“Saving Our Own”

Taking Action Against Cancer In The Fire Service

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Objectives

- Define the scope of the cancer problem in the fire service.
- Discuss the increase in toxic agents in today's fire environment.
- Identify routes of exposure to cancer-causing agents.
- Discuss common firefighter exposures to carcinogens.
- Review the steps firefighters can take to protect themselves from cancer.
- Define and discuss Presumptive Disability Laws.

Scope Of The Cancer Problem In The Fire Service

- Cancer is the most dangerous and unrecognized threat to the health and safety of firefighters.
- Multiple studies have demonstrated the connection between firefighting and cancer.

Scope Of The Cancer Problem In The Fire Service (cont.)

"Pinpointing the exact cause of cancer is extremely difficult because firefighters are not exposed to just one agent. They are exposed to multiple cancer-causing agents. Because of the multiple exposures and the multiple routes of exposure – they inhale carcinogens and carcinogens are absorbed through the skin – it is also highly unlikely for firefighters to get only one type of cancer."

- Dr. Grace Le Masters -

Scope Of The Cancer Problem In The Fire Service (cont.)

Studies have demonstrated higher rates of multiple types of cancers in firefighters compared to the general American population including:

- Testicular cancer (2.02 times greater risk)
- Multiple myeloma (1.53 times greater risk)
- Non-Hodgkin's lymphoma (1.51 times greater risk)
- Skin cancer (1.39 times greater risk)
- Brain cancer (1.31 times greater risk)
- Malignant melanoma (1.31 times greater risk)
- Prostate cancer (1.28 times greater risk)
- Colon cancer (1.21 times greater risk)
- Leukemia (1.14 times greater risk)
- Breast cancer in women (preliminary study results from the San Francisco Fire Department)

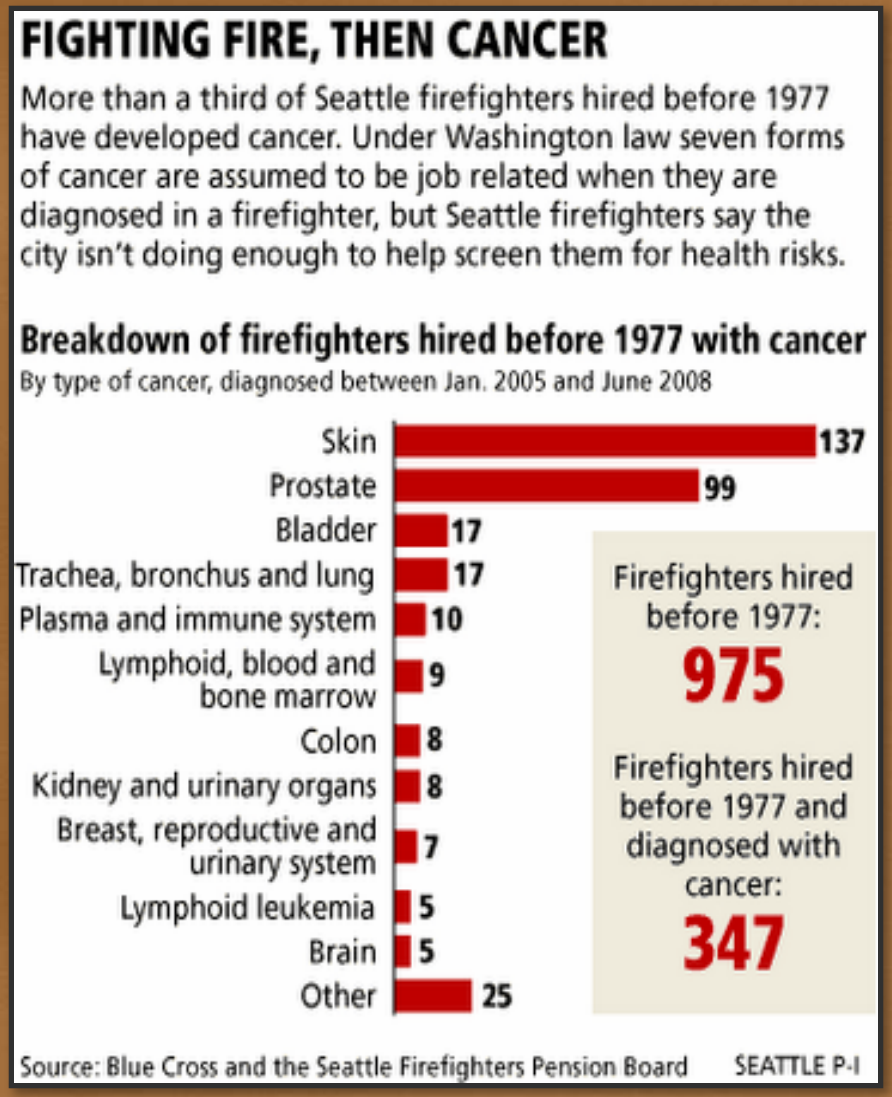
Scope Of The Cancer Problem In The Fire Service (cont.)

