

Draft Cancer Prevention Action Plan

San Diego Fire & Rescue Department

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Frequently, firefighters, the public and policy makers perceive the most dangerous aspects of firefighting as those functions associated with actions taken on the fireground, such as search and rescue, advancing hoselines, or vertical ventilation. While these functions are admittedly dangerous, a far less glamorous and insidious foe, occupational cancer, is responsible for greater morbidity and mortality in the fire service than adverse fire events, structural collapse, and fireground disorientation combined. This document serves to briefly review the magnitude and implications of occupational cancer in the fire service and provide a plan for the San Diego Fire & Rescue Department to address this pressing issue.

Occupational Cancer

Today's byproducts of combustion are different from those in the past, as natural materials including wood, textiles and the like have been replaced with synthetic furnishings, plastics, fireproofing compounds and construction materials. These fuels produce a host of known carcinogens when burned, including: benzene, chromium, formaldehyde, polycyclic hydrocarbons and many more (Fabian et al., 2010). As a result, today's fires are highly toxic, burn hotter and faster and pose significantly greater risk to firefighters when compared to the past. Additionally, diesel exhaust was recently reclassified by the International Agency for Research on Cancer (IARC) from a Group 2A (probably carcinogenic to humans) to a Group 1 (carcinogenic to humans) classification (International Agency for Research on Cancer [IARC], 2012). Combined, these factors demonstrate the increased risk of occupational cancer firefighters face both on the fireground and in the station. According to the International Association of Firefighters (IAFF) *Line of Duty Deaths Database*, 86 firefighters died of occupational cancer in

2014, ("IAFFLODD," 2015) compared to 22 who were killed at fire scenes during the same time period (National Fire Protection Administration [NFPA], 2015).

The association between occupational cancer and firefighting has been well documented in numerous peer-reviewed research publications, including:

- LeMasters and colleagues, meta-analysis of 32 studies published in the *Journal of Occupational and Environmental Medicine*, identified 10 cancers that were significantly associated with firefighting and four that were designated as probable risk, these included: multiple myeloma, non-Hodgkin's lymphoma, prostate and testicular cancers (LeMasters et al., 2006).
- Pukkala, and colleagues, study of 16,442 Nordic firefighters over a 45 year period, published in the *Journal of Occupational and Environmental Medicine*, found moderate excess incidence of the following cancers: prostate, skin melanoma, non-melanoma skin cancer, multiple myeloma, adenocarcinoma of the lung, and mesothelioma (Pukkala et al., 2014).
- Daniels and colleagues, NIOSH study of mortality and cancer incidence in a pooled cohort of 29,993 firefighters from San Francisco, Chicago and Philadelphia between 1950-2009, found small to moderate increases in risk for several cancer sites and for all cancers combined, stemming from excess malignancies of the respiratory, digestive and urinary systems as well as a causative relationship between firefighting and mesothelioma (Daniels et al., 2015).

The findings of these researchers and many more have been persuasive enough that

32 states and 9 Canadian provinces have adopted presumptive law coverage for firefighters who develop cancer (International Association of Firefighters [IAFF], n.d.). The evidence is abundant and compelling; an association between firefighting and cancer exists.

While the impacts of cancer are numerous, two areas of special interest include the emotional and financial aspects. Emotionally, the impact of cancer is both obvious and catastrophic at the individual, family and organizational levels, as those accustomed to being the “helpers” are thrust into the unfamiliar role of asking for help and family and friends are witness to potentially preventable suffering. In terms of finances, the impact of occupational cancer is equally consequential in an era of scarce resources, as workers compensation pays for presumptive occupational cancers. Cancer care is very costly, for example:

Direct Cancer Costs Related to Hospitalizations in 2009:

Diagnosis	Mean Hospital Cost
Leukemia	\$40,200
Multiple Myeloma	\$28,700
Non-Hodgkin’s Lymphoma	\$24,900
Bone	\$19,600
Brain	\$19,400
Prostate	\$10,900

Source: (Price, Stranges, & Elixhauser, 2012)

Annual Cost of Cancer Drugs in 2012

Drug name	Use	1-year cost
Sipuleucel	Prostate	\$90,000
Lenalidomide	Multiple Myeloma	\$90,000
Ofatumumab	Lymphoma	\$120,000
Dasatinib	Leukemia	\$110,000

Source: (Siddiqui & Rajkumar, 2012)

Just one incidence of occupational leukemia costs the City of San Diego in excess of \$150,000 dollars in direct medical costs over the course of one year. This number does not reflect additional indirect costs including but not limited to, workers compensation litigation, backfill, and death benefits. Based on both the emotional and economic impact of occupational cancer, a reactionary approach is inappropriate. Rather, the objective should be to prevent the onset of occupational cancer in the first place.

