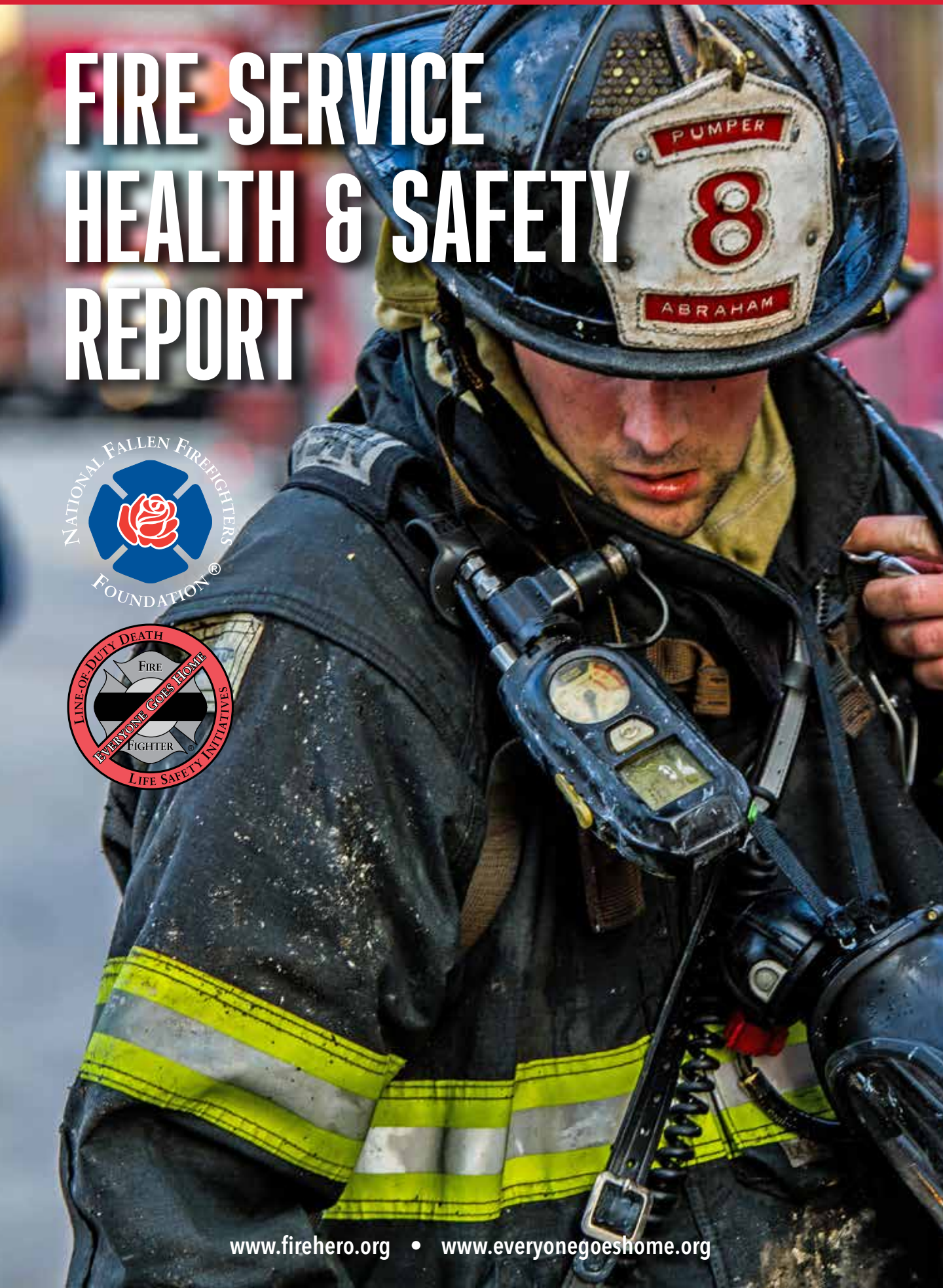
FIREHOUSE® SUPPLEMENT

FIRE SERVICE HEALTH & SAFETY REPORT



National Fallen Firefighters Foundation®

Line-of-Duty Death
Everyone Goes Home
Fire
Fighter®
Life Safety Initiatives

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FIRE SERVICE HEALTH & SAFETY REPORT

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Above photo by Chad Wittenberg
Cover photo by Bryan Engel

Funding for the Fire Service Health and Safety Report was generously provided through DHS/FEMA's Grant Program Directorate for Assistance to Firefighters Grant Program – Fire Prevention and Safety Grants.

Our Mission: Serving the Survivor Community & Preventing LODDs

Chief Dennis Compton
Chairman, Board of Directors
National Fallen Firefighters Foundation

It continues to be my honor to serve as the Chairman of the Board of Directors of the National Fallen Firefighters Foundation (NFFF). The goals of our Board, composed of individuals representing diverse aspects of the fire service, set the tone and policy direction for the Foundation. We are constantly asking ourselves challenging questions, such as "where do we go next?" and "how do we direct resources?"

As in the past, serving our line-of-duty death (LODD) survivor community continues to be foremost on our minds. We are also proud that beginning in 2004, we at the NFFF enhanced our mission to include *preventing* firefighter line-of-duty injuries and LODDs as a way to pay even higher respect to our survivors, the fire service family as a whole, and those firefighters who have fallen.

This Fire Service Health and Safety Report demonstrates this commitment by providing information on some of the critical issues that the NFFF is working on. I urge you to pay particular attention to the sections on cardiac health and cancer prevention. Even though heart disease continues to contribute to approximately 50 percent of all firefighter LODDs each year, dealing with the health issues surrounding firefighter occupational cancers has emerged as an area of significant concern as well.

Further, I could not be more pleased that the fire service continues its support of the Fire Service Occupational Cancer Alliance (FSOCA), formed in January 2015. The NFFF provides the overall leadership and facilitation for the work of the Alliance, which is composed of members from all walks of our service, including individual fire departments and their fire chiefs and union presidents, major fire service constituent organizations, firefighters who are cancer survivors, representatives from industry, and others. We are working collectively to be a force multiplier in the national effort to learn more about, and therefore prevent, occupational diseases like cancer. The research that is highlighted in this report provides clear examples of what can be accomplished when we combine research with practical interventions to guide prevention efforts for occupational cancer.

As you read this material, please keep in mind that *you* are our intended audience. The goal is to provide this overview so that you and those with whom you serve every day are better equipped and trained to stay healthy and be a positive force for firefighter safety in your organizations.

Thank you for your service.

Since the Everyone Goes Home® program was established in 2004, the NFFF has developed a breathtaking array of training programs and educational materials within the rubrics of safety, health and wellness. I am so proud of the NFFF staff and contractors as they have worked so diligently over the past 12 years to see emerging issues, and to keep health and wellness in the forefront of firefighter safety.

What we are most proud of is that we have approached firefighter health and safety in a holistic way, working within the guiding principles of the 16 Firefighter Life Safety Initiatives. The Initiatives are an attempt to answer critical questions: How can we address culture lag? How can we get people to speak up when they see unsafe practices? How can we address behavioral issues and raise these issues to the level of a physical injury? and so on. The fire service representatives who created the Initiatives were insightful as they looked to the future and practical as they viewed the roles of individuals and organizations.

If you are new to the fire service, you might not believe this, but safety was once a scant issue for discussion. Getting injured, getting sick or even dying while responding to an incident or on the fireground were once thought of as "the cost of doing business." But no more.

An emerging class of chief officers—but mostly company officers—have been enculturated within the new safety model. These are the the men and women upon whom we have placed the future of the fire service. They understand that occupational diseases, injuries and even LODDs are not part of doing business. I applaud them and pledge that the NFFF will support them in this new and exciting ethos.

The departments highlighted in the Everyone Goes Home® Advocate Program section and the Making a Difference sections are only a sample of the work that I hear about when traveling the country representing the NFFF. We hope that you will be inspired with what you read in this supplement and decide to take action, regardless of your rank or role in your department, to ensure that Everyone Goes Home®. We have included a checklist on page 30 to help get you started today.

My message: We're here for you! The NFFF will never stop supporting your health and safety efforts.

Chief Ronald J. Siarnicki
Executive Director
National Fallen Firefighters Foundation

16 FIREFIGHTER LIFE SAFETY INITIATIVES

Guiding the NFFF's focus on health and safety

Photo by Steven Coleman

The 16 Firefighter Life Safety Initiatives (FLSIs) were developed at the 2004 NFFF Firefighter Life Safety Summit by representatives of fire service organizations, government agencies and other partners in related fields. The 2014 NFFF Firefighter Life Safety Summit reaffirmed the value of the Initiatives and supported continuing Initiative-related efforts. The 16 FLSIs serve as guidance for the work of the NFFF in the arena of firefighter health and safety.

FLSI 1 CULTURAL CHANGE

Define and advocate the need for a cultural change within the fire service relating to safety, incorporating leadership, management, supervision, accountability and personal responsibility.

FLSI 2 ACCOUNTABILITY

Enhance the personal and organizational accountability for health and safety throughout the fire service.

FLSI 3 RISK MANAGEMENT

Focus greater attention on the integration of risk management with incident management at all levels, including strategic, tactical and planning responsibilities.

FLSI 4 EMPOWERMENT

All firefighters must be empowered to stop unsafe practices.

FLSI 5 TRAINING & CERTIFICATION

Develop and implement national standards for training, qualifications and certification (including regular recertification) that are equally applicable to all firefighters based on the duties they are expected to perform.

FLSI 6 MEDICAL & PHYSICAL FITNESS

Develop and implement national medical and physical fitness standards that are equally applicable to all firefighters, based on the duties they are expected to perform.

