U.S. Fire Administration

Working for a fire-safe America

Firefighter Fatalities in the United States in 2017

September 2018

FEMA

Firefighter Fatalities in the United States in 2017

Prepared by
U.S. Department of Homeland Security
Federal Emergency Management Agency
U.S. Fire Administration
National Fire Data Center
and
The National Fallen Firefighters Foundation
https://www.firehero.org

In memory of all firefighters
who answered their last call in 2017.

To their families and friends.

To their service and sacrifice.

Mission Statement

We provide national leadership to foster a solid foundation for our fire and emergency services stakeholders in prevention, preparedness and response.

U.S. Fire Administration

Working for a fire-safe America

Table of Contents

Photo/Mark A. Whitney

Acknowledgments

This study of firefighter fatalities would not have been possible without the cooperation and assistance of many members of the fire service across the United States. Members of individual fire departments; chief fire officers; wildland fire service organizations, such as the U.S. Forest Service, the National Park Service, the Bureau of Land Management, the Bureau of Indian Affairs, the U.S. Fish and Wildlife Service; as well as the U.S. Department of Justice, the National Fire Protection Association, and many others, contributed important information to this report.

The National Fallen Firefighters Foundation was responsible for compilation of a large portion of the information used in this report. Their cooperation and work toward reducing firefighter deaths is gratefully acknowledged.

The ultimate objective of this effort is to reduce the number of firefighter deaths through an increased awareness and understanding of their causes and how they can be prevented. Firefighting, rescue and other types of emergency operations are essential activities in an inherently dangerous profession, and unfortunate tragedies do occur. These are the risks that all firefighters accept every time they respond to an emergency incident. However, the risks can be greatly reduced through efforts to improve training, emergency scene operations, and firefighter health and safety.

Background

For 41 years, the U.S. Fire Administration (USFA) has tracked the number of firefighter fatalities and conducted an annual analysis. Through the collection of information on the causes of firefighter deaths, the USFA is able to focus on specific problems and direct efforts toward finding solutions to reduce the number of firefighter fatalities in the future. This information is also used to measure the effectiveness of current programs directed toward firefighter health and safety.

Several programs have been funded by the USFA in response to this annual report. For example, the USFA has sponsored significant work in the areas of general emergency vehicle operations safety, fire department tanker/tender operations safety, firefighter incident scene rehabilitation, and roadside incident safety. The data developed for this report are also widely used in other firefighter fatality prevention efforts.

In addition to performing this analysis, the USFA, working in partnership with the National Fallen Firefighters Foundation (NFFF), develops a list of all on-duty firefighter fatalities and associated documentation each year. If certain criteria are met, the fallen firefighter's next of kin, as well as members of the individual's fire department, are invited to the annual National Fallen Firefighters Memorial Service. The service is held at the National Emergency Training Center (NETC) in Emmitsburg, Maryland, during Fire Prevention Week in October of each year. The 37th Annual National Fallen Firefighters Memorial Weekend will be held Oct. 6 and 7, 2018. Additional information regarding the memorial service can be found at https://www.firehero.org, or by calling the NFFF at 301-447-1365.

Other resources and information regarding firefighter fatalities, including current fatality notices, the National Fallen Firefighters Memorial database, and links to the Public Safety Officers' Benefits (PSOB) Program, can be found at https://apps.usfa.fema.gov/firefighter-fatalities/.

Introduction

This report continues a series of annual studies began in 1986 by the USFA of on-duty firefighter fatalities in the U.S.

The specific objective of this study is to identify all on-duty firefighter fatalities that occurred in the U.S. and its territories in 2017 and to analyze the circumstances surrounding each occurrence. The study is intended to help identify approaches that could reduce the number of firefighter deaths in future years.

Who is a firefighter?

For the purpose of this study, the term "firefighter" covers all members of organized fire departments with assigned fire suppression duties in all 50 states; the District of Columbia; and the territories of Puerto Rico, the Virgin Islands, American Samoa, the commonwealth of the Northern Mariana Islands, and Guam. It includes career and volunteer firefighters; full-time public safety officers acting as firefighters; fire police; state, territory and federal government fire service personnel, including wildland firefighters; and privately employed firefighters, including employees of contract fire departments and trained members of industrial fire brigades, whether full-time or part-time. It also includes contract personnel working as firefighters, or assigned to work in direct support of fire service organizations (e.g., air-tanker crews).

Under this definition, the study includes not only local and municipal firefighters, but also seasonal and full-time employees of the U.S. Forest Service, the National Park Service, the Bureau of Land Management, the Bureau of Indian Affairs, the U.S. Fish and Wildlife Service, and state wildland agencies. The definition also includes prison inmates serving on firefighting crews; firefighters employed by other governmental agencies, such as the U.S. Department of Energy; military personnel performing assigned fire suppression activities; and civilian firefighters working at military installations.

What constitutes an on-duty fatality?

An on-duty fatality includes any injury or illness that was sustained while on-duty and proves fatal. The term "on-duty" refers to being involved in operations at the scene of an emergency, whether it is a fire or nonfire incident; responding to, or returning from, an incident; performing other officially assigned duties, such as training, maintenance, public education, inspection, investigations, court testimony or fundraising; and being on call, under orders or on standby duty (except at the individual's home or place of business). An individual who experiences a heart attack or other fatal injury at home, while he or she prepares to respond to an emergency, is considered on-duty when the response begins. A firefighter who becomes ill while performing fire department duties and suffers a heart attack shortly after arriving home (or at another location) may be considered on-duty since the inception of the heart attack occurred while the firefighter was on-duty.

On Dec. 15, 2003 the president of the U.S. signed the Hometown Heroes Survivors Benefit Act of 2003 into law. After being signed by the president, the act became Public Law 108-182. The law presumes that a heart attack or stroke is in the line of duty if the firefighter was engaged in nonroutine, stressful or strenuous physical activity while on-duty, and the firefighter became ill within 24 hours after engaging in such activity.

The full text of the law is available at https://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=108_cong_public_laws&docid=f:publ182.108.pdf.

The inclusion criteria for this study have been affected by this change in the law. Before Dec. 15, 2003, firefighters who became ill as the result of a heart attack or stroke after going off-duty needed to register a complaint of not feeling well while still on-duty in order to be included in this study. For firefighter fatalities after Dec. 15, 2003, firefighters will be included in this report if they became ill as the result of a heart attack or stroke within 24 hours of a training activity or emergency response. Firefighters who became ill after going off-duty, where the activities while on-duty were limited to tasks that did not involve physical or mental stress, will not be included.

A fatality may be caused directly by an accidental or intentional injury in either emergency or nonemergency circumstances, or it may be attributed to an occupationally related fatal illness. A common example of a fatal illness incurred on-duty is a heart attack. Fatalities attributed to occupational illnesses also include a communicable disease contracted while on-duty that proved fatal when the disease could be attributed to a documented occupational exposure.

Firefighter fatalities are included in this report even when death is considerably delayed after the original incident. When the incident and the death occur in different years, the analysis counts the fatality as having occurred in the year in which the incident took place.

There is no established mechanism for identifying fatalities that result from illnesses, such as cancer, that develop over long periods of time and may be related to occupational exposure to hazardous materials or toxic products of combustion. It has proved to be very difficult to provide a complete evaluation of an occupational illness as a causal factor in firefighter deaths due to the following limitations: the exposure of firefighters to toxic hazards is not sufficiently tracked; the often delayed long-term effects of such toxic hazard exposures; and the exposures firefighters may receive while off-duty.

Sources of initial notification

As an integral part of its ongoing program to collect and analyze fire data, the USFA solicits information on firefighter fatalities directly from the fire service and from a wide range of other sources. These sources include the PSOB program administered by the U.S. Department of Justice (DOJ), the National Institute for Occupational Safety and Health (NIOSH), the Occupational Safety and Health Administration, the U.S. Department of Defense, the National Interagency Fire Center, and other federal agencies.

The USFA receives notification of some deaths directly from fire departments, as well as from such fire service organizations as the International Association of Fire Chiefs, the International Association of Fire Fighters, the National Fire Protection Association (NFPA), the National Volunteer Fire Council, state fire marshals, state fire training organizations, other state and local organizations, fire service internet sites, news services, and fire service publications.

Procedure for including a fatality in the study

In most cases, after notification of a fatal incident, initial telephone contact is made with local authorities by the USFA to verify the incident, its location, the jurisdiction, and the fire department or agency involved. Further information about the deceased firefighter

and the incident may be obtained from the chief of the fire department, designee over the phone, or by other forms of data collection. After basic information is collected, a notice of the firefighter fatality is posted at the National Fallen Firefighters Memorial site in Emmitsburg, Maryland, as well as on the USFA website. A notice of the fatality is also transmitted by email to a large list of fire service organizations and fire service members.

Information that is routinely requested from fire departments that have experienced a fatality include National Fire Incident Reporting System (NFIRS)-1 (incident) and NFIRS-3 (fire service casualty) reports; the fire department's own incident and internal investigation reports; copies of death certificates and autopsy results; special investigative reports; law enforcement reports; photographs and diagrams; and newspaper or media accounts of the incident. Information on the incident may also be gathered from NFPA or NIOSH reports.