Preventing disease prior to its onset is termed primary prevention and is the ultimate goal of any health intervention program, as it optimizes quality of life and results in a significant return-on-investment. While it is intuitive that living a life free of cancer is ideal, the notion that preventing chronic disease such as cancer is cost-effective warrants greater scrutiny. While there is little data specifically focused on the impact of primary prevention of occupational cancer in firefighters, there is a wealth of data concerning primary prevention of chronic diseases in the general population from which we can draw insight.

According to a 2009 report from the *Trust for America's Health*, a non-profit, non-partisan organization funded by the Robert Wood Johnson Foundation and The California Endowment, primary prevention is good business, in both human and economic terms. Researchers evaluated 84 low-cost, community based studies where primary prevention was employed in the context of several chronic diseases, including cardiovascular disease, diabetes and some forms of cancer (TFAH, 2009). The results were remarkable; in **California the ROI at 1-2 years was .73:1, at 5 years 4.84:1 and at 10-20 years 5.41:1 (TFAH, 2009)**. An obvious limitation of this data is that it was derived from large-scale, health promotion campaigns that dealt with numerous chronic diseases rather than just cancer, potentially limiting its applicability. However, based on the data, it does not seem unreasonable to extrapolate that in the context of

occupational cancer, potentially significant savings would result from keeping workers healthy rather than treating them when sick.

Based on the premise that primary prevention is both ethically and financially prudent, a course of action is warranted. Thankfully, organizations including the IAFF, Firefighters Cancer Support Network (FFCSN), and fire departments from Boston, FDNY and more have taken the lead in the cancer prevention arena. Therefore, collaboration with these organizations is essential, as completely reinventing the wheel in San Diego is unnecessary. However, even with the best program and collaboration, no program is a one-size fits-all. Crafting a customized program based on a proven foundation that fits within the cultural norms and values of the SDFD will be key to gaining organizational acceptance.

The SDFD Cancer Prevention Program (SDFD/ CPP) will be a comprehensive health promotion campaign, built upon several of the widely accepted *16 Firefighter Life Safety Initiatives* (see appendix) presented at the National Fallen Firefighters Tampa 2 Firefighter Life Safety Summit.

Short-term objectives:

Primarily focus on behavioral change, based on *Life-safety Initiatives 1,2 & 4*, which in essence advocate for cultural change at all levels as it relates to health & safety, improving accountability for health and safety and the empowerment of all employees to feel secure in speaking up and stopping unsafe practices (National Fallen Firefighters Foundation [NFFF], 2014). What does this look like where the rubber meets the road?

- Engage key stakeholders from throughout the organization through outreach and focus groups and provide education regarding occupational cancer

- Work collaboratively with stakeholders to develop culturally competent messaging that encourages/markets behaviors recommended by FFCSN & the IAFF that include such things as: 100% exhaust extractor use, showering after a fire, using wipes to remove soot on face/neck at the scene of a fire, washing hood and/or entire ensemble on a weekly basis, wearing SCBA throughout incident and being cognizant of apparatus exhaust flow paths and bunkers on the app floor.
- Create a cadre of “SDFD Health Ambassadors” who in large part are comprised of informal leaders, firefighters who “have been there and done that” who communicate leaders intent by spreading the health & wellness message through one-on-one work, small-group meetings and modeling of healthful behavior. Ideally the message comes from the top *and* bottom, as long-lasting cultural change will come from firefighters *wanting* to engage in healthful behaviors, because they understand the “why” and the “how”, rather than simply having to do it because the “Chief says so”.
- Develop and implement a curriculum to be taught at the Fire Academy and recurring training addressing occupational cancer and the actions employees can take to minimize risk.
- Develop and implement a plan to evaluate effectiveness of interventions.

Behavioral change will likely prove challenging in a culture that prides itself on 200 years of tradition unaffected by progress, however encouraging behavioral change is the crux of this program, as numerous high-impact, low-cost, behavioral targets of opportunity exist that stand to reduce risk significantly. Historically, numerous health promotion campaigns have fought similar uphill battles and succeeded, based in large part on perseverance coupled with the

right message *and* messengers, resulting in countless lives being saved. Examples include: smoking cessation campaigns, condom use to slow the spread of HIV transmission, seatbelt use, and closer to home, the use of SCBA's and RIC teams, both of which were unheard of just 30 years ago.

Recent research published in the *Journal of Research in Organizational Behavior* is worth reading (see appendix), as its applicability to our organization's goals in terms of health & safety is remarkable. Researchers studied the "macho" culture of offshore oil platform workers who lived and worked together for weeks at a time in a highly competitive, high-risk environment, where ego was king and getting the job done at all costs was the underlying organizational message, creating a culture where safety was an afterthought (Ely & Meyerson, 2010). In order to foster cultural change, organizational health & safety initiatives were embraced and implemented at all levels (Ely & Meyerson, 2010). Workers adopted a culture of inclusiveness and a philosophy of collective good where humility was expressed openly throughout the organization. As a result, safety was enhanced, production increased and worker satisfaction improved, a win-win for all parties involved (Ely & Meyerson, 2010). While fire stations are not oil platforms, the cultural similarities are striking, lending hope to the notion that we can and will achieve positive behavioral change.