"Some cancer studies are also noting that firefighters are developing far more aggressive types of cancers, such as brain cancers, at a younger age than the general population, which provides further indications that the cancer could be a result of firefighting."

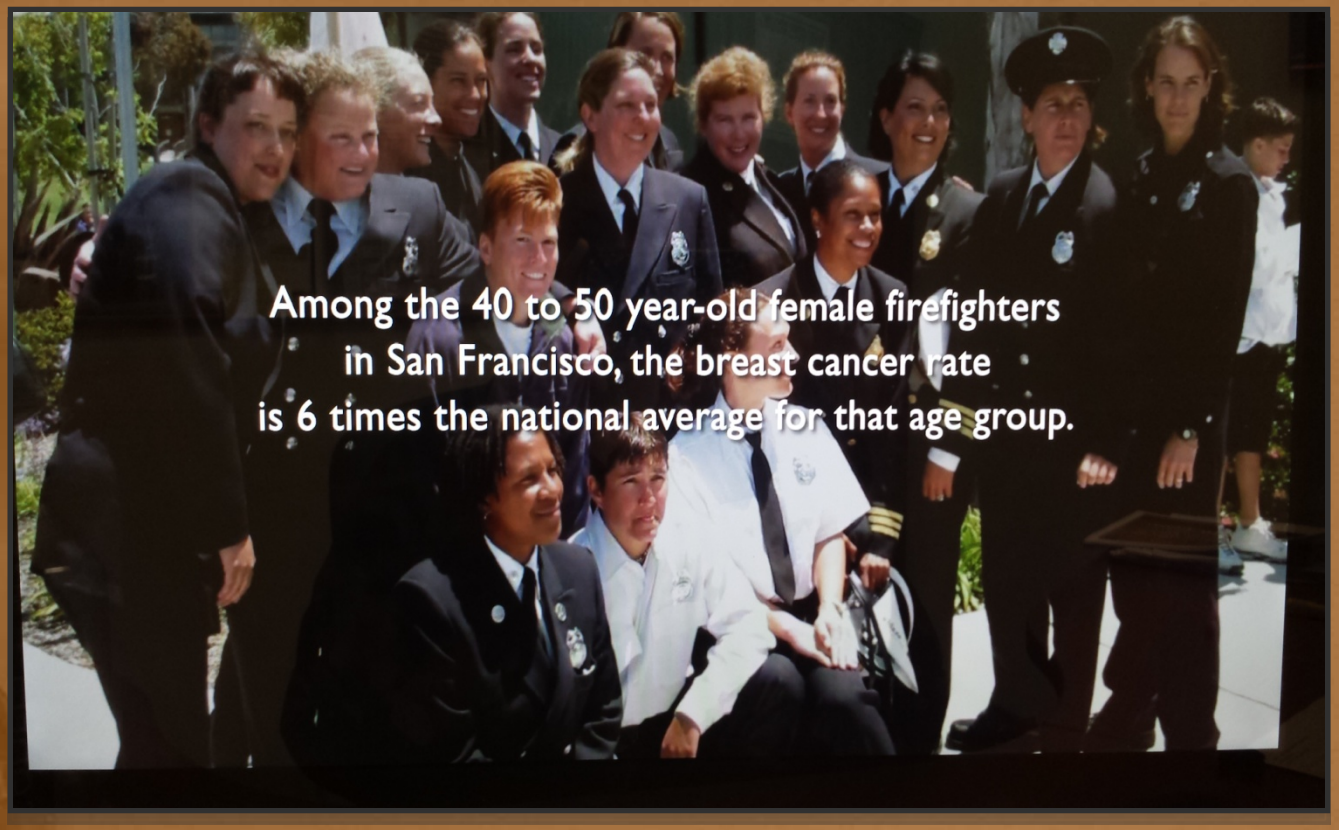
- Taking Action Against Cancer in the Fire Service white paper -

Scope Of The Cancer Problem In The Fire Service (cont.)

36% of the 975 firefighters have been diagnosed with cancer!!!



Scope Of The Cancer Problem In The Fire Service (cont.)



Toxicity of Today's Homes

- *Today's residential fires have more in common with hazmat events than old-fashioned house fires.*
  - Contents in homes are made primarily of plastic and synthetic materials.
  - Approximately 84,000 chemicals being used commercially today.
  - Flame retardants in furniture.
    - "Toxic Hot Seat"

Toxicity of Other Types of Fires

- Commercial and vehicle fires have highly concentrated toxic agents.
- Dumpster fires contain completely unknown substances and toxic agents.

