

What Cities Can Do to Prevent Firefighter Exposure to Toxic Materials and to Mitigate the  
Potentially Lethal Effects when Exposure Does Occur

by

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## Introduction

A young boy plays with his bright red toy fire engine on the floor of the living room wearing his plastic Firefighter's helmet and bunker coat. He imagines rushing to a burning building, which is actually his sister's doll house, with lights and sirens blaring. He makes the loud roaring sound of a siren and he quickly crawls across the floor. He then grabs the hose sprays the building with water causing the fire to extinguish. The dolls are safe. He saved the day. He is a hero.

Fast forward twenty years, the same Firefighter responds to an emergency call involving an electrical fire downtown. As he sits in the fire truck waiting to arrive on scene, he checks to make sure his bunker gear is on right. His heart is racing as he jumps off the truck and drags the hose towards the burning fire. Someone yells that there is still a person inside. He takes order from his Battalion Chief, puts on his respiratory mask and carefully enters the building, axe in hand, with his heart racing as fast as ever. His wife and 5 year old son are running through his mind. He helps those that are trapped inside the building exit safely. Everyone is safe. He is a hero. He returns home safely to his family where he is greeted with a hugs, kisses and tears. He is their hero. Daddy is home and he is safe. This is not his first fire and will not be his last.

15 years later our Firefighter sits quietly in shock after hearing the news from his doctor. His diagnosis is Lymphoma. He has cancer. Is this diagnosis a result of him doing what he loves most – being a Firefighter, a Hero?

According to the International Association of Fire Fighters (IAFF), cancer caused 61% of deaths for career firefighters in the line of duty from January 1, 2002 to December 31, 2016. Furthermore, according to IAFF, 70% of line-of-duty deaths of career firefighters in 2016 were caused by cancer. The National Institute for Occupational Safety and Health (NIOSH), a part of the Centers for Disease Control and Prevention (CDC), states that firefighters have a 9% higher risk of being diagnosed with cancer than the general U.S. population. (Reno)

“A surplus of new evidence shows that it’s not just the flames themselves or the inhalation of smoke that’s taking our firefighters in historically large numbers,” writes Jaime Reno in an article titled “*Why Cancer is the Number One Killer of Firefighters*”. “It’s the toxins and often carcinogenic soot that’s left behind on the fire gear and the firefighters themselves.” Neither heart disease nor lung disease was the number one killer of firefighters in 2017. It was cancer. Studies show that it is largely because fires have gotten far more toxic in the past 25 years.

Joseph Finn, the Fire Commissioner and Head of the Boston Fire Department, said “the increasing cancer danger is because of the plastics that are so commonly found now in most structures, as well as the fire retardants used on furniture and other things found in homes and offices. Almost everything in modern buildings today is made of processed plastic. And it burns very hot and fast and gives off more carcinogenic by-product than traditional fires did in years gone by.” Finn believes this has led to a national and global cancer crisis among firefighters. (Reno) “This is the hidden hazard and the silent killer in the fire service,” said Matthew Miller, a Prince George County firefighter and cancer survivor who is developing cancer prevention and safety reforms at his department. (Bui and Hermann)

Cancer in Firefighters has become an increasingly popular topic due to the growing number of diagnosis. Significant advances have been made in prevention and early detection. Fire Departments across the nation are educating their firefighters on cancer awareness and decontamination techniques. They have also started implementing operating procedures to prevent exposure. In addition, many fire departments have started to offer cancer screenings to firefighters to aid in early detection. Fire Departments are purchasing equipment such extra bunker gear, wipes, decontamination stations, etc. to reduce the exposure to toxins.

Based on my research, it appears that cities have been supportive of the efforts to prevent firefighter exposure to toxic materials and to mitigate the potentially lethal effects when exposure does occur. Support has also been given on the federal level with the

enactment of the Firefighter Cancer Registry Act of 2018. This research paper will discuss these efforts. The one area where improvement is desperately needed is in the processing of workers' compensation claims for cases involving firefighters diagnosed with cancer.

