Health

Health Concerns of the U.S. Fire Service: Perspectives From the Firehouse

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Abstract

Purpose. *Firefighters are expected to respond to any domestic emergency at a moment's notice, and therefore their health and readiness are key to the public safety net. Although emerging research is focusing on understanding firefighters' increased risk for disease and injury, the perspectives of fire service personnel is lacking.*

Design. *This study uses the cross-sectional qualitative data collection techniques of key informant interviews and focus groups.*

Setting. *Data collection occurred with a national sample of firefighters from 28 (municipal and federal) career fire departments.*

Participants. *Participants were 332 career firefighters (57.2%), company officers (23.4%), fire chiefs (15.4%), and other fire service personnel (3.9%).*

Method. *Focus groups and informant interviews were conducted with firefighters, fire chiefs, health promotion personnel, and medical directors to assess attitudes, opinions, and perceptions about firefighter health.*

Results. *Major themes that developed among fire service personnel included concerns about cancer, risk of cardiovascular disease, the importance of and barriers to physical fitness, the food culture of the firehouse, psychological stress resulting from repeated exposure to trauma, sleep disruptions, injuries, and risk for infectious disease. Health concerns identified by firefighters are juxtaposed with current efforts and trends within the national fire service.*

Conclusions. *The health concerns of firefighters parallel both available epidemiological research and the health priorities of national fire service organizations. Unfortunately, these concerns often are in contrast with efforts by local governments to limit their financial liability for illnesses presumed to be caused by occupational exposures and long-held traditions in the fire service. This study highlights the need for epidemiological surveillance of firefighters and innovative health and organizational policy in the fire service. Future directions for the fire service, the public health community, and researchers are discussed. (Am J Health Promot 2012;27[2]:111–118.)*

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PURPOSE

Firefighters are expected to respond to any emergency that occurs in their community. Firefighting is an inherently dangerous occupation, given that job tasks involve not only fire suppression but, increasingly, providing emergency medical services, rescue operations, and hazardous material response to any emergency that occurs in the community.[1] Because of the unique role firefighters fill, their readiness and ability to respond at a moment's notice becomes a key concern for emergency preparedness.

There has been a considerable amount of research into the relationship between firefighting and cancer,[2] but other areas, such as cardiac health, physiologic strain, and injury have received less attention, and several of the seminal articles on these topics have been published just in the past decade.[3,4] A number of occupation-specific challenges exist for firefighters that put them at increased risk for disease and injury. For instance, Kales and colleagues[5] identified a number of chronic stressors (e.g., long periods of sedentary activities, smoke exposure, the challenges of shift work, firehouse dietary patterns, and occupational stress) and acute stressors (e.g., irregular physical exertion, smoke exposure, dehydration and excessive heat, alarm response, and extreme physical exertion of firefighting and training activities) that likely lead to increased risk.

With increased understanding of the unique job tasks and exposures firefighters face, increased scientific attention has focused on the impact of these duties on firefighter health. Current evidence suggests that fire-

fighters are at increased risk for heart attacks on duty,[2,3] cancer,[4] and injury.[6] In addition, evidence suggests low physical fitness[2,3,7,8] and rates of obesity higher than those of the general population.[8] Although current research has explored these trends and risks through cross-sectional and epidemiologic methods, perspectives from fire service personnel themselves are lacking.

Unlike the military, there is no unifying organization that oversees policies and procedures for every fire department. Rather, the U.S. fire service has several organizations that set priorities, suggest policies, and direct prevention and intervention efforts among firefighters. Two of the primary organizations, the International Association of Fire Chiefs (IAFC), representing management, and the International Association of Firefighters, representing the labor union of firefighters, have developed the Fire Service Joint Labor Management Wellness Fitness Initiative (WFI), now in its third edition.[9] The WFI presents a comprehensive program for fire departments to improve firefighter health and fitness by implementing medical physicals, fitness programs, and injury and medical rehabilitation, and by providing mental health services.