FLSI 7 RESEARCH AGENDA

Create a national research agenda and data collection system that relates to the Initiatives.

FLSI 8 TECHNOLOGY

Utilize available technology wherever it can produce higher levels of health and safety.

FLSI 9 FATALITY, NEAR-MISS INVESTIGATION

Thoroughly investigate all firefighter fatalities, injuries and near misses.

FLSI 10 GRANT SUPPORT

Grant programs should support the implementation of safe practices and/or mandate safe practices as an eligibility requirement.

FLSI 11 RESPONSE POLICIES

National standards for emergency response policies and procedures should be developed and championed.

FLSI 12 VIOLENT INCIDENT RESPONSE

National protocols for response to violent incidents should be developed and championed.

FLSI 13 PSYCHOLOGICAL SUPPORT

Firefighters and their families must have access to counseling and psychological support.

FLSI 14 PUBLIC EDUCATION

Public education must receive more resources and be championed as a critical fire and life safety program.

FLSI 15 CODE ENFORCEMENT & SPRINKLERS

Advocacy must be strengthened for the enforcement of codes and the installation of home fire sprinklers.

FLSI 16 APPARATUS DESIGN & SAFETY

Safety must be a primary consideration in the design of apparatus and equipment.

Fire Hero Learning Network

The Fire Hero Learning Network supports the Everyone Goes Home® program and the 16 Firefighter Life Safety Initiatives by delivering free virtual training for all levels of the fire service. Training modules include some of the most popular NFFF cornerstone programs, including Courage to Be Safe,® Taking Care of Our Own,® and Leadership, Accountability, Culture and Knowledge (LACK). Other training modules focus on the roles and responsibilities of company officers and the behavioral health series (After Action Review, Curbside Manner: Stress First Aid for the Streets and Stress First Aid for Fire and EMS Personnel). Users can access standardized operational checklists or customize the checklists to fit their department's policies and procedures.

New to the Fire Hero Learning Network are 3D Fire Attack Scenarios, which use the latest research on fire attack and suppression decision-making.

Additionally, the Emergency Services Risk Reduction Program Certificate was launched this year. Registered users who complete four specific training modules receive a certificate of completion representing four hours of training. For more information on the certificate program and the Fire Hero Learning Network, visit fireherolearningnetwork.com.

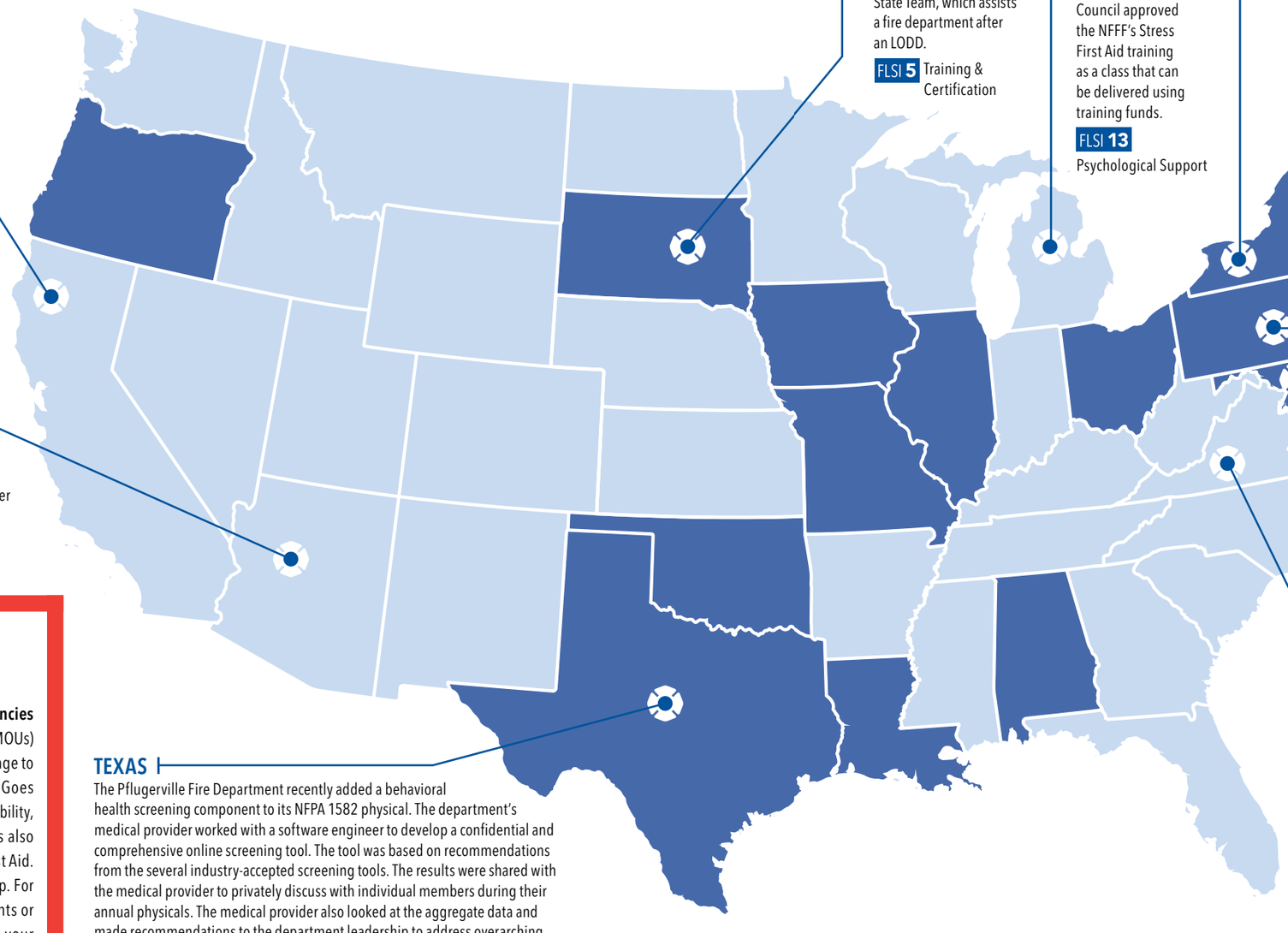
For more information on the 16 Firefighter Life Safety Initiatives, **visit everyonegoeshome.com.**

Everyone Goes Home® Advocates

Representing the NFFF state by state

Everyone Goes Home® Advocates serve as volunteer representatives of the NFFF to assist in the promotion and awareness of the 16 Firefighter Life Safety Initiatives (FLSIs). The Advocate Program is managed by an Eastern Division Management Team Coordinator and a Western Division Management Team Coordinator. FEMA regions and states have lead advocates, and some states have multiple advocates. There are also advocates for wildland and military firefighters. An advocate's primary responsibility is to coordinate and/or participate in activities, events, programs and training related to the 16 FLSIs.

The map below highlights some of the success stories of the work of the advocates at the department and state levels. NFFF greatly appreciates the tireless efforts of the advocates in raising awareness of the 16 FLSIs to ensure that Everyone Goes Home®.



CALIFORNIA

In response to the 2015 terrorist attack, the San Bernardino County Fire Department partnered with numerous local fire departments to create a comprehensive active shooter policy.

FLSI **12** Violent Incident Response

ARIZONA

Members of the Scottsdale Fire Department and Goodyear Fire Department signed a cancer pledge related to prevention measures for cancer exposures on the fire scene.

FLSI **6** Medical and Physical Fitness

SOUTH DAKOTA

In 2017, the State Fire Marshal's office coordinated train-the-trainer trainings for NFFF programs and created its first Local Assistance State Team, which assists a fire department after an LODD.

FLSI **5** Training & Certification

MICHIGAN

In 2017, the Michigan Fire Fighter Training Council approved the NFFF's Stress First Aid training as a class that can be delivered using training funds.

FLSI **13** Psychological Support

NEW YORK

The Oneida Fire Department is providing middle school students with life-long lessons in fire prevention. Students are taught how to use a fire extinguisher by extinguishing a real fire on a stove. Also, part of the fire prevention activities includes conducting a side-by-side live-burn demonstration showing the importance of early detection and early fire suppression with the use of smoke detectors and fire sprinklers. These activities enhance their chances of surviving a real fire should the need ever arise.

FLSI **14** Public Education

CONNECTICUT

The Wilton Fire Department recently took delivery of a Class A pumper. The pumper's specifications included seat covers that can be wiped down and decontaminated, rather than traditional seat covers. This is just one example of the department's proactive approach to cancer prevention. Vehicles carry wet wipes so firefighters wipe down their necks and heads at the fire scene. Firefighters place contaminated turnout gear on the hosebed or in a compartment for transportation back to the firehouse rather than wearing it in the cab. They also provide extra hoods for members to change into after their first stop at rehab and air bottle change.

FLSI **6** Medical and Physical Fitness

PENNSYLVANIA

The East Derry Fire Department has placed gross decontamination kits in apparatus to help reduce the exposure of carcinogens after a fire. The kits were made from material purchased at a local store and gloves donated by a local EMS service.

FLSI **6** Medical and Physical Fitness

MARYLAND

Howard County integrated the 16 FLSIs into their policies and procedures.

FLSI **1** Cultural Change

VIRGINIA

The Virginia Fire Officer Academy holds two week-long residency leadership programs under the motto "Safety through Leadership." One of the requirements is that the students must create a pledge to complete once they return to their own respective departments. This year, the students wrote a pledge on how they intend on being safety leaders using the foundation of the 16 FLSIs.

