



READINESS

OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE
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September 29, 2020

MEMORANDUM FOR: ASSISTANT SECRETARY OF DEFENSE FOR HEALTH AFFAIRS
ASSISTANT SECRETARY OF THE ARMY (INSTALLATIONS,
ENERGY & ENVIRONMENT)
ASSISTANT SECRETARY OF THE NAVY (ENERGY,
INSTALLATIONS & ENVIRONMENT)
ASSISTANT SECRETARY OF THE AIR FORCE
(INSTALLATIONS, ENVIRONMENT & ENERGY)
DIRECTOR, DEFENSE LOGISTICS AGENCY
DIRECTOR, WASHINGTON HEADQUARTERS SERVICE
CHIEF, NATIONAL GUARD BUREAU

SUBJECT: Transmittal of Fact Sheets for Blood Testing for DoD Firefighters Per- and Polyfluoroalkyl Substances Levels

This memo conveys supporting fact sheets for use in informing DoD Firefighters and Occupational Medicine (OM) providers involved in implementing the National Defense Authorization Act of Fiscal Year 2020, Section 707, which states: "Beginning on October 1, 2020, the Secretary of Defense shall provide blood testing to determine and document potential exposure to perfluoroalkyl and polyfluoroalkyl substances (commonly known as "PFAS") for each firefighter of the Department of Defense during the annual physical exam..."

PFAS blood testing of DoD firefighters will be performed in conjunction with the firefighter's annual OM examination. Enclosure 1, "Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS): A Guide for Department of Defense Firefighters" and Enclosure 2, "Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS): A Guide for Occupational Medicine Providers Evaluating DoD Firefighters" provide helpful background information about PFAS, results of PFAS studies examining health effects, the purpose of PFAS testing, and general information about PFAS exposure.

The DoD Components who have firefighters participating in PFAS testing will distribute these fact sheets to participating DoD Firefighters and OM Providers. The content of these fact sheets will not change without approval by the Assistant Secretary of Defense for Readiness.

My point of contact is Mr. John Seibert, john.f.seibert.civ@mail.mil, or 571-372-6898.

Thomas A. Constable

Performing the Duties of the Assistant Secretary
of Defense for Readiness

Enclosure:
As stated

Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS): A Guide for Department of Defense Firefighters

Introduction

Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) refers to a large and complex class of chemicals. Of the multiple chemicals categorized as PFAS, perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) were historically the most widely-used throughout the U.S. PFAS are man-made chemicals found in many industrial and consumer products because they increase resistance to heat, stains, water, and grease. PFAS are not uniquely attributable to Department of Defense (DoD) activities.

Commercial and consumer use of PFAS started in the 1950s. Uses include keeping food from sticking to cookware, certain food packaging, making sofas and carpets resistant to stains, and making clothes and mattresses more waterproof. PFAS are also used in firefighting materials. A variety of other industries use PFAS because they help reduce friction, including the aerospace, automotive, building and construction, and electronics industries. In the 1970s, DoD began using aqueous film forming foam (AFFF) that contained PFAS including PFOS and, in some formulations, PFOA. AFFF is mission critical for DoD because it quickly extinguishes petroleum-based and liquid fuel fires.

People are exposed to PFAS through a variety of means including drinking water, inhalation, and skin absorption. Information concerning exposures to PFAS can be found on the United States Environmental Protection Agency's (EPA) website at: <https://www.epa.gov/pfas/basic-information-pfas#exposed> and on the Centers for Disease Control and Prevention's (CDC) Agency for Toxic Substances and Disease Registry (ATSDR) website at <https://www.atsdr.cdc.gov/pfas/pfas-exposure.html>. Many PFAS compounds are known to be extremely persistent in the environment, which means they don't break down readily and can accumulate over time. A large research effort is underway to determine whether there are potential health effects for people from PFAS exposures.

In 2016, EPA issued a lifetime Health Advisory (HA) for PFOS and PFOA in drinking water of 70 parts per trillion (ppt). For context, one (1) ppt is equivalent to one (1) drop of water in 20 Olympic-sized swimming pools.