The National Fallen Firefighters Foundation also has highlighted the importance of health through their Everyone Goes Home (EGH) program.[10] The EGH is a program of 16 initiatives aimed at decreasing the number of annual firefighter deaths. Among the initiatives is a focus on improving firefighters' physical and mental health. The National Fire Protection Association (NFPA) is the standard-setting organization for the fire service and includes voluntary standards on creating fitness programs and implementing medical standards.[11,12] The United States Fire Administration (USFA) was established by Congress to provide ''national leadership to foster a solid foundation for fire and emergency stakeholders in prevention, preparedness, and response.''[13] Although no one organization serves as the unifying and authoritative association, they all influence and inform the direction fire departments and the fire service take.

Although health standards, priorities, initiatives, and programs exist at the national level for the fire service, there has been no systematic assessment of the leading health concerns and perceptions of health priorities among line firefighters and fire department leadership. Thus, the purpose of this formative study is to discover the key health concerns of personnel in a broad sample of departments from across the national fire service. We conducted interviews and focus groups with both leadership and rank-and-file firefighters in firehouses across the country, from large departments in metropolitan areas to small volunteer departments in rural communities. Using qualitative analysis methodology, we extract both the primary concerns of fire service personnel and relevant thematic information within each area of concern. In addition, the discussion juxtaposes study findings with the health priorities of national fire service organizations and the response by local governments. By contrasting qualitative data from fire department personnel with current fire service organization practices, this study provides a context for future research questions and areas for prevention, and suggests areas of possible intervention for both the U.S. fire service and research communities.

DESIGN

Data on general health concerns were extracted from the focus group and key informant interviews conducted with a national sample of fire departments. Data were collected between 2008 and 2010, and the project was approved by the National Development & Research Institutes Institutional Review Board.

SETTING

Department interest was solicited through an article in *Fire Chief* magazine that described the purpose of the study as exploring the culture of health and wellness in the fire service.[14] Interested fire service personnel were asked to contact the project principal investigator for inclusion. Final selection of departments was based on having a variety of departments with regard to region (East, Central, West), type of department (career, volunteer), and size of department to ensure a diverse sample. When there was underrepresentation of a certain type of department, contacts with fire service leaders were consulted for a recommendation of a department and direct solicitation of those departments were made. A total of 28 career fire departments were represented in the final sample (15 West, 6 Central, and 7 East).

At each department, focus groups and key informant interviews were scheduled with the fire chief and/or his/her designee; designees often were assistant chiefs, wellness coordinators, and/or medical directors. For career departments, the point of contact was asked to schedule focus groups with a sample of crews from the department. On average, two to four focus groups were scheduled per department. For larger departments, additional groups were scheduled to ensure a broad sample of firefighters.

PARTICIPANTS

A total of 332 career fire service personnel participated in the study (see Table), with the majority of participants being male (92.7%) and Caucasian (67.6%), which is consistent with national data on minority and gender diversity in the fire service.[15] The average age of participants was 41.7 years (SD = 10.6). More than half of participants were at the firefighter rank (57.2%), approximately one-quarter held captain or lieutenant positions (23.4%), 15.4% were either fire chiefs or deputy/battalion chiefs, and the remainder worked in a health capacity within the department (e.g., wellness coordinator, physician). On average, participants had 15.6 years (SD = 9.4) of fire service experience. Most participants (57.2%) had some college or technical school training and more than a quarter (28.3%) were college graduates. A few (7.8%) held postgraduate degrees and the remainder had a high school or general equivalency diploma.

Table
Demographic Characteristics

Characteristic	Mean (SD) or %
Gender, % male	92.7
Ethnicity, %	
Caucasian	67.6
African-American	9.2
Native Hawaiian/ Asian/Pacific Islander	17.8
Hispanic/Latino	2.8
Multiethnic	2.4
Age, y	41.7 (10.6)
Rank, %	
Firefighter	57.2
Captain/lieutenant	23.4
Chief (including deputy, battalion)	15.4
Other	4.0
Average experience, y	15.6 (9.4)
Education, %	
High school/general equivalency diploma	6.7
Some college/ technical school	57.2
College graduate	28.3
Postgraduate training	7.8

METHODS

After explaining the purpose and procedures of the study, participants were provided an opportunity to ask questions. Next, participants signed the informed consent document and completed a brief demographic questionnaire. The discussion began with the question, ''What are the biggest health concerns facing the fire service?'' The following analysis is of the responses to that question.

