

JOB RELATED CANCERS IN FIREFIGHTERS

JOHN K. KING

FOR

GERALD "SKIP" LAWVER, DIRECTOR

FIRE SCHOOL OF STAFF AND COMMAND

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ABSTRACT

Firefighters are dying at an alarming rate and it's not just from heat and building collapses but also from a silent killer, *Cancer*.

The Detroit Fire Department has historically embraced bravado that has brought about too many widows and bagpipe ceremonies. The perception of a good firefighter should not be based on their tolerance to smoke while carrying out their duties, but the avoidance of it. A survey of both old and young firefighters, active and retired, revealed that attitudes have not changed, but research shows that our environmental dangers have.

This research paper will answer what Cancer is, where it comes from, what body systems are affected by its insidious mutant cellular growth and how to avoid the unnecessary risk factors associated with the disease.

Through an increased awareness of the information presented, hopefully firefighters will use precaution in the manner in which they approach the fire ground in an effort to minimize the contact with the silent, deadly killer, *Cancer*.

JOB RELATED CANCERS IN FIREFIGHTERS

INTRODUCTION

Not too many years have passed since firefighters had no protective breathing equipment as fires were fought within structures (occupied or vacant), rubbish containers, vehicles and 50 gallon drums of unknown substances, etc. The principles of how fires were extinguished were irrelevant because firefighters around the globe were taught to put the "wet stuff on the red stuff". Our actions have proven to be both unsophisticated and uncomplicated, but deadly. Clear, delineated thoughts of firefighter health and wellness in addition to safety were not paramount in the job description. Exposures to substances that were not questioned or feared have now cost many firefighters their health and in some case's their lives.

According to a newspaper article appearing in the Detroit News (March 19, 999, p.1),

Michigan firefighters run abnormally high risks for multiple cancers that are tied to burning plastics, chemicals and even fire-truck fumes ... Firefighter exposures in the field and the firehouse are believed by researchers to be direct sources of cancers of the brain, bladder, skins, lungs, kidney and blood.

This paper will examine the emerging relationship between exposures and the incidence of certain cancers in firefighters. It will also examine how much, in any, ignorance, machismo, phobias, or peer pressure lends itself to what firefighters are exposed to and look at how the possibility of age related cancers, smoking, job induced stress or lack of exercise contribute to these cancers.

The most threat to rescuer safety is attitude; attitude towards changing the mindsets on how we do our jobs. In these times of uncertainty and environmental hazards it becomes incumbent on all firefighters to learn more about the unseen dangers

associated with performing our jobs, to minimize the stress related to emergency call and to ensure that the work environment is as stress free as possible. Then and only then can we be assured that job related cancers are minimized and/or eliminated?

HISTORY

Over the last fifty years the Fire Service has seen the job of battling fires become increasingly more dangerous. Fifty years ago the City of Detroit had 1800 fire fighters and more than 90 fire companies. Fire apparatuses rolling down the streets of Detroit had at least five (5) fire fighters on each and some (Rescue Squads) carried as many as seven. The typical engine or pumper had a Fire Officer, a Fire Engine Operator that drove the engine, a Senior Fire Fighter and two or three other Fire Fighters riding in the rear. With the first engine arriving on a fire incident, you would have seen the Officer with two or three Fire Fighters taking the off the engine and starting an attack on the structure. The Fire Engine Operator and the Senior Fire Fighter would take-off down the street to the first available fire hydrant and connect to it. Out of the three to four Fire Fighters riding the engine, only the Senior Fire Fighter and the Officer wore some type of breathing device. The breathing device was chemically activated canisters that filtered the smoke and were often compromised because of the extreme heat of the atmosphere it encountered. According to Retired Emergency Medical Chief John T. King (2003), “the breathing chemical canisters sometimes caused an additional danger, in super heated air, the canisters would constrict. The younger Fire Fighters, especially Trial Fire Fighters were expected to take in as much of this acrid smoke as possible, so their lungs would become accustom to that particular environment”. Assistant Fire Marshal Richard Lang

(2003) stated, "Eating smoke was what we were about. The more smoke you ate the better firefighter you were assumed to be. We were killing ourselves and didn't know it".

Retired Chief John T. King, Retired Marshal Donald L. Robinson and former Executive Fire Commissioner Harold Watkins, were three of only nine Black firefighters on the Detroit Fire Department (DFD). Acceptance was something these men wanted, ambivalence is what they got and integrity and stamina, are what allowed them to persevere. Because Black firefighters tried to find their place within the department, they often had to prove their worth and would find themselves in extremely dangerous, toxic and possibly hostile environment.

