



REDUCE **YOUR** RISK

FDNY's Call to Action for Reducing
Occupational Exposure to Fireground Contaminants



online at fdnypro.org/reduceyourrisk



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**FDNY's Call to Action for Reducing
Occupational Exposure to Fireground Contaminants**





Dedicated to the men and women of
the Department who have been
lost to cancer...and those who
carry on their lifesaving work
without them.



Thank you!



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**There have been many others who also have
contributed greatly to the efforts of the
Contamination Reduction Workgroup.
Although they are not part of the Workgroup, we would be
remiss not to thank them.**

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COURTESY BILL TOMPKINS



MISSION AND GOALS

**FDNY is
recommitting its
efforts toward
reducing cancer
risks.**

Our Mission is Clear

By Fire Commissioner Daniel A. Nigro

One of the greatest attributes of FDNY members is that they always will go above and beyond to help others. They bravely will enter the most dangerous situations—buildings fully engulfed in flames, hazardous incidents, confined spaces and extreme heights—to save lives. Our members set the standard by which all fire departments are measured. That tradition of selfless service and unwavering dedication to helping others has earned the Department’s reputation as New York City’s Bravest.

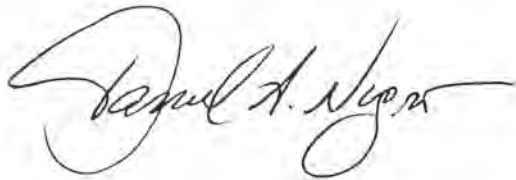
This job has great risks. Fighting fires and providing emergency medical care are incredibly dangerous. As of this writing, 1,150 FDNY members have lost their lives in the line of duty and 177 FDNY members have died due to World Trade Center-related illnesses, primarily cancers. Thousands more active and retired members and their families continue to fight brave battles against cancer.

This publication is a call to action for all of our members to go above and beyond for themselves—just as they do for others—when it comes to reducing their risk of exposure to contaminants that cause cancer.

Our members rigorously train for every one of those dangerous situations they face. They work together as a team, using the best tools, equipment and technology available. All of these actions are critical to reducing the risks inherently found in their work. We must use that same mind-set when it comes to the individual health of our Firefighters and EMS personnel.

As part of this important initiative, we are asking our members to take the valuable information from these pages and implement it at every level.

Pledge that you will do everything in your power to reduce your risk of contracting occupational cancers, for your health and your loved ones as well. As we do in every aspect of public safety, I want our members to help lead the charge in the prevention of cancer.





REDUCE YOUR RISK MISSION

Provide for the long-term health and safety of our FDNY family by raising awareness of the dangers of fireground contaminants and implementing practical policies and procedures that best support the central mission and core values of the Department, all while affording members with the tools, equipment, facilities and training that address the acute health concerns facing today's Firefighters.



REDUCE YOUR RISK GOALS

- Reduce rates of future illness (cancer) diagnoses of FDNY members.
- Continually educate members and share information on the health threats they face daily.
- Build on the long-standing FDNY tradition of safety by embracing a “cleaner” culture regarding contamination reduction.
- Improve and enhance on-scene member medical monitoring and on-scene member decontamination.
- Continue to modify and develop methods and practices to act as force multipliers to further support and compound the benefits of existing FDNY policies, procedures and tactics regarding health and safety.

Our Goals are Attainable

By Chief of Department James E. Leonard

FDNY's sworn mission is to protect life and property. That's been our objective since 1865. To accomplish that mission, we constantly prepare for the worst possible scenarios because millions of New Yorkers rely on us to always be ready to respond when called.

It's a lofty goal, but one that we achieve through training and an intense focus on safety. We stress safety at every level. At our Academies, the young men and women who are the future of our job have safety instilled in them from day one. In the field, our veteran members continue that training and our Officers look after the safety of those in their command. And, thousands of times a year, through extensive education outreach, we bring fire and life safety directly to the public we serve. Safety is at the core of all we do.

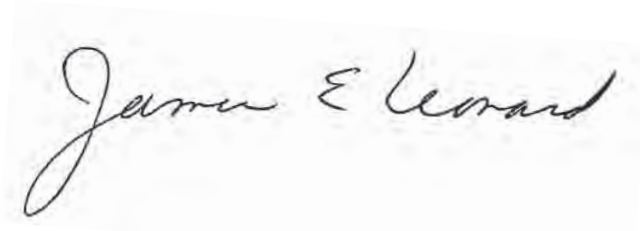
Our goals of saving lives, reducing fire deaths and improving the safety of our members are ones we continue to fulfill. It often is said that New York City is "the safest big city in America" and the FDNY is front and center in making that a reality.

Similar to those accomplishments, the goals set forth in our Reduce Your Risk initiative are ambitious, but they, too, are attainable.

We will execute this mission through education. Informing and preparing our members about the dangers to their health will make them safer.

Creating new traditions, while honoring those that have made us successful, also will mean increased safety. For example, there is nothing beneficial about "salty" gear, covered in soot and contaminants. It doesn't make you a better Firefighter. The training and experience you possess save lives.

Together, as we have done for those we protect, we will reduce the risks and better protect the lives of our own members. We will do it for them, as well as our families and our future.





**EVOLUTION,
NOT REVOLUTION**

**FDNY has been
on the forefront
of member health
and life safety for
decades.**

A Department's Commitment— Cancer Risk Reduction

By Deputy Chief Joseph M. Jardin, Acting Chief of Safety

Evolution, Not Revolution is the title of a presentation made late last year to Commissioner Daniel A. Nigro and Chief of Department James E. Leonard. The purpose of the presentation was to summarize the FDNY's Contamination Reduction Workgroup's recommendations for enhancing the Department's on-scene rehabilitation procedures, in addition to furthering the Department's cancer risk-reduction efforts. Due to the Department's rich history as a fire service leader in providing for the health and safety of the membership, it quickly became evident to the Workgroup that a "heavy lift" would not be required to meet many identified best practices for reducing Firefighter cancer risk due to fireground contaminants, while simultaneously increasing on-scene rehabilitation services.

Among the identified cancer risk-reduction best practices already implemented by the FDNY are:

- SCBA Policy
- Annual Medical Exams
- Firehouse diesel exhaust capture systems
- Two bunker ensemble sets per member
- Personal PPE transportation bags
- Decontamination Support Unit
- On-scene rehabilitation and care (RAC) resources and medical monitoring

Implementation of these measures during the past 30 years has positioned the Department well to fine-tune existing practices in the pursuit of reduced cancer risk, rather than overhauling existing policies and procedures.

As is reinforced by several articles in this publication, data from the collection of accepted research drive home the message that fire service occupational cancer risk is real. This research emphasizes that as Firefighters, we are at much greater risk; more than twice the risk for some cancer types than the general adult population. Even more alarming is the emerging recognition that our families, including children, face an increased risk as a result of our occupation.

The message is clear: As a Department, we need to strive to make available the means to diminish exposure and provide procedures and resources to further limit—if not prevent—contamination. In addition to reducing the contamination of exposed Firefighters, we need sensible practices that will serve to better protect our EMS and FDNY civilian counterparts, as well the public with whom we regularly interact.

Enhanced RAC Unit response, cleansing wipes, improved on-scene medical monitoring and tracking and improved PPE laundering alternatives are among measures that will be implemented in the near future. The Department will continue to explore best practices and make available resources for Firefighters to best protect themselves.

As Firefighters and Officers, it is your personal commitment and related actions that are key. Chief and company Officers must provide leadership in terms of mandating compliance and modeling best practices. As a supplement to proper SCBA usage, ensuring that you and your PPE, tools and apparatus are clean is critical to your long-term health, as well as the health of FDNY colleagues and your family.

Take every precaution and opportunity to enjoy a long and healthy retirement!

A National Focus

Fire service occupational cancer risk has taken a prominent place as a front and center issue impacting the nation's Firefighters. During the past year, several national media outlets, including NBC News, have focused attention on this fire service health issue. Statistics show that cancer has become a leading cause of Firefighter illness and death. Fire service periodicals, fire department conferences and the national media are emphasizing the topic and reporting that the body of research agrees that Firefighters are at greater risk for cancer when compared to the general population and at much greater risk for specific forms of cancer.



Taking proper safety precautions during operations is critical.

Also cited recently is the suggestion that Firefighter exposure to contaminants may result in an increased risk to family members. Accompanying the exposure and risk research are studies related to establishing cancer risk-reduction tactics and strategies.

The International Association of Firefighters (IAFF), International Association of Fire Chiefs (IAFC), National Fire Protection Association (NFPA), National Fallen Firefighters Foundation (NFFF), Firefighter Cancer Support Network and the Illinois Fire Service Institute are among a number of organizations concentrating on the topic of fire service occupational cancer. These bodies have commissioned studies, issued reports, developed educational campaigns and hosted workshops and conferences highlighting related issues. A number of jurisdictions— notably the Boston Fire Department—have been key to driving the dialogue. Consider some of the operational recommendations, which have been the result of the identified studies and efforts:

Metro Fire Chiefs/Urban Fire Forum 2017 Position Paper (IAFC/NFPA):

Exposure Prevention and Decontamination Elements

- Cancer risk-reduction awareness and education
- Use of SCBA throughout overhaul
- On-scene PPE cleaning/decontamination
- Post-exposure showers
- Address contamination issues in quarters

FDNY and Cancer Risk Reduction

A review of the many sets of recommendations and developed guidance on topics related to cancer risk reduction reflect that through natural evolution, the FDNY has taken a leading role in the implementation of the recognized best practices. As FDNY members, we sometimes take for granted the benefits derived from the below-listed procedures. Due to financial and logistical limitations, many departments nationwide can strive only with great challenge to implement some of, but not all of these practices.

The FDNY has been at the forefront of Firefighter health and safety with a several decades-long track record of implement-

“Clean is the New Salty” should be the mantra of all FDNY personnel.

ing groundbreaking initiatives aimed at reducing Firefighter exposure to toxic contamination. However, several new studies and scientific research suggest that there is more to be done. Additionally, areas for improvement exist related to the collective implementation of these practices, creating significant opportunities for building awareness and leading to improved use of existing practices and procedures.

Contamination Reduction Workgroup

The FDNY has convened a Contamination Reduction Workgroup. The charge for this group is to review the current state of the Department’s cancer risk-reduction programs and recommend future practices and strategies to better protect all FDNY members—Fire, EMS and civilians. In addition to emphasizing cancer risk-reduction policies, this workgroup is reviewing the Department’s post-fire and emergency rehabilitation and medical monitoring programs. During the past year, members of the workgroup have participated in a number of national level workshops and conferences concentrating on fire service occupational health and cancer risk reduction. Several workgroup members serve on NFPA standards with scopes that impact this topic.

The workgroup has the following Department representation:

- Operations (including Haz-Mat Ops, Decon Support Unit and Rescue Operations)
- Safety
- Training
- EMS
- BHS
- UFA
- UFOA

The workgroup started its efforts this past July, met on nu-

merous occasions and has submitted an initial set of recommendations to supplement existing Department approaches related to contamination reduction and on-scene rehabilitation. The following recommendations were included in the workgroup’s initial submission.

Forward RAC Setup in Proximity to Area of Operations

- Assign RAC Unit on transmission of 10-75 (as opposed to All Hands Doubtful) (Implemented).
- Assign additional RAC Unit on the transmission of the fourth alarm.
- Staff RAC Units with two Firefighters.
- Establish a “forward” RAC capability.
- Redistribute RAC Units to reduce RAC Unit response time.
- Add a sixth RAC Unit to the Rehabilitation and Care fleet.

On-Scene Medical Monitoring and Decontamination

- Implement mechanisms to provide for the reliable and efficient medical monitoring of exposed members.
- Implement improved tracking mechanisms to ensure the comprehensive monitoring of impacted personnel.
- Implement an on-scene hood cleaning program, whereby members can deposit dirty hoods for expedited cleaning.
- Provide members with on-scene access to personal cleaning wipes.

Post-Fire Rehabilitation

- Implement a rehabilitation time period following fire operation to allow personnel ample time to exchange contaminated PPE for clean PPE, shower and change into clean uniforms.



RAC unit.

General Contamination-Reduction Practices

- Vigilant use of PPE transportation bags to prevent cross-contamination
- Vigilant use of firehouse diesel exhaust systems
- Perpetual participation in annual PPE cleaning
- Use of Decon Support Unit to clean fire operations-contaminated PPE

As a result of these enhancements, you should expect to experience the following operational changes in the near future:

- Enhanced SCBA use enforcement throughout fire operations, including overhaul
- Hydration stations located close to operational areas
- Implementation of compulsory medical monitoring at All Hands fires and above
- Improved on-scene PPE decontamination
- Improved on-scene personal decontamination resources
- Improved contamination-reduction practices applied to all FDNY facilities

"Clean is the New Salty"

"Clean is the New Salty" should be the mantra of all FDNY personnel. Clean helmets, clean bunker gear, clean firefighting equipment and clean apparatus should be the goal of each Firefighter and Fire Officer. Contaminated PPE, equipment and/or apparatus expose you, your Brother and Sister Firefighters, EMS personnel, Fleet Services personnel and your family to cross-contamination and increased cancer risk. These enhanced procedures will offer improved "short-term" benefits related to combating heat-related emergencies and evaluation of Firefighter health and well-being. Members also should consider the long-term benefits from a reduced risk to long-term health threats following healthier contamination-reduction practices. ■

Reduce Your Risk Initiative



The FDNY's Reduce Your Risk project was established in 2017 by the Department's Contamination Reduction Workgroup to increase awareness of the cancer risk faced by Firefighters and promote the proactive measures that should be taken to combat this deadly, but frequently avoidable, occupational hazard. FDNY Deputy Chief Joseph Jardin, Acting Chief of Safety, wrote about this important initiative in the WNYF 1st/2018 article, "FDNY and Cancer Risk Reduction." Battalion Chief and Executive Officer to the First Deputy Fire Commissioner Brian Mulry hosts.

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About the Author

Deputy Chief Joseph M. Jardin has served the FDNY since 1985. He is the Acting Chief of Safety. Prior assignments include Battalions 44, 28 and Rescue as a Battalion Chief. As a Firefighter, he served in Engine 210, Ladder 154 and Rescue 2; as a Lieutenant, he served in Battalions 51 and SOC and Squad 252; as a Captain, he served in Division 14 and the Rescue Battalion. He is a registered professional engineer and holds a BS degree in Fire Protection Engineering from the University of Maryland.