All focus groups and interviews were transcribed verbatim. A two-phase process was used to capture the meaning behind the transcribed text with the overall purpose of understanding major themes across and between transcripts. First, researchers reviewed the transcribed documents to develop a familiarity with the text and began a thematic analysis by searching for patterns and themes that occurred frequently in a single interview or were common across interviews. The data then were coded by identifying passages that exemplified key concepts or ideas related to major patterns and themes. Use of multiple reviewers assisted in establishing the thematic framework. Next, the transcripts were uploaded to NVivo,[16] a qualitative data analysis program that allows researchers to highlight and code data into ''parent'' nodes for overall themes and ''child'' nodes for subthemes. Summaries were then made within each major/parent theme. The two primary coders compared their analyses and any discrepancies were discussed. A third researcher who attended the majority of the focus groups reviewed the findings of the two primary analyses to confirm that the summary of the findings was reflective of the data collected. For the current study, responses to the general health concern question were analyzed and then compared with current practices, policies, and suggestions highlighted by the contributing organizations outlined above.

RESULTS

Reflective of the fire service organizations, fire service personnel were aware of the negative health implications of their job duties. Primary concerns about health described by both firefighter and fire service administration included cancer, cardiovascular disease (CVD), injury, and concerns about the negative psychological impact of occupational exposures. Across the country, firefighters expressed the belief that their lives would be shortened based on their career. The reasons varied by crew, but were typically related to the domains identified as key health concerns:

> ''I remember I was told when I got hired that you—and I don't know if this was an actual fact that you lost 7 years off your life if you took this job.'' —career firefighter, West

> ''Being in the fire service puts a lot of stress on you. It's hard on your health. No question about that.'' —career firefighter, Central

Cancer

One of the most prevalent concerns among personnel was increased risk of cancer and exposure to cancer-causing agents. Personnel discussed the complexities of understanding firefighters' cancer risk. Often noted were the changes in exposures compared to years past. Although the protective equipment provided to firefighters, such as turnout gear and self-contained breathing apparatus (SCBA), have improved, the products of combustion and other toxic and infectious substances (e.g., methicillin-resistant *Staphylococcus aureus*, human immunodeficiency virus) firefighters are exposed to have become increasingly complex and dangerous.

> ''Twenty years ago everything was basically natural fiber and now we are into a lot of manmade fiber in everything, you know, soup to nuts and we get into these situations and you really aren't sure what you're breathing, what the long-term effect of the exposure is. So, I think those are going to become issues that haven't really surfaced 100% yet.'' —career fire chief, Central

In particular, personnel often noted the challenge of carcinogens that are present on gear and carried back to the station.

> ''Now the historical approach has been to worry about the inhalation hazard of those products. But then we also, the thing that we are just getting into really understanding is the absorption through the body and through tissues that was never really addressed before and trying as a national fire service, trying to address that.'' —career chief, East

> ''… bunker gear is like a sponge basically.'' —career firefighter, West

Fire service organizations' focus on increased cancer awareness and mitigating exposure seems to be making an impact on fire service practice, as several participants indicated a changing culture related to use of protective equipment. A number of firefighters, particularly those with more years of service, noted the differences in culture related to use and cleaning of protective gear:

> ''When [name removed] and I came on, we were smoke eaters, you know, it's, uh, we never donned the SCBA.

That was—that was a sign of weakness. And now, we're trying to change that culture. Over the years, it's changed, but to the point now where you basically wear it until you turn over to the homeowners and that's quite a cultural change for us.'' —career chief, West

''It used to be—if I can go into this smoky building, and not put my mask on and last longer than he can, he's got to put his mask on first—well, then I am tougher.'' —career firefighter, East

Cardiovascular Health

Firefighters and administrators across the country often referred to the statistic that more than half of line-of-duty deaths (LODDs) each year are cardiac related.[17] Participants alluded to many of the same challenges to cardiovascular health as the WFI, including factors such as intense physical demands, high emotional stress, the shift structure, and the need for high levels of physical fitness.[8] Some health challenges are necessary because of the job tasks (e.g., interrupted sleep). Several pointed out the relationship between CVD and well-established risk factors such as physical activity, nutrition, and stress.