Mid-range Objectives:

Consistent with *Life-Safety Initiatives 8 and 16*, both of which put forth the imperative that departments utilize available technology to improve health & safety and when designing or purchasing new equipment, health and safety be a primary consideration (NFFF, 2014).

- Survey all fire stations and assess environmental systems/conditions in the context of occupational cancer risk reduction, including: PPE storage areas, door seals, common area furnishings, exhaust extraction systems, PPE washing machines, etc. and make evidence-based recommendations
- Collaborate with apparatus specification team in terms of health and safety and occupational cancer risk reduction, potential areas of concern include, such things as exhaust flow path, PPE storage compartments and more
- Research and produce feasibility report for in-house repair and maintenance of PPE

Long-term objectives:

Consistent with *Life-Safety initiative #7*, research and develop in-house and/or collaborate with other agencies/organizations to create a data collection system related to health and safety for evaluation and future, yet to be determined research (NFFF, 2014).

Implementation

In order to implement a successful health promotion campaign, both a philosophical and financial commitment is required on the part of senior leadership. As part of the financial commitment, the creation of a full-time project manager position is essential. A project manager would solely focus on occupational cancer, a subject with breadth and depth enough to encompass an entire career. Tunnel vision, a detriment on the fireground, would in this case be an asset, as all energies are directed at this singular imperative. The project manager would report to Chief Duron, yet be free from dealing

with the myriad of issues his office currently deals with, as he fills the shoes of both a Health and Safety Officer and Incident Safety Officer.

Because the messenger is often times equal to or even more important than the message itself, selecting the ideal project manager is key. The ideal candidate should have excellent organizational, communication, and interpersonal skills; be committed to the project for several years; be detailed oriented; have knowledge of the subject material and be culturally in-tune with the fire service. Duties may include:

- Collaboration with organizations & agencies currently engaging in occupational cancer prevention health campaigns
- Engaging with and developing relationships with internal and external stakeholders
- Planning, implementing, and evaluating health promotion activities
- Creating educational curriculum tailored to the SDFD
- Creating health promotion material tailored to the SDFD
- Conducting on-site surveys of facilities
- Researching and reporting on evidence-based practices related to occupational cancer
- Researching and reporting on feasibility of in-house PPE repair/maintenance

Keeping firefighters healthy rather than treating them when they develop cancer is both ethically and economically prudent. This document provides a starting point from which we can begin to implement cultural/behavioral change to reduce risk, as cultural/

behavioral change is the single most important aspect of preventing occupational cancer. The fact is, we currently possess an arsenal of tools we can put to use today to reduce risk, including: showers, washers, SCBA's, exhaust extraction systems, and handy-wipes, many of which are tools that are required by policy to be used, yet culturally fall by the wayside. The reality is, our members fail to appreciate the significance of occupational cancer, likely in large part due to the lengthy latency of the disease. A positive attribute of firefighters is their sense of invincibility, a fact that serves us well on the fireground but may kill us in the long run, as we fail to recognize and mitigate controllable risk factors associated with cancer.

While occupational cancer and its association with firefighting is currently receiving the attention it deserves, we need only open a history book to discover that this information is not new. The byproducts of combustion have long been known to cause cancer; it's amazing that it has taken this long to start connecting the dots. In 1775, Sir Percival Pott, a London surgeon was credited with being the first person to describe an environmental form of cancer (Frills, 2010). Pott observed that chimney sweeps had a higher incidence of scrotal and testicular cancer when compared to men of other occupations and that the causative agent was soot (Frills, 2010). As a result, Pott established the first occupational hygiene recommendations; that chimney sweeps bathe at least once per week (Frills, 2010). Pott's recommendation in 1775 to bathe after sweeping chimneys was timeless, as one of the current recommendations of the IAFF and FFCSN to reduce the incidence of occupational cancer, is to shower after firefighting in order to remove the soot! Apparently, history does repeat itself.

As an organization we have been successful in preparing our members to fight fire, ventilate roofs and search for trapped victims. However, we now face a new danger, occupational cancer. Occupational cancer kills significantly more firefighters than firefighting; the problem is very real and demands our full attention. By developing and implementing a health promotion campaign we will begin to address this complex issue at its core, by raising awareness and promoting behavioral change. While some fixes intended to reduce risk will require capital expenditure, the fact is, as previously stated we already possess many of the tools required to significantly reduce risk, we just need our people to use them. Let's take action together to make a truly meaningful impact in the lives of our members and their families, let's mobilize and join the fight against occupational cancer.

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