After obtaining this information, a determination is made as to whether the death qualifies as an on-duty firefighter fatality according to the previously described criteria. With the exception of firefighter deaths after Dec. 15, 2003, the same criteria were used for this study as in previous annual studies. Additional information may be requested by the USFA, either through follow-up with the fire department directly, from state vital records offices, or other agencies. The final determination as to whether a fatality qualifies as an on-duty death for inclusion in this statistical analysis is made by the USFA. The NFFF criteria as a line-of-duty death (LODD) for inclusion in the annual National Fallen Firefighters Memorial Service is made by the NFFF.

2017 Findings

Eighty-seven firefighters died while on-duty in 2017, four less than the revised 2016 total of 91. The 2017 total includes 16 firefighters who died under circumstances that were part of inclusion criteria changes resulting from the Hometown Heroes Survivors Benefit Act. When not including these fatalities for the purposes of a trend analysis, there were 71 non-Hometown Hero firefighter fatalities in 2017, tied (with 2012) for the third lowest annual total since the USFA began this study.

An analysis of multiyear firefighter fatality trends needs to acknowledge the changes from the December 2003 Hometown Heroes Survivors Benefit Act. Some graphs and charts in this report may not indicate the Hometown Heroes portion of the total. However, this does not diminish the sacrifices made by any firefighter who dies while on-duty, or the sacrifices made by his or her family and peers.

In the same light, when conducting multiyear comparisons of firefighter fatalities in this report, the losses resulting from the attacks on the World Trade Center in New York City on Sept. 11, 2001, are sometimes also set apart for illustrative purposes. This action is by no means a minimization of the supreme sacrifice made by these firefighters.

Figure 1. On-duty firefighter fatalities (1977-2017)

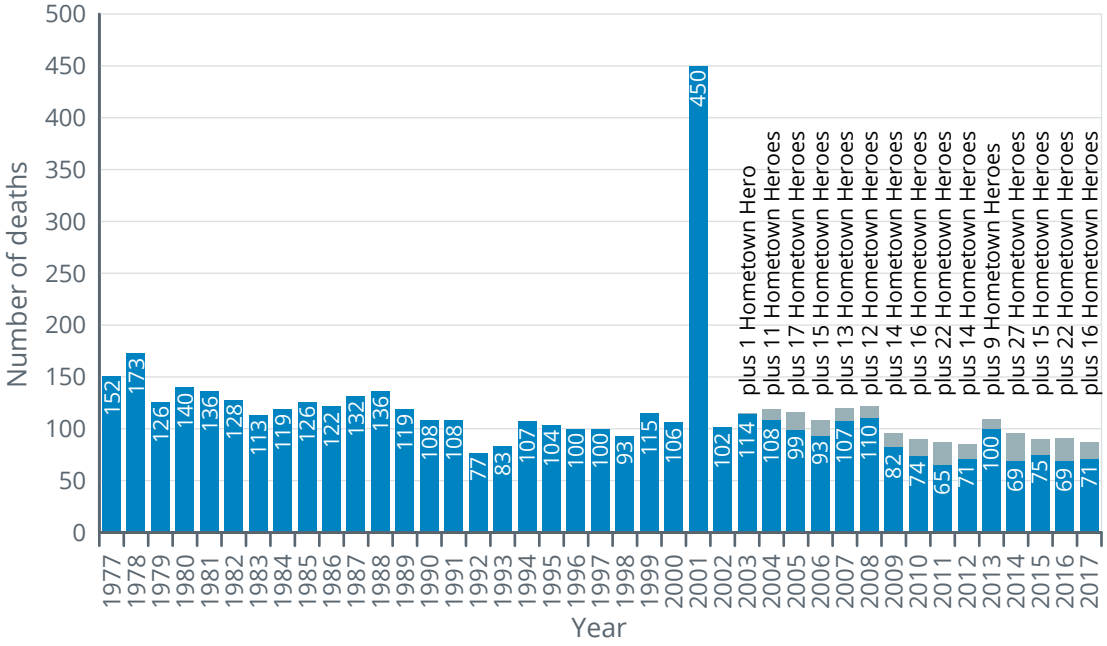
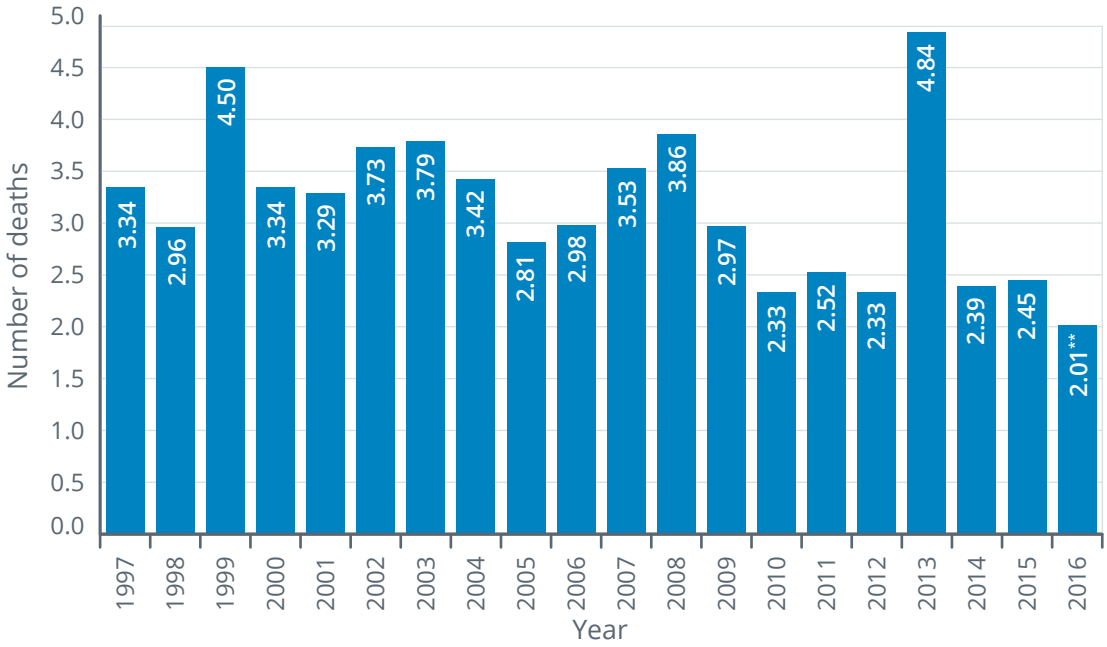


Figure 2. Firefighter fatalities per 100,000 fires* (1997-2016)



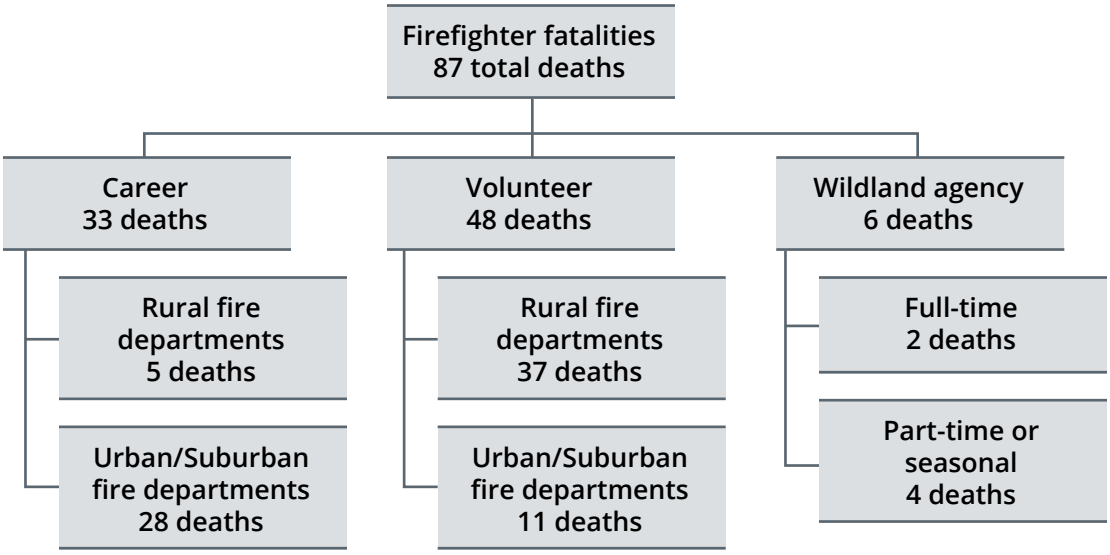
*NFPA

**The 2017 ratio will be included in the 2018 report.

Career, volunteer and wildland agency deaths

In 2017, firefighter fatalities included 33 career firefighters, 48 volunteer firefighters, and 6 part-time or full-time members of wildland or wildland contract fire agencies (Figure 3).

Figure 3. Career, volunteer and wildland agency deaths (2017)



Gender

Four firefighters who died while on-duty in 2017 were female and 83 were male.

Multiple firefighter fatality incidents

The 87 deaths in 2017 resulted from a total of 86 fatal incidents, including one multiple firefighter fatality incident taking the lives of two firefighters.

Table 1. Multiple firefighter fatality incidents

Year	Number of incidents	Total number of deaths
2017	1	2
2016	3	7
2015	3	7
2014	2	4
2013	4	34
2012	4	10
2011	3	6
2010	4	8
2009	6	13
2008	5	18

From 1990 to 2017, there have been 485 firefighters killed during activities involving brush, grass or wildland firefighting — an average of 17 deaths per year. There were an average of 12 such deaths per year over the past decade.

