

**FIREFIGHTER FATALITIES  
IN THE UNITED STATES – 2008**

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## **Abstract**

In 2008, a total of 103 on-duty firefighter deaths occurred in the U.S. This is the same number of deaths as occurred in the U.S. in 2007, and the fourth time in the last 10 years that the annual total has been 103. The largest share of deaths (39 deaths) occurred while firefighters were responding to or returning from emergency calls. This includes a single incident which resulted in nine deaths. Stress, exertion, and other medical-related issues, which usually result in heart attacks or other sudden cardiac events, continued to account for the largest number of fatalities. Of the 41 exertion- or stress-related fatalities in 2008, 36 were classified as sudden cardiac deaths.

Keywords: Firefighter fatality, statistics, heart attack, sudden cardiac death

## **Acknowledgements**

This study is made possible by the cooperation and assistance of the United States fire service, the Public Safety Officers' Benefits Program of the Department of Justice, CDC's National Institute for Occupational Safety and Health, the United States Fire Administration, the Forest Service of the U.S. Department of Agriculture, and the Bureau of Indian Affairs and the Bureau of Land Management of the U.S. Department of the Interior. The authors would also like to thank Carl E. Peterson, recently retired from NFPA's Public Fire Protection Division, and Thomas Hales, MD, MPH, of CDC-NIOSH, for their assistance on the study.

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## **2008 Experience**

In 2008, a total of 103 on-duty firefighter deaths occurred in the U.S. This is the same number of deaths as occurred in the U.S. in 2007, and the fourth time in the last 10 years that the annual total has been 103.<sup>1</sup> The average number of deaths annually over the past 10 years is 101. Figure 1 shows firefighter deaths for the years 1977 through 2008, excluding the 340 firefighter deaths at the World Trade Center in 2001.

Of the 103 firefighters who died while on duty in 2008, 58 were volunteer firefighters, 27 were career firefighters, 12 were contractors with federal land management agencies, three were employees of federal land management agencies, one was an employee of a state land management agency, one was a member of a Native American wildland firefighting crew and one was the supervisor of an inmate fire crew.<sup>2</sup>

In 2008, there were five multiple-fatality incidents, and for the second consecutive year, the most severe incident resulted in the deaths of nine firefighters. That incident involved the crash of a helicopter ferrying wildland firefighters back to their base. The details can be found in the incident summaries section of this report. Three firefighters were killed in the crash of an air tanker just after takeoff. The other multiple-fatality incidents were all double-fatality cases. Two firefighters were killed when their wildland fire apparatus crashed while they were responding to a wildland fire. Two firefighters died after becoming trapped inside a structure at a fire in a lumber mill and two firefighters died after falling through the floor into the basement at a dwelling fire. More details will be presented throughout this report.

Analyses in this report examine the types of duty associated with firefighter deaths, the cause and nature of fatal injuries to firefighters, and the ages of the firefighters who died. They highlight deaths in intentionally-set fires and in motor vehicle-related incidents.<sup>3</sup> A 10-year analysis showing trends in wildland fires is included. Finally, the study presents summaries of individual incidents that illustrate important problems or concerns in firefighter safety.

## **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 term *on-duty* refers to being at the scene of an alarm, whether a fire or non-fire incident; while responding to or returning from an alarm; while participating in other fire department duties such as training, maintenance, public education, inspection, investigation, court testimony or fund raising; and being on call or stand-by for assignment at a location

other than at the firefighter's home or place of business.

On-duty fatalities include any injury sustained in the line of duty that proves fatal, any illness that was incurred as a result of actions while on duty that proves fatal, and fatal mishaps involving non-emergency occupational hazards that occur while on duty. The types of injuries included in the first category are mainly those that occur at a fire or other emergency incident scene, in training, or in crashes while responding to or returning from alarms. Illnesses (including heart attacks) are included when the exposure or onset of symptoms occurred during a specific incident or on-duty activity.

The victims include members of local career and volunteer fire departments; seasonal, full-time and contract 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.

Fatal injuries and illnesses are included even in cases where death is considerably delayed. When the injury and the death occur in different years, the incident is counted in the year of the injury. The NFPA recognizes that a comprehensive study of firefighter on-duty fatalities would include chronic illnesses (such as cancer or heart disease) that prove fatal and that arise from occupational factors. In practice, there is no mechanism for identifying 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 limitations in tracking the exposure of firefighters to toxic environments and substances and the potential long-term effects of such exposures.