''The nature of what we do can be very strenuous. And I think one of the other things that we try to instill, too, is that we can go from zero to sixty in a heartbeat depending on when the call comes in. You can be in a dead sleep at 1:30 in the morning and then you have to do something strenuous and stressful, uh, just like that. So, if you're healthy and—and all those kind of things, it will help you to be a more effective firefighter.'' —career fire chief, West

Physical Activity and Fitness

In general, firefighters and administrators indicated a belief that firefighters should be in better physical condition than the general public because of their job duties, which is consistent with suggestions from fire service organizations.[8,18] Several noted the trend toward rising rates of obesity in the United States but many also noted the demands of firefighting as a need to combat those trends in the fire service.

''I think we as a fire department are representative of this society where the society is getting larger, putting on more weight, we in the fire service are also doing that. And then we're still expecting to perform like athletes, but with bodies of couch potatoes.'' —career fire chief, West

''And we're reflective of, obviously, the general population. But the general population doesn't walk around with 80 pounds of gear going into these buildings, dragging these people out, and doing those kind of things.'' —career chief, West

A common theme that arose from participants was the challenges of maintaining physical fitness and the challenges of knowing what types of exercise are best to perform the job.

''… a lot of guys … try to turn the workout into a kind of high school gym class where guys are trying to get mere muscles and bulk up for, to be the linebacker, whatever the case might be. But they really don't understand that firefighting is a lot more like karate, you know, than, you know, football. And we need to train more. It's like a long-distance running event in a sense, and we need to train more to have that stamina. Strength is important too—very important—but in my opinion not as important as just the cardiovascular fitness.'' —career chief, West

Many discussed the importance of implementing programs that focus on improving firefighter health and fitness.

Nutrition

A number of participants discussed the food environment in the firehouse as being of particular concern to firefighter health. Although many realized the negative consequences of a poor diet, there also was the recognition by many that the food environment in the firehouse is strongly rooted in tradition and is uniquely resistant to change. Many also expressed a belief that the negative impact of a poor diet is underrecognized as a key concern in firefighter health.

''You do have a certain fatalistic attitude about some of it, there's only so much you can do to prevent being injured in these situations. It's going to happen. If you do it long enough you're going to get hurt, but diet and exercise, that's right in your pocket. That's all yours.'' —career fire chief, Central

''I think there's an accepted perception that if you wanted a safe job, you probably should have been a teacher or something. We're risk takers by nature and so we don't like to face the fact that if you eat cheeseburgers that it will kill you or those type of things. It's an attitude that I think exists, that 'hey we're in a dangerous profession and you're worried about me eating a piece of cake?''' —career fire chief, Central

In particular, the social norms around eating were identified as sometimes being barriers to healthier lifestyles. Traditions in particular around mealtimes and the social expectation to conform to the crew were discussed by many.

''It all starts between people's ears because nobody forced you to eat that big steak. Oh, actually we did because when you went to the fire station, that's what we eat. You eat a big steak and a potato. And then we put the social pressure around—but you got to eat with the crew, because if you don't eat with the crew then we're going to ostracize you.'' —career fire chief, West

Food choices were identified as one area that was, at times, problematic. Traditions of rich and unhealthy foods in some firehouses were identified as key concerns. In addition, portion sizes consumed were noted by many as particularly detrimental to health.

''It's been a huge shift over the last 10 years as far as how badly we used to cook compared to the nice meal we just had that was healthy. But even a healthy meal eaten in excess

is damaging, and that's what we do. So, I had to sit out some meals because they're just too tasty.'' —career firefighter, West

Sleep

Sleep difficulties were consistently raised as an area of concern among firefighters. Some discussed lack of sleep while at the station from being up for calls throughout the night and many reported that, even when they did sleep at the station, they did not sleep well as they were waiting for the next call. Others discussed how their sleep disturbance carried over into their home life.