Wildland firefighting deaths

In 2017, 10 firefighters were killed during activities involving brush, grass or wildland firefighting. This total includes part-time and seasonal wildland firefighters, full-time wildland firefighters, and municipal or volunteer firefighters whose deaths are related to a wildland fire (Figure 4).

Figure 4. Firefighter fatalities related to wildland firefighting (2008-2017)

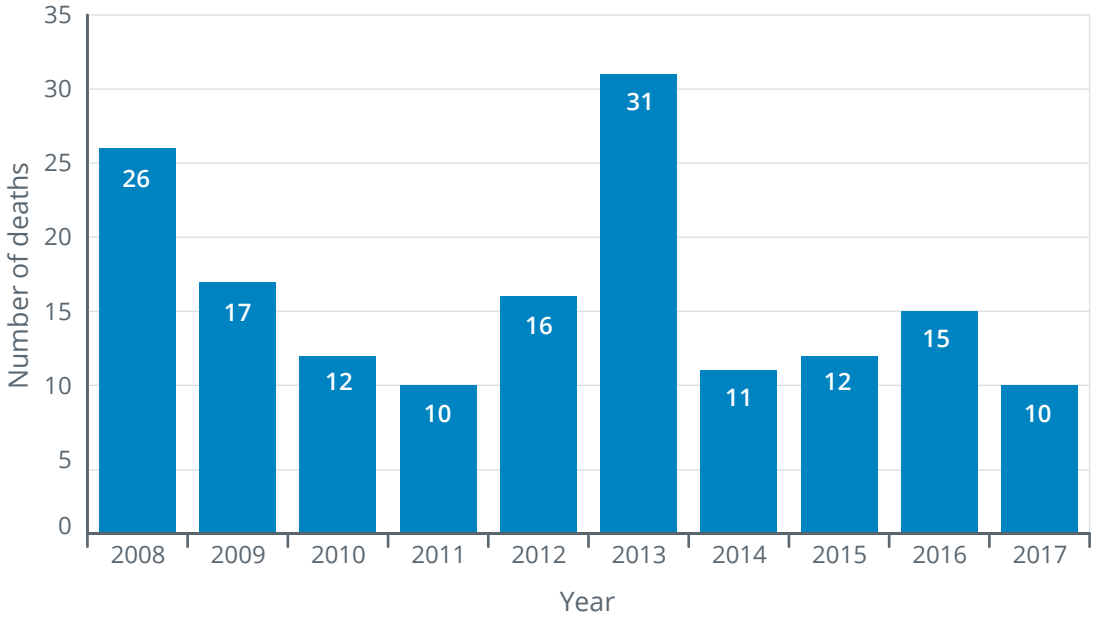


Table 2. Firefighter deaths associated with wildland firefighting (2008-2017)

Year	Total number of deaths	Number of fatal incidents	Number of firefighters killed in multiple-death incidents
2017	10	10	0
2016	15	13	4
2015	12	9	5
2014	11	11	0
2013	31	13	19
2012	16	12	6
2011	10	9	2
2010	12	12	0
2009	17	14	5
2008	26	15	14

Table 3. Wildland firefighting aircraft deaths (2008-2017)

Year	Total number of deaths	Number of fatal incidents
2017	0	0
2016	0	0
2015	2	1
2014	2	2
2013	0	0
2012	6	2
2011	0	0
2010	0	0
2009	5	3
2008	16	4

Despite a very active and virtually year-long fire season in 2017, there were no firefighter fatality incidents from an aircraft crash related to wildland firefighting.

Type of Duty

Activities related to emergency incidents resulted in the deaths of 40 firefighters in 2017 (Figure 5). This includes all firefighters who died responding to an emergency or at an emergency scene, returning from an emergency incident, and during other emergency-related activities. Nonemergency activities accounted for 47 fatalities. Nonemergency duties include training, administrative activities, performing other functions that are not related to an emergency incident, and post-incident fatalities where the illness or injury does not become evident until after the emergency.

A multiyear historical perspective relating to the percentage of firefighter deaths that occurred during emergency duty is presented in Table 4.

Figure 5. Firefighter deaths by type of duty (2017)

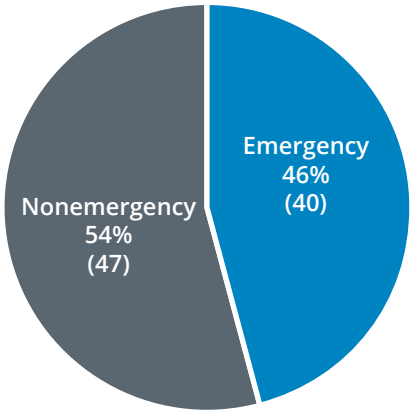


Table 4. Emergency duty firefighter deaths (2008-2017)

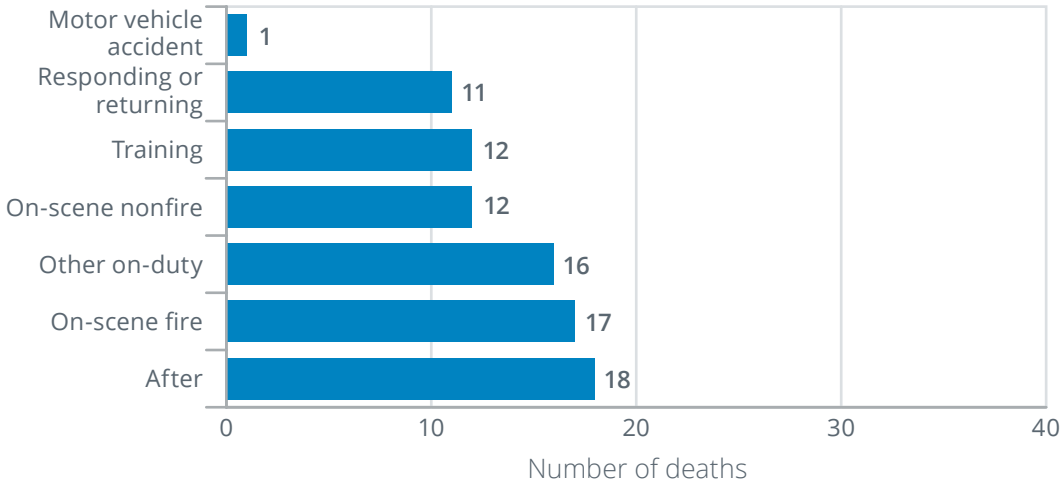
Year	Percentage of all deaths	Percentage of all deaths excluding Hometown Heroes
2017	46	56
2016	40	54
2015	49	59
2014	46	63
2013	73	77
2012	56	65
2011	54	70
2010	55	67
2009	63	82
2008	64	70

The number of deaths by type of duty being performed is shown in Table 5 and presented graphically in Figure 6 for 2017.

Table 5. Firefighter deaths by type of duty (2017)

Type of duty	Number of deaths
Motor vehicle accident	1
Responding or returning	11
Training	12
On-scene nonfire	12
Other on-duty	16
On-scene fire	17
After an incident	18
Total	87

Figure 6. Firefighter deaths by type of duty (2017)



Fireground operations

Seventeen firefighters experienced fatal injuries during fireground operations in 2017. Of these fatalities, 10 were at the scene of a structure fire, and seven were at the scene of a wildland or outside fire. The average age of the firefighters killed during fireground operations was 45, with the youngest being 19 years old and the oldest being 74 years old. Seven of those killed were volunteer, six were career and four were wildland firefighters. The nature of fatal injury while engaged in fireground operations for seven of the firefighter deaths was heart attack (41 percent). The nature of fatal injury for the other 10 deaths include: trauma (six), asphyxiation (two), and burns (two).

Type of fireground activity

Table 6 shows the types of fireground activities in which firefighters were engaged when they sustained their fatal injuries or illnesses. This total includes all firefighting duties on the fireground, such as wildland firefighting and structural firefighting.

Table 6. Type of fireground activity (2017)	
Support	1
Responding	1
Search and rescue	2
Incident command	2
Other	3
Water supply	4
Advance hoselines	4

Fixed property use for structural firefighting deaths

There were 10 fatalities in 2017 where firefighters became ill or injured while on the scene of a structure fire. Table 7 shows the distribution of these deaths by fixed property use.

Table 7. Structural firefighting deaths by fixed property use (2017)	
Residential	8
Commercial	1
Other	1

Responding/Returning

In 2017, 11 firefighters died or experienced an onset of symptoms while responding to or returning from 11 emergency incidents; six while responding to, and five while returning from an incident.

Table 8. Firefighter deaths while responding to or returning from an incident (2008-2017)

Year	Number of firefighter deaths
2017	11
2016	13
2015	8
2014	13
2013	14
2012	17
2011	11
2010	17
2009	15
2008	25

Training

In 2017, 12 firefighters died while engaged in training activities. Nine of the 12 firefighters died from heart attacks. There were two deaths from traumatic injuries: one from a fall and one from a vehicle crash. One firefighter died from a pulmonary embolism — categorized as "other" — which was directly attributed as a complication of a leg fracture suffered during live fire training.