Landmark Steps Already Taken

Comprehensive SCBA use policy

Personal facepiece issuance

Two issued sets of PPE

PPE transport bags

Department-provided annual medicals

Firehouse apparatus diesel exhaust capture systems

On-scene rehabilitation, including medical assessment

Programs available for tobacco cessation and alcohol

PPE cleaning and inspection by an independent service provider

Establishment of a Decontamination Support Unit with response capabilities

Decontamination Support Unit capable of laundering contaminated gear per member requests

Response of a Rehabilitation and Care (RAC) unit to all structural fires

Medical assessment, including blood gases checked after operating at two-alarm or greater fires

Computerized injury/exposure reporting system for exposure tracking

Annual paid leave of absence to undertake a screening for any type of cancer



Evolving Tactics to Improve Safety

Enhanced SCBA use throughout structural and exterior fire operations, including overhaul

Forward rehabilitation stations located close to operational areas

Implementation of compulsory medical assessment at “All Hands” (working fires) and above

Improved on-scene PPE decontamination

Improved on-scene personal decontamination resources

Improved contamination-reduction practices applied to all FDNY facilities and apparatus



INSIGHT

**Knowledge
empowers us to
take additional
action.**

Deadly Foes— Cardiac Disease *and* Cancers

By Dr. David Prezant, Chief Medical Officer,
Special Advisor to the Fire Commissioner for Health Policy

For many years, heart disease was the number one killer for Firefighters and first responders, including EMS personnel. During the past decade, there has been a growing realization that cancers pose an equal, if not greater risk, to the health and well-being of our membership—especially if one includes, as one should, the post-retirement years.

Two recent studies by the National Institute of Occupational Safety and Health (NIOSH) on cancer incidence rates followed Firefighters from three cities (Chicago, Philadelphia and San Francisco) through 2008. Compared to the general, non-Firefighter, U.S. population (age-/gender-/race-matched), they found a significant increase in the overall rate of cancers (by ~10 percent) and for several specific cancers (prostate, bladder, lung cancer, mesothelioma and leukemia). The result is that Firefighters have a 14 percent increase in cancer-related deaths compared to the general public.

We at FDNY were the first to show similar findings in WTC-exposed Firefighters by demonstrating a 10 to 30 percent increase in overall cancers and trends for an increase in several specific cancers (prostate, thyroid and hematologic cancers). We just published a follow-up study showing an increase in multiple myeloma and that this increase occurred in Firefighters 40 years or older—at least a decade younger than expected, based on U.S. population studies. What these studies mean is that occupational exposures are an important factor, but not the only factor.

If we were to eliminate all of them, as we should strive to do, we would reduce our cancers by 10 to 30 percent and we could reduce certain specific cancers by several fold. Unfortunately, the remainder and majority of the cancers still will occur. But we are not all destined to develop cancer. A plethora of studies clearly has shown that substantial further reductions in cancer rates can occur through diet, exercise, limiting alcohol intake and tobacco prevention/cessation.

As first responders (Firefighters and EMS personnel), we come to work every day with the knowledge that going home at the end of the tour is not guaranteed. We accept that life-threatening fires, building collapses, motor vehicle crashes and acts of violence and terrorism occur and often are beyond

our control. Limiting exposures and maintaining a healthy lifestyle are not beyond our control and FDNY is partnering with you to achieve this. We all must share responsibility and make this a full-time commitment so that we can go home every day to our friends and families. How we have been doing this and how we expect to expand this effort are the subject of this article.

Action Taken

FDNY was the first fire department in the nation to understand this responsibility and begin a long journey toward health and wellness for our first responders. That commitment begins with the candidate's physical fitness and medical exams and continues today with the most complete annual medical (physical and mental health) monitoring exam in the nation. It combines all of the components of the annual medical monitoring evaluation recommended in the National Fire Protection Association Standard for Fire Department Health Evaluations (NFPA 1582), the International Association of Fire Fighters (IAFF) Wellness/Fitness Initiative and the World Trade Center medical monitoring evaluation. It includes risk-based cancer screenings for leukemias, thoracic malignancies (thyroid and lung cancers, lymphoma and mesothelioma) and colon, prostate, cervical and breast cancers.

For those of you in our WTC Health Program, all of the above cancer-screening tests are paid for by the federal government (Zadroga Act). Both screening and treatment are free of charge to you and continue post-retirement. For those without WTC-exposure, essentially those members hired after 2002, many of the above tests are paid for by FDNY as part of your annual monitoring exam. The remaining tests and treatment are covered by your health insurance.

While finding cancers early when treatment is most effective is a major goal of our program, it is not the primary goal. First and foremost, we must try to eliminate exposures and change the lifestyles that lead to these cancers.

Next Steps: Cancer Prevention

Two of the most important health and safety initiatives for the fire service have been mandatory use of self-contained



At fires, bunker gear offers a credible barrier to many toxins.

breathing apparatus (SCBA) and thermal protective equipment (bunker gear, including hood and gloves). SCBA can eliminate inhalation exposures only if worn throughout the entire fire evolution. We have learned that the lung is a window to the rest of your body. Inhalation exposures become systemic exposures that can result in cancers at distant organs and cardiac disease. No Firefighter should suffer inhalation exposures unless lives are in immediate danger.

And yet, inhalation exposures, while vastly reduced, still occur. To remedy this, improvements in SCBA are needed to facilitate easier use during the entire evolution, including overhaul. Respirators are uncomfortable to wear, reduce visibility, difficult to communicate through and extremely hard to use when performing the overhead work required during overhaul. These use problems are magnified by the limitation in air supply, often lasting fewer than 18 minutes. This can be a good thing, since it provides an endpoint so that Firefighters, even those in the best physical condition, must exit the fire scene, thereby preventing overuse injuries and cardiac events.

But, at other times, when the stakes are high, a now-exhausted Firefighter with a spent SCBA may continue to advance into the fire, leading to heroic misadventures and the potential

for smoke inhalation, cardiac ischemia/arrest and other potentially fatal results for both that Firefighter and others who then are deployed in an all-out rescue effort. Providing and wearing respirators are not enough. Physical conditioning, training, supervision, fire scene rehabilitation and medical monitoring are equally important.

Other than SCBA, bunker gear has been the most important safety advance for the fire service. EMS now has similar gear to prevent the hazardous exposures unique to their job (blood-borne exposures, etc.). Prior to mandatory bunker gear use, burns were an expected event in every Firefighter's career. Far too often, these burns were career-threatening, requiring skin grafts, long hospitalizations and, tragically, some were life-ending. FDNY was the first to show that bunker gear reduced burn injuries by 85 percent. With the addition of improved knee pads, serious burns requiring skin grafts now are rare events.

While we required bunker gear for thermal protection, we hoped that it also would serve as a barrier for other hazardous exposures—blood-borne, chemicals, biological, radiation and nuclear. History has shown that when maintained and worn properly, bunker gear does offer a credible barrier to many of these toxins. We demonstrated after a Con Ed transformer fire

FDNY is participating in several national studies aimed at understanding and improving Firefighter health.

in Staten Island that bunker gear was an effective barrier for PCBs and dioxins.

However, by serving as a barrier, bunker gear, if not properly cleaned and decontaminated, can be a source of future and continued exposure to Firefighters by inadvertently spreading these toxins into the firehouse and the home. This was demonstrated in a recent NIOSH study showing higher than expected levels of contamination on bunker gear and especially on the gloves and hoods.

Fire departments throughout the nation are grappling with the best approach to mitigating these “second-hand” exposures. Smaller departments with few fire or haz-mat incidents could “bag” the gear at the scene, before the fire apparatus and firehouse potentially are contaminated. This requires the ability to bag it for full-scale cleaning; have additional clothing to wear at rehab and on the way back to the firehouse; and have a second set of bunker gear available so that the fire unit is not out of service.

Fire departments with high call volumes, such as FDNY, find this difficult to institutionalize. Instead, we are taking a stepwise approach to reduce second-hand exposures. For now, we are concentrating on those pieces of contaminated gear—the hood and gloves—that pose the greatest risk for transfer of toxins through the skin. FDNY is ramping up to have every Firefighter on-scene at a working fire swap out the hood and gloves for a clean set. They then will be professionally decontaminated and put back into service. We will provide clean wipes on RAC Units to allow for an on-scene wipe-down of the most vulnerable skin surfaces (hands, face and neck). Upon return to the firehouse, members will remove any remaining gear before entering the kitchen/living quarters, followed by immediate showering.

Simultaneously, we must identify and validate which type of events provide the greatest likelihood for exposure and then design administrative and operational controls that focus on those incidents. We continue our NFPA 1851-compliant inspection, cleaning and repair program. Bunker gear and now

the hoods are cleaned and inspected at least annually by an independent contractor. During cleaning, problem areas are repaired or replaced.

We have begun the process of selecting new bunker gear specifications. Our goal for the next generation bunker gear is to maintain thermal and haz-mat protection, while improving breathability, ergonomic efficiencies and decontamination capabilities. For example, we are encouraging manufacturers to design gloves and helmet linings that facilitate easier decontamination and cleaning.

While it is long overdue to concentrate on preventing skin exposures by wearing properly designed gear and preventing second-hand exposures by not reusing contaminated gear until properly cleaned, we must not forget that the many dangerous exposures on the fireground occur via inhalation and, to a lesser extent, from swallowing these same chemicals, particulates and gases. These exposures are prevented by wearing SCBA. The lungs are designed to transfer gases into the blood and lymphatic system and while this is responsible for oxygenation, it has the untoward consequence on the fireground of resulting in systemic exposures to toxins and carcinogens. Proper use of SCBA prevents not only direct damage to the upper and lower respiratory system (sinusitis, asthma, emphysema, interstitial pulmonary inflammation and fibrosis, throat cancer, lung cancer and mesothelioma), but also for systemic diseases, such as cancers at distant organs and heart disease.

Cardiac Health is an Important Step in Cancer Prevention

While cancer is a growing concern, cardiac events still occur. Thankfully, cardiac deaths in the fire service have decreased. A large portion of this decrease is not due to lower rates of heart disease, but because of better treatment of myocardial infarcts (heart attacks). While we are thankful for this, we must not forget that our primary goal is prevention.

Significant reductions in cardiac disease can occur through limiting exposure on the fireground (heat shock proteins and by-products of combustion have an influence on vascular health), diet, exercise, limiting alcohol intake and tobacco prevention/cessation. Sounds familiar! These are the same exposure reductions and healthy lifestyle changes recommended for cancer prevention. Your annual monitoring exams also screen for cardiac disease. Weight, body mass index, blood pressure, cholesterol profiles and risk-based cardiac stress tests are provided at the annual monitoring evaluation and the findings too often are ignored by our members. Risk factors can be lowered and eliminated by diet, exercise and, if necessary, medication. These medications do not prevent full duty. Cancer prevention and cardiac prevention go hand in hand. We can reduce both, but we must take individual responsibility for modifying these risk factors.

Our future depends on continuing and expanding research efforts with our partners in the fire service, EMS, industry, academic centers and the health care community. There is real value to these partnerships. Our studies were the first to prove the effectiveness of bunker gear, the first to show increased incidence of disease in Firefighters and the first to show the impact of the WTC exposure on health. Without these studies, we would not have the many health and safety benefits that we enjoy today.

But we are not stopping there. FDNY is participating in several national studies aimed at understanding and improving Firefighter health. In fact, based on our demonstrated excellence, we have received funding with our partners at the Albert Einstein College of Medicine to take over the NIOSH three-city cancer study and make it a four-city study, combining FDNY cancer statistics with the original three cities (Chicago, Philadelphia and San Francisco). This is a huge honor and responsibility.

We can achieve these goals only by continuing and growing our labor/management partnership. For that reason, FDNY has strengthened the Health & Safety Labor-Management Committee to include our unions, the Chief of Department, Chief of Operations, Chief of EMS Operations, Chief of Safety and the Bureau of Health Services. This committee has the power to identify issues and make recommendations directly to the Chief of Department and the Fire Commissioner. Many of our cancer-prevention initiatives have come directly from this committee. Without the full partnership and support of all of these parties, our FDNY WTC Health Program would not exist.

Our journey to improve the health and safety of our membership is a continuous one and can be successful only when we work together. Some of our goals already have been met and others will take continued hard work and mutual commitment. But the same “can-do attitude” that enables us to be successful at every emergency to which we respond will allow us to eventually be equally successful with our attack on cancer and cardiac diseases—an attack that must be shared personally and Department-wide. Through health and safety, we can live long and well and prosper. ■

Annual Medicals— A Lasting Impact



On March 16, 2018, FDNY Chief Medical Officer, Dr. Kerry Kelly, retired after 37 years of dedicated service. The FDNY has set the standard for monitoring the health and well-being of its members and Dr. Kelly was instrumental in getting that done. Dr. Kelly began the FDNY program of Annual Medicals, which is a yearly medical examination that became even more essential after 9/11. Because the FDNY performed yearly medical exams on all first responders, this Department had the baselines that helped illustrate (and actually prove in some circles) that 9/11 debris and dust did impact the health of first responders. Hear more about this, Dr. Kelly's background and experiences in this episode. Chief of Staff Elizabeth Cascio hosts.

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About the Author

Dr. David Prezant is the Chief Medical Officer for the FDNY and the Special Advisor to the Fire Commissioner for Health Policy. He is Co-Director of FDNY's World Trade Center Medical Program. Dr. Prezant was in charge of coordinating FDNY's overall preparedness and response to patients with potential Ebola Virus Disease.

Getting Smarter About Our Cancer Risks

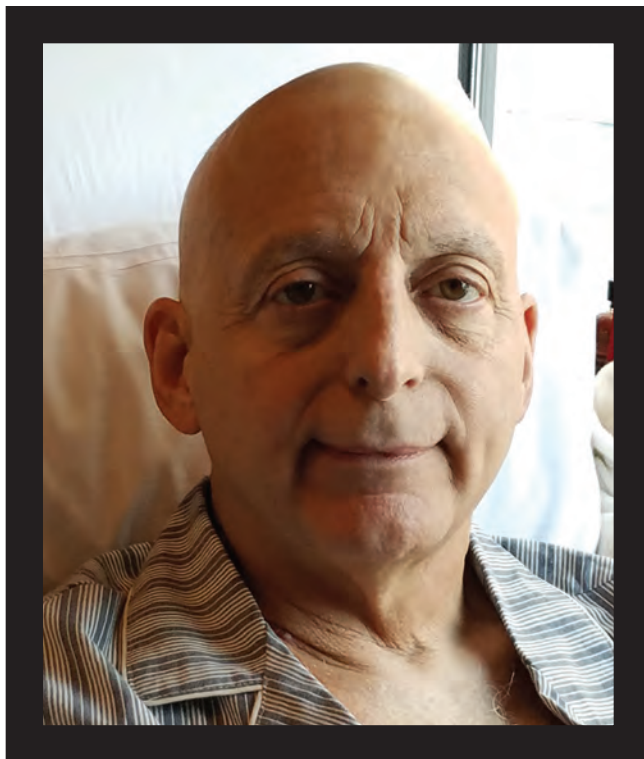
By Assistant Chief Ronald R. Spadafora, Chief of Fire Prevention

I thought I was invincible, but I was wrong. All the years of working on the fireground and during the World Trade Center rescue and recovery operation had taken its toll. In the autumn of 2015, while not realizing it, I was experiencing many of the symptoms of blood cancer (acute myeloid leukemia or AML), which includes fatigue, shortness of breath during light physical activity, fever and night sweats, black-and-blue marks for no clear reason and aches and pains in the shoulders and knees. Working through the indicators for several months ended in December when I was being driven home at the conclusion of the workday. Collapsing in the passenger seat, I later was told that my eyes rolled up into my head. I was taken to NYU Lutheran Medical Center (now NYU Langone Hospital) in Brooklyn and stabilized.