FLSI **1** Cultural Change FLSI **2** Accountability

TEXAS

The Pflugerville Fire Department recently added a behavioral health screening component to its NFPA 1582 physical. The department's medical provider worked with a software engineer to develop a confidential and comprehensive online screening tool. The tool was based on recommendations from the several industry-accepted screening tools. The results were shared with the medical provider to privately discuss with individual members during their annual physicals. The medical provider also looked at the aggregate data and made recommendations to the department leadership to address overarching behavioral health issues within the department.

FLSI **13** Psychological Support

States with NFFF Program MOUs

The NFFF and 16 state training agencies have memoranda of understanding (MOUs) to deliver three NFFF programs: Courage to Be Safe®, Leadership: So Everyone Goes Home, and LACK: Leadership, Accountability, Culture and Knowledge. Some states also have agreements to deliver Stress First Aid. These states are **dark blue** on the map. For more information on these agreements or to explore similar agreements with your state training agency, please contact Victor Stagnaro vstagnaro@firehero.org.

For more information on the Everyone Goes Home® Advocate Program or to apply to be an advocate, visit everyonegoeshome.com/about-us/advocates.

CARDIAC HEALTH

Understanding cardiovascular strain and heart disease in firefighters

By Denise L. Smith, Gavin P. Horn and Stefanos N. Kales

Sudden cardiac events are the number one cause of LODDs among firefighters in the United States, accounting for 45 percent of all fatalities. The cardiovascular strain of firefighting can trigger an arrhythmia or heart attack in people with underlying cardiovascular diseases.

The Cardiovascular Strain of Firefighting

Firefighting causes tremendous strain on the cardiovascular system, including:

- Increased heart rate to max[1]
- Increased vascular stiffness[2]
- Increased coagulation [3]
- Increased cardiac fatigue[4]
- Increased inflammatory markers (in review)

[1] Smith et al. 2001, Ergonomics
[2] Fahs et al. 2011, Vascular Medicine
[3] Smith et al. 2014, MSSE
[4] Ferhall et al. 2012, Eur J Appl Physiol

Structural Heart Disease vs. Coronary Heart Disease

There are two types of heart disease: structural and coronary.

Structural heart disease is a general term to describe structural changes to the heart, including cardiomegaly (enlarged heart) and left ventricular hypertrophy (thickening of the heart muscle in the left pumping chamber). The major risks associated with structural heart disease are increased susceptibility to arrhythmia and the impediment of blood flow from the heart.

Coronary heart disease is characterized by the narrowing of blood vessels that supply blood and oxygen to the heart tissue. This is also called coronary artery disease and atherosclerotic heart disease. The major risks of coronary heart disease are atherosclerotic plaque buildup in arteries causing stenosis and ischemia. Also, plaque ruptures causing blood clots can result in a heart attack.

HEART DISEASE RISK FACTORS

Coronary Heart Disease	Structural Heart Disease
Family History	Hypertension/High Blood Pressure
45 years or older	Obesity
Male	Coronary Heart Disease
Tobacco User	Sleep Apnea
High Cholesterol	Heart Valve Problems
Hypertension/High Blood Pressure	
Obesity	
Diabetes Mellitus	

What you can do:

- Get a medical evaluation from a physician who understands the stress and environment of firefighting, and follow up on the findings to aggressively manage any identified risk factors.
- Stay fit and make healthy decisions: Maintain a minimum level of physical fitness to safely perform the strenuous tasks of firefighting (12 METS – metabolic equivalent of task), eat healthy, aim for 7–8 hours of sleep per night, and do not use any tobacco products.

There are multiple benefits of a healthy lifestyle, including:

- Decreased cardiovascular risk factors and disease progression
- Increased work capacity
- Increased thermal tolerance
- Increased plasma volume
- Increased cardiac efficiency
- Improved clotting profile

Dr. Denise L. Smith is a professor at Skidmore College and a research scientist at the Illinois Fire Service Institute (IFSI). She conducts research on the heat stress and cardiovascular strain associated with firefighting, pathoanatomic cause of firefighter fatalities, and strategies to increase performance and decrease cardiovascular events.

Dr. Gavin P. Horn is the director of the IFSI Research program and a firefighter/engineer with the Savoy, IL, Fire Department. His research focuses on firefighter health and safety and first responder technology development.

Dr. Stefanos N. Kales is an associate professor at Harvard Medical/Harvard Chan School of Public Health. He has participated in academics on five continents with over 145 publications and recognition internationally as the leading authority regarding cardiovascular disease among firefighters. He has received numerous professional society and fire service awards.

Facts about Heart Disease and Firefighters

- **There are approximately 700–1,000 non-fatal, duty-related firefighter cardiovascular events in a typical year.**
- From 1995 to 2015, there were 918 firefighter deaths due to overexertion and strain (cardiac, cerebrovascular accident, heat exhaustion).[5]
- Among firefighters under the age of 45, 67 percent of cardiac-related fatalities had coronary heart disease, and 66 percent had cardiomegaly or left ventricular hypertrophy.[6]
- Body mass index (BMI) is a major contributor to left ventricular mass among firefighters.[7]
- Cardiomegaly is associated with a five-fold increased risk (500 percent increased risk) of sudden cardiac death in firefighters.[6]
- Autopsies of traumatic fatalities indicate that approximately 40 percent of firefighters have cardiomegaly or left ventricular hypertrophy.[8]

[5] Fahy et al. 2016, NFPA
[6] Yang et al. 2013, American Journal of Cardiology
[7] Korre et al. 2016, American Journal of Cardiology
[8] Korre et al. 2016, Journal of Clinical & Experimental Cardiology

Occupational Cancer

Researchers working for you

The NFFF and the Fire Service Occupational Cancer Alliance (FSOCA) are committed to promoting awareness of cancer prevention interventions and to supporting continued research on occupational cancer. Recent and emerging research in the field are providing the fire service with potentially life-saving information, and all fire service members are encouraged to explore the findings of this research.

Completed Research

National Institute for Occupational Safety and Health (Multi-Year Study)

Background: In 2010, NIOSH began a multi-year study of nearly 30,000 firefighters from the Chicago, Philadelphia and San Francisco fire departments to investigate the potential link between firefighting and cancer. The study was led by NIOSH and supported in part by the U.S. Fire Administration.

Major Findings: The study suggests that firefighters are at a higher risk of certain types of cancers when compared to the general population. These types of cancer include digestive, oral, respiratory and urinary systems.

More Information: cdc.gov/niosh/firefighters/ffCancerstudy.html

NIOSH Study of California Firefighters (1988–2007)

Background: Nearly 4,000 California firefighters in the California Cancer Registry were studied to examine risks for several major cancers.

Major Findings: This study identified firefighters as having an increased risk for melanoma, multiple myeloma, acute myeloid leukemia, as well as esophageal, prostate, brain and kidney cancer.

More Information: onlinelibrary.wiley.com/doi/10.1002/ajim.22466/abstract

"Cancer risk among firefighters: A review and meta-analysis of 32 studies," by LeMasters GK, et al., indicates that firefighters are at an increased risk of several types of cancer, as depicted in the graphic at left. The study was published in the *Journal of Occupational and Enviornmental Medicine* in 2006 (*48:1189–1202).*
Image by DigitalStorm

Current Research

Cancer Prevention in the Fire Service: Exposure Assessment, Toxic Effects and Risk Management: Firefighter Cancer Prevention Study

Background: In 2015, the University of Arizona Zuckerman College of Public Health and Tucson Fire Department received a grant from DHS/FEMA's Grant Program Directorate for Assistance to Firefighters Grant Program – Fire Prevention and Safety Grants. This study will identify carcinogenic exposures and epigenetic changes associated with these exposures, and the effectiveness of interventions intended to reduce the risk of cancer.

Status: The study is expected to be completed in 2018.

More Information: publichealth.arizona.edu/research-project/cancer-prevention-fire-service-exposure-assessment-toxic-effects-and-risk

Firefighter Multicenter Cancer Cohort Study: Framework Development and Testing

Background: This research partnership includes the University of Arizona, the University of Miami, NIOSH, multiple fire service organizations, and others, funded by a DHS/FEMA grant. It is building the framework for a long-term study of carcinogenic exposures and effects, starting with a limited number of fire departments. Once the framework is complete, the study team will work to identify funding to expand the study to other departments.

Status: Testing of the new study protocols is scheduled to start this fall.

More Information: publichealth.arizona.edu/research-project/firefighter-multicenter-cancer-cohort-study-framework-development-and-testing

Cardiovascular & Chemical Exposure Risks in Today's Fire Service

Background: A series of studies focusing on the two leading causes of firefighter LODDs (cardiac events and cancer) are being conducted by the Illinois Fire Service Institute (IFSI) at the University of Illinois-Urbana/Champaign along with partners at the UL Firefighter Safety Research Institute (FSRI) and NIOSH, with funding from DHS/FEMA's Grant Program Directorate for Assistance to Firefighters Grant Program – Fire Prevention and Safety Grants. The studies are investigating cardiovascular strain and chemical exposures related to carcinogenic risk in the most complete manner to date in both modern firefighting structures (and fuels) and during various training scenarios common in the fire service. These studies are not only helping us understand the risks faced immediately after these firefighting activities, but they also characterize the recovery timeframe and measures the effectiveness of cleaning procedures using skin wipes and gross on-scene decontamination of PPE.

Status: A detailed toolkit with comprehensive information and tactical considerations will be released in late 2017. Further, the September issue of *Firehouse Magazine* included a supplement titled "10 Considerations Relating to Cardiovascular & Chemical Exposure Risks," which highlights many of the study findings. It is available for download at firehouse.com/12361314.

More Information: More information can be found on fsi.illinois.edu/research and updates on Twitter/Facebook @IFSIresearch.