For the 12 firefighters who died while engaged in training activities, three firefighters died while performing fire department mandated physical fitness training; one died while involved in an apparatus drill; one died in a vehicle crash while on-duty and en route to a paramedic training class; one died while engaged in an equipment drill; two died from live fire training; two died during self-contained breathing apparatus (SCBA) training; one died while engaged in wildland fire training; and one firefighter died after suffering a heart attack (death classified as "other") while participating in a search and rescue training exercise.

The average age of the 12 firefighters was 48 years old. The youngest was 29, and the oldest was 63.

Table 9. Firefighter fatalities while engaged in training (2008-2017)

Year	Number of firefighter deaths
2017	12
2016	9
2015	7
2014	9
2013	7
2012	8
2011	8
2010	12
2009	10
2008	12

Nonfire emergencies

In 2017, 12 firefighters were killed during emergency duties not related to fire. These response calls included eight motor vehicle accidents, two weather/natural disasters, one hazmat incident, and one wildland call for "wires down" (struck and killed by a privately-owned vehicle (POV) while at the scene). Eleven of the 12 firefighters died from traumatic injuries and one from a heart attack. Ten of the eleven traumatic injury deaths were from being struck by a vehicle, and one was from a vehicle collision involving fire apparatus. The average age was 57 years old. The youngest was 27, and the oldest was 83.

After the incident

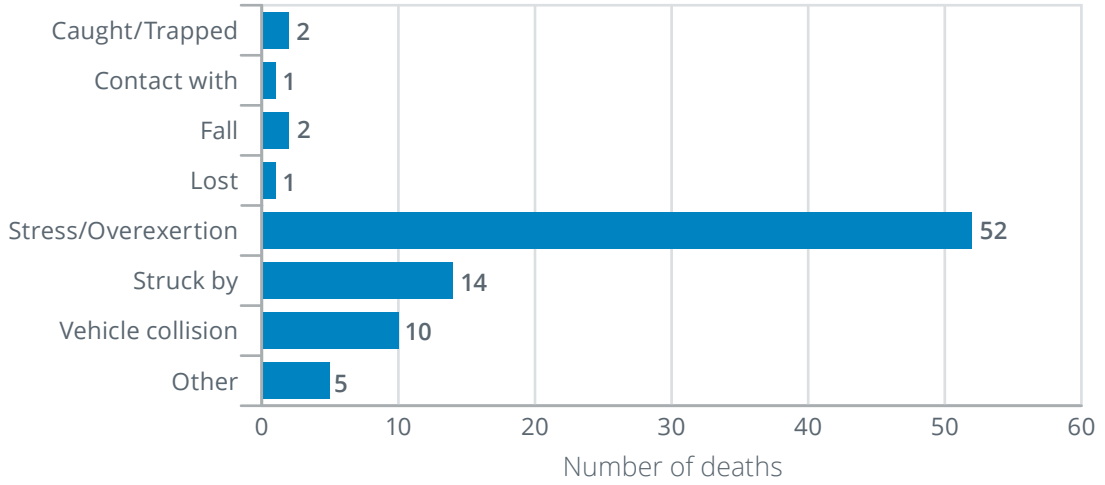
In 2017, 18 firefighters died after the conclusion of their on-duty activities. Of these fatalities, 15 deaths were from heart attacks. The nature of the fatal injury for the remaining three firefighters was not reported. The average age was 56 years old. The youngest firefighter was 38, and the oldest was 80. Sixteen deaths were classified as Hometown Heroes where no symptom or complaint of illness became evident or was reported during duty.

Cause of Fatal Injury

The term "cause of fatal injury" refers to the action, lack of action, or circumstances that directly resulted in the fatal injury. The term "nature of fatal injury" refers to the medical cause of the fatal injury or illness, which is often referred to as the physiological cause of death. A fatal injury is usually the result of a chain of events, the first of which is recorded as the cause.

Figure 7 shows the distribution of deaths by cause of fatal injury or illness in 2017.

Figure 7. Fatalities by cause of fatal injury (2017)



Caught or trapped

Being caught or trapped covers firefighters in wildland and structural fires who were unable to escape due to rapid fire progression and the byproducts of smoke, heat, toxic gas and flames. This classification may also include firefighters who drowned and those who were trapped and/or crushed.

In 2017, two firefighters died from being caught or trapped. One firefighter was killed while attempting to fill tankers at a wildland fire/scene, involving several local fire departments. The firefighter fell from the back of a firefighting apparatus as it was escaping from wind driven flames that had changed direction and burned over their location. Firefighters quickly returned to find him (a 74 year-old with almost 30 years of service) walking toward them, apparently badly injured. As they approached, the first inquiry from the firefighter was to ask about the condition of a second firefighter who was also hanging on to the truck and was injured, asking if the 35 year-old firefighter was okay. The firefighters were treated by fellow responders and transported to the hospital where the firefighter who had fallen from the truck later succumbed to his injuries. The second injured firefighter was subsequently released from the hospital.

The second firefighter killed from being caught or trapped was fighting some of the largest fires in California's history. He was part of a multiengine strike team, dispatched from San Diego. Details on this incident have not been released, pending a Cal Fire serious accident review.

Contact with

In 2017, one firefighter succumbed to injuries after suffering a chainsaw injury to the leg while working a fire. Fire crews were clearing brush and working with air crews to successfully defend a threatened mobile home park when the injury occurred.

Fall

Two firefighters were killed in 2017 from injuries sustained in a fall.

- One firefighter and members of his ladder truck, along with additional fire units, responded to an apartment fire on the second floor of a five-story apartment building. The firefighter, who was assigned as his unit's outside ventilation firefighter, was accessing the roof of the structure when he fell five stories. The firefighter was rushed to a medical center where he succumbed to his injuries.
- One firefighter fell from an aerial ladder while participating in a training exercise. Fellow firefighters and paramedics rendered immediate medical attention. The firefighter was in critical condition and was transported to a local trauma center where he died from his injuries two days later.

Lost or disoriented

One firefighter died in 2017 by becoming lost or disoriented inside of a burning structure. The firefighter and his ladder company were dispatched to the report of a structure fire in a strip mall shopping complex. Arriving firefighters found a working fire in a gym. The firefighter was assigned to conduct a search of the gym occupancy. After locating the fire and calling for a hoseline, conditions rapidly worsened and the firefighter became disoriented within the structure. As the structure began to collapse, all firefighters were ordered to exit the building, but the one firefighter who was lost was unable exit. Crews continued to battle the fire but, due to conditions, were unable to reach the lost firefighter. According to initial reports, another member of the initial search team was also trapped in the fire but was pulled to safety, along with an injured member of the Rapid Intervention Team.

Other

Five firefighters died in 2017 from causes of fatal injuries not previously categorized.

- One firefighter collapsed while battling a two-alarm house fire. The firefighter was transported to the hospital where he passed away. The nature and cause of fatal injury has not been reported.
- One firefighter responded, with his fire department, to a motor vehicle accident. The following morning, Emergency Medical Services (EMS) were summoned to his residence. The firefighter had indicated to one of his family members that he began feeling ill while at the motor vehicle accident the previous evening. The firefighter was treated and transported to the hospital where he passed away. The nature and cause of fatal injury has not been reported.

- While advancing a hoseline during mandatory live-burn training, one firefighter suffered a spiral fracture to his right fibula. A little over two weeks later, the firefighter's spouse contacted 911 from their residence. The firefighter was showing signs of severe respiratory difficulty. Upon the arrival of emergency responders, the firefighter stopped breathing and went into cardiac arrest. With EMS performing CPR, he was immediately transported to a local hospital. CPR was continued at the hospital and, after approximately 20 minutes, doctors pronounced him deceased. Autopsy results showed that he suffered a pulmonary embolism, which was directly attributed as a complication of his initial leg fracture and recovery process.
- One firefighter, during his normally scheduled shift, answered an emergency response call. Several hours later, while at home, the firefighter passed away. The nature and cause of his death has not been reported.
- While on duty at the fire station, one firefighter succumbed to complications from a medical condition. The nature and cause of fatal injury has not been reported.

Stress or overexertion

Firefighting is extremely strenuous work, and it can be one of the more physically demanding of human activities.

Stress or overexertion is a general category that includes all firefighter deaths that are cardiac or cerebrovascular in nature, such as heart attacks and strokes, as well as other events, such as extreme climatic thermal exposure. Classification of a firefighter fatality in this "cause of fatal injury category" does not necessarily indicate that a firefighter was in poor physical condition.

In 2017, 52 firefighters died as a result of stress or overexertion:

- Fifty firefighters died due to heart attacks.
- Two firefighters died due to cerebrovascular accident (CVA) — stroke.
- Fifteen were Hometown Heroes.

Table 10. Deaths caused by stress or overexertion (2008-2017)

Year	Number	Percent of fatalities	Hometown Heroes
2008	55	45	12
2009	52	55.3	12
2010	56	62.2	16
2011	54	62	21
2012	48	57.1	14
2013	39	36.1	9
2014	63	67	24
2015	60	66.7	15
2016	43	48.3	22
2017	52	59.8	15
10-year average	52	56	16

Struck by object

Being struck by an object was the second leading cause of fatal injuries for firefighters in 2017, resulting in 14 firefighter fatalities.