### **Why is the Growing Number of Firefighter Cancer Diagnosis Important to Cities?**

Cities must be aware of the growing number of Firefighter cancer diagnosis for several reasons. First and foremost, a healthy and safe workforce is a top priority for all municipalities. Employees are a city's biggest asset and expense. Through the direction of the City Manager and Council, Fire Departments must ensure that all preventative best practices and equipment are available to firefighters. Extensive efforts on training must be placed to mitigate exposure.

Workers' compensation claims can be costly, disruptive and complicated as will later be discussed in this research paper. In addition, a cancer diagnosis will result in time off for treatment, doctor visits and recovery. This can affect overtime which may present budget challenges. Furthermore, a cancer diagnosis can be earth shattering to a Fire Department. The idea of a fellow firefighter or "brother", as they often refer to the each other, is devastating for a firefighter's personal family and work family. This can cause low morale.

"The direct and indirect cost of a cancer diagnosis on a fire department is huge and starts with the emotional impact on the other firefighters. The loss of a qualified and experienced member, even for the time of treatment, includes training, overtime and backfill and will increase insurance costs after a cancer event which adds to the costs of both the individual and the department." (Firefighter Cancer Support Network)

On a big picture scale, the increasing number of firefighter cancer diagnosis can affect recruitment for the fire industry as a whole. The inherited hazards of firefighting are a well-known and an accepted risk, a cancer diagnosis is not. Firefighter Cancer Support Network writes in their white paper titled "*Taking Action Against Cancer in the Fire Service*," "It is in the

interest of all involved to reduce the impact of cancer on the fire service through a proactive and aggressive approach by the reduction of exposure to carcinogens.”

### **Workers’ Compensation Claims for Firefighter Cancer in Texas**

Steve Fisher, a firefighter from Portland Oregon told Reno with Healthline, “When we got back to the firehouse, my captain would always say to everyone, ‘Hit the shower and wash that cancer off your body’.” 11 years later he diagnosed with testicular cancer. An Oregon law that recognizes the growing body of evidence linking firefighting and cancer was approved by the state Legislature just in time to help Fisher. Fisher’s claim was the first under the new presumptive law which requires the insurance company to prove that the cancer came from somewhere else other than firefighting. (Reno)

“The way we care for firefighters who are diagnosed with cancer needs to be fixed because it isn’t working well for firefighters or the public they serve,” says TML Executive Director Bennett Sandlin in an article he wrote titled “Sandlin: Firefighters and Cancer: A Broken System. Texas Municipal League Intergovernmental Risk Pool (TMLIRP) provides workers’ compensation coverage to more than 2,300 local governments, including more than a thousand Texas cities. Sandlin states: “Cancer claims for firefighters are some of the most difficult claims we deal with at TMLIRP when we must make decisions based on our reading of the law rather than our compassion for the firefighters who have protected us and our neighbors.”

“At a time when a firefighter and family and friends are struggling to deal with a potentially life-threatening illness, the bureaucratic and judicial confrontation over workers’ compensation coverage and benefits is overwhelming. Firefighters who have devoted years of their lives to serving and protecting the public suddenly feel betrayed and abandoned. And the cities that employ them feel trapped between their loyalty to a city employee and their responsibility for managing taxpayer dollars,” says Sandlin.

The current state law on which cancers are automatically presumed to be related to firefighting has resulted in vastly different interpretations resulting in many legal disputes. A possible solution is to presume all cancers diagnosed in firefighters are work related. This would be very costly for cities and tax payers. If workers compensation benefits for full-time paid firefighters are automatically provided for 20 specific cancers that have been studied for possible links to firefighting, the cost to taxpayers statewide for those benefits could be between \$18.1 million to \$22.7 million annually. The cost could be over \$200 million over the course of the next 10 years. This figure does not include volunteer firefighters, and including all cancers would cost substantially more. (Sandlin)

House Bill 1521 was recently filed in the 86<sup>th</sup> Legislature that could implement penalties on insurers that deny coverage. This would allow an administrative penalty to be assessed against a political subdivision, such as a city, and designates an administrative violation regarding an employee's compensation claim. (James)