Health Effects

A large number of studies have examined possible relationships between levels of PFAS in blood and harmful health effects in people. However, not all of these studies involved the same groups of people, the same amounts of exposure, or the same PFAS. These different studies therefore reported a variety of health outcomes. Research-involving humans suggests that high levels of certain PFAS may lead to the following:

- Increased cholesterol levels
- Changes in liver enzymes
- Decreased vaccine response in children
- Increased risk of high blood pressure and/or pre-eclampsia in pregnant women
- Small decreases in infant birth weights
- Increased risk of kidney or testicular cancer

At this time, scientists are still learning about the health effects of exposures to mixtures of different PFAS. Additional information concerning PFAS health effects can be found on the ATSDR website at: <https://www.atsdr.cdc.gov/pfas/PFAS-health-effects.html>

Why are DoD firefighters being tested for PFAS?

The National Defense Authorization Act for Fiscal Year 2020 requires DoD to offer and provide blood testing for PFAS to all DoD firefighters at the time of their annual occupational medical examinations beginning October 1, 2020. This testing is not part of the medical qualification or medical surveillance program, rather, it is a congressionally mandated exposure assessment because of concern for potential occupational exposure. This is not a mandatory test and there will be no adverse actions taken if a DoD firefighter chooses not to have their blood tested for PFAS.

The six PFAS compounds associated with AFFF to be tested in the blood are: perfluorobutanesulfonic acid (PFBS), perfluoroheptanoic acid (PFHpA), perfluorohexanesulfonic acid (PFHxS), perfluoronanoic acid (PFNA), PFOA, and PFOS.

The current procedures for performing the periodic (annual) occupational medical examinations for DoD firefighters (civilian and military) are found in DoD 6055.05-M, "Occupational Medical Examinations and Surveillance Manual."

What do the results of the blood test mean regarding PFAS exposure?

A blood test can measure specific PFAS compounds in blood, but this is not a test routinely done in a doctor's office. Almost everyone has a detectable level of PFAS in their blood. Simply finding PFAS in blood is not necessarily meaningful. Currently, test results can't predict how PFAS might affect an individual's health now or in the future. An individual with PFAS detected in their blood, has been exposed to these chemicals and absorbed them into their body at some time in the past. Determining exactly where and when an individual was exposed is impossible given how prevalent PFAS are in the environment. Information concerning exposures to PFAS can be found on EPA's website at:

<https://www.epa.gov/pfas/basic-information-pfas#exposed> and on ATSDR's website at <https://www.atsdr.cdc.gov/pfas/pfas-exposure.html>

CDC scientists found four specific PFAS (PFOS, PFOA, PFHxS, and PFNA) in the blood of nearly all of the people tested, indicating widespread exposure to these PFAS in the U.S. population. CDC data suggest that over 98% of Americans have detectable levels of PFAS in their blood. The data tables showing PFAS blood testing results for the general population since 1999 can be viewed at:

<https://www.cdc.gov/exposurereport/>.

What does it mean if PFAS is detected in a blood test?

It means a person has been exposed to PFAS in the past and this is the level that is currently in that person's blood from all past exposures. Finding a measurable amount of PFAS in blood serum (the liquid part of blood) does not imply that the levels of PFAS have caused or will cause an adverse health effect.

There is no specific treatment for PFAS exposure. For personnel with signs or symptoms of any disease or illness, they should follow up with their medical providers for a medical evaluation. The provider can treat or refer individuals using the same established standards of medical care. This would be the same process for an individual who has elevated levels of PFAS based on blood testing.

How can an individual reduce future exposure to PFAS?

PFAS are present at low levels in some food products and in the environment, so one probably cannot prevent PFAS exposure altogether. Strategies for reducing individual exposures to PFAS are described on the ATSDR website at: <https://www.atsdr.cdc.gov/pfas/pfas-exposure.html>.

During firefighting events, the proper use of personal protective equipment (e.g. firefighting suits, gloves, SCBA's) will significantly help prevent an individual from being exposed to physical and chemical hazards

to include exposure to PFAS.