- On-scene where a dump truck got tangled in power lines, two firefighters were struck and killed by a hit-and-run driver while directing traffic. The driver of the vehicle was later apprehended by law enforcement.
- While directing traffic at the scene of a minor motor vehicle accident, one firefighter was struck by another vehicle.
- One firefighter, while outside of his vehicle checking water conditions during severe storms, was struck and killed by another vehicle on the highway.
- One firefighter died in the hospital several days after suffering a traumatic brain injury while at the scene of a working residential structure fire. According to initial reports, the firefighter was donning protective gear when the accident occurred. As other firefighters were setting up a hoseline, the fire hose snagged on a truck causing a coupling to strike the firefighter in the head and knock him to the ground. The firefighter was treated at the scene and was rushed to the hospital where a computed tomography (CT) scan showed he had suffered a stroke on the left side of his brain. The firefighter later underwent surgery, but succumbed to his injury.
- One firefighter was leading a crew to clear brush to contain a fire when a 120-foot tree uprooted and fell on him. The firefighter suffered major head, neck and back injuries. The remote location of the incident posed challenges for medical responders and before aeromedical crews could get to him, the firefighter passed away.
- At approximately 2230 hours, one firefighter responded with his township fire department to a reported motor vehicle accident on an interstate highway. Upon arrival, they found an empty vehicle and no injuries to report. As fire crews were getting ready to leave the scene, a passing motorist lost control of his vehicle and struck the firefighter, who was standing at the rear of his rescue vehicle returning equipment to service. Crews at the scene tried to revive him but were unsuccessful. The firefighter was pronounced dead at the scene.
- One firefighter was killed and another firefighter was injured when fire apparatus was struck by a POV. While working at the scene of a “wires down” call, a private vehicle crashed into the rear of another private vehicle that was stopped on the roadway behind a fire department vehicle. The fire department vehicle then struck the two nearby firefighters, trapping them underneath as it went down an embankment and stopped. One firefighter was pronounced deceased at the scene. The second firefighter, a 33-year-old, was flown to a medical center with critical injuries.
- While part of a 20-person crew that was staging an initial attack on a forest fire in Montana, one firefighter was struck by a falling tree. He was flown to a hospital for treatment but he passed away from the injuries he sustained when struck by the tree.
- One firefighter was struck by a passing vehicle while he was operating in the roadway at the scene of a single vehicle rollover. As firefighters were cleaning up the scene, the firefighter was walking with traffic in the westbound lanes when he was struck. The firefighter was rushed to a hospital where he succumbed to his injuries.

- One firefighter was struck and killed by a falling tree while working on the Lolo Peak fire in western Montana. The firefighter was given CPR and other emergency medical aid by fellow firefighters before being airlifted to a hospital. Despite all efforts, the firefighter passed away as a result of his injuries.

- One firefighter responded to a service call for a tree blocking the roadway. The firefighter's POV was parked behind the fire department's brush truck; a police department vehicle was also on the scene. All emergency vehicles had their lights activated. Just after midnight, a pickup truck, traveling eastbound on U.S. Highway 70, approached the scene and failed to stop. The vehicle first struck the firefighter, who was wearing his reflective gear, killing him instantly before crashing into the vehicles at the scene. The driver of the vehicle received injuries and spent the night in the hospital. The driver has since been charged by police with driving while impaired, driving without an operator's license, reckless driving, possession of marijuana and possession of drug paraphernalia.

- Shortly after arriving on the scene of a motor vehicle crash, one firefighter was struck and killed by a POV being operated by another firefighter who was responding to the same accident scene. The second firefighter, who was allegedly driving under the influence of alcohol, registering a blood alcohol level of 0.21 percent, was arrested and charged with operating a motor vehicle while intoxicated causing death, and reckless driving.

- One firefighter, a sworn officer with statewide jurisdiction, encountered a single-vehicle crash that was blocking the left lane of a busy interstate highway. He activated his flashers and he notified state police that he would be checking upon the welfare of the driver involved. While he and the driver were standing on the shoulder of the roadway, another driver swerved their vehicle to avoid the crash scene. The vehicle struck them both, throwing them over the jersey wall into the opposite lanes of travel. Both suffered fatal injuries.

Vehicle crashes

In 2017, a total of 10 firefighters — two career, seven volunteer, and one wildland — lost their lives due to vehicle crashes. Vehicle crashes were the third leading cause of fatal firefighter injuries for the year. Four deaths involved POVs, one death involved a fire department engine, three involved tankers (water tenders), one death involved fire apparatus of a type not reported to USFA, and one involved an EMS vehicle (nontransport). None of the vehicle crashes in 2017 involved an aircraft.

- One firefighter responded to a motor vehicle accident call reported at 1515 hours. Units cleared the scene at 1600 hours. Before making it back to their home, she and her husband, also a firefighter, were involved in a motor vehicle accident. The firefighter became entrapped and response personnel began resuscitation efforts. The firefighter was transported to the hospital but died as a result of her injuries shortly after arrival. The firefighter's husband was also seriously injured in the crash and was transported to the hospital.

- One firefighter was stopped on a highway in the department's rescue truck preparing to make a left-hand turn when she was struck from the rear by a tractor-trailer. The rescue unit was forced into oncoming traffic where the vehicle was struck again and forced off the roadway into trees lining the highway. Members of the firefighter's fire department

and surrounding agencies arrived on scene and began to treat the firefighter. She was then transported to a regional medical center where she succumbed to her injuries.

- While responding to a structure fire, one firefighter died from injuries sustained when he lost control of the fire apparatus he was driving and crashed. According to reports from the highway patrol, the vehicle rolled over one and a half times, ejecting and pinning the firefighter beneath the tanker. Seat restraints were installed in the vehicle but were not in use at the time of the crash.

- One firefighter succumbed to injuries sustained as a passenger in a fire department vehicle. After losing control on an ice and snow covered roadway, the vehicle crashed and came to rest on its top. The firefighter, who was reported to have not been wearing seat restraints, was ejected from the vehicle. Two other firefighters who were traveling in the vehicle at the time, all on their way to the state fire school, were reported to have been wearing seat restraints and received only minor injuries in the crash.

- One firefighter died from injuries sustained while responding to a multiple alarm row house fire which had confirmed civilian entrapment. The firefighter's POV was struck on the passenger side at a controlled intersection by a stolen vehicle, reportedly being operated by an intoxicated 19 year-old female who failed to stop. According to reports, the force of the accident sent the firefighter's vehicle through a fence and into a parking lot. The driver of the stolen vehicle fled the scene but was arrested later at the hospital by law enforcement.

- One firefighter was struck and killed by a piece of fire apparatus at the scene of a motor vehicle crash. Initial reports indicate that the firefighter was acting as a ground-guide while the apparatus was backing up to block the roadway and protect the scene.

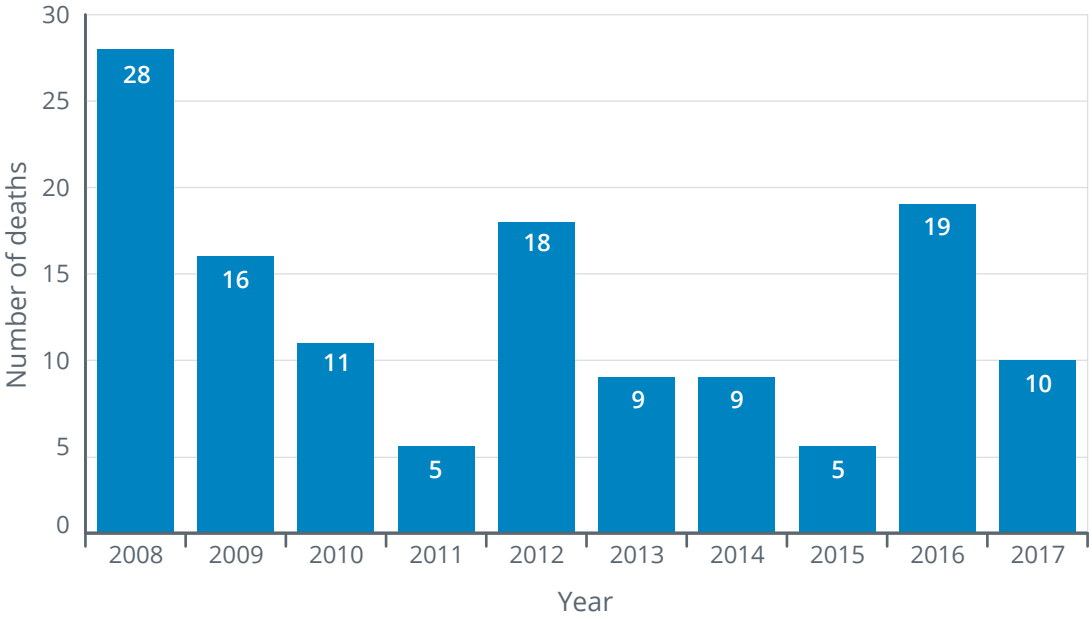
- One firefighter, responding to an outdoor (field) fire call, was operating the fire apparatus when it crashed. While negotiating a curve, the vehicle overturned several times, ejecting both the firefighter and a passenger. The firefighter died at the scene from injuries sustained. The passenger was treated and was flown to a hospital with serious injuries. Seat belts were not in use at the time of the crash.

- One firefighter was driving a fully loaded water tanker and was responding to the scene of a residential structure fire. The truck left the roadway and tipped over, sliding several yards before striking an embankment. At that point, the water tank came loose and crashed into the truck cab, causing the death of the firefighter.