The NFPA also recognizes that other organizations report numbers of duty-related firefighter fatalities using different, more expansive, definitions that include deaths that occurred when the victims were off-duty. (See, for example, <http://www.usfa.dhs.gov/fireservice/fatalities/index.shtm> and <http://www.firehero.org/>) Readers comparing reported losses should carefully consider the definitions and inclusion criteria used in any study.

## **Type of Duty**

Figure 2 shows the distribution of the 103 deaths by type of duty. The largest share of deaths occurred while firefighters were responding to or returning from emergency calls. This result is largely due to the nine-fatality crash mentioned earlier. It is important to note, though, that not all deaths in this category are the result of crashes. Twenty-six of the 39 occurred in 15 collisions and rollovers and 12

were due to sudden cardiac events or stroke. One firefighter in the station shortly after returning from a fire became pinned between a tanker and a bay door when a pickup truck crashed into the door. Twenty-six of the victims were volunteer firefighters, 12 were employees of or contractors for federal land management agencies, and one was a career firefighter. All crashes and sudden cardiac deaths are discussed in more detail later.

Fire ground operations accounted for 29 deaths. That total is the second lowest since this study began in 1977, and is the fourth time in the past six years that the total has been 30 or less. Twelve of the victims were career firefighters and twelve were volunteer firefighters. Five of the victims worked on state or federal wildland firefighting crews. The average number of career firefighter deaths on the fire ground over the past 10 years is 13 deaths per year, while the average for volunteer firefighters is 18 deaths per year.

Eleven firefighters died at non-fire emergencies, including nine at the scene of motor vehicle crashes, one during a tornado watch, and one while searching for a drowning victim.

Seven deaths occurred during training activities. Two recruits collapsed after maze drills, a new volunteer firefighter died of heat stroke after a day at a training academy, one firefighter collapsed after a training drill, one died when a tanker crashed during a drill, one was shot during a break at an off-site training program, and one died while on his way to a training session.

The remaining 17 firefighters died while involved in a variety of non-emergency-related on-duty activities. These activities included normal administrative or station duties (14 deaths), attendance at an outside meeting on fire protection at an industrial site (one death), a paid detail at a demolition site (one death) and road maintenance in a wildland area (one death).

### **Cause of Fatal Injury or Illness**

Figure 3 shows the distribution of deaths by cause of fatal injury or illness. The term *cause* refers to the action, lack of action, or circumstances that resulted directly in the fatal injury.<sup>4</sup>

Deaths resulting from overexertion, stress and related medical issues made up the largest category of fatalities. Of the 41 deaths in this category, 36 were classified as sudden cardiac deaths (usually heart attacks), four were due to strokes and one from dehydration with underlying hemoglobinopathy. See the section below for more detail on sudden cardiac deaths.

The second leading cause of fatal injury was being struck by an object or coming into contact with an object. The 38 firefighters killed included 29 in motor vehicle crashes and four struck by motor vehicles. Those deaths are discussed in more detail in a separate section of this report. One firefighter

was struck by a collapsing parapet wall. One was struck by a door and power saw when an explosion occurred as he attempted to access a fire in a locked room in an electrical switching station. One was struck in a tornado. One firefighter was struck by a water monitor that came off an elevated aerial ladder. One firefighter was struck and killed by a falling tree.

The next leading cause of fatal injury was being caught or trapped, resulting in 13 deaths. Six firefighters were trapped by fire progress in five fires -- four were fatally burned and two were asphyxiated. (One of the five fires was a wildland fire.) Two were caught in structural collapses. Two firefighters became lost inside fire-involved structures -- one ran out of air and one was fatally burned. One victim was caught in an explosion at the fire station. One became pinned between an elevating platform and the control panel as the platform was being lowered. Another, mentioned earlier, was pinned between a tanker and the bay door when the door was struck by another vehicle.

Six firefighters were killed in jumps or falls. Three fell through floors at structure fires, one fell down a cliff while working on a wildland fire, one fell from a ladder at the fire station and one jumped from a road grader when its brakes failed and it started to roll backwards.