FSOCA–A United Voice

The Fire Service Occupational Cancer Alliance (FSOCA) was established in 2015 to serve as a united voice for issues related to occupational cancer in the fire service. The Alliance is comprised of representatives from major fire service organizations, researchers, governmental partners and industry leaders. In September 2017, the FSOCA hosted the Fire Service Occupational Cancer Symposium in Phoenix. Presentations focused on current research, prevention strategies and presumptive legislation.

The First Responder Center for Excellence for Reducing Occupational Illness, Injuries and Deaths, Inc. (FRC), in coordination with the FSOCA, launched an electronic tool kit of firefighter cancer awareness and prevention information at the symposium. Visit firstrespondercenter.org for more information.

MAKING A DIFFERENCE:

Boston Fire Department

The Boston Fire Department has emerged as an industry leader in dealing with occupational cancer over the last several years. Recently, Boston Fire Commissioner Joseph E. Finn and NFFF's Fire Service Programs Director Victor Stagnaro discussed occupational cancer in the fire service.

Stagnaro: What was the "enough is enough" moment that triggered Boston's change of outlook?
Finn: In the past, Boston wasn't much different than other large urban administrations. Investments in the department's infrastructure were limited, and investing in prevention measures for cancer wasn't even on the radar. Boston Local 718 knew there was a problem with cancer because they were burying their friends. In 2014, when I became commissioner, I committed to work with President Rich Paris and Local 718 on the issue of firefighter cancer. I cannot stress enough the importance of labor, management and elected officials working together on the epidemic of cancer in the fire service. Cancer is the one issue that labor, management and elected officials can and should come together on to find common ground. Cancer has a devastating effect on a fire department, on firefighters and their families, and it simply cannot be ignored anymore.

Stagnaro: What type of advice would you give to fire departments who might not have the resources that a fire department like Boston has?

BFD partnered with O2X, which takes a holistic approach to health and fitness.
Photo courtesy O2X

Finn: When it comes down to it, firefighter cancer prevention cannot just be a fire department issue. Working with who and what is available in your community is going to make the biggest difference. One aspect that I think many fire departments overlook is involving the community's healthcare providers. We are fortunate in Boston to have the Dana-Farber Cancer Institute and Massachusetts General Hospital in our backyard. They have been tremendous partners in our innovative approach to prevention efforts. Also, we have worked with our insurance providers to decrease the age minimum for cancer screenings so our firefighters are getting tested earlier than the general public would. The Boston Fire Department Relief Fund has also stepped up to support families dealing with cancer by organizing transportation to and from treatment and even helping with financial support. So it's all these people working together that is going to have the strongest impact on occupational cancer.

"We all have a role in doing everything we can to decrease the number of firefighters getting cancer. We owe it to each other."

– Boston Fire Commissioner Joseph E. Finn

Stagnaro: That seems to be a reoccurring theme—you have to involve the right stakeholders, build those relationships and work toward the common goal of preventing firefighter cancer. What do you think are some unique challenges that the Boston Fire Department has when addressing prevention efforts?
Finn: The Boston Fire Department hasn't built a new firehouse in more than 35 years. The average age of our firehouses is 76 years old and we have some firehouses dating back to the 1800s. This creates a lot of challenges but we aren't using that as an excuse.

We are beginning a pilot program to industrial clean every firehouse in the city with an investment of about $125,000 per firehouse. The industrial cleaning will include removing all soft furniture (like couches and mattresses), encapsulating the ceiling, degreasing the walls and floors, repainting the interior and cleaning the air-handling systems. We know we can't afford to replace all the firehouses in the next 25 years, but by industrial cleaning them, we are going to create a safe working and living environment.

We just ordered 23 new engines and each one is coming with a 30-gallon foam bladder. We are going to be looking at using more foam in our day-to-day operations for dumpster fires and car fires. The goal here is to reduce the chronic exposure to smoke by using foam to keep our firefighters out of the exposure area.

Stagnaro: Sounds like you are addressing prevention efforts proactively from many different angles. Do you see a big difference in getting the message across to new firefighters versus your veteran firefighters?
Finn: Our older generation firefighters are the ones who have gone to their brother's funerals. They have had cancer scares themselves. They know that there are things they can do to help prevent cancer and they are listening. They have adapted to the cultural changes because they have buried their friends and they know that these risks are real.

The firefighters we are having a harder time getting buy-in from are our newly hired military veterans. About 97 percent of our new firefighters have served in the military, many in Iraq and Afghanistan, and they have a false sense of being invincible because of what they have gone through. Reaching the Millennials is our greatest challenge so we must be creative in getting their attention because we know it will make a difference for their futures.

Stagnaro: How have you tried to engage firefighters in cancer prevention efforts?
Finn: We wanted to get consistent messages out to our department to make sure everyone knew that we were aggressively going to attack firefighter cancer. We decided to do some videos because we knew that would grab their attention. The first video we did was for the "shock and awe" factor. We interviewed firefighters going through cancer diagnoses to show that this is a serious issue that cannot be ignored. The second video we did was to show firefighters the best practices for cancer prevention on the fireground, to show them this is how we were going to do business in the Boston Fire Department. We highlighted things like proper decontamination, using wipes, washing gear, changing hoods and what to do post-exposure. We are now working on a third video about what smoke does to your body's systems. [These videos can be found on www.takenosmoke.org.]

The other thing I want to mention that we have done department-wide is to focus on the overall health of our firefighters as a prevention measure. We know that people who are in better shape have a better chance of survival. We have partnered with O2X, a company created by former Navy SEALs who take a holistic approach to health and fitness. We have trained firefighters on the effects of sleep deprivation, the connection between physical endurance and stress and behavioral health management.

Stagnaro: I know I speak for many when I say thank you for sharing those videos with the fire service. Boston's willingness to share those videos is making a strong impact across the country.
Finn: We are all in this together. If there is something we are doing in Boston that another department can learn from, then it's our duty to share that. We all have a role in doing everything we can to decrease the number of firefighters getting cancer. We owe it to each other.

MAKING A DIFFERENCE:

San Diego Fire-Rescue Department

Growing its Cancer Awareness and Prevention Program

In early 2016, members of San Diego Firefighters IAFF Local 145 (L145) and the San Diego Fireman's Relief Association (SDFRA) met with the San Diego Fire-Rescue Department (SDFD) fire chief to discuss cancer awareness and prevention. They proposed that an SDFD program be established to address this issue and that a full-time position be budgeted to lead the program.

After addressing hurdles related to the establishment of a new program and a new position, the SDFD Cancer Awareness and Prevention Program (CAPP) was established. Firefighter/Paramedic (now Fire Inspector) Kurtis Bennett was appointed as the SDFD Cancer Prevention Officer (CPO) reporting directly to Fire Chief Brian Fennessy.

SDFD addressed cancer awareness and prevention on two levels: organizational and individual. Organizationally, the department committed to revising the department's policies on SCBA usage and decontamination on scene and in the firehouse. The department also agreed to the phased purchase of NFPA 1851-compliant washing machines and to upgrade its diesel exhaust extraction systems. SDFD acknowledged that these changes were critical in cancer prevention but knew that the greatest challenge was changing SDFD firefighter behavior. So a primary focus for Bennett was to create a cancer awareness training program.

The CAPP curriculum development team recognized that delivery of its cancer awareness training program wouldn't be successful if it relied on standard presentation formats like PowerPoint. Instead, the approach was to use the same techniques that commercial marketers use when selling a product. The curriculum included visual content strengthening the awareness of CAPP's slogan: Clean Air, Clean Body, Clean Gear. Firefighters who verbally agreed to buy in to CAPP's slogan were given a CAPP logo helmet sticker at the end of the training as an indication that they have requested to be "called out" by their peers when engaging in unsafe behaviors.

FirefighterAid is a nonprofit charity managed by SDFRA dedicated to caring for firefighters and their families in times of need. *FirefighterAid* commissioned and produced an eight-minute video featuring testimony from SDFD's cancer survivors. Each of the survivors, all active-duty firefighters, discuss their journey with cancer and its effect on their professional and personal lives. This video was shown prior to each training presentation to engage the firefighters. This approach forced firefighters to consider their own vulnerability after watching their sister and brother firefighters recount the impact that cancer had on them and their families. Prints featuring photos and quotes from the video are now in every firehouse in San Diego to further support the messages in the video.

San Diego's Cancer Awareness and Prevention Program includes posters designed to connect with firefighters.

Each of the partners play a critical role in the success of CAPP, and the future of the program relies on their collaborative efforts to help prevent cancer in the members of the SDFD. CAPP is one example of how fire departments are addressing the issue of occupational cancer. SDFD noted that what works for them may not work for another department because of each department's unique organizational culture. However, the key factor is to engage all stakeholders to create a unified voice in the prevention and awareness of occupational cancer.

MAKING A DIFFERENCE:

Denver Fire Department

Creating a Total Wellness Program

The Denver Fire Department (DFD), in cooperation with IAFF Local 858, created the Total Wellness Program to maintain and enhance the physical and mental resilience of its members. The Total Wellness Program is an aggressive and comprehensive wellness system promoting healthy lifestyles and safe work environments. It also provides the opportunity for rehabilitation and remedial support for those in need.

A wellness coordinator is responsible for the oversight of all the components of the Total Wellness Program. There is also a wellness committee comprised of representatives from each of the first responder city departments (fire, police and EMS), members of Risk Management and IAFF Local 858. The wellness coordinator ensures confidentiality of medical, behavioral and fitness evaluations and coordinates that the physical fitness and wellness programs are educational and rehabilitative.

The Total Wellness Program encompasses a holistic multi-pronged approach including medical evaluations, physical fitness, rehabilitation and behavioral management. Below are some of the components of the Total Wellness Program that contribute to the health and well-being of DFD members.