''I sleep horrible when I'm at home, I sleep horrible when I'm any—when I'm anywhere because this job's like, especially like if I hear the slightest noise, because I don't want to get left on the call.'' —career firefighter, West

''I go on 10 calls at night or go on zero calls at night and still go home and sleep all day long, it's like you just never—when you're here, you never get rest. You can't—you can't rest because you're always, you know, you always got to be ready to go. So, it doesn't feel like I really sleep here. Because like I said, zero to 10, you're still—you'll still go home and you'll still feel beat up and tired like I worked all night long and didn't get any rest.'' —career firefighter, West

Mental Health

Several fire service organizations have highlighted the importance of focusing on the mental health of firefighters given their repeated exposure to traumas. Mental health also emerged as a theme with data collection from the current study, both as an independent concern and as a contributing factor to other diseases.

''I think that that emotional psychological injury that we place on people manifests itself in other areas. That's the cause of some of the strokes and the heart attacks and the cancers and—because that energy's got to go some place. And it just manifests itself in the disease process. Humans are not built to be exposed to what we expose them to repetitively.'' —career chief, West

The emotional toll of repeated exposure to trauma was a common theme across the fire service. Most indicated that they didn't experience the negative impact from one particular event, but that the totality of their exposures, particularly on medical calls, had an impact on their mental health.

''We might see an incident where somebody's shot up or somebody's, you know, lost a limb or—we see all these—these things that people consider extremely gruesome, but we get up and go look at it and come back and eat dinner. You know? And when you really, really think about it, that's kind of, like, not normal.'' —career firefighter, West

''Seeing, you know, thousands and thousands of dead people and all this other stuff and how it impacts and it just crosses over into your personal life. It crosses over into the health and how you're working out.'' —career fire chief, West

Consistently, firefighters reported that debriefing with other firefighters was the most useful way of managing the emotional toll of their experiences.

''I think that it's more comfortable in our little firefighter circle just because they understand where we're coming from, so they know the point of view that you're going to be looking at the experience with versus an outsider looking in. They don't—they wouldn't know how to take it. It would be gruesome to them. They—they wouldn't understand how we deal with it versus to us, it's just like a normal day at the fire department.'' —career firefighter, West

Injuries

Because of the nature of the job tasks, most firefighters and administrators indicated a high risk for several different types of injuries during the course of a firefighter's career. They also indicated concern over the impact of injuries on their jobs.

''Every firefighter will experience an injury throughout their career.'' —career fire chief, West

''… we're like professional athletes in a sense that we're only one injury away from our careers ending.'' —career firefighter, West

One reason cited for this risk was the nature of the job, where firefighters have to respond to emergencies without warning and without the ability to prepare for what the incident might require. Several firefighters indicated that, although their departments provided instructions on proper lifting technique, the nature of the incidents they see often preclude them from using proper lifting technique in practice.

''A lot of times you're put in a place where you don't have the option to have—you don't have a lot of room. You got a 300-pound person in a bathtub, an old bathtub. And you gotta get two or three people in there to lift him out.'' —career firefighter, West

Another concern cited by many was the national obesity epidemic and the number of incidents that required the lifting of very large individuals.

''… they [referring to patients] just keep getting bigger, bigger, bigger.'' —career firefighter, West

CONCLUSIONS

Thematic analysis of the focus group and interview data indicated that the leading health concerns among fire service personnel included cancer, heart disease and its contributing factors such as fitness, nutrition and sleep, mental health, and injury. Although the fire service is proactive and responsive to concerns in many areas, there remain areas of opportunity for improving firefighter health. The belief was expressed by many that firefighting has an unavoidable and nega-

tive impact on health, with many stating a belief that their lives would be shortened by their chosen occupation. The implications of these beliefs on actual health behaviors deserve further research.

Cancer

With regard to cancer, although evidence exists to support the relationship between several types of cancer and firefighting,[4] political and financial concerns ensure debate about the association remains alive.[19–22] Both fire service organizations and researchers are calling for additional research to understand the relationship between firefighter exposures and cancer risk.[4,8,19] Increased attention to mitigating the dangers of chemical exposures will likely be useful to improving firefighter health.