My Cancer to Battle

The word, "myeloid," refers to the cell type it affects. Myeloid cells are precursors to other blood cells that develop into red (oxygen carriers), white (disease fighters) and platelets (bleeding inhibitors). When a person has AML, the myeloid cells mutate and form leukemic (cancer) cells that don't function as normal cells and prevent the body from making healthy cells. The result is low red, white and platelet counts. The five-year overall survival rate for AML is 26 percent.

Blood drawn at Lutheran confirmed the results of my latest blood test taken during the annual WTC medical examination. FDNY medical doctors referred me to Memorial Sloan Kettering Cancer Center where a CBC (complete blood count) was performed, which revealed the presence of leukemia cells in my blood.



Chief Spadafora's battle with cancer.

Cancer and Firefighting

In conjunction with the increasing toxicity of modern-day fires, cancer deaths among members of the fire service have risen dramatically during the past two decades. Studies show this is a direct result of the increased use of plastics and other synthetic (man-made) components found in furniture, wallpaper, carpeting and other room contents. In a fire, contemporary substances emit toxic chemicals and cancer-causing by-products when heated. They include ammonia, arsenic, benzene, carbon monoxide, formaldehyde, hydrogen cyanide, phenol and toluene.

Firefighters, who regularly are exposed to smoke and toxic gases, have been examined for long-term health effects. Scientific findings often show an increased frequency of cancer among Firefighters, compared to reference populations. There is also the potential for chronic (recurring) health effects from exposure to the components of smoke. Cancer is a leading cause of death among Firefighters today, following cardiovascular disease. These facts have been established by data collected and evaluated by the National Institute for Occupational Safety and Health (NIOSH) and the International Association of Fire Fighters (IAFF). This information demonstrates that occupational exposure to carcinogens significantly increases the risk of many cancers in correlation with the duration of firefighting activities. The list below compares the health risk Firefighters face in the performance of their duties, compared to the general public.

- 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)*
- Malignant melanoma (1.31 times greater risk)

Dirty (or salty) gear does not impress. It demonstrates you are naive to the dangers of contamination and cancer risk.

- Brain cancer (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)

Workgroup Formation

In June 2017, the FDNY, along with the Uniformed Firefighters Association (UFA) and the Uniformed Fire Officers Association (UFOA), formed the Contamination Reduction Workgroup with the major purpose of reducing the cancer risk for members. The goal is to make everyone aware of the hazards faced when working both at fire and emergency scenes and at the firehouse/EMS station. Workgroup recommendations supplement existing Department approaches related to health hazards at the firehouse/station and contamination of members on the fireground.

Procedures and policies reviewed include SCBA use protocols, rest and rehabilitation, annual medicals, Recuperation and Care (RAC) Units, medical monitoring, bunker gear cleaning, Decontamination (DECON) Support Units, firehouse personal protective equipment (PPE) best practices and firehouse diesel exhaust systems.

This article is written not to analyze specific recommendations of the Workgroup. The members of this coalition will pro-

vide their ideas and endorsements as their mission unfolds. Their efforts will aid in reducing the problematic statistics concerning the high risk of cancer to Firefighters.

Fundamental procedures to follow today include wearing and using your SCBA during both interior and exterior fire operations. This action is especially important during overhaul and when outside a burning building where smoke and gases are emitting into the street. Wash your bunker gear; it will reduce the exposure you have to carcinogenic substances. Dirty (or salty) gear does not impress. It demonstrates you are naive to the dangers of contamination and cancer risk. During a fire, toxic smoke settles on your protective clothing, as well as exposed skin. Showering is the final step to decontamination. This action will decrease your time of exposure, as well as to potential cancer-causing particulates. Diesel exhaust long has been suspected of causing cancer. The Workgroup is exploring different ways and products to minimize exposure to Firefighters, including in-house, ventilation and apparatus-mounted, exhaust-removal systems.

Avoid spending a year in two different hospitals, trying to survive cancer as I did in 2016. Take the steps needed to protect yourself and your family at all times. ■



About the Author

Assistant Chief Ronald R. Spadafora has served the FDNY since 1978. He is the Chief of Fire Prevention. He holds a Master's degree in Criminal Justice from LIU-C.W. Post Center, a BS degree in Fire Science from CUNY-John Jay College and a BA degree in Health Education from CUNY-Queens College.

Current Research on Reducing Cancer Risks

By Dr. Gavin P. Horn, Steve Kerber, PE,
Dr. Kenneth W. Fent and Dr. Denise L. Smith

The fire environment has changed dramatically in the past 50 years. Building construction presents significant life safety issues for Firefighters. Home furnishings and building materials produce more toxic products of combustion that increase cancer risk, add to cardiovascular strain and pose a threat to the respiratory system. Fortunately, there has been a tremendous increase in scientific research to support the implementation of evidence-based strategies and best practices in the fire service. In recent years, we have made advances in scientific understanding of fire dynamics; dramatically increased Firefighters' understanding of the cardiovascular strain; documented increased risk of specific cancers among Firefighters; and identified some markers of toxic exposure associated with firefighting.

Despite all of these advances, what is still sorely missing and has been desperately needed to devise policies and create technologies to protect Firefighters is meaningful integration of three important lines of research. A multi-disciplinary team of researchers worked together to address major firefighting concerns—fire behavior, physiological strain and exposure risks—in a comprehensive manner.

To better understand the threats produced by the modern fire environment, we conducted live fire scenarios in a wood-frame structure that was appointed with typical furnishings and finishes. Although we addressed all three risks in our comprehensive study, this article will focus heavily on findings related to exposure risks associated with firefighting in modern structures with realistic fuel loads and the lessons we learned from the study.

In the summer of 2015, a team from the Illinois Fire Service Institute (IFSI), UL Firefighter Safety Research Institute (UL FSRi) and the National Institute for Occupational Safety and Health (NIOSH) began a study to investigate the impact of real structural firefighting operations on the most important clinical health concerns of the fire service—cardiovascular risk and toxic exposures. The study was designed to address several important questions:

1. What is the physiological and chemical impact from the various exposures experienced by Firefighters employing different tactics and working in different job assignments on the

fireground?

2. How do factors related to firefighting affect heat stress and cardiovascular responses under realistic fire environments Firefighters face in today's structures?
3. How effectively does the body recover over the 12 hours following a response?
4. How do toxic combustion products get into a Firefighter's body?
5. How effective are personal protective equipment (PPE) and skin decon procedures?

Modern Fire Behavior

A significant contributing factor to the continued tragic loss of Firefighters and civilians is the lack of understanding of fire behavior in residential structures, resulting from the changes that have taken place in several components of residential fire dynamics. The changing dynamics of residential fires due to changes in home size, geometry, contents and construction materials during the past 50 years add complexity to the fire behavior. On average, Firefighters in the United States spend less than one percent of their training on the subject of fire behavior.

As homes become more energy-efficient and fuel loads increase, fires will become ventilation-limited, making the introduction of air during a house fire extremely important. If ventilation is increased, either through tactical actions of Firefighters or unplanned ventilation resulting from effects of the fire (e.g., failure of a window) or human action (e.g., door opened by a neighbor), heat release will increase, potentially resulting in flashover conditions.

These ventilation-induced fire conditions sometimes are unexpectedly swift, providing little time for Firefighters to react and respond. Firefighters today are being challenged by different fireground hazards due to construction practices and the use of synthetic materials in furniture and building products. These changes have made structure fires more challenging than ever before and led to re-evaluation of firefighting tactics. The changes in modern building design and materials have altered the nature of structure fires, with modern homes able to reach flashover eight times faster than homes built 50 years ago.

The impact of firefighting tactics, such as ventilation (horizontal, vertical and positive pressure) and water application from the exterior, have been studied carefully. Among the important findings of these studies is the critical importance of coordinating ventilation with the application of water or another type of fire suppressant in achieving a successful firefighting outcome. Underwriters Laboratories (UL) partnered with the National Institute of Standards and Technology (NIST), the Fire Department of New York (FDNY) and the Governors Island Preservation and Education Corporation to use rigorous scientific methods to advance Firefighter safety.

Ventilation and suppression procedures were analyzed in basement, first-floor and second-floor blazes during 20 townhouse fire experiments. These live burn tests were aimed at quantifying how fires are different today, largely due to new building construction and the composition of home furnishings and products. Historically, furnishings mainly were composed of natural materials, such as wood and cotton, but now contain large quantities of petroleum-based products and synthetics that burn faster and hotter.

Significant progress has been made in understanding the modern residential fire environment and the fire service has been provided with important tactical guidance that can increase Firefighter effectiveness. Key questions we investigated included:

1. How do the tactical choices made by the fire service impact members' risk for cardiovascular and chemical exposure?
2. What is the physiological and chemical impact of the different exposures experienced by Firefighters in different roles/assignments on the fireground?

Exposure and Cancer Risk

Several detailed statistical studies have been conducted to determine cancer risk in the fire service compared to the general population. In the largest such study ever conducted in the U.S., Firefighters (30,000 career Firefighters from Philadelphia, Chicago and San Francisco, a study that currently is expanding to the FDNY), the National Institute for Occupational Safety and Health (NIOSH) found statistically significant increases in rates of contracting and dying from all cancers and cancers of the esophagus, intestine, lung, kidney and oral cavity, as well as mesothelioma, compared to the general population. The NIOSH study also found excess risk of bladder and prostate cancers at younger ages.

Other studies throughout the world (Nordic countries, Australia and California) have identified increased risks among Firefighters for multiple types of cancer, many of which also were identified in the NIOSH study. NIOSH also found an exposure/response relationship between fire hours and lung cancer and a similar relationship between fire runs and leukemia. These are important findings because if the risk of disease increases with increasing exposure, the likelihood of causality is enhanced. All together, these studies suggest that firefighting may put Firefighters at an increased risk for multiple types of cancer.

There are a number of factors that can increase someone's risk of cancer. These include smoking, alcohol consumption, diet, obesity, sun exposure and exposure to chemical carcinogens. Several studies have been conducted to assess Firefighters' exposure to combustion byproducts. These studies have identified numerous carcinogenic compounds in the fire atmosphere, including benzene, certain polycyclic aromatic hydrocarbons (PAHs), 1,3-butadiene, formaldehyde, vinyl chloride and other halogenated compounds.

Firefighters also can be exposed to diesel exhaust, a known human carcinogen, on the fireground or in the firehouse. When

Firefighters wear positive-pressure, self-contained breathing apparatus (SCBA), inhalation of these toxicants essentially is eliminated. However, it has been observed that Firefighters do not always wear SCBA; for example, when sizing up the fire, working as the engineer or Incident Commander (IC) or conducting overhaul operations. Some of these carcinogenic compounds also can be absorbed through the skin, either directly in vapor form (e.g., benzene) or through deposition or contact-transfer of particulate to the skin (e.g., PAHs).

In a recent study, NIOSH measured Firefighters' dermal exposure to PAHs on the neck, face, arms and scrotum, following controlled burns where laundered or new gear was used. NIOSH found a statistically significant increase in PAHs on the neck, which the investigators attributed to the lower dermal exposure protection afforded by fire hoods. In this same study, PAH metabolites in urine appeared to be elevated three hours after firefighting (most likely from dermal uptake) and exhaled breath levels of benzene were significantly elevated immediately after firefighting. The NIOSH investigators postulated that the increased breath levels of benzene primarily were due to absorption of vapor through skin. Some benzene off-gassing from contaminated gear also could have been inhaled during the doffing process.

Firefighting gear that becomes contaminated may be an important source for dermal exposure, whereby Firefighters touch the contaminated gear and spread it to other areas of their bodies. Studies have quantified numerous contaminants on firefighting gear, including PAHs, phthalates, flame retardants and metals. Findings from these studies and others suggest that the act of firefighting and contamination of gear may contribute to the internal dose of pollutants. However, the magnitude and biological significance of this contribution to Firefighters' internal dose are not well understood. In addition to the concern for dermal exposure, contaminated gear may increase Firefighters' exposure through the inhalation route.

Two recent studies found elevated levels (compared to background) of several volatile organic compounds (VOCs) off-gassing from contaminated gear soon after doffing. This off-gassing of VOCs could expose Firefighters to known carcinogens, such as benzene, if they rehab near contaminated gear, continue to wear their gear post-fire or wear or store their gear in the apparatus compartment on the drive back to the station.

What Can We Do About it Now?

While all of this information gives us cause to be concerned, we are not without recourse. These studies have shown that a few simple steps can greatly reduce your fireground exposure, while having little impact on how you operate while fighting a fire.

Anecdotal evidence and many best practice documents suggest that gross on-scene decon can reduce the contamination on your PPE. While much has been promoted in these documents, there was little evidence to support one method over another until recently. We found that the wet soap decon technique—similar to what might be conducted during haz-mat PPE doffing—removed about 85 percent of the PAH contamination from the Firefighters' outer shell. This technique was simple. Wet the gear, spray on a soap solution, brush lightly, then rinse off, which required approximately two to three minutes per Firefighter and was fairly inexpensive to conduct.

We also studied the effectiveness of brushing off the gear or using an air wash system to blow off the PPE contamination. The brushing removed about 25 percent of the contamination, while the air flush had little impact. These "dry" techniques also could re-aerosolize the contamination, which is a potential hazard for the Firefighter, as well as the person performing the decontami-

We recently have found that some of the contamination that gets deposited on the Firefighter's PPE can be transferred to the skin while doffing the gear, particularly from the gloves to the hands and the hood to the neck.

nation. So, if you are going to do this, be sure to protect your airway. These techniques aren't perfect, but wet soap decon has the greatest potential to remove much of the contamination that otherwise could re-expose a Firefighter or deposit toxic materials into the apparatus cab or firehouse. Currently, there is significant work by many manufacturers to improve decon efficiency, so stay alert for developments that are likely to be evolving.