City of Baytown and City of Houston, like many Texas cities, have denied workers' compensation to firefighters with cancer. "Over the past six years, more than 90 percent of the 117 workers compensation claims filed by Texas firefighters with cancer have been denied, according to the Texas Department of Insurance", writes Christopher James with the Baytown Sun Newspaper in article titled "City vs. firefighter lawsuit resolution still two weeks out". The Houston Professional Firefighters Association has had all seven of the association's members cancer-related workers' compensation claims since 2016 denied. Firefighters have said that cities use a memo by the Texas Intergovernmental Risk Pool that presumes only three types of cancer are caused by firefighting: testicular, prostate and non-Hodgkin's lymphoma. (James)

### **Firefighter Cancer Registry Act of 2018**

On July 7, 2018, President Donald Trump signed the Firefighter Cancer Registry Act of 2018 (H.R. 931). The bipartisan act requires the Centers for Disease Control and Prevention (CDC) to create and maintain a national voluntary cancer registry for firefighters. This bill

authorizes \$2 million for fiscal years 2018-2022 to carry out those activities. Information in the registry will be used to improve monitoring of cancer incidents among firefighters and to collect and publish information about the occurrences of cancer among this population. Furthermore, it seeks to assist in developing new protocols and safeguards to protect firefighters. (Bill Pascrell, 9<sup>th</sup> District of New Jersey)

“The brave men and women of the fire services who put their lives on the line for us each day deserve every ounce of support. Passing this bipartisan bill into law is Congress’s way of having their backs. The Firefighter Cancer Registry will bring together information on firefighters’ history to help doctors and researchers find any connections between firefighters’ work and increased risk for cancer,” said Congressman Bill Pascrell (9<sup>th</sup> District of New Jersey), co-chair of the Congressional Fire Services Caucus.

“Pinpointing the 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,” said Grace LeMasters, Ph.D., a professor of epidemiology at the University of Cincinnati and the lead author of a 2006 meta-analysis of 32 published studies of cancer in firefighters. (Firefighter Cancer Support Network) This law will hopefully assist with identifying cancer-causing agents and improve the health and safety of firefighters.

Firefighter Cancer Registry Act of 2018 plans to:

1. Develop a firefighter registry of available cancer incidence data collected by existing State Cancer Registries and a strategy to maximize participation;
2. Create a registry that will contain relevant history, such as other occupational information, years of service, number of fire incidents responded to, and additional risk factors;



3. Make de-identified data available to public health researchers to provide them with robust and comprehensive datasets to expand groundbreaking research; and
4. Improve our understanding of cancer incidences by requiring administrators to consult regularly with public health experts, clinicians, and firefighters.

(Bill Pascrell, 9<sup>th</sup> District of New Jersey)

### **What Cities are Doing to Prevent and Mitigate the Risk**

Fire Departments have started taking action to prevent and mitigate the risk of exposure in the recent years and continue to make improvements. In 2013, the Firefighter Cancer Support Network developed a white paper on cancer in the fire service. The participants came from volunteer, combination and career fire departments and the legal, medical and social research industries. Two firefighters who are cancer survivors also participated. Back in 2013, they were just beginning to understand the “horrific magnitude of the problem” and “the challenges involved and the changes required in education, training, operations, medical screenings and personal accountability to effectively address cancer in the fire service.”

(Firefighter Cancer Support Network)

The signs of firefighters’ exposure to carcinogens were everywhere:

- Photos appeared every day of firefighters working in active and overhaul fire environments with SCBA on their backs, but not masks on their faces.
- Firefighters proudly wore dirty and contaminated turnout gear and helmets.
- Some fire instructors wore their carcinogen-loaded helmets and bunker gear as symbols of their firefighting experience.
- Diesel exhaust, a recognized carcinogen, still contaminated many fire stations apparatus bays as well as living, sleeping and eating quarters.
- Many firefighters only had one set of gear which means they were continually re-contaminated from previous fires.

