

PFAS Exposure Assessment Community Summary

Moose Creek, Fairbanks North Star Borough, Alaska

INFORMATION TO PROTECT OUR COMMUNITIES



The Centers for Disease Control and Prevention (CDC) and the Agency for Toxic Substances and Disease Registry (ATSDR) conducted exposure assessments (EAs) in communities that were known to have PFAS in their drinking water and are near current or former military bases. The EAs provide information to communities about levels of PFAS in their bodies and can provide guidance to help people reduce or stop exposure.

This document summarizes the exposure assessment results from Moose Creek in Fairbanks North Star Borough, Alaska, near Eielson Air Force Base (the Base). The full exposure assessment report is available at <https://www.atsdr.cdc.gov/pfas/activities/assessments/sites/fairbanks-north-star-borough-ak.html>.

Why did we select Moose Creek?

When selecting EA sites, ATSDR considered the extent of PFOA and PFOS contamination in drinking water supplies, the duration over which exposure may have occurred, and the number of potentially affected residents. Moose Creek was one of several sites nationwide identified with PFAS drinking water contamination from use of products such as aqueous film forming foam (AFFF).

As early as the 1980s, the Base used AFFF containing PFAS for its firefighter training. Over time, the PFAS from the AFFF entered the ground, moved into the groundwater to offsite locations, and affected nearby private wells in Moose Creek. PFAS were first detected in private wells downgradient of the Base in May 2015. To reduce levels of PFAS in drinking water, the Air Force immediately began providing bottled water to Moose Creek households served by the affected wells. The Air Force eventually implemented other mitigation efforts, including installing underground storage tanks, above-ground storage tanks, bottled water delivery services, and whole-house granulated activated carbon filtering systems.

Based on information available to ATSDR, the alternative drinking water provided by the Air Force (whether through filters, bottled water, or tanks) currently meets or is below the U.S. Environmental Protection Agency's (EPA) 2016 health advisory (HA) and state public health guidelines for PFAS in drinking water. At this time, ATSDR recommends community members continue to use the alternative sources of water provided by the Air Force.

What are PFAS?

PFAS (or “per- and polyfluoroalkyl substances”) are a family of man-made chemicals that have been used in industry and consumer products since the 1950s.



PFAS do not occur naturally but are widespread in the environment. Most PFAS (including PFOA, PFOS, PFHxS, and PFNA) are either very resistant to breaking down or degrade into other PFAS that do not degrade further. Certain PFAS will therefore remain in the environment indefinitely. Some studies have shown that PFAS exposure may harm human health.

How was the testing conducted?

ATSDR invited all Moose Creek residents to participate in the PFAS exposure assessment. To be eligible to participate, household members must have

- (1) received their drinking water from a private well in Moose Creek for at least 1 year before December 28, 2017 (these residents have the greatest likelihood of past exposures to PFAS via their private well drinking water),

- (2) been greater than three years old at the time of sample collection,

- (3) not been anemic or had a bleeding disorder that would prevent giving a blood sample.

In August 2020,
ATSDR collected samples and other information from participants.

ATSDR analyzed data from

88 people,
(79 adults and 9 children)



Everyone completed a questionnaire



most people provided blood and urine samples

ATSDR collected samples of tap water and dust from some homes



ATSDR sent each participant their individual results in February 2021 and published community summary results at <https://www.atsdr.cdc.gov/pfas/communities/factsheet/Moose-Creek-Community-Level-Results-Factsheet.html>.

Key Takeaways

- Average age-adjusted levels of two PFAS (PFHxS and PFOS) in the blood of Moose Creek EA participants were up to 7.7 times the national levels. Other PFAS were not higher than the national average or were detected too infrequently to compare to national averages.
- Elevated blood levels may be linked with past drinking water contamination.
- Some demographic and lifestyle characteristics were linked with higher PFAS blood levels.
- All tap water samples collected during the EA in 2020 met the EPA's HA and the Alaska Department of Environmental Conservation (AK DEC) action levels for specific PFAS in drinking water.

What did we learn about PFAS levels in blood?