From commercial buildings to residential dwellings, from car fires to dumpsters, the men who fought fires in Detroit consumed more by-products and carcinogens, than any four pack-a-day cigarette chain smoker. How could men put their bodies through so much stress and trauma and relish what they did? There is a common thread that links all these men together. In order to join the department in the 1950's, one would have had to go through a written examination, overcome physical challenges (an obstacle course and series of exercises) that tested their stamina, dexterity and endurance and a physical examination. They were all, for the most part, athletes and understood the team concept. It is because of that athleticism and the understanding that they were their brother's keeper that enabled firefighters the resolve to endure far more than the average person.

The same attitude that made firefighters HEROES fifty years ago is still here today. Firefighters still want to prove their mettle. They still attack fire incidents with the same salt of their predecessors. The problem with today's firefighter verses yesterday's firefighters, is that chemicals now dominate all fires and because hazardous

materials cause neurological and biological effects on our bodies that may take months and years to develop. The materials firefighters are encountering now days didn't exist fifty years ago, today's materials are far more hazardous. Other links that ties today's firefighter with those fifty years ago is they both took/take unnecessary risks with their bodies and their lives; they still eat smoke when they don't have too, eat food for taste rather than nutrition, believe it's macho to have their bunker gear full of soot (what's in the soot?) and their helmets are blackened to the point where the actual color is no longer distinguishable.

All municipalities use this swagger to their benefit. This cowboy style of throwing oneself into harms way, has placed firefighters in a position as the Marines of the inner city streets. This all-out attitude takes a toll on the skeletal structure of the body, as well as its organs. Those young men fifty years ago are paying the price of exposures today and today those young men, aren't just men anymore. We have sister, mothers, wives and girlfriends, who are now in harms way. Fire Departments globally and the men and women that serve, must take responsibility for destroying the machine that once worked at saving lives and protecting property.

BACKGROUND OF THE DISEASE

The nature of the job dictates the aches and pains sustained by firefighters, we take as much as our bodies will allow and keep right on going because we understand that we're supposed to hurt. There's no fear associated with on-the job injuries or illnesses. There's no need to go to the doctor to have that sore throat examined or a mole that keeps growing inspected or that unusual pain in the left flank area tested. Except, the "C"

word. We fear the “C” word. Cancer comes like a thief in the night, robbing us of everything we hold dear in life. We don’t understand cancer. Where does it come from? According to a study authored by Landrigan, et al. (p.3) and published by the Division of Environmental and Occupational Medicine at Mount Sinai School of Medicine,

“Cancer is characterized by uncontrolled growth and chaotic multiplication of cells in the human body. Cancerous cells have lost their normal ability to stop growing and dividing. They do not mature and become stable, and they do not respond to messages from other cells and organs. ***The essence of cancer is uncontrolled cell growth***”.

The cell is the basic unit of all living tissues. Every organ in our body has cells. The article suggests “hundreds of thousands” (p.3). If we are to believe that cancer is caused by uncontrolled cell growth, the next nagging question would be, how does it start and when do these uncontrolled cells begin to grow? To attempt to answer those questions, the study would have us to believe that,

“ ... cells that comprise a fully developed cancer are believed to all be descendants of a single cell that has gone awry and undergone malignant transformation.

The creation of a cancerous cell is a stepwise process, a transformation that usually requires many years and cell cycles. Each step in the process consists of a mutation, a change in the DNA, the basic genetic material that is present in each cell in the human body. The development of a malignant cancer requires a series of mutations.

Many factors can trigger the initial mutation. These include chemical carcinogens as well as physical agents”.