Finally, over the years the DoD has taken actions to minimize the potential exposure to PFAS in AFFF by no longer allowing AFFF to be used for training events. DoD is also conducting research to find suitable firefighting alternatives that do not contain PFAS.

References and Additional Resources

Supporting Occupational Medicine Clinic

An Overview of the Science and Guidance for Clinicians PFAS on Per- and Polyfluoroalkyl Substances (PFAS). Agency for Toxic Substances and Disease Registry. US Department of Health and Human Services.

<https://www.atsdr.cdc.gov/pfas/index.html>

National Defense Authorization Act for Fiscal Year 2020. Conference Report.

<https://docs.house.gov/billsthisweek/20191209/CRPT-116hrpt333.pdf>

National Health and Nutrition Examination Survey, 2015-16. Perfluoroalkyl and Polyfluoroalkyl (PFAS_I). Published September 2018.

https://wwwn.cdc.gov/Nchs/Nhanes/2015-2016/PFAS_I.htm

Occupational Medical Examinations and Surveillance Manual. DoD 6055.05-M. May 2, 2007 (Change 3, 08/31/2018)

<https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodm/605505mp.pdf?ver=2017-08-14-111314-123>

Per- and Polyfluorinated Substances (PFAS). Environmental Protection Agency.

<https://www.epa.gov/pfas>

Per- and Polyfluorinated Substances (PFAS) Factsheet

Centers for Disease Control and Prevention, U.S. Department of Health & Human Services.

https://www.cdc.gov/biomonitoring/PFAS_FactSheet.html

ToxFAQs™ for Perfluoroalkyls. Agency for Toxic Substances and Disease Registry. U.S. Department of Health and Human Services.

<https://www.atsdr.cdc.gov/toxfaqs/TF.asp?id=1116&tid=237#bookmark09>

Per and Polyfluoroalkyl Substances (PFAS). Food and Drug Administration, U.S. Department of Health and Human Services.

<https://www.fda.gov/food/chemicals/and-polyfluoroalkyl-substances-pfas>

Department of Defense PFAS Website.

<https://www.defense.gov/pfas>

Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS): **A Guide for Occupational Medicine Providers Evaluating DoD Firefighters**

Introduction

Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) refers to a large and complex class of chemicals. Of the multiple chemicals categorized as PFAS, perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) were historically the most widely-used throughout the U.S. PFAS are man-made chemicals found in many industrial and consumer products because they increase resistance to heat, stains, water, and grease. PFAS are not uniquely attributable to Department of Defense (DoD) activities.

Commercial and consumer use of PFAS started in the 1950s. Uses include keeping food from sticking to cookware, certain food packaging, making sofas and carpets resistant to stains, and making clothes and mattresses more waterproof. PFAS are also used in firefighting materials. A variety of other industries use PFAS because they help reduce friction, including the aerospace, automotive, building and construction, and electronics industries. In the 1970s, DoD began using aqueous film forming foam (AFFF) that contained PFAS including PFOS and, in some formulations, PFOA. AFFF is mission critical for DoD because it quickly extinguishes petroleum-based and liquid fuel fires.

People are exposed to PFAS through a variety of means including drinking water, inhalation, and skin absorption. Information concerning exposures to PFAS can be found on the United States Environmental Protection Agency's (EPA) website at: <https://www.epa.gov/pfas/basic-information-pfas#exposed> and on the Centers for Disease Control and Prevention's (CDC) Agency for Toxic Substances and Disease Registry (ATSDR) website at <https://www.atsdr.cdc.gov/pfas/pfas-exposure.html>. Many PFAS compounds are known to be extremely persistent in the environment, which means they don't break down readily and can accumulate over time. A large research effort is underway to determine whether there are potential health effects for people from PFAS exposures.

In 2016, the EPA issued a lifetime Health Advisory (HA) for PFOS and PFOA in drinking water of 70 parts per trillion (ppt). For context, one (1) ppt is equivalent to one (1) drop of water in 20 Olympic-sized swimming pools.