- Physical Therapy Program: With the assistance and support of Risk Management, Local 858, Denver Fire Administration and several grants, the Total Wellness Program hired the department's first full-time physical therapist and now employs two full-time physical therapists offering complete and individual therapy programs. About 70 percent of the 230 visits per month are for prevention or maintenance.
- Behavioral Health: DFD recognizes the value of addressing the behavioral health needs of firefighters to help prevent and treat things like vicarious traumatization, compassion fatigue, sleep deprivation, substance use and suicide. In 2014, Denver's Peer Support Team and F.I.R.E (Firefighters for Racial Equality) collaborated with the Carson J. Spencer Foundation to develop a suicide prevention program in response to a suicide of one of the department's most respected captains. The training program was presented to the entire department and resulted in more than a 20 percent increase in contact with the Peer Support Team and department psychologist. In 2015, following a line-of-duty death, a grief and resiliency program was developed and delivered to DFD members.
- Performance Psychology Training: In 2016, DFD partnered with a leading performance psychologist, Dr. Richard Perea, and introduced Performance Psychology Training to the department. Performance Psychology Training helps firefighters concentrate on being at their absolute peak mentally so they are able to perform.
- Cancer Prevention: To assist with early detection, Local 858 and DFD administration negotiated with the department's health provider, Kaiser Permanente, to develop a comprehensive physical examination addressing cancer and cardiovascular risks. A Cancer Resource Guidebook was developed to inform members of what to expect after a cancer diagnosis including worker's compensation, administration and treatment.
- Fit for Fire: The DFD's wellness coordinator oversees 24 peer fitness trainers who perform various fitness assessments for cardiovascular and functional fitness. In 2017, a four-year performance evaluation was initiated to provide for the minimum standard of acceptable physical fitness and basic firefighting skills. Each member will be evaluated and given a plan to maintain or improve for optimal performance of the job requirements.
- Better Halves of DFD: The Better Halves of DFD was created by Denver's Peer Support Team and the Denver's Firefighter's Relief Fund to support the spouses and families of its members. The Better Halves now has 485 members and continues to grow.

The Denver Fire Department continues to strive to be an innovative and progressive department by taking a realistic and comprehensive approach to supporting members' total wellness. The Total Wellness Program is an excellent example of the value of the partnership between labor and management in taking care of their members and their families.

Behavioral Health

Developing a Behavioral Health Management Program that any department can use

Since 2008, the NFFF has studied the various aspects of fire service behavioral health issues. In 2011, a new model for firefighter behavioral health was developed through a three-year consensus-building process. The model is based on empirical research that supports what many in the fire service already knew: People have different support needs (or needs for support) when exposed to a stressful event. Rather than a "one-size-fits-all" approach to behavioral health, the model demonstrates the need for individualized approaches based on need.

The NFFF created resources to provide training to the fire service based on the most current research and data that led to the development of the new model for firefighter behavioral health. Free virtual training is available at fireherolearningnetwork.com on After Action Review, Curbside Manner: Stress First Aid for the Streets, and Stress First Aid for Firefighters and Emergency Service Personnel.

Feedback from attendees at live training events and from individuals contacting the NFFF for support made it clear that there was a need for guidance on building or growing a department's behavioral health program. With the help of subject-matter experts, the NFFF embarked on creating *The Behavioral Health Management Guide*, which is now available at firehero.org.

FLSI 13 **Firefighters and their families must have access to counseling and psychological support.**

This guide is not intended to be a step-by-step manual for creating a behavioral health management program because departments have different resources. However, it is intended to provide recommendations and suggestions to support all fire service members taking an active role in increasing their knowledge of behavioral health in order to take better care of themselves, their colleagues and their families. The guide is divided into four levels depending on the individual's role: leadership, firefighters, peer support and clinical support. (See the chart on p. A19.) Each level works together to form a comprehensive behavioral health management program.

4 Levels of a Behavioral Health Management Program

LEVEL 1: LEADERSHIP

Effective behavioral health programs begin and *thrive* with supportive leadership. Leadership encompasses many individuals who can set the tone through their support for a program of this nature: the fire chief, the union and/or volunteer executive board, department management, and informal leaders or decision-makers throughout the department. The guide helps leaders to understand the value of a behavioral health program and to determine the resources needed to build a successful program in their department.

LEVEL 2: FIREFIGHTERS

This level in the guide provides information on training applicable to all fire department members. Of course, a formal and supported behavioral health program is more successful. But the guide provides information about resources available to all members of a fire department, regardless of whether a formal program is in place. The guide underscores the importance of taking care of oneself, as well as looking out for one another.

LEVEL 3: PEER SUPPORT TEAM

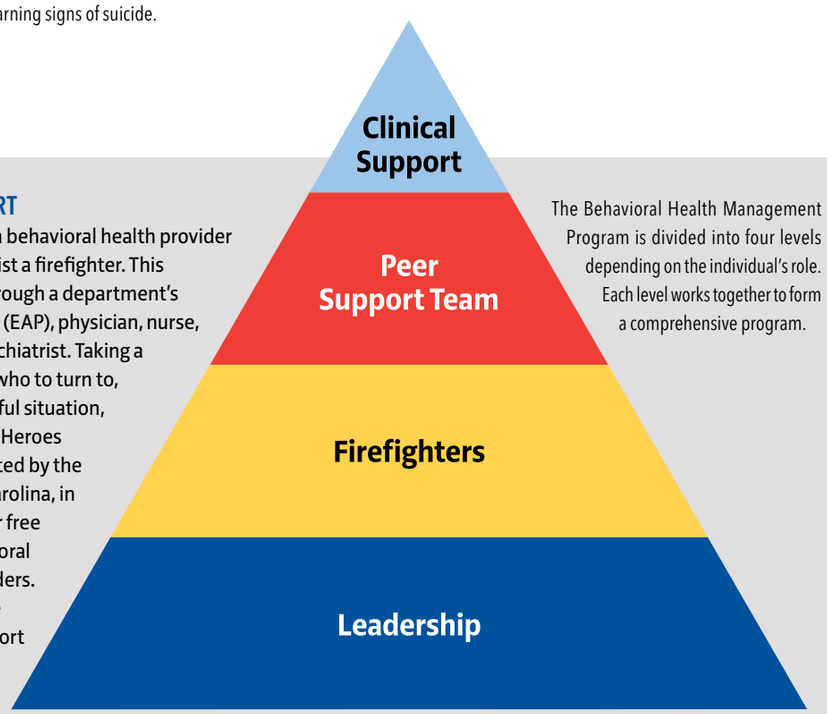
Peer support programs provide fire departments with members who are trained to recognize behavioral health issues and to provide access to professional care when needed. Fire departments have various forms of peer support teams, some formal and some informal. The guide offers tips on selecting members, providing training, evaluating team members and caring for team members.

Understanding Stress in the Fire Service

PocketPeer.org was developed by the Medical University of South Carolina in partnership with NFFF. This resource offers training videos to learn more about stress and its effect on fire service members. It also includes a module on recognizing and responding to warning signs of suicide.

LEVEL 4: CLINICAL SUPPORT

There are certain times when a behavioral health provider will need to be engaged to assist a firefighter. This provider could be accessed through a department's Employee Assistance Program (EAP), physician, nurse, licensed social worker or a psychiatrist. Taking a proactive role in determining who to turn to, even before you are in a stressful situation, is extremely valuable. Helping Heroes (helping-heroes.org) was created by the Medical University of South Carolina, in partnership with NFFF, to offer free training to providers of behavioral health services to first responders. You are encouraged to provide your EAP or other clinical support entities with information about Helping Heroes.



The Behavioral Health Management Program is divided into four levels depending on the individual's role. Each level works together to form a comprehensive program.

Checking In: A Behavioral Health Size-Up

The NFFF's five-episode podcast series "Checking In: A Behavioral Health Size-Up" aims to help firefighters, their families and healthcare providers better understand the behavioral health challenges and needs of firefighters. The podcasts can be used to generate discussion at the firehouse kitchen table and to promote use of other resources created by NFFF. Episode topics include leadership, firefighter training, peer support training and wildland firefighting, and one episode includes a discussion on general issues regarding behavioral health in the fire service. The podcasts are available for download at fireheropodcast.com.

The Fire Dynamics Boot Camp is based on previous research conducted by the UL Firefighter Safety Research Institute. *Photo courtesy UL*

FIRE DYNAMICS

Five core concepts from the Fire Dynamics Boot Camp

By Steve Kerber

In April 2017, the Howard County, MD, Department of Fire and Rescue Services hosted the NFFF and Underwriters Laboratories (UL) Firefighter Safety Research Institute's pilot course of Fire Dynamics Boot Camp. The course was designed to illustrate how fire service leaders and instructors can incorporate current research findings about fire behavior and firefighting tactics into their training programs with the ultimate goal of improving safety on the fireground. Videos from the Fire Dynamics Boot Camp are on NFFF's YouTube Channel: youtube.com/user/NFFFTV.

The research findings presented at the Fire Dynamics Boot Camp were not intended as mandates for change. Instead, they were presented in a manner for leaders and instructors to consider as validated findings on fire dynamics to improve firefighter performance on the fireground. The goal is for firefighters to apply fire dynamics concepts with what they see, their resources, their staffing and their equipment so they can get the best outcome possible.

The pilot class divided the last decade of fire dynamics research into five sets of core concepts for the Boot Camp. Each of these core concepts was supported by research results, video and/or hands-on demonstrations. The core concepts are listed below. More information on these concepts and other supporting material is available at ULfirefightersafety.org.