Toxicity of Other Types of Fires (cont.)

Components of Vehicle Fire Smoke (present during start-up, knockdown, and overhaul):

- Acrolein - 3
- Methyl methacrylate - 3
- Acrylonitrile – 2B
- Ethyl benzene – 2B
- Toluene diisocyanate – 2B
- Hydrogen Chloride - 3
- Benzene – 1
- 1,3- Butadiene – 1
- Toluene - 3
- Naphthalene – 2B
- Styrene – 2B
- Formaldehyde – 1

Routes of Exposure

- Two routes of greatest concern for entry of carcinogens into the body of a firefighter are:
  - **The lungs:** When firefighters do not wear or prematurely remove their SCBA – especially during overhaul.
  - **Dermal Absorption**: Carcinogens are absorbed through the skin.
- Inhalation and absorption of toxic substances into the bloodstream.
  - Transported and stored in fat cells and organs.

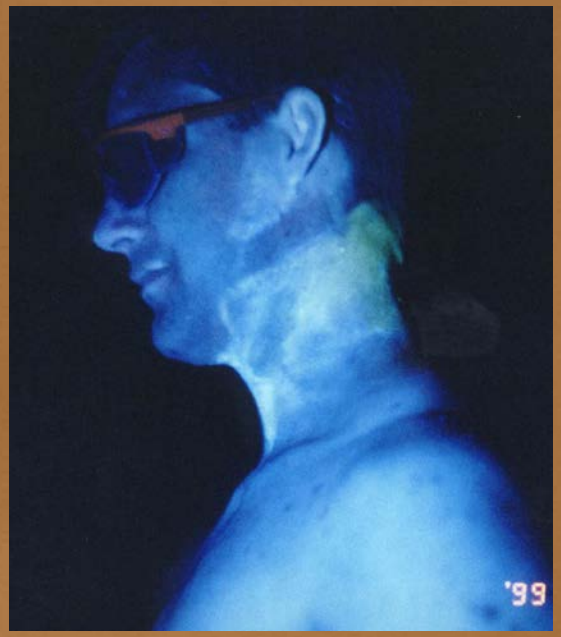
Routes of Exposure (cont.)

- Skin is highly absorptive. Some areas of skin are more permeable than others:
  - Face, angle of the jaw, neck, throat and groin.
- For every 5° increase in skin temperature, absorption increases 400%.

Routes of Exposure (cont.)

- ***<u>Most permeable piece of PPE is the hood.</u>***
  - Designed to protect our head and neck from heat.
  - Not designed to stop skin absorption through the forehead, angle of the jaw, the neck, and throat.
  - Liquid integrity test.
- SAFD firefighters have been issued a 2nd hood in accordance with the department's "Cancer Prevention Initiative."

Routes of Exposure (cont.)



Firefighters absorb toxic chemical via skin

- University of Ottawa researchers found that firefighters had anywhere from three to more than five times the amount of toxins in their urine after battling a blaze than they did before
- "There's a relationship between firefighters' urinary PAH metabolite levels and the levels of PAHs on their skin
- Researchers concluded that decontaminating skin immediately after a fire could help reduce the risk of cancer.

Common Firefighter Exposures to Carcinogens

- During the overhaul process
- Soot particles
- Diesel engine exhaust

Characterization of Firefighter Exposures During Fire Overhaul

- Today's synthetic household items pose a risk to firefighters even after a fire is out.
  - Materials continue to emit gasses which firefighters continue to breathe.

Characterization of Firefighter Exposures During Fire Overhaul (cont.)

Chemicals found during the overhaul phase:

- **Formaldehyde - 1**
- **Asbestos - 1**
- **Benzene - 1**
- **Arsenic - 1**
- **Ethyl benzene – 2B**
- **Polynuclear aromatic hydrocarbons (PNAs) - 1***
- **Polycyclic Aromatic Hydrocarbons (PAHs) - 1***
- **Acetaldehyde – 2B**
- **Styrene – 2B**
- **Coal-Tar Pitch - 1**
- **Diesel exhaust - 1**
- **Vinyl Chloride – 1**
- **1,3-Butadiene – 1**

Characterization of Firefighter Exposures During Fire Overhaul (cont.)

"Carbon monoxide should not be used as an indicator gas for other contaminants found in the overhaul atmosphere."

Characterization of Firefighter Exposures During Fire Overhaul Study – City of Phoenix

Soot Particles

- First reported form of occupational cancer attributed to exposure to soot.
- Prolonged exposure to soot on the skin is a hazard.
  - Soot particles absorb hazardous vapors, holding them in place on surfaces including a firefighter's clothing and skin.

Soot Particles (cont.)