Health Effects

A large number of studies have examined possible relationships between levels of PFAS in blood and harmful health effects in people. However, not all of these studies involved the same groups of people, the same amounts of exposure, or the same PFAS. These different studies therefore reported a variety of health outcomes. Research involving humans suggests that high levels of certain PFAS may lead to the following:

- Increased cholesterol levels
- Changes in liver enzymes
- Decreased vaccine response in children
- Increased risk of high blood pressure and/or pre-eclampsia in pregnant women
- Small decreases in infant birth weights
- Increased risk of kidney or testicular cancer

At this time, scientists are still learning about the health effects of exposures to mixtures of different PFAS. Additional information concerning PFAS health effects can be found on the ATSDR website at: <https://www.atsdr.cdc.gov/pfas/PFAS-health-effects.html>

Why are Occupational Medicine providers testing firefighters for PFAS?

This testing is not part of the occupational medical qualification or medical surveillance program, rather, it is a congressionally mandated exposure assessment. The National Defense Authorization Act for Fiscal Year 2020 requires DoD to offer and provide blood testing for PFAS to all DoD firefighters at the time of their annual occupational medical examinations beginning October 1, 2020. This is not a mandatory test and there will be no adverse actions taken if a DoD firefighter chooses not to have their blood tested for PFAS.

The six PFAS compounds associated with AFFF to be tested in the blood are: perfluorobutanesulfonic acid (PFBS), perfluoroheptanoic acid (FHpA), perfluorohexanesulfonic acid (PFHxS), perfluoronanoic acid (PFNA), PFOA and PFOS.

The current procedures for performing the periodic (annual) occupational medical examinations for DoD firefighters (civilian and military) are found in DoD 6055.05-M, "Occupational Medical Examinations."

How do Occupational Medicine providers test for PFAS?

There is no single blood test for all PFAS, however there are individual tests for many PFAS (see National Health and Nutrition Examination Survey [NHANES], 2015-16).

A 1 mL whole blood sample will be obtained in an EDTA (lavender-top) tube and can be refrigerated or kept at room temperature for transportation. The sample will be sent to the nearest reference lab that can perform the test. Contact your reference lab and installation/Military Medical Treatment Facility resource management office for ordering and billing information.

What do I do once I get the results?

As the health service provider you are expected to review and convey the results to the individual employee and discuss general exposure history and recommendations to reduce chemical exposures. The information below will help guide your interaction with the employee. More detailed talking points addressing particular situations are under development and will be provided to the Occupational Medicine enterprise for use once completed.

- CDC data suggest that over 98% of Americans have detectable levels of PFAS in their blood. There is no single or combined PFAS blood level at which a health effect is known to occur in humans for any or all PFAS combined. Although individual PFAS blood tests exist, they will not identify a health problem, predict or rule-out the development of future health problems, or provide information for medical treatment (there is no treatment to reduce blood PFAS).
- For any individuals exposed to PFAS, insufficient evidence exists at this time to support deviations from established standards of medical care. For personnel with signs or symptoms of disease, occupational medicine providers should advise these individuals to follow up with their personal medical provider who would use the same established standards of medical care they would use for a patient who did not have exposure to PFAS.

Where can I find reference levels for blood tests to compare firefighter results to the general population?

Participants aged 12 years and older have been monitored for 12 PFAS compounds while taking part in the NHANES study conducted by the CDC since 1999. CDC scientists found four PFAS (PFOS, PFOA, PFHxS, and PFNA) in the blood of nearly all of the people tested, indicating widespread exposure to these PFAS in the U.S. population. The data tables showing results since 1999 can be viewed at: <https://www.cdc.gov/exposurereport/>.

References and Additional Resources

An Overview of the Science and Guidance for Clinicians PFAS on Per- and Polyfluoroalkyl Substances (PFAS). Agency for Toxic Substances and Disease Registry. US Department of Health and Human Services.

<https://www.atsdr.cdc.gov/pfas/index.html>

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Department of Defense PFAS Website. <https://www.defense.gov/pfas>