On-scene skin cleaning also has received significant attention as a rapid means for removing contamination that makes its way through the PPE and ends up on the Firefighter's skin. Skin cleansing wipes can be used while Firefighters are changing air bottles, getting a drink or even reporting to rehab. As part of this study, we used generic cleansing wipes that are commercially available and had the Firefighters wipe off their neck after firefighting activities. For those who had measurable contamination on their necks, we found that 54 percent of the contamination could be removed. While not perfect, the ability to significantly reduce contamination very quickly can reduce the dose that otherwise would be absorbed into the Firefighter's body. These data also highlight the need to shower as quickly as possible after the firefight in order to reduce further contamination and systemic absorption. This is another area where significant development from the fire service support industry has produced new products that may improve on this cleaning efficiency.

The best way to reduce the dose that Firefighters receive is to reduce the soot that reaches the skin. We often have assumed

that the bulk of the skin contamination comes while working inside a structure fire. That's not the full story. We recently have found that some of the contamination that gets deposited on the Firefighter's PPE can be transferred to the skin while doffing the gear, particularly from the gloves to the hands and the hood to the neck. However, simple changes in how Firefighters remove the gloves—ensuring not touching the outside of the gloves while taking them off, similar to removing EMS gloves—can greatly reduce what ends up on one's hands.

Likewise, common hood-doffing procedures have the Firefighter pull the hood down around the neck while removing the SCBA facepiece. When doing this, much of the contamination on the exterior of the hood can transfer to the neck skin, which is some of the thinnest and most absorptive skin on the human body. We can modify this approach slightly to take the hood off over the mask. This is a simple change that can have a big effect on your exposure.

While there is much more to learn about fireground contamination and contamination control, research is helping us to understand how contamination is produced, how it can expose the human body and how you can effectively reduce your exposure. ■

On-Scene Skin Cleaning



Field wipes can be used for skin decontamination after a fire incident. Use them to clean away contaminants from your skin quickly and effectively. The wipes remove toxic metals, dirt and germs. Soot after an incident is not a trophy; it is a potentially harmful contaminant. Remember, the wipes are not a substitute for taking a shower after an incident. Watch this video to learn how to use the wipes properly.

More Online
Watch Video

About the Authors



Dr. Denise L. Smith is the Tisch Family Distinguished Professor in Health and Human Physiological Sciences at Skidmore College in Saratoga Springs, NY, where she directs the First Responder Health and Safety Lab. She is also a Research Scientist at the University of Illinois Fire Service Institute. Dr. Smith earned her PhD in Kinesiology with a specialization in Exercise Physiology from the University of Illinois at Urbana-Champaign in 1990. Her research is focused on the physiological effects of firefighting, particularly the thermal and cardiovascular strain, and with sudden cardiac death in the fire service.



Steve Kerber is the Director of the UL Firefighter Safety Research Institute. He has led research with the fire service in the areas of ventilation, structural collapse and fire dynamics. He is a 13-year veteran of the fire service with most of his service at the College Park Fire Department in Prince George's County, Maryland, where he served in ranks up through Deputy Chief. He received his Bachelor's and Master's degrees in Fire Protection Engineering from the University of Maryland and currently is working on his doctorate at Lund University in Sweden. He also has been appointed to the rank of Honorary Battalion Chief by the FDNY and was named the 2014 ISFSI and *Fire Engineering* George D. Post Instructor of the Year.



Dr. Kenneth W. Fent obtained his MS and PhD degrees in Environmental Sciences and Engineering from the University of North Carolina at Chapel Hill. Dr. Fent joined NIOSH in 2008, where he currently works as a research industrial hygienist. He is also a Commander in the U.S. Public Health Service. Much of Dr. Fent's research has focused on assessing dermal and inhalation exposures to combustion by-products in firefighters. He has published more than 45 technical reports and journal articles and presented his findings nationally and internationally.



Dr. Gavin P. Horn has served as the Director of IFSI Research since August 2004, immediately after receiving his PhD in Mechanical Engineering from the University of Illinois at Urbana-Champaign. Dr. Horn also serves as a Firefighter/engineer with the Savoy (IL) Fire Department. His research interests focus on firefighter health and safety, first responder technology development, material testing and design and non-destructive evaluation. He has published more than 50 peer-reviewed journal articles and given presentations at fire service meetings, conferences and symposia across the country.

Sounding the Alarm on Occupational Cancer Risks and the Costs of Doing Nothing

By Battalion Chief Frank Leeb

With the dangers of occupational cancers for Firefighters receiving more attention nationwide, it's important to examine appropriate ways to respond to this health crisis. In part, we, the Firefighters, need to seize this moment and ensure that a long-term movement is sparked. We also need to ensure that decision-makers and key leadership figures across the fire service spectrum understand the true costs of this problem and, more importantly, the costs of doing nothing.

In this article, I cite and draw parallels to two disparate publications; one book, written in 1962 by Rachel Carson, titled *Silent Spring*, and one report released in 2017, commissioned by the National Institute for Occupational Safety and Health (NIOSH). In short, *Silent Spring* illustrates how educating people is the crucial first step to reversing grim trends and ultimately winning the war against occupational cancer.

The NIOSH report outlines the pragmatic, financial rationale to fund health and safety programs that can capitalize on a movement and promote positive change.

Lesson from *Silent Spring*

In 1962, author Rachel Carson, released one of the most influential books of the time, *Silent Spring*. It sounded the alarm to the American people about the problem of toxic chemicals and the slow poisoning caused by the indiscriminate use of chemical pesticides that also were polluting our environment. Specifically, chapter 9 (titled, "One in Every Four") takes a closer look at occupational exposure and cancer and the countless new cancer-causing chemicals that were introduced in the 20th century.

Similarities with today's fire service parallel the effort to draw attention to the health hazards of chemical exposure and induce change. In the years following the publication of *Silent Spring*, public education and awareness to the hazards grew and change soon followed. The alarm was sounded and answered.

We in the fire service now find ourselves in a moment in time, similar to the 1960s when *Silent Spring* first was published. Today, we understand the cancer risk posed by modern-day fires.

Numerous research reports have been published that are full of convincing data that demonstrate the need for immediate and aggressive action to reduce the risk of exposure to fireground carcinogens. Contamination control best practices, based on data, common sense and Firefighter ingenuity, have been culled together and shared. From coast to coast, many now have sounded the alarm in the fire service. We in the fire service must answer the call and take appropriate action.

Silent Spring provides another important parallel to the fire service. The highly toxic chemicals found in modern-day fires are some of the same chemicals found in chemical pesticides. These chemicals not only found their way into pesticides, but also found their way into many household items.

Examples Adapted from Book

Consider the following examples adapted from *Silent Spring*:

- The pesticide DDT (dichloro-diphenyl-trichloroethane) was manufactured using chlorinated hydrocarbons and sold as an agricultural and household pesticide. Today, DDT is banned in most countries around the world. However, chlorinated hydrocarbons are used in the manufacturing of PVC pipe and other common household products and often are present in modern-day fire smoke. Improperly protected Firefighters or Firefighters who fail to properly decontaminate their equipment and shower following a fire risk exposure to the same toxic chemicals that were found in DDT.
- "The road to cancer may be an indirect one." Cancer can develop from exposure to chemicals found in fire smoke that may not be a "known carcinogen." Smoke is composed of many different chemicals. Some of the chemicals in smoke—while not considered carcinogenic—are capable of interrupting normal body functions. For example, all chlorinated hydrocarbons are toxic to the liver. Damage to the liver can prevent the liver from functioning properly, causing an excess accumulation of hormones, which can lead to the development of specific types of cancer not typically associated with an increased risk to Firefighters.

From coast to coast, many now have sounded the alarm in the fire service. We in the fire service must answer the call and take appropriate action.

- Benzene and aromatic hydrocarbons, both found in pesticides, also are found in high quantities at every modern-day fire to which we respond. Both can lead to higher rates of leukemia. Firefighters have a higher rate of leukemia than the general population.
- One of the earliest pesticides associated with cancer is arsenic, also common in today's fire smoke.
- Polyurethanes, also found in pesticides, contain multiple, dangerous carbamate groups as part of their structure. These chemicals also are found in household items. When they burn, they release a toxic cloud.
- Mixing the many chemicals found in fire smoke increases the risk to Firefighters. Together, these chemicals can amplify or "potentiate" the effect of each other, greatly compounding the potential danger from inhalation, ingestion and absorption.

Let the fire service learn the lessons that have been gained from others in different, yet similar, experiences. Perhaps now is the *Silent Spring* of the fire service.

Quantifying the Economic Value of Preventive Measures

In 2017, the National Institute for Occupational Safety and Health (NIOSH) asked the RAND Corporation to develop and illustrate an approach for estimating the economic benefit of

NIOSH research. The report, titled, *Understanding the Economic Benefit Associated with Research and Services at the National Institute for Occupational Safety and Health*, can be very useful to quantify the value of preventive measures, compared to the costs associated with cancer treatment.

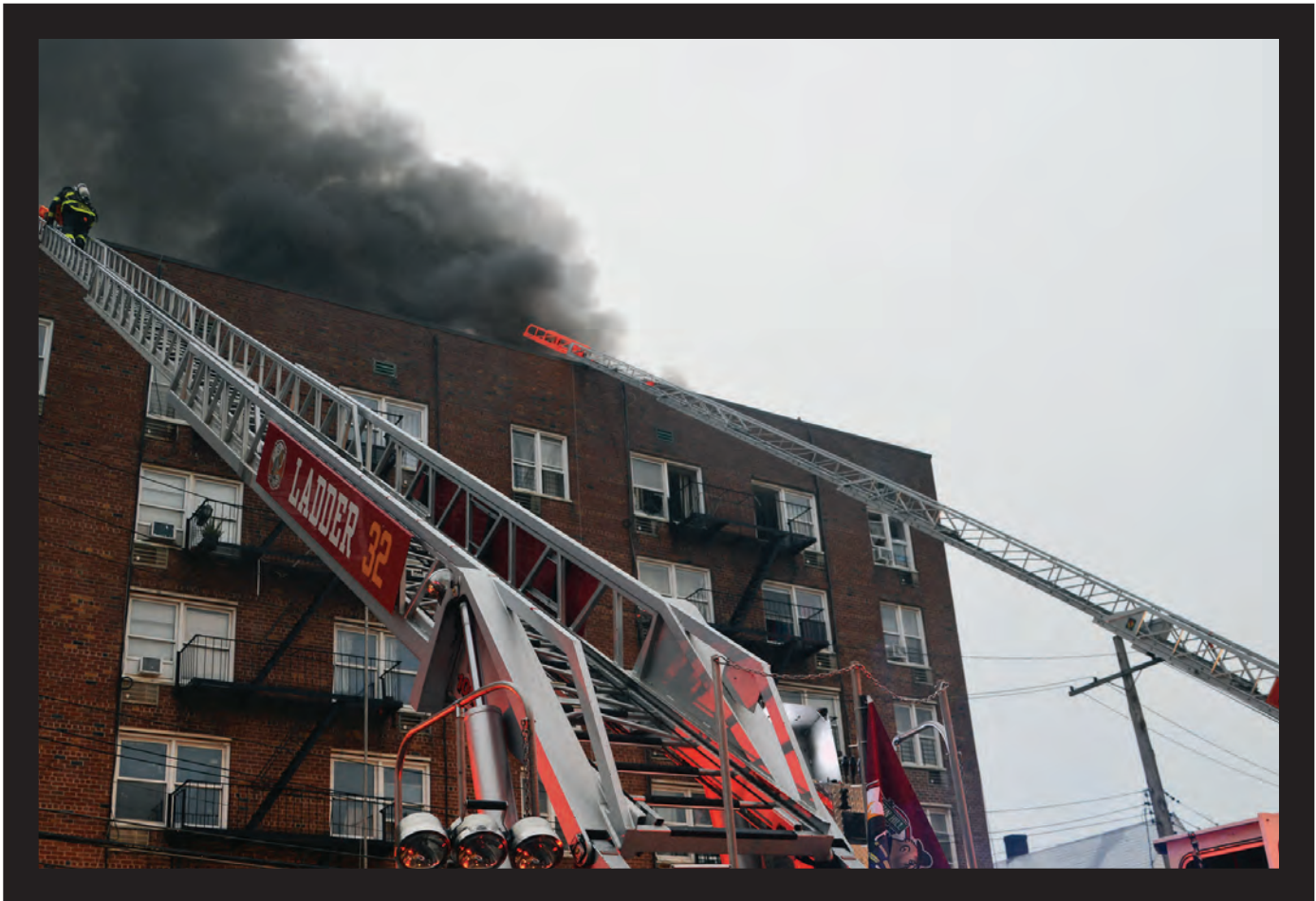
- Cost analysis data can be valuable in securing additional support for much-needed funding to save Firefighter lives. Budgetary constraints are a reality for most jurisdictions. Providing decision-makers with cost analysis data enable them to make informed decisions regarding the allocation of funding.
- It is simply not possible to quantify in dollars and cents the tremendous loss of a Firefighter felt by family and friends. However, understanding the economics can provide a vehicle that supports the central goal of saving Firefighter lives.

Using the extensive data compiled within the RAND report, we can extrapolate the pertinent material to provide quantifiable, estimated dollar figures on the economic benefit of preventing injuries and death related to Firefighter occupational cancer.

Findings from Report

The following is an overview of the significant findings of this report, supplemented with additional data obtained through email correspondence with the authors of the report.

This report and its case studies within provide concrete il-



Modern-day fire smoke has proved to be full of harmful chemicals.

illustrations of the ways in which NIOSH research might have an impact on Firefighter health and safety practices and outcomes, as well as some initial estimates of the economic benefit associated with those impacts.

One of the case studies used (Case study number 2), involves two NIOSH studies that strengthened the evidence base regarding the linkage between firefighting activities and increased risk of certain cancers among Firefighters and provides an example of etiological and exposure surveillance research, coupled with an intervention study.

The economic benefit stemming from two NIOSH research publications that support development of personal protective equipment (PPE) and other control measures to reduce Firefighters' exposure to hazardous materials during and after fires was examined.

Assessing the economic benefit of such research requires assigning a dollar value to prevented injuries, illnesses or deaths, using risk-reduction measures derived from the research; determining whether such risk-reduction measures might have occurred without the research in question; and determining whether a particular entity (e.g., NIOSH) made a significant contribution to any resulting benefits.

It is estimated that resulting reductions in mortality and morbidity resulting from the NIOSH research would reduce medical costs and productivity losses by \$71 million per year, with a range of \$23 to \$93 million, depending on assumptions about reduction in risk and adoption of control measures.

Value of a statistical life (VSL) estimates are broader, capturing individuals' subjective willingness to pay to avoid the loss of life, health, quality of life and other factors. Thus, estimates using VSL instead of medical costs and productivity losses are significantly higher. Using VSL, the estimated benefit of NIOSH research in this area is approximately \$1 billion!

The Benefit of Preventing Deaths, Illnesses

There are two common approaches to estimating the economic benefit of avoided injuries, illnesses and fatalities.