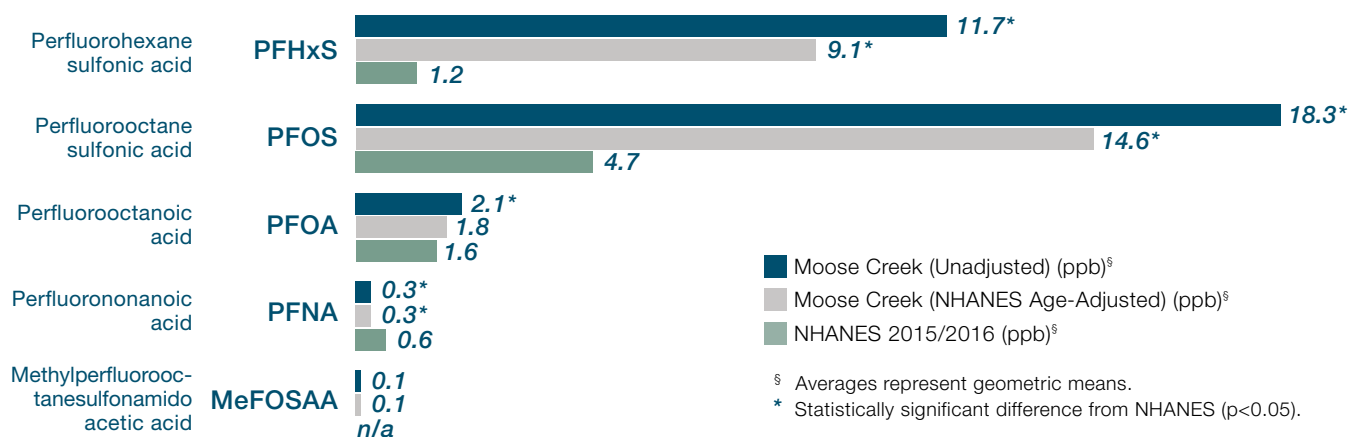
Of the seven PFAS tested in Moose Creek, five PFAS were detected in more than 70% of the blood samples collected: PFHxS, PFOS, PFOA, PFNA, and MeFOSAA.

Since 1999, the National Health and Nutrition Examination Survey (NHANES) has measured PFAS levels in blood in the U.S. population. PFAS levels are shown to be age dependent and tend to increase with age in part due to longer periods of exposure. The initial community summary results showed average levels of three PFAS above national averages. ATSDR adjusted blood levels of study participants in Moose Creek for age to enable meaningful comparison to the NHANES dataset. After adjustment, two PFAS were higher than levels nationwide. Age-adjusted averages are more representative of the Moose Creek community.



Average blood levels of two PFAS (PFHxS and PFOS) in Moose Creek were higher than average levels nationwide.

Moose Creek EA site average PFAS blood levels compared to national averages[§]





Elevated blood levels of two PFHxS and PFOS in the Moose Creek EA participants may be linked with past drinking water contamination.

PFHxS and PFOS were detected in Moose Creek private wells as early as 2015, though contamination likely began earlier. Between 2015 and 2017, actions taken by the Air Force reduced PFAS levels in drinking water in the affected area below the EPA HA for PFOS and PFOA and AK DEC action levels for multiple PFAS. There were 2 years and 8 months between the reduction of exposure via contaminated private wells and the collection of the EA blood samples. Because of the long half-lives of PFHxS, PFOS, and PFOA in the human body, past drinking water exposures may have contributed to the EA participants' blood levels. Typically, residents who had elevated blood

PFHxS levels also had elevated blood PFOS levels. This correlation suggests a common exposure source, such as the drinking water. Other sources of exposure were not measured, but could have contributed to PFAS concentrations measured in blood of the EA participants.



Adults who mainly drank bottled water at home had lower PFHxS and PFOS blood levels than those who mainly drank private well water.



Adults who primarily drank from a public water system (including water delivered by the Air Force) **had lower PFOS blood levels than adults who primarily drank private well water.**

ATSDR used statistical models to study relationships between various demographic and lifestyle characteristics of the tested residents. The models showed that, in general



Blood levels of PFHxS, PFOS, and PFOA were higher in older participants.



Males had higher blood levels of PFHxS and PFOS than females did.

The difference between males and females was larger in younger people.



Residents who came in contact with soil 3 times a week or more had higher PFOS blood levels

than those who came in contact with soil a few times per years or less.



Adult participants who had at least one occupational exposure to PFAS in the past 20 years had higher PFHxS, PFOS, and PFOA.



Women who breastfed had lower blood levels of PFOS than women who did not.

What did we learn about exposure in children?



Because of the small sample size, findings about children are not included. The final aggregate report on all exposure assessment sites will include a more detailed analysis.

What did other testing find in Moose Creek?



No PFAS were detected in urine.



PFAS contamination in house dust was similar to that reported in other studies (with and without PFAS contamination) and likely contributed to PFAS levels in the blood.



All Moose Creek drinking water samples collected during the EA in 2020 met the EPA's HA and the AK DEC action levels for specific PFAS in drinking water.