Many fire service organizations advocate for increased awareness of cancer risk, consistent medical screenings for early detection, and increased protection against carcinogens through use of personal protective equipment (PPE) and SCBA.[9] However, the exact mechanisms linking cancer and occupational exposures remain a question for additional research. There exists a strong literature on the topic of cancer among firefighters.[2] In a meta-analysis of the published literature, LeMasters et al[2] examined the findings of 32 published studies and reported a probable or possible relationship between firefighting and multiple myeloma, non-Hodgkin lymphoma, prostate cancer, testicular cancer, skin cancer, malignant melanoma, brain cancer, rectal cancer, buccal cavity/pharynx cancer, stomach cancer, colon cancer, and leukemia.

Despite the strong evidence and biologic credibility given firefighters' exposures to known carcinogens as the result of combustion, debate remains from those with economic interests in managing firefighter cancer. For instance, the National League of Cities published a report in 2009 that concluded ''… that there is a lack of substantive scientific evidence currently available to confirm or deny linkages between firefighting and an elevated incidence of cancer.''[19(pvi)] The executive director urged that ''States should not pass laws requiring cities to take on difficult financial burdens with no clear scientific connection between illness and occupation.''[18] The report was violently opposed by many in the fire service community.[19,20] Currently, the National Institute of Occupational Safety and Health is undertaking a retrospective cohort study of firefighter cancer to clarify the relationship between occupational exposures and cancer among firefighters.[23] Additional research both retrospectively and prospectively, such as a national cancer registry for firefighters, will be important to understand this important occupational hazard.

Recent research by Fabian and colleagues[24] analyzed the combustion gases and particulates generated from residential, automobile, and material-based fires. Monitored carcinogens resulting from the fires included benzene, chromium, formaldehyde, and polycyclic aromatic hydrocarbons. Equipment used by firefighters during the experiments was found to have high concentrations of several chemicals. Most notably, nearly all smoke particulates during the overhaul period, the time after the fire has been extinguished, were less than 1 μm in diameter, meaning that the air appeared clear while it was actually full of invisible carcinogens. The findings highlight the importance of both cleaning PPE consistently and using SCBAs throughout the incident. In particular, use of SCBAs during both fires and overhaul was highlighted as a key area of intervention, as well as an increased focus on cleaning gear, equipment, and exposed clothing.

Cardiovascular Disease

CVD, which is the leading cause of LODD,[17] was well recognized as a concern for firefighter health. Fire service personnel and fire service organizations consistently recognize dangers and occupational factors that increase the risk for firefighters. For factors such as physical fitness, there is a strong focus by the fire service to promote improved physical conditioning[8,25]; however, personnel indicated continued concern with the lack of fitness among firefighters. Currently, the NFPA has recommended minimum standards for firefighter fitness[12]; however, the standards are only a suggested guideline for fire departments rather than a requirement. The WFI outlines an annual fitness standard guideline to include assessments of body composition, aerobic capacity, strength, endurance, and flexibility, but recommends scores not be compared to a standard but rather be used to inform personnel of their performance relative to their peers. Peate and colleagues[26] found that firefighters were unable to appropriately assess their own fitness levels accurately, which underscores the need for departmental focus on periodic assessment. Although the WFI is well known throughout the fire service by both labor and management, the USFA[18] reported that most (76%) of fire department lacked programs to help firefighters maintain their physical fitness.

Although nutrition and the food environment was a primary concern for many, there is limited focus on nutrition within the fire service. The WFI has extensive information about firefighter fitness, but less than a page of information is available about nutrition and less than half a page outlines the needs of a balanced diet.[9(p32)] In addition, the NFPA standard related to the development of fitness programs only mentions nutrition as a suggested topic for health promotion in the appendix.[12] Given the relative importance of nutrition to overall health, the lack of focus on this topic by fire service organizations presents a potential area of impact. Nutrition also was an area of concern as it relates to overall physical health, and a number of challenges, such as the cultural norms around food in the firehouse, were identified as particularly challenging. Elliot and colleagues' findings[27] suggest that health promotion interventions can be successful with firefighters for preventing significant weight gain; however, no nutritional epidemiologic data are available for firefighters. Furthermore, traditions of the fire service around eating habits present a key barrier or opportunity for change that should be explored in more depth.