- First approach—Involves estimating associated medical costs and productivity losses. This approach is widely used in economic valuation, especially for non-fatal conditions and often is most useful in addressing questions related to budgeting for medical care and other costs.
- Second approach; willingness to pay (WTP)—Where there were gaps in available cost data, this approach was used. This method expresses benefit in terms of the value of a statistical life (VSL). This approach attempts to take a broader societal perspective than the first approach and value all costs to society, whether "on budget" or not. In practice, it does this by assessing individuals' subjective WTP to avoid the loss of life, health, quality of life or other harms.

The Office of Management and Budget (OMB) (federal) mandates the WTP approach for regulatory analysis and, for many federal agencies, WTP is a standard approach. OMB (federal) recommends that rule-making agencies assume that the value

of saving one life is between \$1 and \$10 million.

Six cancer types are referred to in this report. These are cancers that had significantly higher mortality and incidence among Firefighters than in the general population. They are buccal and pharynx, large intestine, kidney, lung, malignant mesothelioma and esophagus.

Type of Cancer	Average lifetime expected medical costs and productivity losses (2016 \$)	
	Fatal cases	Non-fatal cases
Buccal and Pharynx Cancers (Oral)	\$827,945	\$193,551
Colon, excluding Rectum	\$848,927	\$202,349
Esophagus	\$865,312	\$237,964
Kidney and Renal Pelvis	\$884,674	\$236,958
Lung Cancer	\$814,963	\$255,695
Malignant Mesothelioma	\$700,866	\$236,221

Accurate estimates are necessary to examine and compare the cost effectiveness and value of cancer-control interventions, such as the purchase and installation of gear washers and dryers, on-scene decontamination wipes, annual medical programs, maintenance of a second set of bunker gear or response enhancement of rehabilitation and care (RAC) units.

Tremendous Losses

This article contains the dollar values of six specific cancers. However, the dollar values expressed here do not take into account the costs of hiring and training new Firefighters, nor do they account for pension costs. Nor is it possible to quantify the tremendous loss of the Firefighter felt by family and friends. Additionally, these dollar values reflect the costs based on specific cancers without accounting for or quantifying other occupational illnesses, such as cardiovascular disease and pulmonary ailments, which also will continue to be reduced and prevented, based on proactive preventive initiatives.

Still, using the extensive data compiled within this RAND report, we can extrapolate the pertinent material to provide quantifiable estimated dollar figures on the economic benefit of preventing injuries and death related to Firefighter occupational cancer.

For occupational cancers, the statement—an ounce of prevention is worth a pound of cure—certainly applies. ■

Silent Spring



Written in 1962, Silent Spring, by author Rachel Carson, is one of the most influential books of its time. It sounded the alarm to the American people about the problem of toxic chemicals and the slow poisoning caused by the indiscriminate use of chemical pesticides.



About the Author

Battalion Chief Frank Leeb has served the FDNY since 1992. He is assigned to Battalion 46. He holds a BS degree in Fire Service Administration from SUNY and a Master's degree in Security Studies from the Naval Postgraduate School, Center for Homeland Defense and Security (CHDS).

Prudent Steps You Can Take to Reduce Your Cancer Risks

By Battalion Chief Edward Walsh and Captain Brendan Dean

If we are going to be serious when it comes to reducing cancer risk, we need to take a look in the mirror. We must take our personal responsibility very seriously. The American Cancer Society provides steps to lower your cancer risk. None of these recommendations should come as a surprise to any of us. They all have to do with being healthy, living well and being physically fit; basically, the hallmarks of what we strive to be as members of the New York City Fire Department.

Regular Cancer Screenings

The Department has conducted annual medicals for all members for many years. This is a thorough medical that includes comprehensive blood testing. Additionally, if you are predisposed to certain types of cancer (skin, breast, etc.) due to family history, it would be in your best interest to have more frequent screenings performed with your personal physician. Early detection is the key to beating cancer if it should strike you.

Maintain a Healthy Weight, Exercise Regularly and Eat a Healthy Diet

I have lumped these three recommendations together because they are so closely linked, it's hard to imagine one without the other. All three of these steps should be the goal of every person, *especially* Fire Department members. These three steps really do go hand in hand. If you eat healthy and exercise regularly, then, theoretically, you should be at a healthy weight. I don't think anyone would argue with the point that to be our best on the fire floor, we need to follow these three steps. This is something we have been taught since Probie School. Regular exercise must be a part of every Firefighter's routine. I have yet to work at a firehouse that doesn't have a gym. As far as diet is concerned, the firehouse meals have evolved over the years, along with the rest of society's dietary habits. Most of us know what we should be eating (vegetables, fruits, whole grains, fish, poultry), versus what we need to avoid (red meat, processed

meat, sweets). Nobody is suggesting that you're wrong if you enjoy a nice steak. The recommendation is that you eat a more balanced diet, focusing on the foods that have a lower cancer risk.

Avoid Tobacco

According to the American Cancer Society, 80 percent of all lung cancer deaths and 30 percent of all cancer deaths are caused by tobacco use. Cigarette use among FDNY members has decreased dramatically over the years. This is, in no small part, due to efforts undertaken by the Bureau of Health Services (BHS), in conjunction with the Counseling Service Unit (CSU). Many members, however, continue to use dipping tobacco. This needs to stop. All kinds of tobacco cessation programs are available to you at any time.

Limit Alcohol

According to the American Cancer Society, "the more alcohol you drink, the higher your risk," when it comes to your chances of contracting cancer. Men should have no more than two drinks a day and women no more than one. While I concede that this may be the most difficult of the six recommendations to comply with, nevertheless, members need to be aware of the facts regarding alcohol use and cancer risk. Remember, no one is invincible. There are cumulative effects from excessive alcohol use and if you need help cutting back or quitting, there are multiple avenues for you to seek help.

Emergency Medical Care

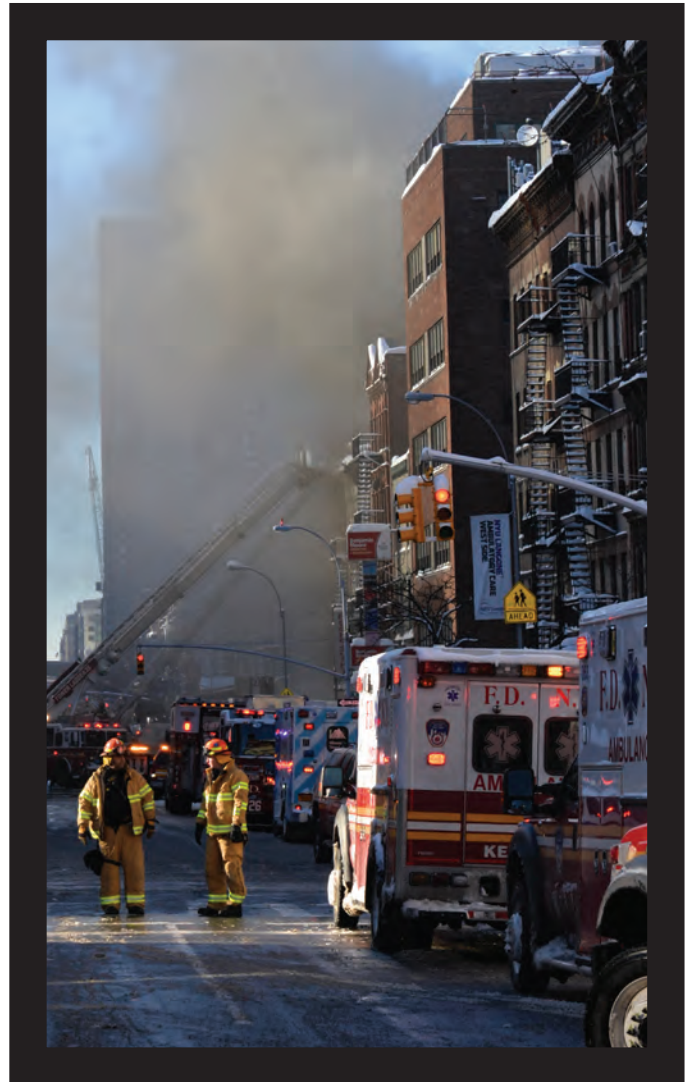
It goes without saying that our job involves dealing with sickness and injuries. Those jobs, as they grow in severity, usually involve blood, vomit and mucus. Years ago in the emergency medical service, it was considered "cool" or "impressive" (choose your adjective) to return to base covered with blood, grease, debris and who knows what else. It was viewed as a mark of courage, a sign of having had a "good" job or a point of personal pride.

We must take our personal responsibility very seriously.

No members want to find blood on themselves, their equipment and clothing or in their vehicle. After years of education about blood-borne pathogens (HIV, AIDS, Hepatitis, etc.), could you imagine or even consider leaving any remnant of a past assignment on your person, equipment or gear when acting as a patient care provider? What once was the norm quickly became the exception. As our service has evolved, our culture has changed.

Common Goal

There are many efforts currently underway by the Department to address the carcinogens and other contamination we are being exposed to on the job. It's up to you to do your part to protect yourself the rest of the time. Remember the common goal we all have—a long, healthy life that gives us an opportunity to enjoy our well-earned pensions. ■



COURTESY LT. KYRA NEELEY KING

About the Authors



Battalion Chief Edward Walsh has served the Department since 2001 and is covering in Division 15. Previous assignments include Ladder 49 as a Firefighter, Engine 285 as a Lieutenant and Ladder 27 as Captain. He holds a BS degree in Civil Engineering from Manhattan College.



Captain Brendan Dean has served in the Emergency Medical Service for three decades, 23 years as a Paramedic. He began his career with five years in Emergency Medical Dispatch (EMD). He attended one of the last Paramedic programs while EMS still was under HHC (NYC EMS). As a Paramedic, he spent 11 years serving the community of Harlem (Battalion 18, now 16). Upon promotion to Lieutenant, he was assigned to Battalion 8 (Bellevue), where he spent 12 years as a field supervisor. Captain Dean currently is assigned to EMS Division 1.

Clearing the Hurdle: Overcoming Implementation Barriers in the Fire Service

By Captain John Haseney

Before you read this article, please take a moment and think of a Firefighter you knew who died as a result of occupational-related cancer. Got it? Now ask yourself: Am I willing to help prevent another Firefighter dying from this terrible disease?

Identifying the Problem

As a result of multiple, scientific research studies, we know that Firefighters across the nation face increased rates of occupational-related cancer when compared to the general population. We also know that best practices have been developed and released to combat and reduce these numbers. However, Firefighter cancer rates continue to climb.

What is the problem nationwide? The problem is neither lack of data nor understanding the magnitude of the threat. Where are we, as an industry, failing? We are failing during the implementation stage of these best practices. We, as fire service members, face multiple barriers to the implementation process.

Barriers to Overcome

What I have discovered is that the fire service faces many barriers that, together, create a synergistic effect on the implementation process.

- **Fire Department Culture**—Does your fire department's culture promote the idolatry of dirty/contaminated Firefighter gear? The support of leadership and senior Firefighters can change the idea that dirty/contaminated gear is something to idolize.
- **The Groupthink Environment**—Do you find yourself agree-

ing with a fire department's decision, even though you have doubts about it? Then you are suffering from groupthink. Try promoting imagination, innovation, critical thinking and devil advocacy within your department.

- **Lack of Funding**—Have you used lack of funding as the excuse for not implementing a safety standard? A simple decontamination setup for a fire engine—consisting of a hose, bucket and brush—can cost less than \$100.
- **Lack of Awareness**—Are your Firefighters aware of their high risk of contracting cancer? Furthermore, are they aware of the methods and practices they can take to reduce their chances of contracting this disease? Institute an annual educational program (repetition of this information is key). PowerPoints and videos are available online.
- **Lack of Enforcement**—Are your enforcement mechanisms too severe that they never would be enforced? Create pathways to compliance by changing these mechanisms.
- **Lack of Urgency**—Has your department become complacent and resistant to change? It is easy for Firefighters to become complacent as a result of cancer's long latency periods. Create a sense of urgency by exposing Firefighters to cancer statistics and videos.
- **Lack of Motivation**—Create pathways to motivation by providing incentives, verbal praise and appealing to a Firefighter's perception of risk.

No matter what your rank is in the fire service, we can overcome these barriers. ■



'SCBA DURING OVERHAUL IS FOR PANSIES! BESIDES, WHAT'S THE WORST THAT CAN HAPPEN?'

**Now ask yourself:
Am I willing to help prevent
another Firefighter dying from
this terrible disease?**



About the Author

Captain John Haseney has served the FDNY since 2005. He began his career in Ladder 43 and was a Lieutenant in Engine 287. Currently, he is covering in the 7th Division. He is a student at the Center for Homeland Defense and Security (CHDS) at the Naval Postgraduate School (NPS), where he is writing his thesis on the topic of implementing health policy in the fire service. He holds a Bachelor of Science degree in Fire Science from John Jay College of Criminal Justice. He served in the New York Army National Guard from 2004-2012 and is a combat veteran of *Operation Enduring Freedom*.

Change Agent: Firefighter Dan DeFranco Should Inspire Us All

By Captain Liam Guilfoyle, Uniformed Fire Officers Association

Before awareness of the dangers of occupational cancers became evident, it would appear that the UFA Sergeant at Arms from 1985 to 1990 and again from 1993 until his death in 1996 had seen into the future. Firefighter Dominic DeFranco, known to a past generation of New York's Bravest as "Dan" and to the current generation as either the name adorning their union's headquarters or on the plaque hanging in every firehouse of NYC, was years ahead of his time. We believe it fitting to introduce FF Dan DeFranco to today's generation of Firefighters, specifically in light of the Department's current efforts with the Contamination Reduction Workgroup.

FF Dan DeFranco

FF DeFranco was appointed to the NYC Fire Department on October 6, 1962, and accepted his duty not merely as a job, but as a vocation. According to those who knew him, he epitomized our greatest traditions. He stepped up for all things concerning the firehouse and made the members—both those in his firehouse, Engine 17, and throughout the job—an extension of his own family.

When it came to Firefighter safety, a former UFA President is quoted as saying, "I never met a man more concerned for Firefighters and dedicated to our health and well-being." A terrific example of this occurred in 1983 when a federal study linking diesel fumes to cancer was published. It is important to paint a picture for those of us who came on the Department *after* the installation of the Nederman system. Imagine entering a firehouse and seeing nothing but black walls and ceilings—not from paint or dirt—but from diesel fumes! At a time when the Nederman system was still a pipe dream to NYC Firefighters, FF DeFranco took it upon himself to set up an exhaust hose in his firehouse—much like those seen in auto repair shops today—to expel car

exhaust from the work bays. The effort, although not perfect, was not in vain.

