



Fire Fighter Cancer Awareness and Prevention



Cancer Disparities Among Fire Fighters by Race and Ethnicity

Fire fighters have an increased overall risk of cancer incidence and mortality compared to the general population, as well as an increased incidence and mortality for specific cancers.

Research is beginning to identify that different ethnicities have different health outcomes.

Among the growing list of evidence identifying a link between firefighting and cancer, ethnic and racial differences in fire fighter cancer rates have been reported in the limited number of epidemiologic studies where there is a sufficient number of minority fire fighters in the sample population.

In a cancer registry-based case control study in California,¹ the results identified that – in only minority fire fighters – the rates of six cancers (tongue, testicular, bladder, non-Hodgkin's lymphoma, chronic leukocytic leukemia and chronic myelogenous leukemia) were significantly elevated compared to the general population. The only minority groups evaluated in this study were either Hispanic (62.2%) or black (27.7%). In addition, non-minority and minority fire fighters both had significantly elevated risks for six other cancers (melanoma, prostate, kidney, brain, multiple myeloma and overall leukemia).

The reasons for the observed cancer disparities among fire fighters by race and ethnicity is not entirely known. Potential explanations may be:

- Different occupational exposures.
- Assigned to busier stations.
- Difference in environmental exposures, such as place of residence or diet.

Another explanation would be the genetic differences between ethnicities. These genetic differences could cause lower or increased rates of DNA methylation; therefore, resulting in a lower or higher ability to alter or block harmful genes. Study results showed that differences in DNA methylation between ethnicities resulted in different cancer risks for those ethnicities. DNA methylation is the main way gene activity changes during life; it is a healthy process that helps regulate gene expression. Generally, Hispanic fire fighters had higher rates of DNA methylation, so they were less likely to get certain cancers. However, methylation for certain genes were lower for Hispanic fire fighters. This resulted in an increased risk of getting prostate cancer, renal cell carcinoma and lymphocytic leukemia.

A study from the National Institute for Occupational Safety and Health (NIOSH)² examined fire fighters in the statewide California Cancer Registry and found that fire fighters had increased risks for several major

cancers. Black and Hispanic fire fighters were found to have increased risks for more types of cancer than white fire fighters (specifically, non-Hodgkin lymphoma, chronic lymphocytic leukemia, chronic myeloid leukemia and cancers of the tongue, testis and bladder), which speaks to the need for further investigation of cancer risks among various races and ethnicities within this profession.

Sources:

1. Goodrich, Jaclyn & Furlong, Melissa & Caban-Martinez, Alberto & Jung, Alesia & Batai, Ken & Jenkins, Timothy & Beitel, Shawn & Littau, Sally & Gulotta, John & Wallentine, Darin & Hughes, Jeff & Popp, Charles & Calkins, Miriam & Burgess, Jefferey. (2021). Differential DNA Methylation by Hispanic Ethnicity Among Firefighters in the United States. *Epigenetics Insights*. 14. 251686572110061. 10.1177/25168657211006159.
2. Tsai, Rebecca & Luckhaupt, Sara & Schumacher, Pam & Cress, Rosemary & Deapen, Dennis & Calvert, Geoffrey. (2015). Risk of cancer among firefighters in California, 1988-2007: Firefighters and Cancer. *American journal of industrial medicine*. 58. 10.1002/ajim.22466.