- Bunker gear was stored in apparatus bays where it is bathed in diesel exhaust.
- Bunker gear went unwashed for months at a time, even after significant fires.
- Many volunteers carried their contaminated gear in the trunks of their personal vehicles resulting in superheating and enhanced off-gassing of contaminants into the passenger compartment and sometimes even into their homes.
- The interiors of apparatus cabs were rarely decontaminated.
- Many firefighters did not take showers immediately following fires

In a 2018 article titled *“Auburn Firefighters Take Preventative Measures to Reduce Cancer Risk,”* author Lonnie Wong writes, “It didn’t take a policy directive to have the fire department employ a series of often simple measures to prevent exposure to toxic fumes and contaminants.” Throughout the article examples of implemented preventative measures are listed such as using special wipes to clean skin after a fire and placing turnout gear in isolated plastic bags. They have also added an extractor, an industrial washing machine, to clean gear thoroughly before the next call.

Fire Chief Shawn Fannan was interviewed and asked about what the Watauga Fire Department has done to mitigate or prevent cancer. It was refreshing to learn about all of the measures were in place. He responded, “In the last two years, the Watauga Fire Department has placed extensive measures to mitigate the risk/exposure to cancer.

The following is a list of the measures in place:

1. All firefighters will wear SCBA through all stages of the fire, including overhaul. (From the arrival to the fire – to the end)
2. Decon on scene – meaning – removing as much of the bulk contamination as possible while still at the fire scene by performing gross decontamination.
3. Wipe soot from your head, neck, jaw, throat, underarms by using City purchased wet wipes immediately after the fire.
4. Change and wash station work and other clothing right after returning to the station or

leaving the fire ground.

5. Shower after the fire within one hour.
6. Ensure that all gear is bagged at the scene and taken to the station to clean.
7. A second set of gear was purchased this year to allow #6 to be done. Every line firefighter now has: 2 helmet liners, 2 hoods, 2 set of gloves, 2 bunker coats, and 2 bunker pants.
8. Developed Cancer SOP.”

The fire service has made great strides in the prevention and mitigation of cancer in firefighters. With the support of City officials, City Management and Fire Chiefs, Fire Departments have developed best practices and even explored non-traditional exploratory detection measures. Cancer awareness training has started at the Fire Academy level. Cancer awareness/prevention material has been developed which includes the personal stories of firefighters surviving a cancer diagnosis.

### **Lavender Ribbon Report Best Practices for Preventing Firefighter Cancer**

The International Association of Fire Chiefs’ (IAFC) Volunteer and Combination Officers Section (VCOS) and the National Volunteer Fire Council (NVFC) partnered to develop and release the “Lavender Ribbon Report: Best Practices for Preventing Firefighter Cancer.” This report provides 11 actions that can be taken to mitigate the risk of cancer for firefighters. It is their hope that cities and Fire Departments take this call to action and embed the “11 Best Practices to Preventing Firefighter Cancer” into every Fire Department’s daily standard operating guidelines.

The Lavender Ribbon Report states “It is imperative that local leaders take this report to heart and spend the time and energy to make changes to improve the safety and health of responders. Too often, we hear about firefighters suffering from and dying of cancer.” The report recommends washing personal protective equipment (PPE) thoroughly and stored it in a better way. It states that many of their recommendation are relatively cost-effective actions that can be taken to reduce the risk.

The 11 Best Practices Recommendations from the Lavender Ribbon Report are as follows:

Best Practice 1 - Full personal protective equipment (PPE) must be worn throughout the entire incident, including a self-contained breathing apparatus (SCBA) during salvage and overhaul.

Best Practice 2 - A second hood should be provided to all entry-certified personnel in the department.

Best Practice 3 - Following exit from the immediately dangerous to life or health (IDLH) incident and while still on air, firefighters should begin immediate gross decontamination of PPE using soapy water and a brush if weather conditions allow. PPE should then be placed into a sealed plastic bag and placed in an exterior compartment of the apparatus, or, if responding in personally owned vehicles, placed in a large storage tote, thus keeping the off-gassing PPE away from passengers and self.

Best Practice 4 - After completion of gross decontamination procedures as discussed above and while still on scene, the exposed areas of the body (neck, face, arms and hands) should be wiped off immediately using wipes, which must be carried on all apparatus. Use the wipes to remove as much soot as possible from exposed areas immediately.

Best Practice 5 - Change your clothes and wash them after exposure to products of combustion or other contaminants. Do this as soon as possible or isolate in a trash bag until washing is available.