"A major cause of cancer in firefighters is Polycyclic Aromatic Hydrocarbons absorbed through the skin as a result of contact with soot, persistently and under hot conditions. The especially high permeability of the groin area results in increased testicular cancer and possibly other types of cancer."

- Dr. Stuart Baxter -

Soot Particles (cont.)

"People think soot is benign but it is not, and most firefighters coming back from a fire are covered in soot. Soot isn't just dirty, it's dangerous"

"Soot in a firefighters' hair or on their skin could leach chemicals into their bodies. Every smear on their clothes could release toxic gases long after the fire is out."

- Dr. Grace Le Masters -

Soot Particles (cont.)

- If not removed, contaminated exterior surfaces and inner layers of protective clothing and equipment results in exposure well after the incident.
- The neck area is one of the most likely regions to become contaminated.
  - Firefighters remove hood and place around neck.
- Demos lead to children being exposed to soot particles.

DECON

- Gross Decon bunker gear at Scene
- Wash hood and gloves after every fire

Diesel Engine Exhaust

- On June 12, 2012, the International Agency for Research on Cancer (IARC) classified diesel engine exhaust as a *Group 1* carcinogen.
  - Exposure is associated with an increased risk of lung cancer.
  - Can cause other types of cancer:
    - Bladder
    - Leukemia and other cancers of the blood (non-Hodgkin's lymphoma and multiple myeloma)
- Vented emissions can disperse up to 650 feet.

Diesel Engine Exhaust (cont.)

- Daily exposure to diesel exhaust in the firehouse:
  - Walls and furniture reveal a tremendous amount of diesel exhaust particles.
  - Diesel particles are inhaled and absorbed every shift and cause significant harm to firefighters.
    - Regulators stored in bay.
    - Bunker gear stored in bay and taken into the station.

Diesel Engine Exhaust

- Install Diesel Capture system
- Turn exhaust

Actions Firefighters Can Take to Protect Themselves From Cancer

Presumptive Disability Laws

- Links a particular occupation with a disease/condition that has been shown to be a hazard.
  - Assumed that it developed in the line of duty.
  - Eligible for Worker's Compensation.
- Pennsylvania has presumptive disability laws that cover cancer. Covered types of cancer include: All cancers listed by the International
- Agency for Cancer Research (IARC)
- Cancer not list by the IARC can still be claimed. But presumption doesn't apply

PA’s Cancer Presumption Law

- Act 46 of 2011, which became effective on July 7, 2011, is the result of a 25-year effort by career and volunteer
- firefighters to win much-needed protection for our brothers and sisters and their families. The **Firefighter**
- **Cancer Presumption Law** will enable firefighters to receive workers’ compensation benefits if they develop
- cancer and can establish exposure to certain carcinogens at fire or hazmat incidents during their careers.

PA’s Cancer Presumption Law

- • *·The Cancer Presumption Law applies to **any cancer**. Firefighters who have served four or more years
- will be entitled to a **presumption that their cancer is job-related**, similar to the process used when
- firefighters suffer from lung cancer, heart disease, or more recently, Hepatitis C.
- * Firefighter cancer claims may be brought on behalf of any **active or retired**, **career or volunteer firefighter**

PA’s Cancer Presumption Law

- * The Cancer Presumption Law extends the period for filing claims to **600 weeks** after separation from
- service. Firefighters who separated as long ago as **January 2000** may be entitled to benefits.
- * Firefighter cancer claims may also be brought on behalf of **surviving family members** of firefighters
- who died as a result of cancer. To qualify for benefits, surviving spouses or dependent children must
- file a claim **within three years** of the **firefighter’s death**

Pa’s Cancer Presumption Law

- * Volunteer firefighters must **participate in PennFIRS** reporting to make a cancer claim, and must have
- passed a **physical exam** before their service that did not reveal the presence of cancer.
- Benefits available under Act 46 are **significant** and may include retroactive and prospective salary and benefits,
- medical care for cancer treatment, and reimbursement for medical costs.

No Presumption

- Department does not use PennFirs
- Have been separated for >600 weeks
- Been in the fire service < 4 years

- You may still file a workers comp. claim but will not be give the presumption.
- The burden is on you to prove the claim.

Presumptive Disability Laws (cont.)

Presumption Rebuttable:

- A presumption may be rebutted through a showing by a preponderance of the evidence that a risk factor, accident, hazard, or other cause not associated with the individual's service as a firefighter or emergency medical technician caused the individual's disease or illness.

The Decisions You Make…

Insurance Pool

- A workman's Comp. Insurance pool

Goals

Reduce cost of insurance

Provide better service

Honor Legitimate claims

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Other Occupational Diseases

- Hearing Loss
- Blood & Airborn Pathogens
  - Hepatitis A, B & C
  - HIV / AIDS
  - TB
- Cardio Vascular Disease
- Seatbelts

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