

The Wildfire Conservancy

California Cancer Research Initiative



Our Mission

Established in 2019, with a mission to address critical issues related to wildfires and the wildland urban interface (WUI), The Wildfire Conservancy is leading an interdisciplinary team of experts in applied research focused on improving firefighter health and safety, attack effectiveness, and community resilience. Each year, we see firsthand just how devastating wildfires are to California, and the toll they take on our communities, our economies, and (most importantly) on the men and women who dedicate their lives to protecting us. *The Conservancy is here to help.*

Firefighter Health and Safety

Modern fires pose new and rapidly evolving hazards never seen before, with firefighters regularly experiencing sustained unsafe peak heart rates, maintaining dangerously high core body temperatures, rapid respiratory rates, and high levels of dehydration. All if this occurs in addition to the myriad chemical compounds contaminating their lungs and skin.

Changing Exposures

There are an ever-changing number of novel materials in homes, businesses, and vehicles. When these materials combust, they produce dangerous and carcinogenic chemical compounds. This includes an evolving suite of unstudied chemicals so new yet still commonplace, that "safe" exposure levels have never been established (if they exist at all).

Increasing Cancer Risk

Cancer is a leading cause of fire service morbidity and mortality, at rates significantly higher than the general population. We do not yet understand which individual exposures are responsible for the various cancers common in firefighters, the mechanisms by which these exposures cause cancer, or effective means of reducing exposures or providing targeted treatments.



Wildland and Wildland Urban Interface firefighting continues to be among the most hazardous yet least studied occupations in terms of exposures and occupational health and safety risks. Today's wildland/WUI firefighters experience complex occupational exposures and endure environmental and physiological extremes beyond which the human body was ever meant to endure. As devastating "megafires" become the norm in California, firefighters will continue facing complicated and evolving exposures.

In collaboration with the **Fire Fighter Cancer Cohort Study** (FFCCS), the Wildfire Conservancy has enrolled over 330 firefighters from CAL FIRE into the largest ongoing cancer study of firefighters in the nation. In collaboration with the **University of Arizona** and **University of Miami**, we will be following these firefighters in the coming years to measure occupational exposures and cancer risk.



For More Information:

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Key Objectives

We must develop a comprehensive statewide firefighter cancer cohort study. A prospective cancer study that follows firefighters throughout their career to understand the link between occupational exposures and cancer is the gold standard in epidemiology. This type of long-term research can guide science-based interventions, screening recommendations, diagnoses and treatments specific to firefighters, and a better understanding of the impacts of occupational exposures on the fireground. **Improving and saving lives.**

The Importance of a Prospective Firefighter Cancer Cohort Study: The Framingham Model

Largely considered the “crown jewel” of epidemiology, the town of Framingham, Massachusetts became the first long-term cohort study of its kind focused on cardiovascular disease (<https://www.framinghamheartstudy.org>). Started in 1948, the original cohort of over 5,000 men and women has expanded to several generations of study across thousands of diverse participants.

The Framingham Heart Study is responsible for the development of nearly every recommendation on the prevention and treatment of heart disease. It has helped identify major cardiovascular disease risk factors, as well as the effects of blood pressure, blood triglycerides and cholesterol levels, age, gender, psychosocial issues and genetics. This is the model of success The Wildfire Conservancy will bring to addressing cancer in the fire service.

In collaboration with the largest ongoing cancer study of firefighters in the nation, The Wildfire Conservancy has partnered with the Fire Fighter Cancer Cohort Study (FFCCS) to begin this effort (<https://www.ffcs.org>). By this summer, we will have successfully recruited 300 firefighters from CAL FIRE into a long-term cancer study. The FFCCS has committed to following these firefighters for three years to measure exposures and incidence of cancer (e.g. diagnoses). However, to provide the same kind of success the Framingham Model has, this study must be significantly expanded in California. Cancer has a long latency period and there are many firefighters in California. We need to include more firefighters in this study and follow them for a much longer period of time.

A longer study with more participants will allow researchers to gather information on specific exposures and other risk factors while also collecting data on cancer precursors. It allows researchers to assess the effects of current firefighting practices and exposures on epigenetics (e.g. changes to how DNA is expressed in the body; how proteins are made) in the short-term and at disease onset in the long-term. It also helps understand current and emerging chemicals of interest including known carcinogens like benzene, formaldehyde, polycyclic aromatic hydrocarbons (PAHs), as well as suspected carcinogens in halogenated compounds (chlorinated and brominated flame retardants, perfluorocarbons, etc.). This information is essential to guide interventions to reduce the most important carcinogenic exposures and develop effective interventions and treatment options.

Development of a Tumor Bank

Cancer is caused by a number of different factors including genetics, health behaviors, the environment, and other contributors and can occur throughout the body. While the diagnosis may share the same name with cancers observed in the general population, a firefighter’s cancer can be significantly different. However, we can only really understand these differences through a significant investment in studying the underlying causes, and variances in firefighter cancer. This can be accomplished by creating a state-wide tumor bank. This bank will store specimens donated by firefighters for future evaluation of their molecular mechanisms and development. Understanding how tumors develop in firefighters will improve both screening recommendations as well as treatment. The importance of this cannot be overstated. This initiative can improve the outcomes for firefighters by not only understanding the exposure pathways and causes of firefighter cancer, but also by developing specialized advanced diagnosis and treatment.

Improved Intervention: Avoid, Minimize, and Mitigate the Risk

We already know that much of the cancer risk for firefighters is likely due to occupational respiratory and dermal exposures. While the FFCCS study will help the next generation of firefighters, we still have a need to help and protect our current firefighters. We need an investment in research and development of personal protective equipment (PPE) that can provide advanced dermal and respiratory protection from chemicals and compounds known to cause cancer.

Some of this work is already underway, including studies related to decontamination, improved laundering/cleaning of clothing, equipment, and vehicles, advanced respiratory protection, and PPE with particulate barriers to reduce and eliminate skin exposure. However, this work is in its infancy, and needs additional support to inform decisions, policies, and standards that reflect the best available science and technology to protect our wildland/WUI firefighters.

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