5 Core Concepts of Modern Fire Dynamics

1. SETTING THE STAGE AND YOUR WORK ENVIRONMENT

- No amount of technology is going to replace the need for you to know your profession.
- Your workplace has changed; you need to evolve. For example, lightweight construction fails rapidly when exposed to heat. Synthetic fuel loads found in homes today produce much more energy when burning than the natural fuel loads that were found in homes of previous generations.
- Fire dynamics-based tactics should align with the available resources (staffing, timing, water, etc.).
- Don't let training props set us up for failure.
- Know the functions of your turnout gear. Energy flows from high to low so energy release can easily exceed the capabilities of firefighter protective gear and safety equipment.
- Know how your equipment works and the limitations of the equipment.

2. FIRE DYNAMICS

- Fire development changes when a fire becomes ventilation-limited.
- Fire flows from high pressure to low pressure.
- No smoke showing means nothing. Once an opening is made, read the air flow, look for signs of smoke or flames deep in the building and anticipate the presentation of smoke.
- Keep the wind at your back and be mindful of unplanned window failure.
- Flow path and suppression must be considered together.
- Water does not push fire. Consider reducing the energy release and heat production with an offensive transitional attack (i.e., quick exterior knockdown). Remember that nozzle movement matters (steep and straight).

3. INITIAL FIRE ATTACK

- Ensure there is a completed size-up of the building geometry, fire location, stage of the fire, and flow path(s) before starting an interior attack.

Fire service leaders and instructors took part in the boot camp to learn how to incorporate current research findings about fire behavior and firefighting tactics into their training programs. Watch the videos at youtube.com/user/NFFFTV.

- Thermal imagers provide additional critical information about the heat source. Use your thermal imager on every fire.
- Assume all structure fires are ventilation limited until proven otherwise.
- Put water on the fire quickly from the safest, most effective position possible.
- Smoke is unburned fuel. Flow water on hot fuel. Don't wait for visible flames.
- Initiate your firefight on the level the fire is on.
- Water in the eaves can get the water where it needs to go for attic fires.
- The door closest to the fire truck should not dictate line/stream placement. Train on the options and develop expectations. The 360 walkaround will tell you where it's best to start the attack.
- Use the reach of your stream to maximize your attack (interior vs. exterior; small opening vs. large opening).
- Consider flowing up, instead of down, with a master stream.
- Use a broken stream to flow water on solar panel systems.

4. COORDINATED VENTILATION

- Forcing the front door (or any door) must be thought of as ventilation.
- Controlling the door limits the air and size of the fire. Consider door control prior to entry, after entry and for isolation.
- Know you are at increased risk when you are between where the fire is, where the fire wants to go, and you are without water or a door to close.
- Venting does not always lead to cooling. Well-timed and coordinated ventilation leads to improved conditions.
- Coordinating vertical ventilation with fire attack must occur just like coordinating horizontal ventilation with fire attack.
- Understand knee-wall fire dynamics. There may be a delay in fire growth.
- Positive pressure attack is exhaust dependent and so is extension into voids.

5. THERMAL IMAGERS AND BASEMENT FIRES

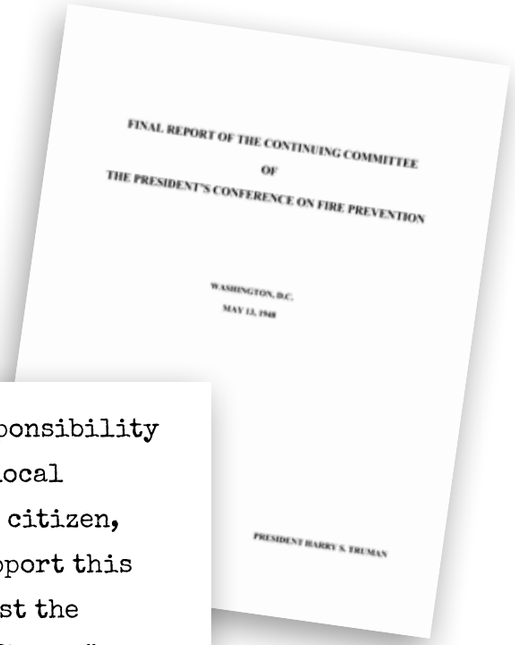
- Thermal imagers provide additional critical information regarding the source of heat.
- Thermal imagers may help indicate there is a basement fire but can't be used to assess structural integrity from above.
- When encountering a basement fire, don't fall through or get caught in the flow path.

Steve Kerber, director of the UL Firefighter Safety Research Institute, has led research with the fire service in the areas of ventilation, fire suppression 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, MD, where he served at ranks up through deputy chief.

Revisiting History

Heritage documents highlight past approaches to health and safety

By Dr. JoEllen Kelly



> "It is the clear responsibility of every state and local official, and every citizen, to aggressively support this national war against the growing menace of fire ..."
>
> — Harry S. Truman

The rate and pace of change in the fire service over the past few years is staggering in terms of technological development, adaptation and adoption. Millennials joining the fire service don't know any other way of life and accept that technology begets new technology and, in general, we all benefit from this pace. But it wasn't always this way, and it's good to look back, if for no other reason than to be grateful for the abundance of what we now take for granted.

President Harry S. Truman asked representatives from state and municipal fire organizations to meet in May 1947 to discuss issues involving fire protection and fire prevention. The national fire toll had been noticeably rising since 1934, and 1946 was "the most destructive year in our recent history with a property loss of $561,487,000 ($7+ billion in 2017 dollars), an increase of 23 percent over 1945." The president exclaimed in his charge to the state representatives that this "large, unnecessary waste of lives and property can be reduced by an all-out nationwide effort."

FLSI 14 Public education must receive more resources and be championed as a critical fire and life safety program.

FLSI 15 Advocacy must be strengthened for the enforcement of codes and the installation of home sprinklers.

The President's Conference on Fire Prevention was an effort to reach universal objectives that would be accepted by the highest officials of the states and municipalities. The Conference's proposed laws and ordinances for fire prevention and protection were impressive, and most of the technology-driven recommendations can be found in the Research chapter of the report. Some of the topic areas will sound familiar: human behavior, shipboard firefighting, aviation, industrial firefighting, extinguishing equipment and wildland firefighting.

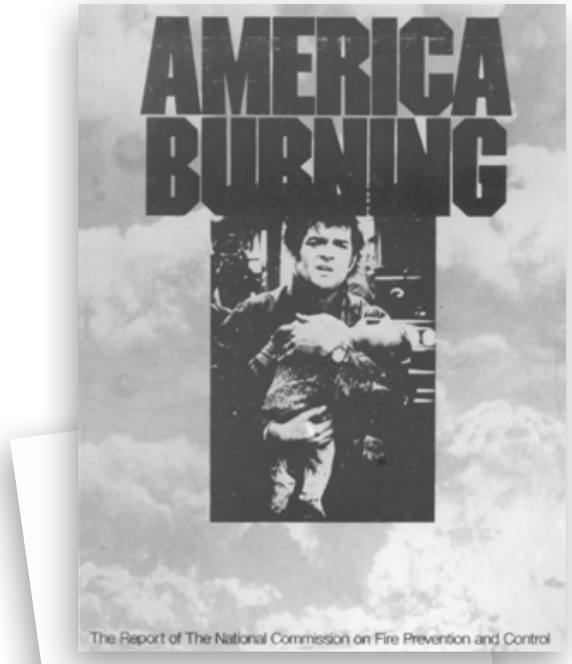
Remarkable progress occurred in the following 12 months. Thirty-four states established fire safety committees, and there were statewide conferences to consider the Action Plan of recommendations in 18 states. In addition, 510 cities reported "scores of diverse action" looking to greater fire safety, including the elimination of hazards, the passage of new ordinances, the procurement of new and improved equipment, radio installation and better training for firefighters. Many of the municipalities noted advances in training, for both paid and volunteer departments, and the adoption of automatic fire protection systems were also being advanced.

The Truman Report of 1947 established the framework between the federal government and the states/municipalities regarding fire prevention and protection that still exists, in large part, today.

Big-picture conferences and reports increased in frequency throughout the decades after Truman to deal with important fire prevention and protection issues reliant on technology. Many of these dealt with improved extinguishing capabilities, firefighter protective gear and the importance of training. But these paled in impact upon the publication of the America Burning conference proceedings (1973) and 29 years later, *America Burning, Recommissioned* (2002).

America Burning (the final report of the National Commission on Fire Prevention and Control) was commissioned during the presidency of Richard M. Nixon in 1971. In his charge to the Commission, Nixon noted that the fire problem in the United States was "almost always the result of human carelessness" and, thus, preventable. The "fire problem" in the United States was indeed prodigious, with an annual loss record over $20 billion (in 2017 dollars) and with a civilian death rate over 6,200.

The Report is the Commission's consideration of Nixon's statement and the frightening statistics on life and property loss. The 20 commissioners, four Congressional advisory members (two Congressmen and two Senators), plus witnesses produced a comprehensive report of 20 chapters and 90 recommendations. In presenting their findings, they noted: "We know our great Nation has the resources and technology presently available to lessen the destructive impact of fire. We believe a continuing federal focus on the fire problem is a necessity. It is the earnest hope of the members of this Commission that this report will provide helpful guidelines for local, state and national efforts to reduce the life and property loss by destructive fire in the United States."



This report and its subsequent update, *America Burning, Recommissioned*, should be considered as important foundation material for every rookie entering the fire service. *America Burning*, especially, is noteworthy for two things. The first is the acknowledgment that although fire-related issues are local, the federal government would have to do much of the heavy lifting to improve conditions in a comprehensive science-based manner. The states and municipalities tried hard, but these problems called for a federal response hence the recommendations for the U.S. Fire Administration, the National Fire Academy, and a national fire data collection system. *America Burning* viewed the Fire Administration as an entity to provide grants and technical advice to local fire agencies and departments, while the Fire Academy would provide training (at no cost) to firefighters across the country. In very short order, participation in the fire data collection system would be mandatory for federal grants.

