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# Women firefighters face high exposure to toxic PFAS chemicals

## Study is part of a larger investigation into breast cancer risks experienced by women in the firefighting force

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*Summary:* San Francisco's women firefighters are exposed to higher levels of certain toxic PFAS chemicals than women working in downtown San Francisco offices, shows a new study. The study represents one of the first published results from the Women Firefighter Biomonitoring Collaborative, a long-term investigation into breast cancer risks faced by women firefighters.

**FULL STORY**

San Francisco's women firefighters are exposed to higher levels of certain toxic PFAS chemicals than women working in downtown San Francisco offices, shows a new study led by researchers at the University of California, Berkeley, the University of California, San Francisco, and Silent Spring Institute.

Per- and polyfluoroalkyl substances (PFAS) are used in grease- and water-resistant coatings and can be found in fabrics, furniture and food packaging, but also notably in firefighting foam and turnout gear. These "forever chemicals," which don't easily break down in the environment, have been linked to a variety of cancers and are known to interfere with immune function, endocrine function and breast development.

The study, which appears Wednesday, Feb. 26 in the journal *Environmental Science and Technology*, is one of the first published results from the Women Firefighter Biomonitoring Collaborative, a long-term investigation into the chemical exposures faced by women firefighters. Partners in the collaboration include the United Fire Service Women, the San Francisco Cancer Prevention Foundation, Commonweal and Breast Cancer Prevention Partners.

"Women firefighters actually raised concern about what they have perceived as elevated rates of breast cancer among their cohort in San Francisco," said Jessica Trowbridge, a graduate student at UC Berkeley and lead author of the paper. "As a team, we decided to conduct an exposure study looking at chemicals that are potential breast carcinogens."

While studies are beginning to document higher rates of cancer among firefighters and higher PFAS exposures, in particular, these studies have primarily focused on men. Documenting the risks faced specifically by women firefighters is critical to ensuring that they receive the protections they need, both for cancer prevention and for compensation if they get sick.

"This is the first study, to our knowledge, that's been done on women firefighters," said Rachel Morello-Frosch, a professor of public health and of environmental science, policy and management at UC Berkeley and senior author of the paper. "The idea of characterizing women's workplace exposures is something that few people are paying any attention to, and here, we are using the newest available technologies to start to do that."

San Francisco is ideal location for this investigation because it has more women firefighters than any other urban fire department in the country. Women make up approximately 15% of the San Francisco fire force, compared to about 5% nationwide. This is due, in part, to 1980s litigation and a consent decree that encouraged the department to hire more women and people of color.

"Women firefighters have benefitted from these well-paid, very honorable professions and now are facing similar concerns about the impacts on their health that studies have demonstrated in men," Morello-Frosch said.

**'Is our job causing cancer?'**

In 2012, Lt. Heather Buren, along with colleagues form the San Francisco Firefighters Cancer Prevention Foundation (SFFCPF) noticed an alarming trend: In that year alone, five female firefighters were diagnosed with breast cancer.

"We started asking questions, wondering what was up," said Buren, co-author of the paper. "Cancer wasn't new to our profession, but for the first time, I was thinking about cancer as an occupational disease: Was fighting fire somehow a contributing factor in my friends getting sick? Were our repeated exposures to toxic burning chemicals on the fire ground a factor to the high breast cancer rates among SFFD women firefighters?"

Through a series of discussions and community meetings with Commonweal and Breast Cancer Prevention Partners, Buren was introduced to Morello-Frosch. Together, the two began the steps that would eventually launch the biomonitoring collaborative.

Since beginning the study, Buren and a small group of other women firefighters have teamed up with the Bluegreen Alliance to create a training program to help other firefighters take steps to reduce their exposures to PFAS and other toxic chemicals. These steps include many basic measures, like immediately wiping down exposed areas of skin and removing and cleaning turnout gear -- a firefighter's coat, boots and helmet -- after an incident.

"There's also a lot of interest in having firefighters use foams that don't contain PFAS, not just to protect the firefighters, but also because the PFAS foams have contaminated a lot of groundwater and drinking water across the U.S.," said study co-author Ruthann Rudel, research director at Silent Spring Institute.

Because many manufacturers do not disclose the ingredients contained in firefighting foam, the project GreenScreen has recently launched a certification program to identify PFAS-free foams, Rudel pointed out.

**'We're here, and our health is important'**

To conduct the study, the researchers collected blood samples from 86 women firefighters and 84 women who work in offices in downtown San Francisco. They also conducted hour-long interviews with each participant, asking about workplace activities, eating habits and consumer product use to tease out possible sources of PFAS exposure.

Of the 12 types of PFAS chemicals the researchers tested for, seven were found in detectable amounts in most participants' blood samples, and four were found at detectable amounts in all participants' samples. Three of the seven -- PFHxS, PFUnDA, and PFNA -- were detected at significantly higher amounts in firefighters' blood, compared to office workers' blood.

Each participant received a digital report generated by Silent Spring, detailing their individual results and providing information and concrete steps for reducing their PFAS exposure.

In a companion paper, which also appeared online this month in Environmental Science and Technology, the team detailed a new method that will allow researchers to rapidly screen blood samples for the presence of a variety of different toxic compounds. This method could help identify what else these women firefighters are exposed to that might be harmful. A future study, currently in preparation, will also report on the levels of flame-retardants in the blood samples of the women firefighters and office workers.

"We are here, and our health is important," Buren said. "In many occupations, women are often overlooked and understudied. Firefighting is no different. The SFFD has more women firefighters than any other metropolitan fire department in the U.S. The strength in numbers, coupled with the continued and strong support from our administration and union, has allowed us to focus on the health of our women, which we hope will benefit all firefighters nationally."

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