Sleep

The IAFC, in cooperation with the USFA, published a report on the

effects of sleep deprivation on firefighters and paramedics.[28] The report outlines the negative effects of fatigue and performance concerns resulting from chronic sleep deprivation. Recommendations for the fire service include education about the effects of sleep deprivation, increased attention on recognizing and treating sleep disorders, and a call for more research on mitigating factors related to sleep deprivation. The report and qualitative findings both highlight the importance of this topic for firefighters nationally and the need for further research on the most beneficial approach to fatigue management.

Mental Health

Mental health remains an area of concern for both fire service personnel and fire service organizations. Fire service organizations consistently support the need for mental health services for firefighters and advocate that attention be paid to the psychological toll of job duties firefighters are required to respond to. However, there remains a great deal of debate about the best mechanism of treatment. Some in fire service advocate for the use of critical incident stress debriefing[25] as a means of treatment whereas others, such as those leading the EGH initiative on behavioral health, highlight the lack of empirical evidence for the approach and suggest more widespread dissemination of proven methods for management of emotional concerns.[25] Future efforts should focus on understanding the emotional impact of firefighters' repeated exposure to trauma as well as the most effective treatment approach.

Injuries

Fire service organizations consistently recognize the risk of injuries, as firefighters experience approximately 80,000 injuries annually at a cost of 2.7 to 7.8 billion dollars a year.[6] The EGH focuses a good deal of attention on improving safety and changing the culture around safety as a means of decreasing firefighter injury.[25] The WFI outlines criteria for proper injury rehabilitation as well as injury prevention programs.[9] The increased attention to injury prevention and safety within the fire service has likely contributed to the decreasing trend of injuries since the 1980s.[6]

Addressing health and wellness in the fire service has a number of challenges. The fire service is diverse with regard to size of department, type of department (career, volunteer or combination), and mission (fire, emergency medical response, or combination), which necessitates that interventions be tailored to the needs of each department. Furthermore, financial challenges at the city and department levels often lead to competing priorities, with health and wellness being prioritized lower than other needs.

SO WHAT? Implications for Health Promotion Practitioners and Researchers

What is already known on this topic?

Firefighting is universally recognized as a dangerous occupation. Limited epidemiological data suggest that firefighters are at a higher risk for certain cancers and that the leading cause of line-of-duty death is cardiovascular disease.

What does this article add?

Although recent research has provided important epidemiological data on the health status of firefighters, no formative research has been conducted to date on the health concerns of firefighters or their perspective regarding the causes and potential interventions for risk factors related to occupational hazards. Using a diverse sample of departments from across the nation, this study presents both key informant interview and focus group data on the health risks of firefighting. In addition, these data are contrasted with health promotion efforts by national fire service organizations to determine degree of convergence with the actual concerns of fire service personnel and to identify areas of research and intervention.

What are the implications for health promotion practice or research?

Specific areas for policy, research, and intervention identified by fire service personnel include cancer, cardiovascular disease, physical activity, fitness, nutrition, sleep, mental health, and injury prevention.

Limitations exist to the current research. For instance, departments were not randomly selected but rather were the result of departments volunteering for the project in response to an article about the project. Although individual firefighters did not volunteer for study participation, fire departments that have more of a health focus were likely the ones that volunteered for the study. Despite this possible selection bias, the large number of firefighters from a diverse collection of fire departments likely increased the variety of responses.

The current findings provide a rich foundation for future research, prevention, and intervention efforts among the fire service and research communities. Although some areas of health are receiving consistent attention, such as physical activity, other areas, such as diet, remain nearly untouched. Given the complex and negative health implications of firefighting as an occupation, it is important to focus on all domains of health rather than focus on any singular issue to create the largest impact.

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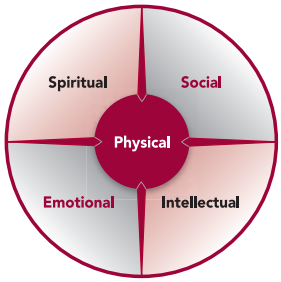
(O'Donnell, *American Journal of Health Promotion,* 2009, 24,1,iv)



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