As we respond to fire, we don’t think about the dangers that exposures can have on our internal or external organs. This reports talks about the “synergism found in the exposure to chemical compounds; a proliferation of plastics and synthetics that are exposed simultaneously”. Let’s look at some of the most cancer causing agents and how contact is made:

- Chlorinated Hydrocarbons: used as solvents, degreasing agents, cutting fluids and fumigants, are commonly encountered at fires in dry cleaning establishments (p.10).
- Polychlorinated biphenyls (PCB's): heavy, oily liquids. Found in electrical transformers and capacitors in utility companies, buildings television sets, fluorescent lights and home air conditioners. Used as heat transfer and hydraulic fluids, as dye carriers in carbonless copy paper; in paints, adhesives, and caulking compounds; in the manufacture of products including upholstering materials, washable wall coverings, paints and plastic bottles (p.10).
- Polyvinyl Chloride (PVC): The dominant plastic resin on the market. Known to cause cancer of the liver. PVC is used as a rubber substitute and as covering for electrical and telephone wires and cables. Can be found in plumbing pipe, molded furniture, electrical fixtures, upholstery, raincoats, house siding, shoe soles, disposable bottles, shower curtains, phonograph records, packaging equipment automobile and aircraft seat covers, office equipment, baby pacifiers and other products too numerous to mention. Thus PVC can be assumed to be present at virtually every structural fire (p.11).
- Polyurethane and Polystyrene: found in mattresses, fold-out couches, upholstered furniture cushioning, thermal building insulation and car seat cushions. Packing materials, fast food wrapping, disposable drinking cups, and building insulations (p.12).
- Benzene: found in gasoline, degreasing agents, model airplane and other glues, paint strippers, kerosene, rubber solvent, and many other products (p.12).
- Pesticides: found in grocery stores, drug stores, plant shops, hardware stores, garden supply shops and residential homes (p.12).
- Polycyclic Aromatic Hydrocarbons (PAH): formed during combustion of organic materials such as fossil fuels that are present in various soot's and tars (p.12).
- Flame Retardants: found in firefighter helmets and boots. Protective clothing and devices (p.13).
- Formaldehyde: produced at every structural fire where wallpapers or lacquered wall coverings burn (p.13).
- Asbestos: is the dominant material fused for thermal insulations, becomes airborne during fires (p.13).

THE IMPACT OF THE DISEASE

No one is immune from this dreadful disease. This disease strikes all genders, race, ethnicity, age and occupational groups. The International Association of Fire of Fighters (IAFF) Department of Occupational Health and Safety (2000) infer in their report on occupational cancers that “firefighters are at an increase risk of sustaining cancers of the brain, rectum colon, skin and leukemia ... bladder cancer, have been found to be elevated in some studies but there is a lack of consistency in the findings”.

Reporter Paul Rubin writing for New Times (1988, p.18) chronicles the story of two firefighters in the Phoenix Fire Department. The sub-caption of the title reads, “A lot of firefighters are dying of cancer. The burning question: Did they get it on the job”. He describes how firefighters among them David Sanchez and Dale Brandt, responded to a 75-gallon nitric acid spill in South Phoenix. These men became sick. A review of their injury reports revealed that both had “been treated for inhaling the fumes of nitric acid”. Mr. Rubin suggests, “The only reason to search for information on the spill is that Brandt is suffering from terminal **brain cancer** and Sanchez recently has battled **testicular and lymphatic cancer**”. The article doesn’t give their ages but shows their pictures. They were young men in the prime of their lives. Could this “silent chemical assault” as the writer alludes to, cause these cancers?

Mr. Rubin cites yet another study done by Dr. Howard Bierman in 1982 for the Institute of Cancer and Blood Research. Dr. Bierman reports that,

“One in three Los Angeles firefighters are expected to develop cancer by the age of sixty, compared with one in five people in general. Additionally, the incident rates in Los Angeles firefighters were up to three times above normal for mouth or throat cancer, and more than twice-above normal for cancers of the brain, lung,

rectum, pancreas, and prostate. Cancer-related deaths among Los Angeles firefighters doubled from 17 percent in 1950 to 36 percent in 1980”.

A significant study of firefighters from the Northwest region of the United States was undertaken by Rosenstock and Demers (1991) and detailed in a report to the Occupational Medicine Program of the University of Washington. From 1945 until 1989, they followed the careers of firefighters and police officers in Seattle, Tacoma, Bellevue, and Kent Washington as well as firefighters and police officers in Portland Oregon. “Years of active duty in positions involving fire combat was used as a measure of smoke exposure” (p.3). This study looked at disease of various body systems to determine illness or death. A noteworthy finding found “an excess of brain cancer and leukemia among firefighters with 30 or more years on the job” (p.14).

Switching gears somewhat, in an attempt to present a different perspective relative to cancers and firefighting it is necessary to illustrate research from an article by Smith et al. 1982, p.18.