Best Practice 6 - Shower as soon as possible after being exposed to products of combustion or other contaminants. "Shower within the hour."

Best Practice 7 - PPE, especially turnout pants, must be prohibited in areas outside the apparatus floor (i.e., kitchen, sleeping areas, etc.) and should never be in the living quarters.

Best Practice 8 - Wipes, or soap and water, should also be used to decontaminate and clean apparatus seats, SCBA and interior crew areas regularly, especially after incidents where personnel were exposed to products of combustion.

Best Practice 9 - Get an annual physical, as early detection is the key to survival.

Best Practice 10 - Tobacco products of any variety, including dip and e-cigarettes, should never be used at any time, on or off duty.

Best Practice 11 - Fully document all fire or chemical exposures on incident reports and personal exposure reports.

(Lavender Ribbon Report: Best Practices for Preventing Firefighter Cancer)

### **Clean Gear is the New Badge of Honor**

The Firefighter Cancer Initiative Education Campaign (launched in 2015) led an effort to promote decontamination behaviors. It consisted of face to face presentations delivered by a member of the research team to audiences of 12-18 firefighters from Palm Beach County and Boynton Beach Fire Departments in Florida. In the past, dirty gear was the badge of honor. Dirty gear was a badge of courage.

As discussed, firefighter's protective gear such as pants, jackets, boots, gloves, facemasks, helmets and hoods get contaminated from emergency vehicle diesel exhaust and from toxic smoke arising from fire incidents. Exposure can occur from the off-gassing of toxins while removing gear post-fire or absorption through the skin from contact with dirty gear. Using cleansing wipes on skin and field decontamination of dirty gear can significantly reduce these toxic exposures, but researchers have found that [firefighters often don't perform systematic decontamination procedures](#). "The reasons for this vary, but often relate to group norms, attitudes and perceived barriers," reports the U.S. Fire Administration article titled "Firefighter Decon Challenges? Try a Communication Intervention." The campaign's focus was to educate firefighters on the effectiveness of post-fire decontamination. The researchers believed that if their group of peers recognized the value of it and if firefighters could overcome

time and/or resource barriers to performing decontamination an increase in post-fire decontamination behaviors would occur. Videos from this program show the firefighters being trained on how to properly decontaminate.

The results of this exercise resulted in a “significant increase in firefighters’ intention to clean their gear following the presentation.” “Firefighter attitudes, perceived norms, and self-efficacy in overcoming barriers all showed substantial increases towards gear cleaning.” (U.S. Fire Administration)

Based on the research conducted when writing this paper, it is apparent that the fire service and the mentality of a firefighter have evolved tremendously. “It has really evolved in the last ten years. I first became aware of it when I watched a documentary about the Miami Dade Fire Rescue - which is one of the largest departments in the US. It showed that from 2008 to 2010, 32 percent of the department’s 2000+ active firefighters were diagnosed with some form of cancer. That’s one in three in only three years! This number represents 1,711 men and 307 women on active duty status. It was a shocking. During the last 10 years, the culture of the fire service has changed – meaning – ten years ago is was a “pride thing” to have the soot covered helmets and gear – showing everyone how much fire you fought. Today, with all the cancer studies, clean is gear is norm.” (Fannan)

### **The Use of Cancer Dogs in Detecting Cancer**

In 2017, the Austin Firefighters Association partnered with Cancer Dogs, a Canada based group that organizes cancer screenings with the help of specially trained dogs. The Austin Firefighters Association is one of more than 100 fire departments in North America, including Fort Worth, Dallas and San Antonio, using Cancer Dogs. The Cancer Dogs experimental trial group has been operating over the last few years. They work specifically with firefighters using highly trained dogs that sniff out signs of cancer. (Rosales)

“There's been lots of scientific journals and articles about dogs detecting cancer, but it had gone largely ignored,” Cancer Dog Director Glenn Ferguson said. “This is life-saving

technology.” The company uses dogs in the same manner they are used to find people in a disaster for search and rescue. Beagles are trained by using breath samples from cancer patients before they started treatment to teach them how to target smell. Samples of people who have other medical conditions are used so the dogs can find cancer, but also ignore other medical issues. These are compared to samples from healthy people. The process offers over 60% sensitivity for finding cancer. Firefighters breathe into a provided mask for 10 minutes. The masks are put in bottles on trays in a sniffing station. (Rosales)

Austin Firefighters Association President Bob Nicks says, “The Cancer Dog program is a good extra tool in the toolbox, but it's not everything. It is something that can help you go down that next step to take additional testing. “It isn't to deter people away from seeing their doctors, but a push in the right direction.” He added, “These detections that turn out not to be cancer are pre-cancer.”