- While returning from an assignment on the Railroad Fire in the Sierra National Forest, one firefighter was killed when a Ford F-350 — traveling in the opposite direction — suffered a tire failure, crossed the middle of the road, and struck the firefighter's vehicle head-on.

- One firefighter was killed while operating an empty 1993 Kenworth water tender (tanker). According to the highway patrol, the vehicle left the roadway on a curve and crashed through a guardrail down a ravine. The firefighter, who died at the scene, was working on the Nuns Fire burning in the hills above Oakville and was heading for a water resupply. The crash occurred near the bottom of a steep, winding section of roadway called the Oakville Grade. According to initial reports, at the time of the crash the roadway was open for fire operations only and no other vehicles were involved.

Figure 8. Firefighter fatalities in vehicle collisions (including aircraft) (2008-2017)



Nature of Fatal Injury

Figure 9 shows the distribution of the 87 firefighter deaths that occurred in 2017 by the medical nature of the fatal injury or illness. For heart attacks, Figure 10 shows the type of duty involved.

Figure 9. Fatalities by nature of fatal injury (2017)

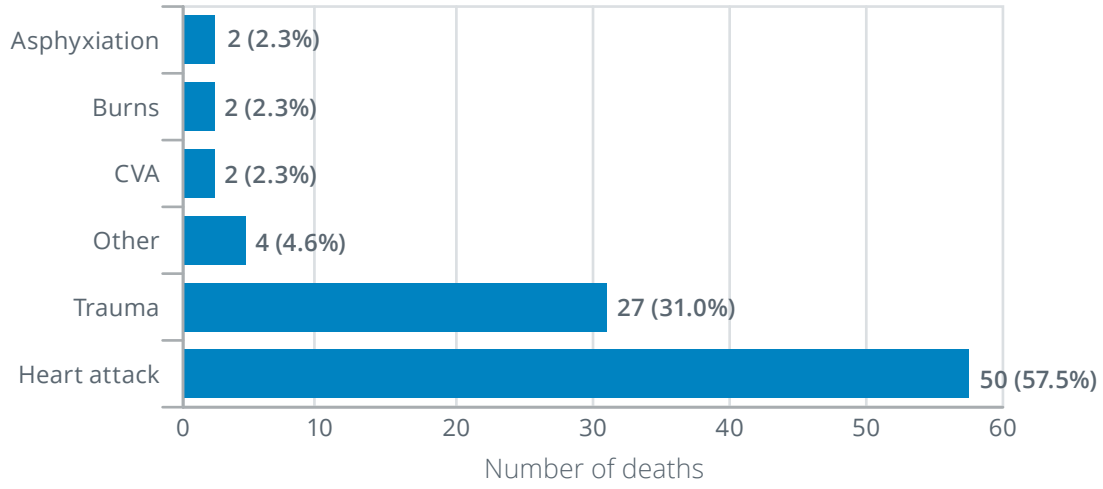
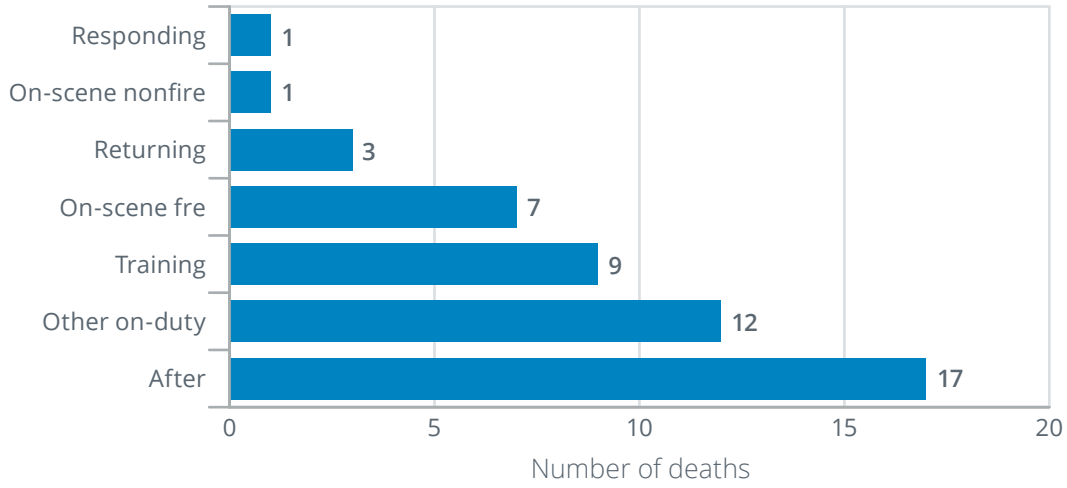


Figure 10. Heart attacks by type of duty (2017)



Firefighter Ages

Figure 11 shows the percentage distribution of firefighter deaths by age (at the time of injury) and nature of the fatal injury. Table 11 provides a count of firefighter fatalities by age and the nature of the fatal injury.

Younger firefighters were more likely to have died as a result of traumatic injuries, such as injuries from an apparatus accident or becoming caught or trapped during firefighting operations. Stress-related deaths are rare below the 31- to 35-years-of-age category and, when they occur, often include underlying medical conditions.

Figure 11. Fatalities by age and nature (2017)

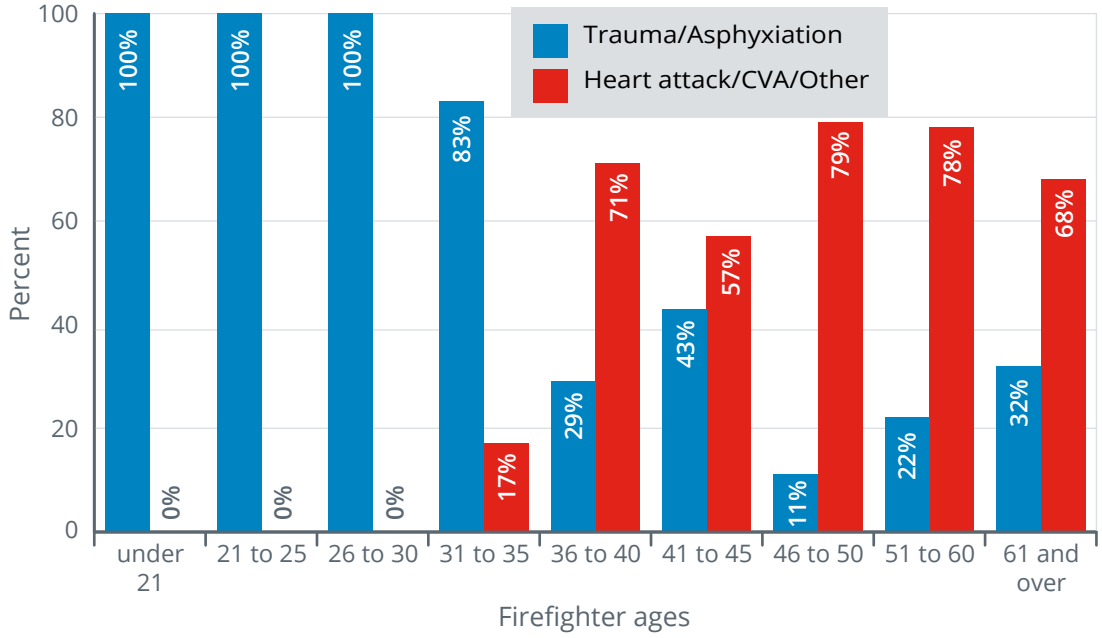


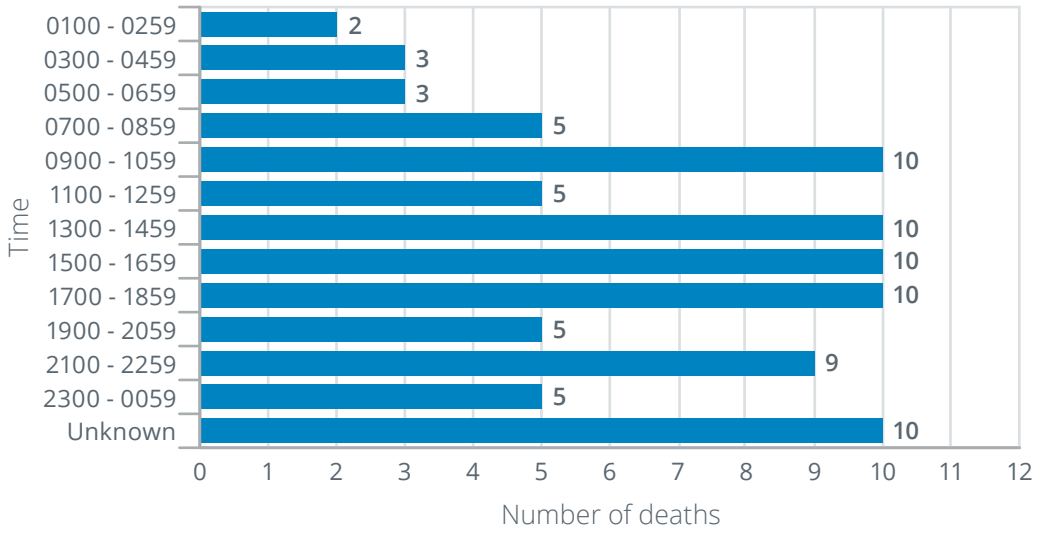
Table 11. Firefighter ages and nature of fatal injury (2017)

Age range	Heart attack/CVA/Other	Trauma/Asphyxiation
under 21	0	1
21 to 25	0	1
26 to 30	0	5
31 to 35	1	5
36 to 40	5	2
41 to 45	4	3
46 to 50	8	1
51 to 60	25	7
61 and over	13	6

Deaths by Time of Injury

For 2017, the distribution of firefighter deaths, according to the time of day when the fatal injury occurred, is illustrated in Figure 12. The time of fatal injury for 10 firefighters was either unknown or not reported.

