CANCER 101

This factsheet was developed by the International Association of Fire Fighters and the Firefighter Cancer Support Network.

WHAT IS CANCER?

Cancer is the general term for a group of more than 100 different diseases that can begin almost anywhere in the body; it starts when cells lose the ability to regulate their growth and grow out of control. These cancer cells can invade and spread to other tissues within the body. This makes it hard for your body to work the way it should.

HOW IS CANCER RELATED TO FIREFIGHTING?

A number of published scientific studies suggest a link between firefighting and the development of cancer. These studies are considered to be foundational for demonstrating that fire fighters are at a greater risk for cancer than the general population due to fire fighters' routine exposure to carcinogenic smoke, soot, and other products of combustion.

These studies all included multiple fire fighters from different departments, and some include multiple countries. As a whole, they examined both the mortality (risk of death) and incidence (risk of developing) cancer.

- Cancer Risk Among Career Male and Female Florida Firefighters: Evidence from the Florida Firefighter Cancer Registry (1981–2014), Lee et al., 2020
- Cancer Incidence and Mortality Among Fire Fighters, Jalilian, et al., 2019
- Cancer Incidence and Mortality in Fire Fighters: A State-of-the-Art Review and Meta- Analysis, Soteriades, et al., 2019
- Mortality in a Cohort of US Fire Fighters from San Francisco, Chicago and Philadelphia: an Update, Pinkerton, et al., 2019
- Exposure-Response Relationships for Select Cancer and Non-Cancer Health Outcomes in a Cohort of Fire Fighters from San Francisco, Chicago, and Philadelphia (1950–2009), Daniels, et al., 2015
- Mortality and Cancer Incidence in a Pooled Cohort of US Fire Fighters from San Francisco, Chicago and Philadelphia (1950–2009), Daniels, et al., 2014
- Cancer Risk Among Fire Fighters: A Review and Meta-Analysis of 32 Studies, LeMasters, et al., 2006

The Pinkerton study identified that fire fighters have a 9% greater chance of being diagnosed with cancer and a 14% greater chance of dying from cancer than the general U.S. population.

These studies show evidence that fire fighters are at a higher risk for developing certain cancers. This means their risk of developing cancer is higher than those in the general population. For example, when data shows that fire fighters face a 1.53 times greater risk for multiple myeloma compared to those who aren't fire fighters, this means for every 100 people who contract multiple myeloma, 153 fire fighters contract the disease.

Additional examples of collective cancer incidence rates in fire fighters you may see in your fire station include:

- **Mesothelioma** - 2.29
- **Testis** - 2.02
- **Esophagus** - 1.62
- **Multiple Myeloma** - 1.53
- **Non-Hodgkin's Lymphoma** - 1.51
- **Lung** - 1.39
- **Buccal and Pharynx** - 1.39
- **Brain** - 1.32
- **Rectal** - 1.36
- **Skin Melanoma** - 1.34
- **Prostate** - 1.28
- **Kidney** - 1.27
- **Breast** - 1.26
- **Malignant Melanoma** - 1.21
- **Intestine** - 1.21

The findings are also responsible for the International Agency for Research on Cancer (IARC) reclassifying the occupational exposure as a fire fighter from Group 2 - Possibly Carcinogenic to Humans to Group 1 - Known Carcinogenic to Humans.

Based on strong science linking carcinogens on the fire ground to increased rates of cancer in fire fighters, researchers determined that "there is a critical and immediate need for additional protective equipment to help fire fighters avoid inhalation and skin exposures to known and suspected occupational carcinogens. In addition, fire fighters should meticulously wash their entire body to remove soot and other residues from fires to avoid skin exposure."

CANCER TERMINOLOGY

Below is some common terminology used to identify cancer diagnosis and treatment.

- **Screening test:** Checking your body for cancer before you have symptoms.
- **Diagnostic test:** A type of test used to help diagnose a disease or condition. Some examples would be mammograms and colonoscopies.
- **Biopsy:** The removal and examination, usually microscopic, of tissue from the living body, often to determine whether a tumor is malignant or benign.
- **Imaging test:** A procedure that creates pictures of internal body parts, tissues, or organs to make a diagnosis, plan treatment, check whether treatment is working, or observe a disease over time.
- **Tumor:** A mass (lump in the body) formed when normal cells begin to change and grow uncontrollably. A tumor can be benign (noncancerous) or malignant (cancerous, meaning it can spread to other parts of the body).
- **Benign:** Refers to a tumor that is not cancerous. The tumor does not usually invade nearby tissue or spread to other parts of the body.
- **Malignant:** Refers to a tumor that is cancerous. It may invade nearby healthy tissue or spread to other parts of the body.
- **Precancerous:** Refers to cells that have the potential to become cancerous. Also called pre-malignant.
- **Prognosis:** Chance of recovery; a prediction of the outcome of a disease.
- **Stage:** A way of describing cancer, such as where it is located, whether or where it has spread, and whether it is affecting the functions of other organs in the body.
    - **Stage 0:** Cancer in early form.
    - **Stage I:** Cancers are localized to one part of the body. Stage I cancer can be surgically removed if small enough.
    - **Stage II:** Cancers are early locally advanced. Stage II cancer can be treated by chemo, radiation, or surgery.
    - **Stage III:** Cancers are late locally advanced. The specific criteria for Stages II and III differ according to diagnosis. Stage III can also be treated by chemo, radiation, or surgery.
    - **Stage IV:** Cancers have often metastasized or spread to other organs or throughout the body. Stage IV cancer can be treated by chemo, radiation, or surgery.
- **In situ:** In place. Refers to cancer that has not spread to nearby tissue (also called non-invasive cancer).
- **Metastasis:** The spread of cancer from the place where the cancer began to another part of the body; cancer cells can break away from the primary tumor and travel through the blood or the lymphatic system to the lymph nodes, brain, lungs, bones, liver, or other organs.

- **Sarcoma:** A cancer that develops in the tissues that support and connect the body, such as bone, cartilage, fat, muscle, and blood vessels.
- **Carcinoma:** Cancer that starts in skin or tissues that line the inside or cover the outside of internal organs.
- **Invasive cancer:** Cancer that has spread outside the layer of tissue in which it started and has the potential to grow into other tissues or parts of the body (also called infiltrating cancer).
- **Localized cancer:** Cancer that is confined to the area where it started and has not spread to other parts of the body. Another term that is used to describe localized cancer is "in situ."

TREATMENT

- **Chemotherapy:** The use of drugs to kill cancer cells.
- **Radiation:** The use of high-powered energy beams, such as X-rays or protons, to kill cancer cells.
- **Surgery:** Remove the cancer cells completely or as much as possible.
- **Bone marrow transplant:** The soft, spongy tissue found in the center of large bones where blood cells are formed. A bone marrow transplant, also known as a stem cell transplant, can use your own bone marrow stem cells or those from a donor. It may also be used to replace diseased bone marrow.

DOCTORS

- **Oncologist:** A doctor who specializes in treating people with cancer.
- **Pathologist:** A doctor who specializes in interpreting laboratory tests and evaluating cells, tissues, and organs to diagnose disease.