Too few adult EA participants reported consuming locally caught fish to allow for meaningful statistical comparison to blood PFAS levels.

What do these results mean for Moose Creek community members?



This PFAS EA provides evidence that past exposures to PFAS in drinking water have impacted the levels of some PFAS in people's bodies. These PFAS are eliminated from the body over a long period of time. This allowed ATSDR to measure PFAS even though exposures through drinking water were mitigated, or lowered, years ago.

Although the exposure contribution from PFAS in private well water in Moose Creek has been mitigated, there are actions community members and other stakeholders can take to further reduce exposures to PFAS and protect public health.

Based on the recent PFAS drinking water test results from private wells tested by the Air Force in Moose Creek, ATSDR recommends that residents continue to use the alternative source of water provided by the Air Force at this time.

What can community members do?



The Air Force has taken action to reduce levels of PFAS in drinking water at homes near Eielson Air Force Base. Based on the information available to ATSDR, the alternative drinking water provided by the Air Force (whether through filters, bottled water, or tanks) currently meets all federal and state guidelines for PFAS. ATSDR recommends that community members continue to use these alternative water sources. The long-term solution is to connect your home to piped water from a source that meets all federal and state drinking water guidelines for PFAS.



Residents should coordinate monitoring and maintenance of the water filtration systems with the Air Force until such time as piped water is supplied.



Nursing mothers should continue breastfeeding. Based on current science, the known benefits of breastfeeding outweigh the risks for infants exposed to PFAS in breast milk.



When possible, eliminate or decrease potential exposure to PFAS in consumer products such as stain-resistant products and food packaging materials. To learn more visit <https://www.fda.gov/food/chemical-contaminants-food/questions-and-answers-pfas-food>.



Pay attention to advisories about food consumption, such as local fish advisories. Because of PFAS in lakes and creeks near Eielson Air Force Base, Alaska Department of Fish and Game currently allows only catch and release sport fishing in Polaris Lake, Bear Lake, Moose Lake, Bathing Beauty Pond, Piledriver Slough, and Moose Creek.



Follow the advice of your child's health care provider and the recommendations for well child checkups, vaccinations, and health screening tests. Consult <https://health.gov/myhealthfinder> to help identify those vaccinations and tests.



For additional information about environmental exposures and children’s health, contact the Pediatric Environmental Health Specialty Units (PEHSUs), a nationwide network of experts in reproductive and children’s environmental health, <https://www.pehsu.net/>.



Discuss any health concerns or symptoms with your health care provider. Share results of PFAS blood testing with your health care provider and make them aware of ATSDR resources for clinicians <https://www.atsdr.cdc.gov/pfas/resources/info-for-health-professionals.html>. Follow the advice of your health care provider and the recommendations for checkups, vaccinations, prenatal care, and health screening tests.

At this time, ATSDR does not have plans to conduct additional blood testing for PFAS or recommend PFAS EA participants get individually retested for PFAS in blood.

The biological half-lives of many of the PFAS measured in people’s blood are long. PFHxS, in particular, has one of the longest half-lives—some estimates range in the decades. This means that PFAS blood levels are not expected to change significantly in the near-term, even if exposure stops. Additionally, it is unclear what an individual’s PFAS test results mean in terms of possible health effects.

For the general population, blood tests for PFAS are most useful when they are part of a scientific investigation like this EA. Test results will tell you how much of each PFAS is in your blood, but it is unclear what the results mean in terms of possible health effects. In addition, blood testing for PFAS is not a routine test offered by most doctors or health departments. Talk to your health care provider and make them aware of ATSDR resources for clinicians. (<https://www.atsdr.cdc.gov/pfas/resources/info-for-health-professionals.html>).

What can the Air Force do?



With permission from homeowners, test private wells in the affected area that have not been previously tested.



Continue to monitor and maintain alternative drinking water systems to ensure that the water provided continues to meet all federal and state drinking water guidelines for PFAS.

What will we do next?



ATSDR will hold a meeting to discuss the results and is available to answer questions from the community at any time.



When all of the exposure assessments are complete, we will prepare a report describing the data across all sites.



We are also reaching out to doctors, nurses, and other health care providers in your area to provide PFAS information. PFAS clinician guidance and continuing medical education can be found at <https://www.atsdr.cdc.gov/pfas/resources/clinical-guidance.html>.

About ATSDR

The Agency for Toxic Substances and Disease Registry (ATSDR) is a federal public health agency of the U.S. Department of Health and Human Services. <https://www.atsdr.cdc.gov/>

For More Information

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