What Cancers Does The Science Support As Work-Related For Fire Fighters As A Group?

Three key studies provide the scientific basis regarding increased cancer risk from the occupation of fire fighting. The LeMasters meta-analysis (J Occup Environ Med, 2006) and studies in it were previously considered by IARC and remain important. Two recent studies provide new information to be considered in the next evaluation of cancer risk in fire fighters. Daniels and colleagues at the National Institute for Occupational Safety and Health (NIOSH) and the National Cancer Institute are working on a study of 29,993 fire fighters from three US cities. In their recently published data (Occup and Environ Med, 10.1136/oemed-2013-101662) fire fighters were at increased for developing and dying from cancer overall compared to the general population. The other key study, by Pukkala and colleagues, examined a cohort of 16,422 fire fighters from five Nordic countries and observed a similar increased risk for cancer overall in fire fighters (Occup and Environ Med, 10.1136/oemed-2013-101803). In at least two of these three key studies, significantly increased risks were observed in one or more age groups studied or in all fire fighters for the following cancers:

- **Colon**
- **Lung**
- **Melanoma**
- **Mesothelioma**
- **Multiple myeloma**
- **Non-melanoma skin cancer**
- **Prostate**
- **Rectal**

In the past, we have supported **kidney cancer** based on a paper by Youakim showed increasing risk for this cancer with increasing years of exposure. In addition, risk for kidney cancer was increased in the NIOSH study.

Traditionally, we have also provided scientific support for non-Hodgkin's lymphoma and stomach cancer based on statistically significant risk in Table 5 of LeMasters. However, risks for these cancers were only increased the NIOSH study in participants age 65 and older and only for mortality rather than incidence. Incidence of these cancers was not increased in the Nordic study.

For a number of years we also supported work relatedness for fire fighters with approximately 15+ years of exposure and testicular and brain using from Table 5 of LeMasters. However, neither of these were elevated in the NIOSH or Nordic studies.

Finally, rare cancers are very difficult since, because they are rare, there are few or no data on risk of those cancers in fire fighters.

LeMasters = statistically significant in Table 5 of study
NIOSH = statistically significant in Table 2 of study, or mentioned in text on next page or in supplemental tables S10 and S11
Nordic = statistically significant in Table 1 & 3 of study

- Buccal & pharyngeal (~~LeMasters;~~ NIOSH ;~~Nordic~~)
- Colon (LeMasters; NIOSH; Nordic [CI 0.99-1.31])
- Esophagus (~~LeMasters~~; NIOSH; ~~Nordic~~)
- Kidney (~~LeMasters~~; NIOSH; ~~Nordic~~)
- Laryngeal ~~LeMasters~~ NIOSH[incidence only] ~~Nordic~~)
- Lung (~~LeMasters~~; NIOSH; Nordic [adenocarcinoma only)
- Melanoma (LeMasters; ~~NIOSH~~; Nordic)
- Mesothelioma (~~LeMasters~~ [did not look]; NIOSH; Nordic age 70+))
- Multiple myeloma (LeMasters; ~~NIOSH;~~ Nordic age 70~~+~~)
- Non-Hodgkin's lymphoma (LeMasters; NIOSH age 65+ mortality; ~~Nordic)~~
- Non-melanoma skin cancer (LeMasters; ~~NIOSH~~; Nordic)
- Prostate (LeMasters; NIOSH 17-64 y incidence only; Nordic)
- Rectal (LeMasters; NIOSH [mortality only]; ~~Nordic~~)
- Stomach (LeMasters; NIOSH age 65+ mortality only;; ~~Nordic~~)
- Bladder (~~LeMasters;~~ NIOSH 17-64 y incidence only ~~Nordic~~)
- Liver/gall bladder/biliary tract (~~LeMasters~~ ; NIOSH[mortality only];~~ Nordic~~)