



The Three Key Fire Fighter Cancer Studies

Three key studies provide the scientific basis regarding increased cancer risk from the occupation of fire fighting. The LeMasters meta-analysis, a study by the National Institute for Occupational Safety and Health (NIOSH) and a study by Pukkala and colleagues of fire fighters in Nordic countries provide significant information about cancer risks in fire fighters.

LeMasters Meta-Analysis

The LeMasters meta-analysis was a widely reviewed report developed by environmental health researchers at the University of Cincinnati.

This study, published in 2006, was a comprehensive investigation of cancer risks associated with fire fighters using a research technique known as “meta-analysis.” Meta-analysis is a quantitative statistical analysis method that pools data from separate but similar experiments or studies. Using meta-analysis, researchers are able to test the pooled data for statistical significance which is better able to detect increased risk.

LeMasters and her colleagues combined data from 32 smaller studies of fire fighters for 20 different cancer types. They classified the cancers into three categories: probable, possible, or unlikely. The study identified 10 cancers that have significant increases in fire fighters.

Fire Fighters’ Increased Risk of Developing Cancer Compared to the General Population:

- i) Testicular cancer (102% greater risk)
- ii) Multiple myeloma (53% greater risk)
- iii) Non-Hodgkin lymphoma (51% greater risk)
- iv) Skin cancer (39% greater risk)
- v) Prostate cancer (28% greater risk)
- vi) Malignant melanoma (32% greater risk)
- vii) Brain cancer (32% greater risk)
- viii) Rectum (29% greater risk)
- ix) Stomach (22% greater risk)
- x) Colon cancer (21% greater risk)

LeMasters GK, Genaidy AM, Succop P, Deddens J, Sobeih T, Barriera-Viruet H, et al. Cancer risk among firefighters: a review and meta-analysis of 32 studies. JOccup Environ Med. 2006 Nov;48(11):1189–202.

The NIOSH Study

The NIOSH study examined cancer risks in 29,993 career fire fighters from three large U.S. cities: San Francisco, Chicago, and Philadelphia.

The study found that fire fighters have a 14% increased risk of dying from cancer compared to the general population

The study also found that fire fighters have a statistically significant increased risk of dying from seven different types of cancer compared to the general population:

- i) Mesothelioma (100% increase)
- ii) Rectum (45% increase)
- iii) Buccal/pharynx (40% increase)
- iv) Esophagus (39% increase)
- v) Large intestine (31% increase)
- vi) Kidney (29% increase)
- vii) Lung (10% increase)

This study also found excess bladder and prostate cancer incidence among fire fighters less than 65 years of age. The prostate cancer excess is limited to fire fighters 45 – 59 years old. These findings are consistent with the third study we will discuss, the Nordic study, and the early onset of these cancers suggests an association with firefighting.

The NIOSH study has several strengths:

- i) It includes a large study population. This was a pooled analysis of 30,000 career fire fighters from three different geographically diverse cities.
- ii) It covered a long study period. Data was collected from 1950 through 2009.

Daniels RD, Kubale TL, Yiin JH, et al. Mortality and cancer incidence in a pool cohort of US firefighters from San Francisco, Chicago, and Philadelphia (1950-2009). Occup Environ Med. Published Online First: [14 Oct 2013] doi:10.1136/oemed-2013-101662

The Nordic Study

The Nordic study, the third key study, studied the likelihood of cancer risk in a cohort of 16,422 fire fighters from five Nordic countries. Cancer incidence was assessed by linking national cancer registries to census data on occupations from 1961 – 2005.

The study found an increased risk for all cancers combined in fire fighters similar to the NIOSH study.

It also found statistically significant increased risk for developing the following cancers:

- i) Prostate cancer (13% increase)
The highest risk was found among fire fighters 30 – 49 years old: (159% increased risk)
- ii) Malignant melanoma (25% increase)
- iii) Non-melanoma skin cancer (33% increase)
- iv) Mesothelioma in fire fighters over 70 years of age (159% increase)
- v) Lung adenocarcinoma (29% increased risk)

Pukkala, E, et al. (2014). "Cancer Incidence among firefighters: 45 years of follow-up in five Nordic countries JPccup Environ Med 71:398-404.