



Fire Fighter Cancer Awareness and Prevention



Carcinogenic Exposures

Fire fighters work in uncontrolled environments. They are exposed to hazards at high levels for varying lengths of time, unlike most other occupations.

Even though personal protective equipment (PPE) is required for firefighting activities, PPE does not completely eliminate the risk of exposure. Exposures can occur in all stages of firefighting, including knockdown and overhaul, and back at the station through contaminated PPE or equipment that may be off-gassing or through diesel exhaust.

Chronic exposure to heat, smoke and toxicants, whether visible or not, can put fire fighters at a higher risk for developing cancer. Fires release many hazardous substances, which can lead to exposures through the lungs (inhalation); the nose, mouth, and throat (ingestion); and contact with skin (dermal).

Some of these chemicals are scientifically proven cancer-causing (carcinogenic) agents. They are classified by the [International Agency for Research on Cancer \(IARC\)](https://www.iarc.fr/) as Group 1 agents.

Another IARC classification is for Group 2A agents; these are thought to be “probable human carcinogens,” i.e., studies on humans have either not been conducted or conducted in such small numbers that the results are controversial. These agents have been found to be carcinogenic in laboratory animals.

IARC GROUP 1 AGENTS

(Known to cause cancer in humans)

- arsenic
- asbestos
- benzene
- cadmium
- 1,3-butadiene
- diesel engine exhaust
- dioxins
- formaldehyde
- polychlorinated biphenyls (PCBs)
- silica
- soot
- vinyl chloride

IARC GROUP 2A AGENTS

(Probable human carcinogens)

- benzo[a]pyrene (a polycyclic aromatic hydrocarbon [PAH])
- creosote
- dibenz(a,h)anthracene (a PAH)
- wood combustion products
- shift work affecting circadian rhythm

These substances do not just stay at the fire scene, either. They can be transferred from fire sites to PPE and apparatus and back to the firehouse. These chemicals have been found in dust samples from engine bays, duty offices and dormitories; or from diesel exhaust from the apparatus when the diesel exhaust extractors are not used correctly.

Despite great work to decrease exposures, fire fighters continue to be exposed to high levels of carcinogens in smoke due to uncontrolled and hazardous environments. Fire fighters are often exposed to carcinogen/toxin levels that are many times higher than the recommended Occupational Safety and Health Administration (OSHA) limits.

With new building materials, plastics, flame retardants and technology, combustion products have become even more chemically complex. Unfortunately, recognition of toxic/carcinogenic materials often lags several years behind the institution of new products.

For this reason (and many others), the correct use of PPE, thorough decontamination and personal hygiene practices are the best defense in combatting the dangers of exposures that can affect fire fighters.

Following fire activities, exposure reporting is necessary to document exposures that can lead to occupational diseases and cancer.

The National Fire Operations Reporting System (NFORS) Exposure Tracker is available as an app for fire fighters, paramedics or officers to log exposure and incident details in a private, encrypted and secure online environment. The information gathered will help researchers better understand toxic exposures on the fire scene and develop new treatments and prevention protocols for occupational diseases, including cancer.

Download the NFORS Exposure Tracker app by going to the app store on your mobile device.