



2023 Urban Fire Forum (UFF) Position Statement

Support for Research on Firefighter Reproductive Health

Firefighters, the brave individuals who selflessly protect our communities, already besieged by inherent occupational hazards, now face unique and worrying risks related to their reproductive well-being. They are at increased risk for adverse reproductive health outcomes, which span from increased sperm abnormalities, and infertility for male firefighters, to increased birth defects in their children. Female firefighters are experiencing decreased ovarian reserve (a measurement of fertility), and increased utilization of infertility treatments, miscarriages, and pre-term births.¹⁻⁷ In non-firefighters, mental health conditions are associated with adverse reproductive outcomes.⁸⁻¹¹ In preliminary research with female firefighters, post-traumatic stress disorder (PTSD) is associated with a two-thirds reduction in ovarian reserve. However, very little is known about the specific exposures and mechanisms leading to these outcomes, let alone effective interventions to reduce reproductive risks.

Male firefighters exhibit sperm abnormalities compared to the reference values established by the World Health Organization, based on a small study in Australia.¹ Additionally, increased exposure to fire-related conditions has been associated with reductions in sperm volume, concentration, and sperm count. Notably, comprehensive research conducted in Denmark found that Male firefighters have increased rates of infertility compared to the general population. .² For full-time firefighters, the risk of male-factor infertility was significantly increased by 1.46 to 1.53-fold compared with the general population, whereas the risk in volunteer firefighters was not significantly increased. Furthermore, a large study in the United States underscores the concerning trend of the increased rate of birth defects in the children of male firefighters.³ This elevated risk encompasses a 3.1 times greater risk of total anomalous pulmonary venous return, a 2.2-fold increased risk of cleft lip, a 1.8-fold increased risk of cleft palate, and a 2.2-fold increased risk of transverse limb deficiency.

In the United States, female firefighters encounter heightened reliance on fertility treatments to achieve pregnancy compared with the general population.⁴ When compared to non-firefighters on average they experience a 33% lower serum anti-müllerian hormone (AMH) level, indicative of a decreased number of remaining oocytes in the ovaries.⁵ Firefighters have a 2.3-fold higher overall risk of miscarriage compared to US nurses, with an increased rate among volunteers compared with career structural firefighters.⁶ Compared with non-firefighters, firefighters have a 1.41-fold higher increased risk of pre-term birth, with an increased rate among wildland and combination wildland/structural volunteer firefighters when compared to career firefighters.⁷

Firefighters exhibit elevated rates of PTSD compared to the general population, with a notably higher rate among female firefighters.¹² In a study supported by the Federal Emergency Management Agency (FEMA) involving over 300 recruit and incumbent female firefighters enrolled in the Fire Fighter Cancer Cohort Study (FFCCS) uncovered alarming figures. Among participants, a clinical diagnosis of depression, anxiety, and PTSD was self-reported in

15.0%, 18.2%, and 8.7% of study participants, respectively, with 11% of incumbents reporting PTSD. Notably, female firefighters with PTSD had a statistically significant 66% reduction in serum AMH compared to participants without PTSD. This disparity was even greater in firefighters 35 to 45 years of age, with an 82.5% reduction in AMH levels. While the mechanisms leading to these effects are not known, they may be linked to chronic inflammation in non-firefighters which is associated with PTSD and correlated with lower AMH levels^{13,14}.

Firefighters are at increased risk of cancer, as determined by the International Agency for Research on Cancer (IARC),¹⁵ the specialized cancer agency of the World Health Organization (WHO), which is part of the United Nations. Toxic chemicals that are known to increase the risk of cancer can also have other effects on firefighters, including adverse reproductive outcomes, which emphasizes the need for overall exposure reduction.¹⁶

Protecting the health and safety of our dedicated firefighters is one of a fire chief's most important responsibilities. Within this context, the Metropolitan Fire Chiefs Association and the NFPA's Urban Fire Forum recognize that additional research funding is required for the evaluation of reproductive health in firefighters, the interplay between behavioral health and reproductive health, and to identify effective interventions and policies to both improve mental health and maintain reproductive health. The NFPA's Urban Fire Forum firmly anticipates that research on reproductive and behavioral health in firefighters will yield essential information to guide fire departments and other fire service organizations in the implementation of effective preventative steps.

The Metropolitan Fire Chiefs Association expresses its general support for additional research on reproductive and behavioral health in firefighters and encourages all fire chiefs to take the following steps:

- **Support the communication and messaging strategies that underscore the importance of research on reproductive health in firefighters, including the effect of mental health conditions on reproductive health.**
- **Express political support for firefighter reproductive health in funding venues for medical research, with a focus on identifying effective preventive steps and policies.**
- **Encourage the participation of your fire departments and your individual members when the opportunity for research on reproductive health is available.**
- **Support the dissemination of educational tools for OB/GYN providers to increase awareness of reproductive health risks for those in the fire service.**
- **Encourage fire departments to build evidence-informed policies to support firefighters during pregnancy, maternity leave, return to work, and breastfeeding.**

Sources

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