. PFAS levels currently in drinking water are not expected to harm residents' health.
- Some individual private drinking water wells, as well as drinking water supply wells on the Willow Grove base, had the highest levels of PFAS. Higher levels of exposure increase the possibility of harmful health effects.
- Research in humans suggests that high levels of certain PFAS may lead to:



- » increased cholesterol levels
- » changes in liver enzymes
- » decreased vaccine response in children
- » increased risk of high blood pressure or pre-eclampsia in pregnant women
- » small decreases in infant birth weights
- » increased risk of kidney or testicular cancer

Scientists are still learning about the health effects of exposures to mixtures of PFAS.

- Blood tests from area residents indicate blood levels of some PFAS are higher than national averages.
- PFAS exposure from other sources (food, consumer products, etc.) add to PFAS exposure in drinking water.
- Coming into contact with or drinking small amounts of creek water contaminated with PFAS is not likely to cause significant added exposure for residents.
- PFAS levels in native (not stocked) fish are unknown.

What did ATSDR do?

ATSDR and the Pennsylvania Department of Health are evaluating PFAS contamination in drinking water and related public health concerns near military bases in Bucks and Montgomery Counties, Pennsylvania:

- the former Naval Air Station Joint Reserve Base Willow Grove (Montgomery County)
- the current Horsham Air Guard Station (Montgomery County)
- the former Naval Air Warfare Center Warminster (Bucks County)



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In 2016, ATSDR completed a review of drinking water exposures near the base in Bucks County. In 2018, PADOH conducted a blood testing pilot in the combined Bucks and Montgomery community. In 2019, PADOH continued exposure assessment including urine testing. In 2020, ATSDR completed a public health review of drinking water exposures near the bases in Montgomery County. In 2020, PADOH, RTI International, and Temple University started work as a research partner in ATSDR's PFAS Multi-site Health Study.

ATSDR's Minimal Risk Levels (MRLs) and EPA's Health Advisory for PFAS

- In 2016, the Environmental Protection Agency (EPA) released a health advisory level of 70 nanograms per liter (ng/L) or parts per trillion (ppt) for PFOS, PFOA, or PFOS and PFOA combined.
- In 2018, ATSDR released a draft PFAS Toxicological Profile that included minimal risk levels (MRLs) for PFOS, PFOA, PFHxS, and PFNA. ATSDR used EPA's health advisory level and the ATSDR MRLs and MRL-based environmental screenings level for this evaluation.

For more information, see https://www.atsdr.cdc.gov/pfas/mrl_pfas.html and <https://www.epa.gov/ground-water-and-drinking-water/drinking-water-health-advisories-pfoa-and-pfos>

What we don't know:

- Actual exposures at residential taps after mixing and distribution in the public water systems.
- Details about the past on-base exposed population, sampling and the distribution system.
- The lowest concentration at which toxic effects occur after years of exposure.
- Specific formulation of the firefighting foam used at these bases.
- Toxicity of some of the less studied PFAS and overall mixtures of PFAS.
- Effects of early life exposures, including breastfeeding.

What were the results for past public drinking water PFAS sampling?

- PFOS, PFOA, and PFHxS levels were above ATSDR screening levels in the public drinking water.
- Because water from various supply wells is mixed into the public water distribution system, we do not know the exact PFAS exposure levels for people drinking public drinking water. Contamination levels were also different in the two affected public water systems near the Willow Grove site:
 - » **Horsham Township:** Some areas in the low pressure zone of the Horsham system may have received water containing PFOS and PFOA with concentrations up to about 15 times EPA's health advisory. The maximum levels detected in the Horsham system were 1,000 ppt PFOS and 290 ppt PFOA.
 - » **Warrington Township:** The southeastern part of the Warrington system's eastern section may have received water with PFOA and PFOS with highest concentrations up to about 10 times the EPA health advisory. The maximum levels detected in the Warrington system were 670 ppt PFOS and 120 ppt PFOA. The western portion of Warrington's system was not affected by the PFAS groundwater contamination.



What were the results for past private drinking water PFAS sampling?

- The highest level of PFAS in private drinking water wells was greater than the highest levels in public water supplies. The maximum levels of PFOS and PFOA were detected in two different private wells (5,200 ppt PFOS and 5,000 ppt PFOA). The maximum combined level of PFOS and PFOA in any one private well was 8,100 ppt.
- PFOS or PFOA were found in 309 (48%) of the 640 private wells sampled. The site's northeast and southwest sides had the greatest number of private wells with PFOA and PFOS higher than the EPA health advisory.
- PFHxS and PFNA were also detected in private wells. PFHxS was found in 67 private wells (11%) and PFNA in 4 private wells (0.6%) above ATSDR screening levels.