The second trend noted in *America Burning* is its emphasis on technological advancement. The call for more research and development is everywhere, from the expansion of burn units across the country to improved firefighter protective gear and breathing apparatus to a much greater reliance on early warning systems, and the call for fully automated sprinkler system expansion. This is a report that calls for increased support by the allied federal agencies (such as the National Science Foundation and the National Institutes of Health) to assist in a greater understanding of the fire problem and suggestions for technology applications.

America Burning, Recommissioned is a look back at how the *America Burning* recommendations were implemented and included a review and, where necessary, a reinterpretation of the original recommendations. These heritage documents are important for many reasons, and there are dozens of others that could have been selected discussion. All of them allow us the great privilege of examining how people were thinking about fire-related problems in their day and time. In some cases, we can see both right- and wrong-road choices, but in many others, we see how prescient they were. And this review begs the question: What are we doing now and how will our efforts be evaluated in the years and decades to come?

Dr. JoEllen Kelly is a project manager for the NFFF. In this capacity, she is the administrator of the Vulnerability Assessment Program, a free online survey that helps fire departments improve policies to avoid line-of-duty deaths. Dr. Kelly is the author of *American Firefighter* (Rizzoli, 2017).

ACCOUNTABILITY

Individual and organizational roles and responsibilities

By Steve Prziborowski

Photo by Scott LaPrade

Are we in the fire service doing what we can to ensure that the next generation of firefighters receives the benefits of what we have learned, sometimes the hard way? Is your training cadre talking about accountability and responsibility in relationship to firefighter health and safety? Whose responsibility is it to act on FLSI #2?

Generally speaking, approximately the same number of firefighters are suffering LODDs each year, not to mention the countless firefighters who are also injured while on duty. Further, most firefighters who die in the line of duty are not making a rescue or saving a savable life.

The Phoenix Fire Department created the following rules of engagement for fire service personnel to consider:

- We WILL risk our lives a lot, in a calculated manner, to save SAVABLE lives.
- We WILL risk our lives a little, in a calculated manner, to save SAVABLE property.
- We WILL NOT risk our lives at all for lives or property that are already lost.

There are many in the fire service who disagree with the last point. I understand that we all signed up to serve in a dangerous profession, and that getting injured or losing our life may be an unfortunate consequence at some point, but there needs to be a balance.

Having closely examined the root causes and contributing factors of LODDs and injuries, it is clear to me that the responsibility to enhance the health and safety of the fire service is on two levels: individual and organizational. Below are some actions you can take to improve safety by enhancing your personal accountability and the accountability of your organization.

Individual Roles and Responsibilities

Learn from history: Subscribe to the NIOSH reports; read the injury reports from the NFPA; attend conferences to form your own opinions based on the information presented.

Avoid complacency and assumptions: Don't allow peer pressure to stop you from speaking up. This can be tough, because nobody wants to feel like the outcast or the one who is different from the group, but it is critical that you speak up for the safety of yourself and your fellow firefighters. Further, don't always assume your instructors, officers and fellow firefighters are doing the safest things: They are human and can make mistakes and even choose to do things incorrectly or inappropriately. While your role as a firefighter is to be a follower (and also a leader at certain times), you cannot go into battle with blinders on. Don't hesitate to say something (tactfully and respectfully) should you see something unsafe, illegal, unethical or just plain wrong. How would you like to have not said something after seeing a potentially life-threatening situation, and then have something tragic occur?

FLSI 2 Enhance the personal and organizational accountability for health and safety throughout the fire service.

Seek out information: Don't wait for your department or officer to provide all necessary knowledge, skills and abilities. Go out and seek it and be a continuous, lifelong learner. Read fire service publications to stay up-to-date and informed through articles that focus on these critical issues, such as Chief Billy Goldfeder's Close Calls column. Attend the National Fire Academy; it's free! With the Internet and social media, we have access to lots of information. The key is sifting through what is reliable, relevant and accurate. And don't forget to network with other fire service professionals while at conferences or classes, and even through social media.

Organizational Roles and Responsibilities

Be the designated adult: As a fire officer, you are a supervisor, also known as a boss. Like it or not, that's your job. Being the designated adult means saying no, stop it or get out, and even providing coaching, counseling or discipline to your crewmembers, all at the right times and for the right reasons. I get it; it's not fun being the supervisor. But if you choose to not be the designated adult, while it's true your crew may "like" you more, you are, in essence, enabling them and encouraging them to continue with the inappropriate, unsafe or unethical behavior that you should have said no to in the first place.

Lead by example: This can be tough for some. It's one thing to talk the talk; it's another thing to walk the walk. In the fire service, we expect our firefighters and company officers to wear their full PPE on scene of a structure fire. As such, chiefs and ICs must follow the same guidelines, setting the example for the rest of the crew.

Train correctly and regularly: Sometimes there are more challenges or excuses than reasons to train—days that end in "y," for example, or a sporting event on TV. Maybe it's too hot, too cold, too late, too early, too wet, etc. A fire officer can have the best of intentions, but all it takes is one person to raise their hand with a reason why not to train, and it can spread like wildfire. As busy as your day may be, carving out a couple of hours of training will be time well spent. And it doesn't have to be all in one shot; 20 minutes here or there is great. As an officer, if your crews hate you for the rest of your life for making them train when they didn't want to, so be it. At least you can live with yourself for doing what you could to make them be the best they could be when the bell goes off. More importantly, train like it's the real thing. Wear your full PPE in training as you would during the big one. Train on throwing ladders and pulling hose the exact same way as you would do at a real incident. This helps build muscle memory.

Don't settle for mediocrity: It's easy to let mediocrity settle in, especially if you don't want to be the "bad guy" or "bad gal." Let's say you're practicing donning an SCBA for time, and the time standard is 60 seconds. Your firefighter does it in 61 seconds. Do you make them do it again until they get it right or let them slide because "it's just practice"? The easy answer is they need to do it again until they get it correct. Yes, they may hate you for making them do it again, but practice makes perfect, and builds good habits and a solid foundation.

In sum

We often throw around words and phrases such as "Never forget," "brotherhood" and "sisterhood," but do we truly understand their meaning and importance? If we truly care about our brothers and sisters, and especially about those who have died in the line of duty, we will do what we can to ensure we don't let the same mistakes happen twice, and that we learn from history so that history doesn't repeat itself.

Steve Prziborowski is the deputy chief of administrative services for the Santa Clara County Fire Department in Los Gatos, CA. He is an instructor for the Chabot College (Hayward, CA) Fire Technology Program and was named the 2008 California Fire Instructor of the year. He is a state-certified chief officer and master instructor, and has Commission on Professional Credentialing chief fire officer and chief training officer designation.

OFFICER DEVELOPMENT

Climbing the ladder one rung at a time

By John Tippett

Photo courtesy Jerry Morrison/ Charleston Fire Department

Over the past few years, a strong emphasis has been placed on the role of the company officer. The NFFF recognized that a comprehensive officer development program in the Charleston, SC, Fire Department was an integral part of the rebuilding effort after the Sofa Super Store Fire tragedy.

In 2010, the NFFF partnered with the department to deliver a course to prepare engineers for advancement to the rank of captain. The initial course delivery was to 17 newly promoted captains and three incumbent captains. The feedback from this training was overwhelmingly positive, and the response sparked interest among the incumbent officer cadre. It was then decided to have the entire officer cadre (assistant chiefs, battalion chiefs and captains) go through the course. From that point on, all engineers promoting to captain now attend 80 hours of instruction prior to being able to act as a captain.

While company officers serve as the backbone of a fire department, the battalion chief (or similar rank) is the hub of the wheel that keeps the department rolling. Given the function of a hub—a central structure that connects peripheral parts to work in unison—the battalion chief is critical to a fire department's success. Furthering the likelihood of success most appropriately centers on preparing people in advance of receiving their first set of crossed trumpets.

Incumbent battalion chiefs frequently commented that a similar course to the one offered for aspiring captains was needed to prepare them for the complexity of becoming a battalion chief. The incumbent battalion chiefs rightly observed that the transition from captain to battalion chief was every bit as dynamic as firefighter to captain. As such, a survey was circulated among the incumbents seeking input on what the course, colloquially dubbed "Officer Development Course II (ODC II)," would look like. A course syllabus was developed based on this input, along with specific learning objectives that emerged from senior staff interactions with department members, response partners, other government agencies and the public. The NFFF again demonstrated its long-term commitment to the fire department by helping to make this training a reality.

Battalion-Level Reading List

In addition to the 40 hours of instruction, attendees were required to write a short research paper from a provided reading list to demonstrate their ability to apply introspective analysis. The texts selected for the course:

- "Everybody Matters" by Bob Chapman
- "The 21 Indispensable Qualities of a Leader" by John Maxwell
- "Evidence-Based Practices for Strategic and Tactical Firefighting," a synopsis of the fire behavior studies conducted by UL and NIST

The initial delivery of this training was for 32 attendees consisting of acting battalion chiefs, incumbent battalion chiefs and assistant chiefs, as well as five attendees from two of the automatic aid response partners. ODC II was designed to promote critical-thinking skills needed by a battalion chief. The course format was a mix of information delivery, individual and group discussion, and constructive feedback. The delivery culminated with a full day of scenario-based incident command training, divided between the department's command training simulation lab and a mock three-dimensional incident involving crews and apparatus arranged in the early stages of a fire incident at a nearby commercial occupancy.

