

## ***Webinar Highlights***

### **PFAS and Testicular Cancer: A Study of U.S. Air Force Servicemen**

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The US military has used firefighting foams containing per- and polyfluoroalkyl substances (PFAS) for several decades. The Department of Defense (DoD) has designated PFAS as emerging contaminants due to their long environmental persistence, contamination of drinking water supplies, and potential associations with several health outcomes (including cancer).

In this webinar, **Dr. Mark Purdue** presented findings from a recent study investigating serum PFAS concentrations and their associations with testicular cancer risk among Air Force servicemen.

**Featured Speaker:** Mark Purdue, PhD, Senior Investigator in the Occupational and Environmental Epidemiology Branch of the National Cancer Institute's Division of Cancer Epidemiology and Genetics, speaking November 16, 2023.

*This fact sheet has been created by CHE based on information presented in an EDC Strategies Partnership webinar. Selected quotes in bold are from the webinar speaker(s). For the full set of resources provided by the webinar presenters, see the [webinar page](#), where you'll also find associated slides and resources.*

### **The Problem**

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PFAS are a key ingredient used in Aqueous Film-Forming Foam (AFFF). The US DoD has used AFFF since the 1970s. AFFF used by DoD contain different formulations of PFAS, including PFOS, PFHxS, and PFOA. In 2016, DoD restricted the use of PFOS-based AFFF and initiated water testing on military bases. Water testing found the following:

- 401 bases with known/suspected PFAS release
- 90 bases with groundwater PFOS/PFOA concentrations > 70 ppt
- 36 bases with drinking water PFOS/PFOA concentrations > 70 ppt

In 2014, the World Health Organization's International Agency for Research on Cancer (IARC) classified PFOA as a possible human carcinogen, with the strongest evidence for a link between PFOA and cancer of the kidney and testis. In 2023, an updated review of PFOA by IARC classified PFOA as "carcinogenic to humans" (Group 1). While fewer studies have been done on other PFAS, such as PFOS, it is possible that they pose similar health hazards.

Dr. Purdue's study investigated the concentrations of PFAS in serum samples from the DoD Serum Repository and looked for associations between those concentrations and testicular cancer. The serum samples were collected from active-duty servicemen between 1988 and 2017. The records from the repository were linked to a military cancer registry, which identified 530 diagnosed cases of testicular cancer among the servicemen. For controls, each identified case was matched with a control case with similar demographics.

### **Key findings:**

- In early 2000s, higher serum concentrations of PFHxS were found in servicemen vs. serum from NHANES samples of the general population.
- Service-related predictors of elevated serum PFAS:
  - Military firefighting work predicted higher levels of PFOS, PFOA, and PFHxS
  - Service on a base with drinking water PFOA/PFAS >70 ppt (PFHxS) predicted higher levels of PFAS
- Elevated serum PFOS was associated with increased risk of testicular cancer. The study did not find this association with PFHxS.

**"These findings are, to our knowledge, the first evidence of a direct association between measured serum PFOS concentrations and testicular cancer."**

Purdue also pointed out previous animal studies that found evidence of PFOS-induced male reproductive toxicity.

### **Recommendations**

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Purdue stressed the need for more research into the health harms of PFAS. Important research questions that follow include whether these findings are replicable, the question of whether short-chain PFAS are safe, and whether PFAS are associated with other health conditions among military personnel and veterans.

Purdue also highlighted the need to study exposures among women.

**“Our group recently published findings suggesting that elevated serum levels of PFOS are associated with an elevated risk of ER (estrogen receptor) and PR (progesterone receptor) positive breast cancer, which is a finding that's consistent with a smaller earlier study.”**

There are many concerns about the potential health risks of PFAS exposure. PFAS have been nicknamed “forever” chemicals because of their persistence in the environment. Even without a full picture of their health impacts, we can take steps to limit their use and our exposure.

## To Find Out More

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- Watch the November 16, 2023 webinar: [PFAS and Testicular Cancer: A Study of U.S. Air Force Servicemen](#)
- Read the presentation slides: [Serum PFAS Concentrations and testicular cancer among U.S. Air Force servicemen](#)
- Read the study: [A Nested Case–Control Study of Serum Per-and Polyfluoroalkyl Substances and Testicular Germ Cell Tumors among U.S. Air Force Servicemen](#)

## About the Speaker

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**Mark Purdue, PhD** is a Senior Investigator in the Occupational and Environmental Epidemiology Branch of the National Cancer Institute’s Division of Cancer Epidemiology and Genetics. Dr. Purdue's interests center on applying molecular and classical epidemiologic methods to identify environmental and occupational risk factors of cancer. He is particularly interested in evaluating the potential carcinogenicity of per- and polyfluoroalkyl substances (PFAS) and chlorinated solvents, and investigating the etiology of kidney cancer.