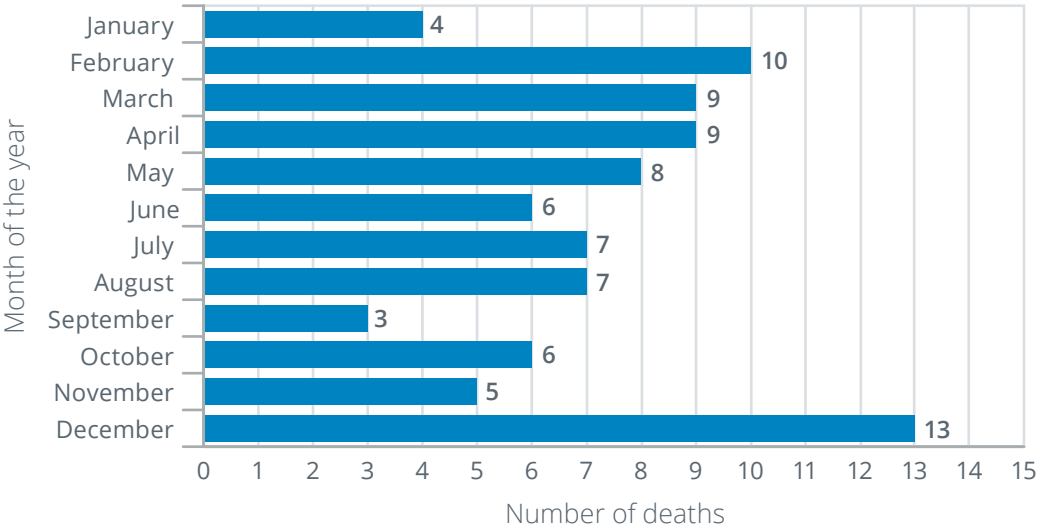
Figure 12. Fatalities by time of fatal injury (2017)



Firefighter Fatality Incidents by Month of Year

Figure 13 illustrates the 2017 firefighter fatalities by month of year.

Figure 13. Deaths by month of year (2017)



State and Region

The distribution of firefighter deaths in 2017 by state is shown in Table 12. Firefighters based in 33 states died in 2017.

The highest number of firefighter deaths in 2017 (based on the location of the fire service organization) occurred in California with 12 losses. New York had seven firefighter deaths, followed by Indiana and Texas with five firefighter deaths each. There were no other states with five or more firefighter fatalities for the year.

Table 12. Firefighter fatalities by state based on location of fire service (2017)*

State	Fatalities	Percentage
CA	12	13.8
NY	7	8.0
IN	5	5.7
TX	5	5.7
AL	4	4.6
NJ	4	4.6
GA	3	3.4
IA	3	3.4
MA	3	3.4
MI	3	3.4
MO	3	3.4
MS	3	3.4
PA	3	3.4
AR	2	2.3
FL	2	2.3
IL	2	2.3
KY	2	2.3
MD	2	2.3
MT	2	2.3
NC	2	2.3
OH	2	2.3
OK	2	2.3
KS	1	1.1
LA	1	1.1
MN	1	1.1
NM	1	1.1
OR	1	1.1
SC	1	1.1

*This list attributes the deaths according to the state in which the fire department or unit is based, as opposed to the state in which the death occurred. They are listed by those states for statistical purposes and for the National Fallen Firefighters Memorial at the NETC.

Table 12. Firefighter fatalities by state based on location of fire service (2017) — continued

State	Fatalities	Percentage
SD	1	1.1
VA	1	1.1
WA	1	1.1
WI	1	1.1
WY	1	1.1

Figure 14. Firefighter fatalities by region (2017)

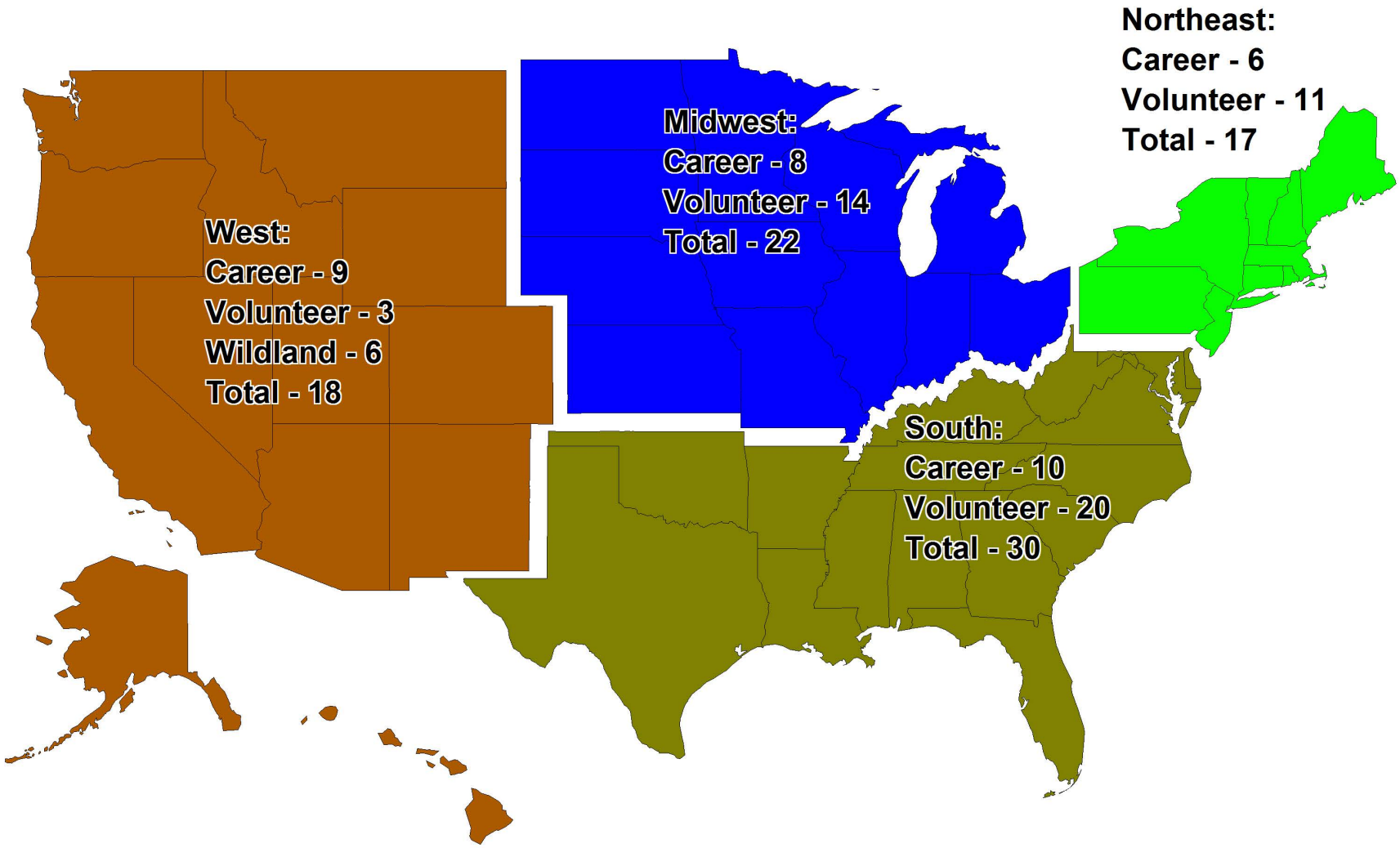


Figure 15. On-duty firefighter fatalities by fire department location (2017)

Figure 16. On-duty firefighter fatalities by incident location (2017)

Analysis of Urban/Suburban/Rural Patterns in Firefighter Fatalities

The U.S. Census Bureau defines "urban" as a place having a population of at least 2,500, or lying within a designated urban area. "Rural" is defined as any community that is not urban. "Suburban" is not a census term, but may be taken to refer to any place, urban or rural, that lies within a metropolitan area defined by the Census Bureau, but not within one of the central cities of that metropolitan area.

Fire department areas of responsibility do not always conform to the boundaries used by the Census Bureau. For example, fire departments organized by counties or special fire protection districts may have both urban and rural coverage areas. In such cases, where it may not be possible to characterize the entire coverage area of the fire department as rural or urban, firefighter deaths were listed as urban or rural based on the particular community or location in which the fatality occurred.

The following patterns were found for 2017 firefighter fatalities. These statistics are based on answers from the fire departments, and when no data from the departments were available, the data were based upon population and area served, as reported by the fire departments.

