

Caring for Firefighters, How Soap and Water May Reduce Carcinogen Exposure



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- There are 1,115,000 firefighters in the United States as of 2018.¹
- Firefighters are at an increased risk for developing cancer over the course of their lifetime than the general public.²
- Evidence suggests that contaminated turnout gear serves as a source of carcinogen exposure to firefighters.^{3,4,5}
- Educating firefighters on effective on scene decontamination of their turnout gear can reduce carcinogen exposure.⁵

Firefighters are exposed to a variety of toxic and carcinogenic chemicals over the course of their careers, which is believed to increase their likelihood of developing cancer.^{6,7} A 2019 systematic review found elevated rates of colon, rectal, prostate, testicular, bladder, and thyroid cancers in addition to mesothelioma and malignant melanoma among firefighters.² While contact with carcinogenic chemicals may occur during active fire suppression, research has identified contaminated personal protective equipment as a potential source harboring carcinogens following a fire response.³ Additionally contaminants have been found to accumulate on used turnout gear, leading to an increased risk of dermal absorption between

fires.⁵ This is an overview for PAs who care for firefighters. It is a brief review of firefighting PPE along with best practices to reduce carcinogen exposure from PPE via decontamination after a fire response.

Firefighting Turnout Gear (PPE) and Decontamination

Structural firefighting turnout gear is made up of a jacket, pants and a protective hood designed to protect the wearer from thermal, chemical, and physical injury.⁸ While turnout gear is designed to protect the wearer from dangerous environments, the gear itself may pose as a hidden danger to a firefighter's health. In the last five years three studies have produced compelling evidence implicating contaminated turnout gear as a source of carcinogen exposure.^{3,4,5} Frequent laundering of turnout gear may seem like a simple solution, however it is important to understand the cultural significance of dirty turnout gear within the fire service. For years dirty turnout gear has been recognized as a symbol of reliability, knowledge, expertise, and professional competence among firefighters.⁹ Yet this aspect of firefighter culture has been under scrutiny as of recent, with two studies published in 2017 finding an increased awareness and concern for cancer risks associated with contaminated turnout gear among firefighters.^{9,10} Increased concern for cancer among firefighters provides an ideal setting for education on steps that can be taken to reduce carcinogen exposure while on the job.

Patient education on decontamination of turnout gear while on scene is crucial to reduce firefighter carcinogen exposure. A variety of methods for on scene turnout gear decontamination have been studied to find the most effective routine. Two studies published in 2017 and 2018 found that soap and water decontamination produced an 85% decrease in measurable contaminants from turnout gear, which was significantly higher than all other

methods that were studied.^{5,11} As such, education for firefighter patients should include the following:

1. Prepare a soap and water mixture using dawn dish soap or a similar product⁵
2. Pre-rinse turnout gear with water before applying soap mixture⁵
3. Apply soap mixture and scrub with an industrial scrub brush⁵
4. Rinse the turnout gear with water copiously until no soap suds remain⁵

It is important to remind firefighters that this method, while effective for removing contaminants following a fire, should not be used as a replacement for laundering based on turnout gear manufacturer recommendations, and should be considered a supplement to reduce carcinogen exposure. Overall firefighters are at an increased risk for developing cancer over their lifetime than the general public.² Steps to reduce their cancer risk are warranted, as there are more than 1 million firefighters in the United States as of 2018.¹ Patient education from their health care providers is essential to encourage turnout gear decontamination so as to reduce their exposure to carcinogens while on the job.

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