“The physical demands of fire fighting means that only those that can frequently meet stringent employment standards in the first place are hired. Thus, the initial population is not indicative of the population at large and can significantly alter findings in studies which seek to determine the incidence of cancer among a specific population”

Smith et al. used the term “healthy worker effect” to lend credence to and to make the assumption that individuals when hired are healthy. They further cite Abrams dissertation on Occupational Mortality Among Professional Firefighters (1974) to describe the “dead worker effect”. This is a fire fighter who may have died from other causes such as a line-of-duty (death) or heart disease before being diagnosed as having cancer”. Not surprisingly, it is noted that,

“Cancers are usually slow to develop and may not appear until after an individual retires ...usually manifesting themselves from 5 to 40 years after exposure to the cancer-causing agents i.e. cancers of the liver, lung or bladder may not appear until 30 years after exposure to asbestos, vinyl chloride or benzidine” (p. 29).

In yet another blazing article portraying the effects of cancer, columnists Cook and Cone (1983, p.2) describes it this way,

“For firefighters, smoke-eating once was a badge of courage. Now it has become a death sentence. The cancer death rate among firefighters in the United States has doubled in the past 30 years. The disease strikes their lungs, stomachs, brains and prostate glands, leaving the once-strong crippled or dead ... lung disease strikes them more frequently than black lung strikes miners”.

This is such a profound statement. In an occupation where danger has been described so vividly, why do we still go in? We go in because it is expected. We save lives and property. How many times have you heard someone say, “When others are rushing out, we’re rushing in?” Cook and Cook graphically epitomize the life expectancy of firefighters by stating,

“The stark bottom line for firefighters today is that their decision to take a job protecting lives and property means that they will live an average of 10 fewer years than other Americans”.

12. Do firefighters take advantage of all safety equipment and/or practices available?
Yes No
13. To change the current mindset regarding safety and health issues, where would you start?
Each individual Officers only Fire Administration
14. In your opinion, should testicular, lung, leukemia, colon, brain, skin cancers, etc. be considered as duty-related?
Yes No Don't know
15. Would you encourage your children to join the Fire Service?
Yes No

RESULTS OF QUESTIONNAIRE

1. What was (is) more important when preparing food at the fire station?

Retired Veteran	0-Nutrition	6- Taste
Current Veteran	1-Nutrition	4- Taste 1-Both

2. Did (do) you participate in some type of extra-curricular physical activity while on duty at the fire station?

Retired Veteran	3-Yes	3-No
Current Veteran	6-Yes	0-No

3. Did (do) you use the protected breathing equipment from the onset of a fire incident through overhaul?

Retired Veteran	0-Yes	6-No
Current Veteran	0-Yes	6-No

4. How often would you remove your breathing equipment during overhaul?

	20%	40%	60%	80%	100%
Retired Vet.	0	0	0	2	6
Current Vet.	0	0	2	4	0

5. Did (do) you wear breathing equipment at vehicle fires?

Retired Veteran	6-Yes	0-No
Current Veteran	4-Yes	2-No

6. Did (do) you wear breathing equipment at residential garage fires?

Retired Veteran	0-Yes	6-No
Current Veteran	2-Yes	4-No

7. When running out of air at a structural fire are you more likely to remain in the building in the structure if initial knockdown is completed?

Retired Veteran	6-Yes	0-No
Current Veteran	5-Yes	1-No

8. Have you ever experienced smoke inhalation?

Retired Veteran	6-Yes	0-No
Current Veteran	4-Yes	2-No

9. Did (do) you prefer to run at a busy firehouse?

Retired Veteran	4-Yes	2-No
Current Veteran	4-Yes	2-No

10. How often did (do) you clean your personal protective equipment (PPE)?

	All the time	Often	Not often	Not at all
Retired Vet	0	0	0	6
Current Vet	0	0	2	4

11. Are firefighting techniques safer today than when you began your career?
- | | | |
|-----------------|-------|------|
| Retired Veteran | 6-Yes | 0-No |
| Current Veteran | 6-Yes | 0-No |
12. Do firefighters take advantage of all safety equipment and/or practices available?
- | | | |
|-----------------|-------|------|
| Retired Veteran | 0-Yes | 6-No |
| Current Veteran | 0-Yes | 6-No |
13. To change the current mindset regarding safety and health issues, where would you start?
- | | Each individual | Officers only | Fire Administration |
|-------------|-----------------|---------------|---------------------|
| Retired Vet | 2 | 3 | 1 |
| Current Vet | 0 | 6 | 0 |
14. In your opinion, should testicular, lung, leukemia, colon, brain, skin cancers, etc. be considered as duty-related?
- | | | | |
|-----------------|-------|------|--------------|
| Retired Veteran | 5-Yes | 0-No | 1-Don't know |
| Current Veteran | 6-Yes | 0-No | 0-Don't know |
15. Would you encourage your children to join the Fire Service?
- | | | |
|-----------------|-------|------|
| Retired Veteran | 3-Yes | 3-No |
| Current Veteran | 6-Yes | 0-No |