### **IvyGene DNA Testing**

The Bedford, Texas Fire Department has lost four (4) of its firefighters to cancer. Those firefighters are Section Chief Rich Nash, Battalion Chief Mark Johnson, Lieutenant Larry Brundrett, and Lieutenant Keith Long. Shortly after Lieutenant Long's death, the department started looking for ways to screen its firefighters for cancer, so it could be detected and treated early.

At the end of 2017, the City of Bedford funded IvyGene DNA blood tests for members of the department. The IvyGene test does not provide a simple yes or no response. It looks for changes in DNA, or methylation patterns, and can reveal a high suspicion of cancer presence. 64 firefighters tested, 10-15 had follow up appointments, but none were positive. Fire Chief Sean Fay said “It gives our folks a fighting chance because the threat is real and it is silent.” The cost for the exam is about \$400 per person. The department is trying to conduct the screening on a regular basis. Chief Fay says he is budgeting for the screenings because he'd like to do them more often than every five (5) years. (Howerton)

### **Conclusion**

Cancer is a life-threatening epidemic that needs to be addressed just as much as we address heart and PTSD issues. (Lavender Report). In 2018, it was recorded that 183 firefighters of the Firefighters who worked in the wreckage of the 9/11 attacks died due to cancers. This number continues to rise. (Wong).

Today's fires grow at a much more rapid rate than yesterday's fires while exposing firefighters to significantly increased concentrations of toxins. City Administration, including City Managers, elected officials and Fire Chiefs, must take the initiative to personally understand the facts about cancer in firefighters.

Fire Departments must continue to explore and implement preventive measures. Cancer awareness and prevention must be integrated into related training. SOPs should be reviewed and require mandatory use of SCBAs from the initiation of active fire operations to the completion of the overhaul process. Field decontamination procedures including the use of industrial strength wet wipes and showers should also be mandatory. The implementation of an exposure tracking system is also critical. Fire Departments should educate Firefighters about the Firefighter Cancer Registry Act of 2018 and its purpose and benefits. While participation cannot be mandatory, information can be shared.

Cancer awareness and prevention must be a priority. Fire Chiefs should work with their governing body, City Managers, government leaders and unions to seek and provide adequate funding for cancer awareness and prevention including necessary equipment and annual physical examinations which should include a cancer screening. An early cancer diagnosis will increase survival and decrease the overall costs of treatment. (Firefighter Cancer Support Network)

A change needs to occur in the law and how firefighter cancer related workers' compensation claims are administered. Laws in nearly 40 states, including Maryland and Virginia, have expanded medical, workers' compensation and disability coverage for such



cancer cases. (Bui and Hermann) While changes to the law may increase tax payer and city costs, it is imperative to find a solution that benefits both. Although there currently is no proposed legislature in the 86<sup>th</sup> Legislative Session, cities must support legislature in Texas in the future that may assist in this effort.

Watauga Fire Chief Fannan was asked how City Administration and Council could support his efforts to mitigate or prevent cancer in firefighters. “The City of Watauga can help support our efforts by allowing us to keep current efforts going each year – meaning purchasing new gear every 5 years to maintain the 2 sets for every line firefighter. The City of Watauga could also budget cancer screenings every 3 years to monitor for cancer.”

Elected Officials must remain open-minded in order to address the complicated issues surrounding cancer in firefighters as well as the funding that will be necessary to reduce its effects in the fire service. If the fire service is going to be successful in increasing awareness and preventing cancer in firefighters, then the cooperation of all parties is critical. Firefighters are our heroes. They are public servants who selflessly protect us and put their lives in harm’s way without a second thought. We have an obligation to do everything we can to protect them. Who is going to be their hero?

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