What were the results for past on-base drinking water PFAS sampling?

- PFAS levels in on-base drinking water supply wells were higher than any of the other results for drinking water sources off the base. The maximum levels detected in the on-base system were 13,700 ppt PFOS and 8,100 ppt PFOA.
- We do not know the specific levels of actual exposures for past users of the on-base drinking water. ATSDR has limited information about the past on-base exposed population, past PFAS sampling results and the past on-base water system set-up.

PFAS levels in the drinking water supplies in this community have been reduced. However, the amount of PFAS in your body may be greater than the amount in the general population. Several of these compounds have a long half-life in your body (the amount of time for the compound to reduce by half). In addition, you may be exposed to PFAS in consumer products. These include stain resistant coatings used on carpets, upholstery, and other fabrics, water resistant clothing, cleaning products, and personal care products, including dental floss and cosmetics.

Recommendations to Protect Your Health

- If you have had exposure to PFAS for many years, reduce exposures from all sources. To learn more, visit <https://www.atsdr.cdc.gov/pfas/docs/PFAS-FAQs-Fact-Sheet-H.pdf>.
- If your private well has PFOA and PFOS levels above the EPA health advisory, continue to use alternative water for drinking and cooking until public water hook-ups are completed.
- Use only certified filters to treat your water. Continue to maintain and test your system.
- If you are a nursing mother, you may continue to breastfeed your baby, even if you have been exposed to PFAS. More than 20 years of CDC research shows that breastmilk nourishes infants and protects them from illness.
- If you are concerned about you or your family's potential exposure, talk to your health care provider. ATSDR is available to consult with any health care provider, as needed.

Next Steps: Navy and Air National Guard

The Navy and Air National Guard will continue working on a long-term remedy and identifying the extent of PFAS groundwater contamination near the site. ATSDR recommends they characterize other non-drinking water environmental exposure pathways to PFAS in the area (e.g., biota sampling and off-site surface soil).

Next Steps: ATSDR

- Continue to help residents understand PFAS health risks and steps to protect themselves.
- Discuss private well sampling results and what these exposures mean for individual families, if requested.
- Explore targeted health education outreach to families who refused private well sampling and to families with the highest private well concentrations.
- Continue to provide scientific assistance to federal, state, and local agency partners and engage in national PFAS public health activities. As part of the Multi-Site Health Study, CDC/ATSDR awarded funding in 2019 to RTI International and PADOH to look at PFAS exposures and human health effects in Montgomery and Bucks Counties. The multi-site study will build upon PADOH's pilot biomonitoring work in this community to collect information about PFAS exposures and immune response, lipid metabolism, kidney function, thyroid disease, liver disease, glycemic parameters, and diabetes.



Contact Us

If you have questions about ATSDR's evaluation:

- Call ATSDR at 1-800-CDC-INFO (232-4636)
- For a copy of the report, visit: <https://www.atsdr.cdc.gov/HAC/PHA/HCPHA.asp?State=PA>
- Community members with questions about the report, contact Lora Siegmann Werner, ATSDR Region 3 Director, at lkw9@cdc.gov or (215) 814-3141.

To Learn More

- General ATSDR PFAS information: <https://www.atsdr.cdc.gov/pfas/index.html>
- ATSDR PFAS fact sheet for clinicians: https://www.atsdr.cdc.gov/pfas/docs/ATSDR_PFAS_ClinicalGuidance_12202019.pdf
- CDC information about environmental exposures and breastfeeding: <https://www.cdc.gov/breastfeeding/breastfeeding-special-circumstances/environmental-exposures/index.html>
- PA Department of Health PFAS activities, including blood testing results for PFAS in this community: <https://www.health.pa.gov/topics/envirohealth/Pages/PFAS.aspx>
- U.S. Navy Administrative Record for Willow Grove: https://bracpmo.navy.mil/brac_bases/northeast/reserve_base_willow_grove/documents.html
- Air National Guard Administrative Record for Willow Grove: <http://afcec.publicadmin-record.us.af.mil/search.aspx>
- ATSDR report on the former Naval Air Warfare Center Warminster (Bucks County) completed in 2016: https://www.atsdr.cdc.gov/HAC/pha/NavalAirWarfareCenter/Naval_Air_Warfare_Center_LHC_01-20-2016_508.pdf