The kind of persistence shown in this effort is what led FF DeFranco to secure the installation of a Nederman system in every firehouse in the City. He researched companies that produced systems for removal of exhaust. Keep in mind, this research was conducted prior to the internet's existence and most companies in this field were European. Armed with the federal diesel studies and his own research on "particle capture devices," he lobbied the Department tirelessly to install the Nederman system. To this day, installment of the Nederman system ranks as one of the single greatest firehouse improvements with respect to the long-term health and safety of NYC Firefighters.

Foresight

As we now know, diesel fumes were not the only cause of cancer. However, 30 years ago, much less was known about the hazards Firefighters faced. FF DeFranco championed another issue close to the heart of NYC Firefighters. Although not front and center on the minds of Firefighters, once again, FF DeFranco showed his foresight when he set his sights on the issues concerning asbestos. On his own time, he became licensed in asbestos removal so he could learn the business and become knowledgeable about the subject. He then conducted midnight raids on asbestos-removal operations that were considered unscrupulous.

He became so well-versed in the topic of asbestos that he drew praise from Joel Shufro, the executive director of the New York Committee for Occupational Safety and Health. Mr. Shufro went on to praise FF DeFranco: "He gave meaning to my life and work; his concern for working people, his love of the union, his willingness to go the extra mile to ensure that the men he

Dan DeFranco's legacy is his selfless nature and love for this job.

represented would not have to be exposed to the conditions he was." Ironically, it was lung cancer—most likely caused by multiple exposures during his firefighting career—that ultimately took his life.

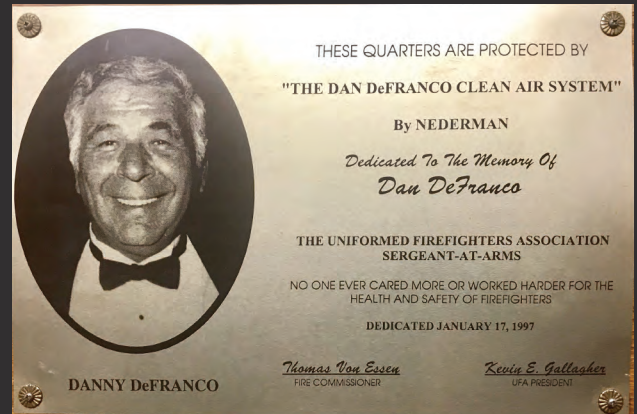
Lasting Legacy

FF Dan DeFranco's legacy is his selfless nature and love for this job. These two attributes are documented through the following: his use of his own car, paying his own tolls, purchasing food with his own money, to ensure that his Brothers and Sisters knew that they were being looked after long before HELP teams existed. He played a tireless role in the choice of bunker gear for the NYC Fire Department, going as far as conducting his own research into the options available at the time.

However, nothing illustrates FF DeFranco's love for this Department more than the fact that two of his sons joined the ranks of the NYC Fire Department. His son, Kenneth, has more than 20 years on the Department and is assigned to Rescue 5. Tragically, his son, David, a member of Rescue 2, was lost to the job in a diving accident in 1984. How remarkable that even with the loss of a son, his love for the job and desire to improve our working conditions never faltered!

FF Dan DeFranco had many titles: Firefighter, plumber, inventor, humanitarian, practical joker, family man, husband and father. How blessed our job is that he also held the title of Sergeant at Arms in the UFA. To him, it was not just a title, but an honor. ■

"No One Ever Cared More or Worked Harder for the Health and Safety of Firefighters."



Plaque hanging in every FDNY firehouse.



FF Dan DeFranco with his son, Kenneth, at the South Street Seaport in 1991.



About the Author

Captain Liam Guilfoyle is serving his first term as a Captain's representative of the Uniformed Fire Officers Association. He is currently the Union's Financial Secretary and serves on a number of committees, including Health & Safety, Glad/EEO/Civil Service and Special Projects. He was appointed to the FDNY in 1996. He was assigned to Engine 72 as a Firefighter, Engine 234 as a Lieutenant and the 13th Division as a Captain.

Continuing the Conversation Across All Channels of Communication

By Nikki Haney, Director of Social Media

Never before have there been so many ways to stay in touch with one another or share information. Within FDNY, we have a robust Intranet, Department Orders, our teleprinter and other forms of official communicate. But, as social media has grown, it has also proved it can be one of the most efficient ways to deliver timely messages. To that end, the FDNY Safety Command and Office of Public Information have coordinated an ongoing effort to include motivational safety content aimed at those directly involved in the fire service on our social media channels, including @fdnypro and @fdny on Facebook, Instagram and Twitter.

Our Safety posts often include the popular hashtag #Monday-Motivation and are meant to keep the topic of personal safety in the national conversation and inspire our membership, their families, important stakeholders and the fire service community at large.

With the help of the Department's Contamination Reduction Workgroup, FDNY Pro and the FDNY Foundation, we are expanding this effort to include messages related to the Reduce Your Risk initiative.

While we are aware that not everyone uses social media, we also know that many do and, in fact, use it as the primary way to

consume content. Therefore, we would be remiss to ignore it as a tool to engage FDNY members and help enact change in fire service culture.

The digital metric of "reach" is the primary measurement tool we use at FDNY and helps our leadership get a good idea regarding how many people our Department can connect with on a regular basis.

Below is a brief snapshot of the success we had in delivering messages to a wide audience during one month of our new Safety content campaign.

	Facebook	Instagram	Twitter
	Reach	Reach	Reach
1-Jan	53,341	39,745	16,625
8-Jan	42,480	42,600	13,739
15-Jan	52,498	41,000	15,028
22-Jan	75,533	54,500	18,374
29-Jan	100,951	62,000	21,285



About the Author

Nikki Haney has served the FDNY as Social Media Director since 2015. Prior to joining the Department, she spent 10 years in the private sector, working in advertising and publishing. She holds a Master of Science in Publishing degree from New York University,

Safety Messages

Resolve to keep yourself, personal protective equipment (PPE), tools and apparatus as clean as possible-- for your health, future and family.

THE FIREGROUND PRESENTS MANY ENTANGLEMENT HAZARDS. DON'T ADD TO IT BY NOT BUCKLING YOUR SCBA WAIST STRAP.

Following exposure to the products of combustion from any type of fire – structure, car, rubbish, etc. – your SCBA and tools are **contaminated**.

If not cleaned, this equipment will continue to expose you and other members to carcinogens well after the fire.

Follow proper procedures for the safe and effective cleaning of tools and SCBA following every exposure.

MANHOLE OPERATIONS

WHEN OPERATING AT MANHOLE FIRES, BE AWARE OF SURROUNDING MANHOLES. FIRE AND CARBON MONOXIDE (CO) CAN TRAVEL INTO BUILDINGS. WEAR YOUR SELF-CONTAINED BREATHING APPARATUS (SCBA), PERSONAL PROTECTIVE EQUIPMENT (PPE) AND USE YOUR CO MONITOR.

Whenever operating in a smoke condition, members must wear their SCBA, including exterior positions exposed to smoke or other toxic atmospheres.

Facepieces are to be worn throughout completion of overhaul.

Check your mask and equipment at the beginning of every tour.

Don't wait until you need it to find out it doesn't work.

DANGER ZONES MARKED BY THE RED TAPE AND BLACK LETTERING APPLIES TO EVERYONE, INCLUDING FIRST RESPONDERS. MARKED ZONES SHOULD ONLY BE ENTERED TO SAVE LIFE OR WHEN ORDERED BY THE INCIDENT COMMANDER (IC) OR SECTOR CHIEF.

DANGER DO NOT ENTER

THIS WEEK IS BURN AWARENESS WEEK. Properly worn personal protective equipment (PPE) will reduce the risk of burns.

63,350 Firefighters in the U.S. suffered line-of-duty injuries in 2014

27,015 of these injuries occurred on the fireground.

10% of reported injuries are due to burns and smoke inhalation

3,000 Firefighters are affected each year.

WEAR YOUR PPE PROPERLY.

You can't operate at a fire if you never arrive there.

DRIVE SAFE



COURTESY JOHN HOPPER

DID YOU KNOW?

**Spreading
Knowledge Instead
of Contamination.**

FDNY Bunker Gear Protects Lives on Many Levels

By Battalion Chief Christopher G. Eysser and Captain Patrick Woods

Bunker gear is one of the most important tools the FDNY members are issued to protect themselves in the countless different FDNY operations. FDNY bunker gear is designed specifically to be tough and durable, while simultaneously maintaining comfort and breathability essential to minimize fatigue and heat stress.

Over the years, the level of Firefighter protection has increased dramatically. The early use of leather or canvas trench coats has been replaced with today's modern fabrics made with Nomex®, Kevlar® and PBI® fibers.

Bunker gear with its mandated reflective/fluorescent strip-

ing is familiar as the visual recognition of a "Firefighter." However, the actual function and integrated workings of the bunker gear are less known. FDNY members' PPE (personal protective equipment) bunker gear provides Firefighters protection against many injuries across a wide range of environmental conditions, while also minimizing heat stress.

To accomplish this complicated task, bunker gear is comprised of three distinct layers: the outer shell, the moisture barrier and the thermal liner. Each layer has specific, multiple functions and, as a composite, is expected to help provide the Firefighter with adequate heat, flame, liquid, chemical and mechanical protection.

WHAT IS TPP?

Thermal Protective Performance

In the 1986 revision of NFPA 1971, Protective Clothing for Structural Fire Fighting, a new test method for measuring thermal protection was introduced and a minimum thermal protective performance (TPP) rating was established. Its purpose is to measure the rate at which convective and radiant heat penetrate through the composite system—outer shell, thermal liner and moisture barrier—to cause second-degree burns to the human skin.

The NFPA minimum requirement of a TPP rating of 35 equates to 17½ seconds until second-degree burns occur in a flashover situation.*

FDNY GEAR TPP -42.7

WHAT IS THL?

Total Heat Loss

The total heat loss is a combination of the dry heat loss and the wet heat loss that occurs through the three-layer ensemble. The NFPA 1971 minimum requirement is 205 W/m².

FDNY GEAR THL -254

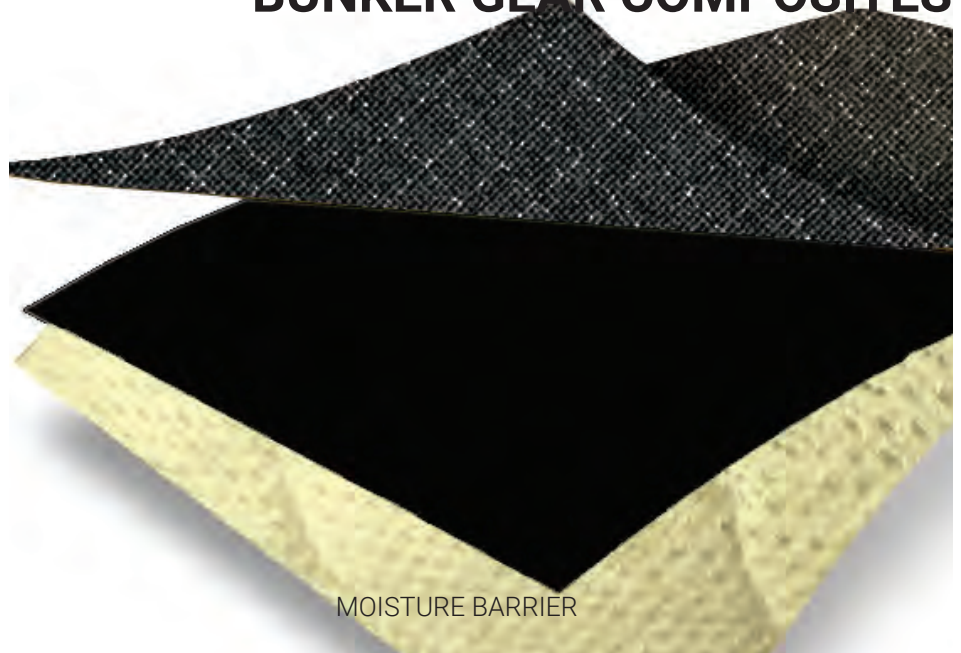
* TPP measurements do not imply a certain protection time. Tests are done under perfect laboratory conditions and DO NOT take into consideration that every fire incident results in different exposures, most likely bringing about lower escape time.

BUNKER GEAR COMPOSITES

OUTER SHELL
PBI® XT

MOISTURE BARRIER
CROSSTECH® BLACK

THERMAL LINER
DEFENDER M SL2



OUTER SHELL

“PBI® XT” outer shell manufactured by Tencate is the outermost layer and is the first line of defense.

The optimal mix of ~40% PBI® and ~60% Kevlar® offers increased thermal and flame protection and the best resistance to break-open in the industry.

In addition to the high flame resistance, it also provides protection from abrasion, cutting and tearing.

MOISTURE BARRIER

The Gore “Crosstech® Black” moisture barrier is a key component that principally prevents the transfer of liquids. It contributes to the overall thermal protection, while also being the primary defense against chemical and viral agents. This is accomplished by laminating a revolutionary, permeable film barrier to a flame-resistant substrate material, which is designed specifically, in combination with the other layers, to allow breathability (the ability to evaporate sweat off skin and out of the gear—the body’s primary cooling mechanism) to reduce physiological stress and overheating.

THERMAL LINER

The Tencate “Defender M SL2” thermal liner is a critical component in bunker gear because, in conjunction with the moisture barrier, the two account for the majority of the thermal protective performance. This is accomplished by air trapped between the layers of the quilted material. The facecloth material is the innermost part of the bunker gear, which has wicking properties (absorbs moisture and remains dryer) and smoothness, which improves comfort and mobility and assists in moisture management.

An important factor in the selection of the three composites that make up the protective ensemble is to match the specific fabric combinations to geographic location and climate, activity level and response analytics. There are hundreds of possible fabric combinations available in today’s market. The FDNY has done extensive research to provide its members with the maximum amount of protection: balancing the high requirements for optimal thermal protection, while simultaneously reducing heat stress. Thermal protection, durability, mobility, breathability, comfort, moisture protection and total heat loss have all been considered in selecting our current, top-of-the-line FDNY bunker gear.

Firefighting bunker gear is one of the most extensively tested items in the protective clothing industry. There are hundreds of tests administered to the many materials, components and overall gear itself in order to certify that they meet the National Fire Protection Association (NFPA) 1971 Standard on protective clothing for structural firefighting. All FDNY bunker gear meets or exceeds the NFPA 1971 requirements.

Having a basic understanding of bunker gear composites and how they have been designed to protect us is important to ensure FDNY members are provided with the highest levels of protection. The regular inspection, care and maintenance of all firefighting PPE will provide members the best advantage to continually operate safely when performing their dangerous, daily firefighting duties.

The Morning Pride® TAILS™ bunker gear combines advanced pattern engineering with reduced weight to give you a better range of motion, increased protection and improved ventilation.