The course syllabus highlighted topics deemed necessary for a battalion chief to function successfully from the first day of promotion. Among the topics covered:

- Presentations by various city agencies to explain the agency's role in serving the city and its interwoven relationship with other departments
- Legal aspects of being a battalion chief and progressive discipline
- Leadership quotient case study
- Leadership and influence
- The influence of birth order, generation and leadership strategies related to battalion-level management in the 21st century
- Managing complex incidents
- Tactical worksheet shorthand
- Incident management practical exercises

Giving officers the tools they need before they take on new responsibilities is empowering to the individual, and serves to strengthen the department's overall value to the community it serves and its members.

If you would like more information about the Charleston Fire Department's officer development courses, please email tippettj@charleston-sc.gov.

John Tippett, CFO, FIFireE, is the interim chief for the Charleston, SC, Fire Department. He has been with the CFD since 2009, serving as deputy chief of operations until his appointment as interim chief. Tippett previously spent 33 years with Montgomery County, MD, Fire and Rescue. He has extensive experience as a company officer, operations battalion chief, safety officer, instructor and chief officer. Tippett has worked extensively on national firefighter safety initiatives, including introducing crew resource management to the fire service and the National Fire Fighter Near-Miss Reporting System.

Photo by Jeff Hall

WILDLAND FIREFIGHTING

Research offers valuable data on the health of wildland firefighters

By Joe Domitrovich and Joe Sol

Wildland firefighting is one of the few occupations that intrinsically requires components of strength and endurance for strenuous labor over long durations. Research pertaining to the occupation has largely focused on the equipment used and fire behavior studies. However, over the last 50 years, research and interest in the human aspects of wildland firefighting have increased. Understanding human performance in the wildland firefighting discipline is essential to operating safely and effectively in these complex, high-risk environments. Two specific areas of human performance studied are nutrition related to calorie expenditure and the impact of smoke exposure.

More than 500 wildland firefighters have been monitored by researchers working for the National Technology and Development Program (NTDP) in an attempt to define the occupational demand and obtain a profile of occupational exposure. Firefighters engaged in wildfire suppression activities have been outfitted with several small, modern physiological monitors since May 2013. More than 60 tasks were identified in trying to categorize activities on the line.

FLSI 6 Develop and implement national medical and physical fitness standards that are equally applicable to all firefighters, based on the duties they are expected to perform.

Findings from these studies revealed the volume of physical and mental stress wildland firefighters manage throughout the fire season. Based on this research, we are able to offer some health-focused recommendations to benefit wildland firefighters throughout their careers.

Calorie expenditure

Calorie expenditure was quickly identified as one of the key components of wildland firefighting. Performing physical tasks such as hiking hills and digging firelines, compounded by the weight of equipment and high ambient temperatures, contributed to high physical demands and higher core body temperatures. All of these exertions and environmental influences led to high caloric use by the firefighters being studied.

In terms of energy expenditure, only 30 percent of the energy used in a muscle contraction is used for the force of contraction, while 70 percent of the energy is released as heat. As such, physical work results in heat production. Adding to the output demand is the average pack weight (excluding tool weight) of 35–51 pounds. Under this load, hiking into the fire in the morning showcased some of the highest physical demands in firefighting. During this high-demand activity, firefighters' body temperatures reached 102 degrees F in a large number of cases, indicating a high energy expenditure.

Smoke exposure

Wildland firefighters are exposed to high levels of smoke with no respiratory protection during suppression activities and conducting prescribed fires. The smoke emitted produces large amounts of air pollutants known to cause adverse health effects. Previous studies of wildland firefighters have shown smoke exposure is associated with increases in airway irritation, decreases in lung function and a significant increase in inflammation markers in the body. Past assessments of wildland fire smoke have recorded measurable levels of fine and respirable particulate matter (PM2.5–PM4), including acrolein, benzene, carbon dioxide, carbon monoxide, formaldehyde, crystalline silica, total particulates, and polycyclic aromatic hydrocarbons (PAHs). Each of these irritants are linked to cancer.

Focusing on the human aspect of the wildland firefighter risk–whether it be malnutrition, heat stress, smoke, or other bodily harm–can aid in the effort to make sure the wildland firefighter goes home after each assignment.

Depending on activity and environment, recovery rarely allows firefighters to return to a normal temperature for the next few hours of the work shift. During that time, firefighters display a diminished margin of error in battling the heat, while they battle many other margins of error on the fire.

Due to these long shifts and variable tasks, wildland firefighters can burn 2,800–6,200 calories per day. This calorie burn also includes a higher-than-normal dehydration rate due to sweating. Workload, work focus and shift durations make it difficult for wildland firefighters to find the time for consuming the quantity of food necessary to maintain an energy balance equal to the calories burned and fluid uptake to offset what is lost through perspiration. One strategy for maintaining energy balance is to have firefighters eat smaller amounts of food more frequently (4–10 eating episodes consisting of 200–400 calories each) throughout the day, in addition to meals pre- and post-shift.

The hydration component can also be addressed through increased emphasis on fluid uptake that includes alternating plain water and diluted electrolyte regimen throughout the time in the field.

Studies conducted by the University of Montana showed that eating these frequent, small amounts of food throughout the day maintains normal blood glucose levels and prevents a decrease in work production at the end of the work shift due to fatigue.

The current issued sack lunch can be modified to fulfill this conclusion. A typical luncheon meat sandwich is around 500–600 calories. By cutting the sandwich into smaller sections, the multiple eating episodes recommended can be achieved.

Smoke inhalation is just as much a safety concern for wildland firefighters as it is for their structural firefighting counterparts. Impaired performance and health impacts (short and long) are real threats to the wildland firefighter's longevity. This exposure, typically consisting of short-term peak exposures with relatively low average values seen throughout the shift, should not be ignored as a threat to the wildland firefighter.

In sum

The research collected provides essential perspective on the impact of the wildland firefighter's long-duration work physiology, energy expenditure, energy replacement needs and strategy, hydration requirements, and hazardous exposure. Risks will continue to be present in the occupation. However, focusing on the human aspects of the wildland firefighter risk–whether it be malnutrition, heat stress, smoke, or other bodily harm–can aid in the effort to make sure the wildland firefighter goes home after each assignment.

Joe Domitrovich is an exercise physiologist at the National Technology and Development Program in Missoula, MT. His work includes hydration, nutrition, employee health, stress, and fitness testing. He also is a wildland firefighter. Domitrovich has a bachelor's degree in kinesiology, a master's degree in exercise physiology and an interdisciplinary studies PhD with an emphasis in exercise science.

Joe Sol earned his bachelor's and master's degree at the University of Montana in Missoula, MT. While going to school, he spent each summer as a crewmember on both Type II and Hotshot crews. Starting in 2013, he began working with the National Technology and Development Program working on a multitude of projects relating to wildland firefighter health and safety.

TIME TO TAKE ACTION

Photo by Emily Thomas

This 2017 Fire Service Health and Safety Report provides information on the resources available through the NFFF's Everyone Goes Home® program. With gratitude to our partner organizations, our subject-matter experts and our funding partners, we encourage you to use this checklist as a reference to further engage in the 16 Firefighter Life Safety Initiatives on a personal level and departmental level. Share this supplement, and in particular this checklist, with your crew, your training department, your safety department and your chief officers to play an active and proactive role to ensure that Everyone Goes Home®.

HEALTH AND SAFETY REPORT CHECKLIST

- ❑ **Stay Connected:** Stay informed on Facebook facebook.com/EveryoneGoesHome/ and on Twitter @EGH_Programs.
- ❑ **16 Firefighter Life Safety Initiatives:** Review the resources available for each of the 16 FLSIs on everyonegoeshome.com.
- ❑ **Everyone Goes Home® Advocates:** Contact your state advocate and learn how you can get involved.
- ❑ **Vulnerability Assessment Program (VAP):** Complete the VAP, an online risk assessment tool a fire department can use to identify vulnerabilities that could lead to a firefighter injury or fatality. Visit firevap.org for more information.
- ❑ **International First Responder Seatbelt Pledge:** The seatbelt pledge has been signed by more than 150,000 first responders, including 850 departments. Visit seatbeltpledge.com for more information.
- ❑ **Cardiac:** Don't wait until January 1 to make resolutions related to your health. Schedule an appointment with a physician and reclaim your health. Ask your family to help by eliminating unhealthy food from your home and stock it with fresh fruit, vegetables, low-fat proteins and whole grains.
- ❑ **Cancer:** Use baby wipes or similar products to remove soot and particles from your PPE and body immediately after a fire. Don't put your dirty gear and PPE in your personal vehicle with the risk of exposures to toxins to you and your family.
- ❑ **Behavioral Health:** Save PocketPeer.org on your phone for when you or a friend may need it.
- ❑ **Fire Hero Learning Network:** Register on fireherolearningnetwork.com to access free virtual training courses.
- ❑ **ACT NOW:** ACT is an acronym with three steps to support a colleague's behavioral health: Ask how someone is feeling, show the person that you Care about their well-being and Take them to get help if needed. Visit everyonegoeshome.com/2017/02/08/prevent-firefighter-suicides to download a poster.
- ❑ **Technology:** Read the *Truman Report on the National Conference on Fire Prevention*, *America Burning* and *America Burning, Recommissioned* (all available online).

ACT Now!
Ask. Care. Take.

Consider

...calling him today.

...asking how she is doing after that call.

...grabbing a cup of coffee with him after your shift.

...encouraging him to get some help or support.

Photographer: John M. Buckman III

ACT Now! Ask. Care. Take.

PocketPeer.org | EveryoneGoesHome.com | National Suicide Prevention Lifeline

1-800-273-TALK (8255)