Table 13. Firefighter deaths by coverage area type (2017)

Urban/Suburban	Rural	Total
39	48	87

Appendix

Firefighter Fatality Inclusion Criteria — National Fire Service Organizations

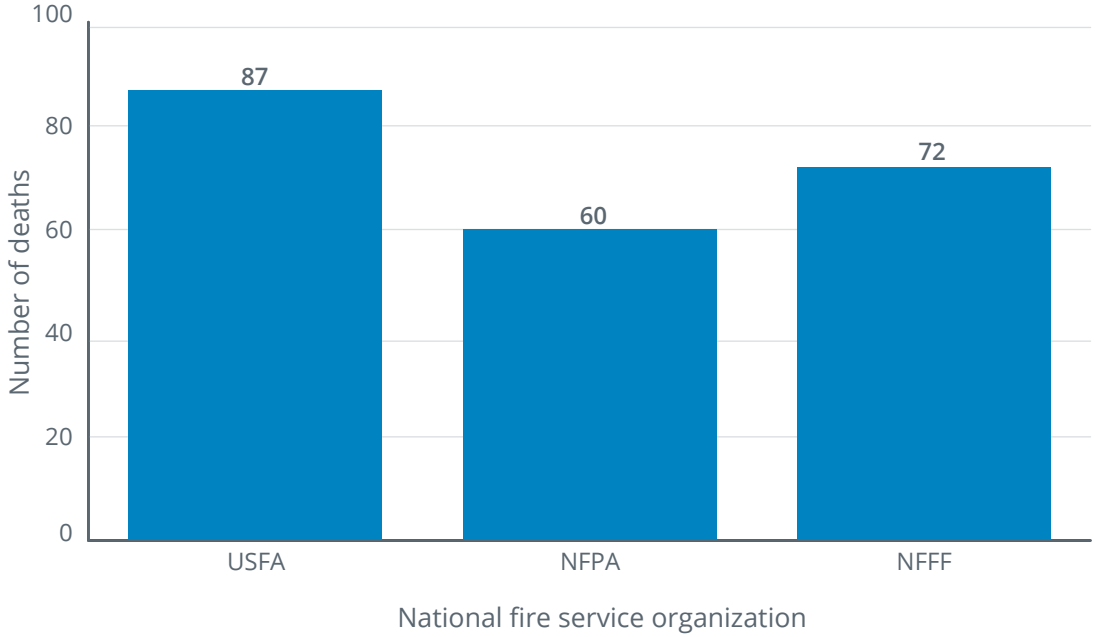
The NFPA, NFFF, USFA and other organizations individually collect information on firefighter fatalities in the U.S. Each organization uses a slightly different set of inclusion criteria that are based in part on the purposes of the information collection for each organization and data consistency.

As a result of these differing inclusion criteria, statistics about firefighter fatalities may be provided by each organization that do not coincide with one another. This section will explain the inclusion criteria for each organization and provide information about these differences.

The USFA includes firefighters in this report that died while on-duty, became ill while on-duty and later died, and firefighters that died within 24-hours of an emergency response or training regardless of whether the firefighter complained of illness while on-duty. The USFA counts firefighter deaths that occur in the 50 states, the District of Columbia, and U.S. territories, such as Puerto Rico and Guam. Detailed inclusion criteria for this report appear starting on page 6.

For 2017, the USFA reported 87 on-duty firefighter fatalities.

Firefighter fatalities in 2017 for incidents occurring in 2017



Inclusion criteria for NFPA's annual firefighter fatality study

Introduction

Each year, NFPA collects data on all firefighter fatalities in the U.S. that resulted from injuries or illnesses that occurred while the victims were on-duty. The purpose of the study is to analyze trends in the types of illnesses and injuries resulting in deaths that occur while firefighters are on the job. This annual census of firefighter fatalities in its current format dates back to 1977. (Between 1974 and 1976, the NFPA published a study of on-duty firefighter fatalities that was not as comprehensive.)

Who is a firefighter?

For the purpose of the NFPA study, the term **firefighter** covers all uniformed members of organized fire departments, whether career, volunteer, combination, or contract; full-time public service officers acting as firefighters; state and federal government fire service personnel; temporary fire suppression personnel operating under official auspices of one of the above; and privately employed firefighters, including trained members of industrial or institutional fire brigades, whether full- or part-time.

Under this definition, the study includes, besides uniformed members of local career and volunteer fire departments, those seasonal and full-time employees of state and federal agencies who have fire suppression responsibilities as part of their job description, prison inmates serving on firefighting crews, military personnel performing assigned fire suppression activities, civilian firefighters working at military installations, and members of industrial fire brigades. Impressed civilians would also be included if called on by the officer in charge of the incident to carry out specific duties. The NFPA study includes fatalities that occur in the 50 states and the District of Columbia.

What does "on-duty" mean?

The term **on-duty** refers to being at the scene of an alarm, whether a fire or nonfire incident; being en route while responding to or returning from an alarm; performing other assigned duties, such as training, maintenance, public education, inspection, investigations, court testimony and fundraising; and being on call, under orders or on stand-by duty other than at home or at the individual's place of business. Fatalities that occur at a firefighter's home may be counted if the actions of the firefighter at the time of injury involved firefighting or rescue.

On-duty fatalities include any injury sustained in the line of duty that proves fatal, any illness incurred as a result of actions while on-duty that proves fatal, and fatal mishaps involving nonemergency occupational hazards that occur while on-duty. The types of injuries included in the first category are mainly those that occur at an incident scene, in training, or in accidents while responding to or returning from alarms. Illnesses (including heart attacks) are included when the exposure or onset of symptoms are tied to a specific incident of on-duty activity. Those symptoms must have been in evidence while the victim was on-duty for the fatality to be included in the study.

Fatal injuries and illnesses are included even in cases where death is considerably delayed. When the onset of the condition and the death occur in different years, the incident is counted in the year of the condition's onset. Medical documentation specifically tying the death to the specific injury is required for inclusion of these cases in the study.

Categories not included in the study

The NFPA study does not include members of fire department auxiliaries; non-uniformed employees of fire departments; EMTs who are not also firefighters; chaplains; or civilian dispatchers. The study also does not include suicides as on-duty fatalities even when the suicide occurs on fire department property.

The NFPA recognizes that a comprehensive study of firefighter on-duty fatalities would include chronic illnesses (such as cardiovascular disease and certain cancers) that prove fatal and that arose from occupational factors. In practice, there is no mechanism for identifying on-duty fatalities that are due to illnesses that develop over long periods of time. This creates an incomplete picture when comparing occupational illnesses to other factors as causes of firefighter deaths. This is recognized as a gap the size of which cannot be identified at this time because of the limitations in tracking the exposure of firefighters to toxic environments and substances, and the potential long-term effects of such exposures.

2017 experience

In 2017, a total of 60 on-duty firefighter deaths occurred in the U.S., according to the NFPA inclusion criteria.

National Fallen Firefighters Foundation

In 1997, fire service leaders formulated new criteria to determine eligibility for inclusion at the National Fallen Firefighter Memorial. LODDs shall be determined by the following standards:

1. (a) Deaths of firefighters meeting the DOJ's PSOB program guidelines, and those cases that appear to meet the guidelines whether or not PSOB staff has adjudicated the specific case prior to the annual National Fallen Firefighters Memorial Service.

   (b) Deaths of firefighters from injuries, heart attacks or illnesses documented to show a direct link to a specific emergency incident or department-mandated training activity.

2. While PSOB guidelines cover only public safety officers, the Foundation's criteria also include contract firefighters and firefighters employed by a private company, such as those in an industrial brigade, provided that the deaths meet the standards listed above.

3. Some specific cases will be excluded from consideration, such as deaths attributable to suicide, alcohol or substance abuse, or other gross abuses as specified in the PSOB guidelines.

The National Fallen Firefighters Memorial was built in 1981 in Emmitsburg, Maryland. The names listed there begin with those firefighters who died in the line-of-duty that year. The U.S. Congress created the NFFF to lead a nationwide effort to remember America's fallen firefighters. Since 1992, the tax-exempt, nonprofit foundation has developed and expanded programs to honor our fallen fire heroes and assist their families and coworkers by providing them with resources to rebuild their lives. Since 1997, the Foundation has managed the National Memorial Service held each October to honor the firefighters who died in the line-of-duty the previous year.

As of this writing, the Foundation will be honoring 93 firefighters who died in the line-of-duty at the October 2018 Memorial Weekend. Seventy-two firefighters being honored are associated with incidents and deaths that occurred in 2017 and 21 deaths as the result of incidents that occurred prior to 2017.

Acronyms

AED	automated external defibrillator
ALS	advanced life support
CPR	cardiopulmonary resuscitation
CVA	cerebrovascular accident
DOJ	U.S. Department of Justice
EMS	Emergency Medical Services
EMT	emergency medical technician
LODD	line-of-duty death
mph	miles per hour
NETC	National Emergency Training Center
NFFF	National Fallen Firefighters Foundation
NFIRS	National Fire Incident Reporting System
NFPA	National Fire Protection Association
NIOSH	National Institute for Occupational Safety and Health
POV	privately-owned vehicle
PSOB	Public Safety Officers' Benefits
SCBA	self-contained breathing apparatus
USFA	U.S. Fire Administration

U.S. Fire Administration
Working for a fire-safe America

16825 South Seton Ave.
Emmitsburg, MD 21727
www.usfa.fema.gov

September 2018