Forward Flex™ Sleeve
Patented design eliminates undesirable sleeve retraction when reaching up or forward.

Stand-up Collar
Improved comfort and quick donning.

Thermal Enhancement Panels
Additional internal padding in shoulder area increases thermal protection.

Comfort Chin Strap
Curved design for better fit and less irritation.

Single-Seam Sleeves
Innovative design eliminates second seam.

Waterproof Wristlets
Double-layer Nomex® wristlets with continuous moisture barrier provide a liquid seal at the wrist.

Continuous Protection
Your outer shell, moisture barrier and thermal liner overlap at all coat facings, collar area and pant fly for uninterrupted protection.

Bellowed Pockets
Offer ample storage capacity.

TAILS™ System
Reduces weight, increases range of motion and eliminates bunching when bending forward. Also increases visibility from behind and improves torso ventilation.

Positive Closure DRD
Its design engages the strap to circle the chest as the coat closes. Larger D-ring facilitates easier and faster connection when dragging a Firefighter.



YOUR PERSONAL PROTECTIVE EQUIPMENT INCLUDES:



Morning Pride Ben 2 Helmet
NFPA/ANSI EZ FLIPS
Wider peripheral protection.
4-POINT CHIN STRAP
Secure and stable



MASKMATE HOOD
ADAPTIVE OPENING
Improves the facepiece-to-hood interface and maximizes field of view.



5007 BOOT
Increased protection and durability with PowerToe™ and PowerHeel.
Vibram® Lug Sole with Fire and Ice Compound for improved traction.

It is imperative for all FDNY members to understand the importance of today's FDNY Bunker Gear Cleaning program. The annual "advanced" cleaning cycle is critical not only to extend the life of your bunker gear, but, more importantly, to ensure that it always maintains the level of protection required for the job.

The accumulation of combustion particles and many other contaminants encountered during almost all FDNY responses can diminish the gear's ability to properly protect the Firefighter. The "dirtier" the gear, the more likely it is to conduct heat and electricity, inhibit its liquid shedding capabilities and also become flammable. Following the regularly scheduled cycles is critical to ensure that the gear is properly cleaned, inspected and repaired. This advanced cleaning, conducted by our certified ISP (Independent Service Provider), not only launders to remove the toxic fireground contaminants, but also ensures that all layers of the gear have been inspected and repaired according to the manufacturers' requirements.

It is returned in optimal condition so members can feel confident to continue to perform the dangerous, but critical lifesaving duties. So send your gear out when scheduled! Clean gear will provide you with the maximum protection...you never know when you will need it!



The NFPA 1851 Standard on Selection, Care and Maintenance of protective ensembles for structural firefighting requires annual inspection and cleaning of your bunker gear.

About the Authors



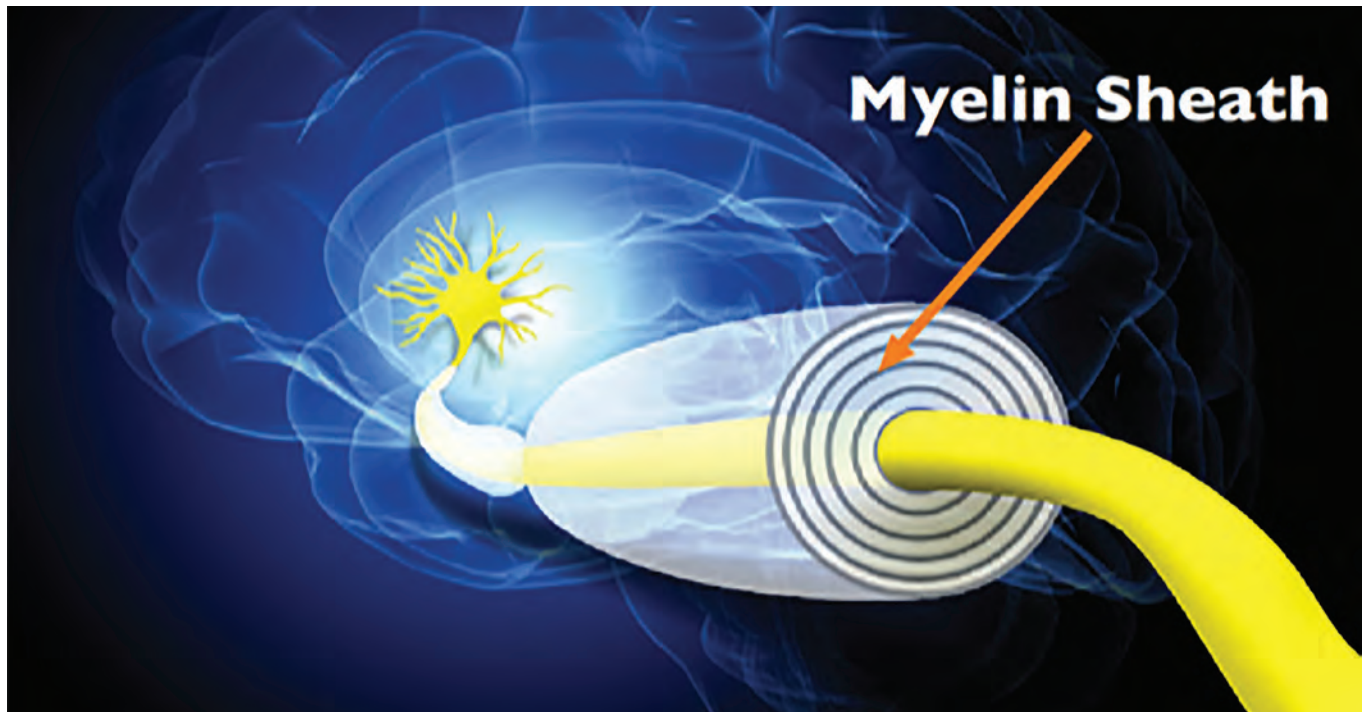
Battalion Chief Christopher G. Eysser has been a member of the FDNY since 1995. He is assigned to Division 13. Previous assignments include Ladder 111 as a Firefighter; Ladder 124 as a Lieutenant; and Captain of Ladder 120. He is an adjunct instructor for the Captain's Development and Chief's Command courses. He is a committee member for NFPA committees 1971 and 1851.



Captain Patrick Woods is a 33-year veteran of the FDNY. Currently, he is assigned to SOC. Hired in 1985, he was assigned to Engine 96/Ladder 54. He was a Lieutenant in Queens and a Captain in Division 1. He was on the initial committee that tested, designed and taught the current PSS (personal safety system) and was the Captain of R&D for eight years. For the past 10 years, he has served as a Technical Committee member of NFPA 1971--Protective Ensembles for Structural and Proximity Firefighting and 1851--Selection Care and Maintenance of Firefighting Ensembles. He has an AS degree in Aerospace Technology from SUNY at Farmingdale and a BS degree in Fire Protection Management from SUNY Empire State.

Smoke Exposure Can Severely Damage Nerves

Neurons are the structures in the nervous system that allow us to think, see, hear, speak, feel and move. Each neuron consists of a cell body and an axon (the extension of the cell body that carries messages). Most of the axons in the central nervous system are wrapped in myelin, a substance rich in lipids (fatty substances) and proteins. Carbon monoxide can severely damage axons and impair the conduction of signals in the affected nerves. In turn, the reduction in conduction ability causes deficiency in sensation, movement, cognition or other functions, depending on which nerves are involved. Symptoms can include double vision; loss of vision/hearing; weakness in arms or legs; cognitive disruption, including speech impairment and memory loss; loss of dexterity; difficulty coordinating movement or balance disorder; difficulty controlling bowel movements or urination; fatigue; and tinnitus.



Carbon monoxide (CO) and toxic smoke can damage or degrade the myelin, leading to disease of the nervous system.

After Fires, Carcinogens Abound

Polycyclic aromatic hydrocarbons (PAHs) are a group of more than 100 organic compounds that contain two or more fused aromatic rings. They are formed during the incomplete combustion of fossil fuels, including coal and petroleum products, such as gasoline, diesel fuel and natural gas, wood and biomass, municipal waste and other organic substances, including tobacco and food products (e.g., charbroiled meats). Several recent studies have demonstrated an increase in Firefighters' absorption of PAH post-fire.

PAHs are common products of incomplete combustion. There are more than 100 PAHs. Some of them are classified as known, probable or possible carcinogens.

What are Mutagens?

Mutagens are agents that can introduce genetic mutations in exposed cells. Genetic mutations have been associated with initiation of cancer. Many combustion by-products, including several PAHs, are known mutagens.

Where are They Found?

Critical to Firefighters, PAHs often are found in complex, combustion-derived materials, such as soot from a fire and vehicle exhaust.

What are Carcinogens?

Carcinogens are substances that are known or suspected to cause an increased risk of developing cancer. Some metals and PAHs have been classified as known, probable or possible carcinogens. Many carcinogens are mutagens.

See a summary of the report here:

AFTER FIGHTING A FIRE

urine samples collected from firefighters showed

4x the potential for DNA damage

3-5x the amount of PAH metabolites of

- naphthalene
- pyrene
- phenanthrene
- fluorene

<https://science.uottawa.ca/biology/news/firefighters-absorb-harmful-chemicals-through-skin-study-finds>

Our Families, Including Children, Face an Increased Risk as a Result of Our Occupation

Children of Firefighters may face a greater risk of developing a childhood cancer. In the only known study on the subject, higher rates of childhood cancer were observed in children of career Firefighters during a nine-year study begun at the National Fire Academy as part of the Executive Fire Officer Program (EFOP). The results of the study found that a child of a career Kitsap County, Washington, Firefighter is 27.4 times more likely to be diagnosed with cancer than a child in the general population of children. Alarmingly, all of the children diagnosed with cancer in the study were diagnosed with direct or indirect blood-related cancers; some of the same cancers that Firefighters develop.



Women Firefighters Face Increased Risk of Breast Cancer



The San Francisco Fire Department (SFFD) has more female Firefighters—including their Chief of Department (JoAnne Hayes-White)—than any other fire department in the country. Sixteen percent of SFFD Firefighters are female (approximately 225). Alarmingly, 15 percent of the department's female Firefighters between the age of 40 and 50 years old have been diagnosed with breast cancer. With an increasing number of females joining the fire service, much more research needs to be done. The Women Firefighters Biomonitoring Collaborative is monitoring women Firefighters in the San Francisco Bay Area to examine exposures to chemicals linked to breast cancer, including carcinogens and chemicals that disrupt the body's normal hormone function.

From Day One, FDNY Probationary Firefighters Size Up Cancer Risk



The Bureau of Training is responsible for coordinating training for the 17,000 uniformed and civilian employees of the FDNY. The FDNY Fire Academy is situated on 27 acres of land on Randall's Island. One of the main responsibilities of the Bureau of Training is running the Probationary Firefighter School. Probationary Firefighter School is an intense, 18-week commitment to physical training and classroom study. Probationary Firefighter School is where the education and awareness of our next generation of Firefighters begins. Probationary Firefighter School has been where many FDNY contamination-reduction initiatives have been implemented first.

For several FDNY initiatives, this has been the proving ground from concept to pilot to field implementation.

This is the future of the Department and the next generation who will reverse the trends of cancer-related illnesses in the fire service.

Resources

Valuable Academic Research

Daniels, Robert D., Stephen Bertke, Matthew M. Dahm, James H. Yiin, Travis L. Kubale, Thomas R. Hales, Dalsu Baris, et al. "Exposure-Response Relationships for Select Cancer and Non-Cancer Health Outcomes in a Cohort of U.S. Firefighters from San Francisco, Chicago and Philadelphia (1950-2009)." *Occupational and Environmental Medicine* 72, no. 10 (October 2015): 699–706.

Summary: The largest study to date with close to 30,000 Firefighters from three large city departments showing evidence of the linkage of cancer to the occupation of firefighting. This study demonstrated that Firefighters are more likely to develop those cancers than the general population. In addition, the population of Firefighters in the study had a rate of mesothelioma two times greater than the rate in the U.S. population as a whole. This was the first study ever to identify an excess of mesothelioma in U.S. Firefighters.

Grace K. LeMasters, PhD, Ash M. Genaidy, PhD, Paul Succop, PhD, James Deddens, PhD, Tarek Sobeih, MD, PhD, Heriberto Barrera Viruet, PhD, Kari Dunning, PhD, and James Lockey, MD, MS. "Cancer Risk Among Firefighters: A Review and Meta-Analysis of 32 Studies." *American College of Occupational and Environmental Medicine* 48, no. 11 (November 2006): 1189.

Summary: Study reviewed 32 studies on Firefighters to quantitatively and qualitatively determine the cancer risk using meta-analysis. The study found that Firefighters have an increased risk of certain types of cancers.

Pukkala, Eero, Jan Ivar Martinsen, Elisabete Weiderpass, Kristina Kjaerheim, Elsebeth Lynge, Laufey Tryggvadottir, Pär Sparén, and Paul A. Demers. "Cancer Incidence Among Firefighters: 45 Years of Follow-up in Five Nordic Countries." *Occupational and Environmental Medicine* 71, no. 6 (May 9, 2014): 398.

Summary: Study that examined the patterns of cancer among Nordic Firefighters (16,422 Firefighters). Study showed increase of cancer rates. Concluded that exposure to polycyclic aromatic hydrocarbons (PAHs), asbestos and shift work explains the results.

Powers, Ronald E. "Cancer Rates in Children of Kitsap County Firefighters," 2015. Accessed November 12, 2017. <https://www.hsdil.org/?abstract&did=804429>.

Summary: A research study that found that there is a 0.0179% chance a child will be diagnosed with cancer in the U.S., whereas a child of a Kitsap County (KC) career Firefighter has a 0.49% chance of getting cancer. This probability is 27.4 times higher than that of the general population of children.

Scientific Justification for Best Practices

Fent, Kenneth W., Douglas E. Evans, Donald Booher, Joachim D. Pleil, Matthew A. Stiegel, Gavin P. Horn, and James Dalton. "Volatile Organic Compounds Off-Gassing from Firefighters' Personal Protective Equipment Ensembles after Use." *Journal of Occupational and Environmental Hygiene* 12, no. 6 (June 3, 2015): 404-414.

Summary: Study demonstrates the dangers of off-gassing of volatile organic compounds (VOCs) from PPE and the justification to conduct rehabilitation away from contaminated ensembles. In addition, provides valuable justification to isolate contaminated gear on apparatus.

Fent, Kenneth W., Barbara Alexander, Jennifer Roberts, Shirley Robertson, Christine Toennis, Deborah Sammons, Stephen Bertke, Steve Kerber, Denise Smith, and Gavin Horn. "Contamination of Firefighter Personal Protective Equipment and Skin and the Effectiveness of Decontamination Procedures." *Journal of Occupational and Environmental Hygiene* (June 21, 2017)

Summary: It was found that field decontamination using dish soap, water, and scrubbing was able to reduce contamination on turnout jackets by a median of 85%. It was also found that Firefighters assigned directly to the fire had an increase of contamination. Cleansing wipes were able to reduce contamination on neck skin by a median of 54%.