Retired Veterans	Date of Hire	Interview Date
John T. King 35 years of service Retired Chief of EMS	7-57	7-03
Richard Lang 31 years of service Retired Assistant Fire Marshal	9-69	6-03
Donald L. Robinson 36 years of service Retired Fire Marshal	9-57	6-03
James A. Choike 36 years of service Retired Battalion Chief	4-55	6-03
Percy L. Warmack 35 years of service Retired Chief of Fire Operations	7-67	6-03
Harold Watkins 41 yeas of Service Retired Executive Fire Commissioner	3-54	6-03
Current Veterans	Date of Hire	Interview Date
Paul B. Nettles 34 years of service Battalion Chief	6-69	7-03
Lawrence Snowden 33 years of service Battalion Chief	5-70	7-03
Marvin Massey 30 years of service Lieutenant	4-73	7-03
Franklin D. Parnell 25 years of service Fire Engine Operator	2-78	7-03
James Davis 17 years of service Sergeant	12-86	7-03
Kim Bell 14 years of service Fire fighter	8-89	7-03

SAFETY PROTECTION EQUIPMENT

RETIRED VETERANS

PLASTIC CIVIL DEFENSE HELMET

THIGH-HIGH RUBBER BOOTS

LONG RUBBER FIRE COAT

RED BALL LATEX GLOVES and NITTY-GRITTY GLOVES

FACE PIECE (DEMAND)

GAS CHEMICAL CANNISTER BREATHING MASK

SELF CONTAINED BREATHING APPARATUS (SCBA)

DEMAND STYLE

CURRENT VETERANS

(2) BUNKER COATS

(2) BUNKER PANTS

(1) CARINS 1010 HELMET

(2) RUBBER FIRE BOOTS

(2) FIRE GLOVES (leather)

(1) HOOD

(1) FACE PIECE

SELF CONTAINED BREATHING APPARATUS (SCBA)

DEMAND and POSITIVE PRESSURE

CONCLUSION

The objective of this research paper was to inform the reader of one of the most prolific dangers faced by the American Firefighter: Cancer. This phenomenal disease has even the experts baffled. Just when they think they figured it out, some mutant cell shows up and does a “aha” here I am, you forgot about me! It is clear from the multitudes of literature on the subject, there are still just as many questions remaining, as there are answers ready found. But the one point all the subject matter experts agree on is that Cancer kills, it kills fast and it kills slowly. It has a mind of its own and therefore, cancer kills at its pace. There are dangers lurking in the air we breathe, how food is prepared, and the water we trudge through. Firefighters find themselves in some very precarious situations. We take too many risks, almost apathetic to what we term “normal fires”. There are no normal fires. The practice of safe operating procedures is not something that a memo or classroom application can enforce. The responsibility of ensuring firefighting safety lies not only with the employer but also with the Battalion Chief, the Company Officers and the firefighters themselves. The rules, policies and procedures governing safe fire ground activity cannot be understated. Smoke-eaters? The purpose of Self-Contained Breathing Apparatus commonly known as SCBA’s are designed to allow fire personnel to breathe in toxic environments. They must be donned on the way to the incident not after you’ve eaten enough smoke that tears are rolling down your face and black soot is being coughed up. Too late!

Equipment has changed. Gone is plastic Civil Defense helmets replaced by CARINS 1010 HELMET, which offers unprecedented protection. SCBA’s now have

positive pressure diaphragms. Leather NOMEX fire gloves have replaced latex gloves. The use of hoods protects the sides of your face and neck. A face piece protects your eyes and enables you to work without being on air.

The rewards to comply with safety features are far greater than the consequences. Firefighters do not want Cancer, no one does. The bottom line is Cancer like most diseases can be minimized when we protect ourselves on the front end-rather than on the back-end. Preventative measures taken first and leave bravado second.

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