Keir, Jennifer L. A., Umme S. Akhtar, David M. J. Matschke, Tracy L. Kirkham, Hing Man Chan, Pierre Ayotte, Paul A. White, and Jules M. Blais. "Elevated Exposures to Polycyclic Aromatic Hydrocarbons and Other Organic Mutagens in Ottawa Firefighters Participating in Emergency, On-Shift Fire Suppression." *Environmental Science & Technology* (October 18, 2017). Accessed October 30, 2017. <http://dx.doi.org/10.1021/acs.est.7b02850>.

Summary: Ottawa Firefighters had from three to more than five times the amount of toxic chemicals in their urine after a fire, compared to before a fire. This study suggests the chemicals entered their bodies mainly through skin contact. It seems reasonable to hypothesize that adequate post-event skin and PPE decontamination will effectively reduce combustion emission exposures and the associated health risks.

Fluorescent Aerosol Screening Test (FAST): (http://ftpcontent4.worldnow.com/wmbf/pdf/RTI_Test_Report_-_FAST_-_Jan2015.pdf)

Summary: A Fluorescent Aerosol Screening Test conducted at RTI International on January 6, 2015, to evaluate standard firefighting gear for protection against aerosols. Test intended to help garment designers, manufacturers, and users see where significant aerosol infiltrates.

Lacey, Steven, Barbara M. Alexander, and C. Stuart Baxter. "Plasticizer Contamination of Firefighter Personal Protective Clothing—a Potential Factor in Increased Health Risks in Firefighters." *Journal of Occupational and Environmental Hygiene* 11, no. 5 (2014): D43-48.

Summary: Findings of this study suggest that Firefighters are exposed to high levels of DEHP, a probable human carcinogen, and at levels much higher than PAHs, the semi-volatile toxic combustion products most extensively studied historically.

Leading Organizations

- Firefighter Cancer Support Network: (<https://firefightercancersupport.org/>) a national organization providing valuable insight and advice on how fire departments and individual Firefighters can battle the epidemic of cancer. Wrote "Taking Action against Cancer in the Fire Service." (<https://firefightercancersupport.org/wp-content/uploads/2013/08/Taking-Action-against-Cancer-in-the-Fire-Service.pdf>)
- Boston Fire Department: (<https://www.takenosmoke.org/>) provides great educational videos that attempt to increase awareness.
- Partnership between the University of Cincinnati and the Cincinnati Fire Department: (<https://www.youtube.com/watch?v=NUstR1doDR8>)
- National Fallen Firefighters Foundation: (https://www.youtube.com/watch?v=fyZ_HQM9_Z_c&index=1&list=PLmDE3nH0H3RGJmseAWe15WYBZVNxyuLW). Created "The Silent killer" Cancer Awareness and Prevention Video. It is a great educational video, attempting to increase awareness in the fire service. Can be used throughout the fire service, not specific to one area.
- Florida Firefighters Safety & Health Collaborative: (www.floridafirefightersafety.org). Free program to fire departments looking to enhance and maintain an effective safety committee and/or safety program. Includes SOGs and policies.
- University of Miami's Sylvester Comprehensive Cancer Center: (<http://www.sylvesternewbadgeofhonor.com/>) Great source that provides videos and materials that are designed to help educate Firefighters about some of the cancer risks they face and processes that might help reduce those risks.
- Illinois Fire Service Institute (IFSI) & Underwriter's Laboratories (UL): (<https://www.fsi.illinois.edu/CardioChemRisks>)
- International Association of Fire Fighters (IAFF): (http://client.prod.iaff.org/#page=Cancer_Summit_2018)
- Cancer Page: www.firstrespondercenter.org/cancer/
- Cancer Tools/ Resources: www.firstrespondercenter.org/cancer/toolsresources/
- Cancer Research: www.firstrespondercenter.org/cancer/research/
- Cancer Toolkit: www.firstrespondercenter.org/cancer/toolsresources/ or <http://16lo3h33km9w3q8o12211jxa.wpengine.netdna-cdn.com/wp-content/uploads/2017/04/Cancer-Toolkit-v6.pdf>

Educational Multimedia

- "Healthy In, Healthy Out—Best Practices for Reducing Fire Fighter Exposures to Carcinogens": (http://www.fcsnwa.org/?zone=/unionactiveview_page.cfm&page=Healthy20In202D20Healthy20Out) A best practice manual that can be used by any fire department.
- Overview video for Fireground study: <https://www.youtube.com/watch?v=uZO3GO1Nd-E>
- Overview video for Training Fires study: <https://www.youtube.com/watch?v=9MWvEya-b3I>
- IAFF Cancer Summit: http://client.prod.iaff.org/#page=Cancer_Summit_2018
- PPE Doffing videos—short videos discussing simple ways of removing gloves and hoods that can reduce cross-contamination during the doffing process:
 - Gloves: youtu.be/QyAt5WHf5uM
 - Hoods: youtu.be/9uYp0ZQP158

The First Responder Center for Excellence is an affiliate of the National Fallen Firefighters Foundation and manages the activities of the Fire Service Occupational Cancer Alliance—a national consortium of organizations devoted to reducing firefighter cancer. The FRCE website contains links for up-to-date research and resources.

COURTESY BROOKLYN DISPATCHER WARREN FUCHS (RETIRED)



P L E D G E

**For Your Health,
Future and Family.**

Consider the Hidden Dangers, Consider Your Family

By Kimberly Settle McDonagh

Itell myself to breathe, breathe *now!* I tell myself, "if I breathe, I think and if I think, I don't want to breathe."

"*Breathe!*"

I inhale. I feel the air rushing into my lungs, the oxygen nourishing my blood even as the thoughts slam into my head, an onslaught invading my self-imposed solitary confinement. I hold my breath again. Each time, the story plays out exactly the same. Each time, I find myself holding my breath, wondering, why is it so hard just to breathe? Is this what it feels like to drown? Is it even possible to drown in one's own thoughts? I think it must be. I am. I feel like I am trapped under the mantle of ice that has descended on my world, beating at it with my fists one minute and then floating in the ethereal darkness the next; thankful for the respite from what my world has become, freed from my ever-present thoughts.

He has cancer.
He has cancer.
He *has* cancer.
He has cancer.

That is my recurring thought. It is my only thought. I hear the doctor saying it over and over again. That instant when the life we thought we had, were going to have, washes down the drain as if someone magically pulled the plug. I hear the whoosh of the water as it spirals down to the sewer. Our life has just entered that murky, unknown realm. Down here, it is hard to breathe.

Home

My sons point out that I sigh a lot. I try to explain, "I can't breathe." They look at me as if I am speaking another language; grown an extra head. "It's hard. It hurts. I don't want to and I know I have to." My two oldest, both of them wise beyond their years, look at me again. The oldest tells me, "You can't change what is going to be. You just have to try and accept it." I know he is right. We don't know what is going to be. I want to know. I want to change it if I don't like it. The littlest one wanders in. I wonder if he, too, will be forced to be wise beyond his years. I don't want to know. I can't breathe again.

The Hospital

I don't want to go in. I know I have to. I have to act nonchalant; pretend like this is an everyday occurrence. I am no good at pretending. I have become a master at it. I smile at the nurses and other patients. I try to look pleasant. He and I make jokes and laugh as he is checked in for surgery. I stand outside myself, watching, wondering who that person is. "Oh yeah," I think, "that's the new me. I'm the one who can't breathe." He is taken back to the operating room. I go to the waiting room to wait. I look around and realize I am only one in a sea of other non-breathing people. "Breathe," I want to tell each person I see, but I say nothing. Words require air and I have none to spare. I have to remember to breathe.



In Memoriam
ED MCDONAGH
FDNY

Laura Yanes' photograph of Lieutenant Ed McDonagh, Jr.

I urge you, for your family's sake,
if you think something is wrong,
get checked out.

Recovery

I see the mop moving back and forth. I know they clean regularly; religiously. Germs are enemy number one for him; for all of them. They must be eradicated; so they mop. The smell is not clean. I don't care what they say. Clean is fresh cotton, a summer's meadow filled with wildflowers or a newborn baby. This is artificial; the acrid smell of sickness masked with antiseptic.

The smell of death and dying hangs in the air. I can't escape it. I have to be here. I have to inhale the unclean clean air. I

don't want to breathe, but I have to. My lungs give me no choice this time. I inhale deeply, bile threatening to rise even as the air goes down. I want to leave. I am trapped here.

I walk the hall. It is a rectangle. I know that 14 laps equal one mile. That is the goal; not for me, but for him. He cannot walk it; so I do it for him. As if I can. I don't know how many miles I walk in a day; miles that lead me nowhere but around the nurses' station and past the rooms of patients recovering from surgery; past the rooms of patients whose families are holding their final vigil; past the rooms of patients who don't know where they are and call out for people only they can see. I walk. I walk to no-

The Significance of a Photograph



Laura Yanes with FDNY subjects.

When it comes to a collection of Firefighter portraits, there may not be one larger than the body of work created by Laura Yanes. She estimates that she's photographed more than 20,000 Firefighters in FDNY, Dallas, San Francisco, Denver, Knoxville, Cal Fire and more. A selection of her portraits of individual Firefighters, families and crews now is archived permanently by the Smithsonian Institution.

It started as a "thank you" to FDNY. Interest by Firefighters and word-of-mouth communication took Ms. Yanes on a photo journey that was unexpected. Of the more than 7,000 FDNY members she's photographed, many now have retired or been promoted. Sadly, some have lost their lives due to 9/11 illness, line-of-duty deaths (LODD) and other causes. This has given a new significance to these photos. Her portraits, such as the photo of Lieutenant Ed McDonagh, have been a valuable part of many funerals and memorials, providing a small measure of comfort to families and friends in attendance.

Few know that it all started before September 11th. Ms. Yanes was learning to use a camera, when one day in July 2001, she took a single portrait of a Firefighter who asked for a copy of the photo. Since this was long before digital cameras, Ms. Yanes promised she would return to the darkroom at the High School of Fashion Industries after the summer vacation ended and print a copy for him. On the morning of September 11th, she was on her way to the darkroom to print a copy. A few days later, Ms. Yanes kept her word and returned to the firehouse with the photo and learned that Ed Mecner, the Firefighter in her first photo, survived.

where, but I walk anyway. Walking forces me to breathe.

The Vigil

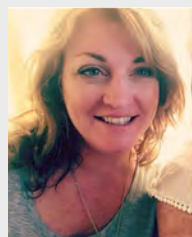
I watch him breathe. It is a daunting task. His chest rises and falls. He breathes. It seems to come so easily for him, this ability. In. Out. In. Out. I have to take a deep breath; my lungs demanding to be filled; my body requiring the colorless, odorless gas to continue its existence. I have to leave. I can't breathe in here.

Hiding

I hide. When I hide, it is easier to breathe. When I hide, I can drop the pretense that I am okay with being here. I can gulp the air or hold my breath. No one is looking. It is easier to breathe, then it isn't. I have to find a new place to hide so I can breathe again.

For those of you who don't know me, I am Kimberly McDonagh, the widow of Lieutenant Edward Joseph McDonagh, Jr., Engine Company 37. Eddie was diagnosed with cancer in March 2014. He died on November 12, 2017. He made it six weeks past his 49th birthday. He left behind five children, ranging in age from 24 to six. I wrote this piece while he was in Memorial Sloan Kettering, recovering from both a colon and liver resection to remove the cancerous tumors. By January 2015, it was back in his liver.

While his cancer may have been 9/11-related, the fact is, 9/11 was just a job on a horrific scale. The hidden dangers of an already dangerous job should not be taken lightly. I urge you, for your family's sake, if you think something is wrong, get checked out. Decontaminate your gear regularly. Follow protocols, even if you think they're a waste of time. Take care of yourself. If cancer can happen to my family, it can happen to yours. If you can't do it for yourself, then look in the faces of your children and do it for them. ■



About the Author

Kimberly Settle McDonagh is an advocate for the improved health and wellness of those in the fire service. She is the proud mother of three boys and two step-daughters. She served four years in the United States Air Force as an F-16 Crew Chief. She chronicled Lieutenant Edward McDonagh's battle with cancer on the Facebook page, "Eddie's Fighting Irish."



REDUCE **YOUR** RISK PLEDGE

Pledge that you will do everything in your power to reduce your risk of contracting occupational cancers, for your health and your loved ones as well.

Together, we can improve our own safety and ensure we are here to serve the public we have sworn to protect.

[More Online](#)
[Take Pledge](#)

We Pledge to Reduce Our Risk by:

- Always using our SCBA, including when operating at car fires, dumpster fires, during overhaul and whenever CO is present. This is the best protection from inhalation hazards.
- Minimizing cross-contamination by not storing bunker gear in our car or home.
- Showering upon return to quarters after a working fire and prior to leaving the firehouse after our tour ends.
- Keeping a clean work duty uniform at home to use when training or other Department purposes, such as medicals.
- Cleansing hard surfaces inside our apparatus crew cab daily.
- Removing surface contamination and washing our SCBAs and other contaminated equipment using soap and water following a working fire.
- Designating, maintaining and strictly enforcing a “no bunker gear zone” in all our living areas of the firehouse.
- Washing our bunker boots after a working fire. Firefighter boots contribute significantly to cross-contamination.
- Maintaining clean PPE by washing the inside liner of our helmet with soap and water, rinsing off contaminated gear on-scene following a working fire and regularly inspecting and cleaning fireground contaminated PPE.
- Sanitizing our hands after every response and both before and after using the bathroom. This will minimize cross-contamination to highly absorptive areas of the body.
- Ensuring our diesel capture exhaust systems are in proper working order and used.
- Practicing healthy lifestyle choices, such as exercising regularly, avoiding alcohol and tobacco products, limiting red meat intake and using sunscreen.

REDUCEYOURRISK

Firefighters have a
14%
higher cancer rate than
the general public

There is a
400%
increase in skin absorption for every
5-DEGREE INCREASE
in body temperature

Using cleansing wipes after
operations reduces carcinogenic
exposure by more than
50%

ALWAYS
Transport your gear using the
job-issued gear bag

online at fdnypro.org/reduceyourrisk



REDUCE YOUR RISK

The FDNY's Reduce Your Risk initiative was established in 2017 by the Department's Contamination Reduction Workgroup to increase awareness of the cancer risk faced by Firefighters and promote the proactive measures that should be taken to combat this deadly, but oftentimes, avoidable occupational hazard.

Proud Partners of the FDNY's Cancer-Reduction Efforts



fdnyfoundation.org



firstrespondercenter.org/cancer



firstrespondercenter.org/cancer



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