Three firefighters were shot to death -- one during a meal break at an off-site training session, one by a sniper at a vehicle fire and one by a car thief who crashed the vehicle and mistook the firefighter for a police officer.

One firefighter was electrocuted at a structure fire when he came into contact with a high-voltage power line while an elevating platform was moving. One firefighter died of heat stroke at a training academy.

### **Nature of Fatal Injury or Illness**

The term *nature* refers to the medical process by which death occurred and is often referred to as *cause of death* on death certificates and in autopsy reports.

Figure 4 shows the distribution of deaths by nature of fatal injury or illness. The largest number of fatalities, 39 deaths, were due to internal trauma. The other major categories were sudden cardiac death (36 deaths), burns (seven deaths), asphyxiation (six deaths), and stroke (four deaths). There were three deaths each due to gunshot and crushing injuries. The remaining deaths included one each due to hemorrhaging, electrocution, heat stroke, septic shock and dehydration.

### **Sudden Cardiac Deaths**

Overall, sudden cardiac death is the number one cause of on-duty firefighter fatalities in the U.S.

and almost always accounts for the largest share of deaths in any given year. In 2008, however, it accounted for the second largest share. The number of deaths in this category has fallen significantly since the early years of this study. From 1977 through 1986, an average of 60 on-duty firefighters a year suffered sudden cardiac deaths. The average fell to 49 a year between 1987 and 1996 and to 42 a year between 1997 and 2006, with 39 in 2007 and 36 in 2008. (These are cases where the onset of symptoms occurred while the victim was on-duty and death occurred immediately or shortly thereafter.) In spite of this reduction, sudden cardiac death still accounted for 40 percent of the on-duty deaths in the last five years, and 35 percent in 2008 alone.

For 20 of the 36 victims of sudden cardiac events in 2008, post mortem medical documentation showed that 14 had severe arteriosclerotic heart disease, 12 were hypertensive, and three were reported to have had prior heart problems -- such as prior heart attacks, bypass surgery or angioplasty/stent placement. (Some of the victims had more than one condition.) Medical documentation was not available for the other 16 firefighters.

NFPA has several standards that focus on the health risks to firefighters. For example, NFPA 1582, *Comprehensive Occupational Medical Program for Fire Departments*, outlines for fire departments the procedures for screening candidate firefighters and handling health problems that might arise during an individual's fire service career. NFPA 1500, *Fire Department Occupational Safety and Health Program*, calls for fire departments to establish a firefighter health and fitness program based on NFPA 1583, *Health-Related Fitness Programs for Fire Fighters*, and requires that firefighters meet the medical requirements of NFPA 1582.

Information on developing a wellness-fitness program is available from other organizations, for example, the IAFC/IAFF Fire Service Joint Labor Management Wellness-Fitness Initiative ([http://www.iafc.org/associations/4685/files/healthWell\\_WFI3rdEdition.pdf](http://www.iafc.org/associations/4685/files/healthWell_WFI3rdEdition.pdf)) and the National Volunteer Fire Council's Heart-Healthy Firefighter Program (<http://www.healthy-firefighter.org/>). The Heart-Healthy Firefighter Program was launched in 2003 to address heart attack prevention for all firefighters and EMS personnel, through fitness, nutrition and health awareness.

An important part of this NVFC program includes health screenings that they make available annually at several fire service trade shows around the country. The purpose of the program is to lower the incidence of cardiac-related problems in the fire service by educating firefighters and their families about nutrition, fitness and heart disease prevention. While those screenings provide valuable information to the individuals tested, they've also collected data that provides a disturbing picture of the health status of many of the nation's firefighters. The program has screened more than 9,600

firefighters, both career and volunteer, over the five years of the project for blood pressure, cholesterol, body fat and glucose.

- Cholesterol screening done from 2003 through 2007 found high or borderline-high levels (greater than or equal to 200 mg/dl) in 37.0 percent of the 7,904 firefighters tested.
- Blood pressure screenings from 2005 through 2007 found that 6.2 percent of the tested firefighters had Stage 2 hypertension; 28.9 percent had Stage 1 hypertension; and 48.0 percent were prehypertensive. Only 16.9 percent had normal blood pressure readings.
- Almost all of the 5,065 firefighters tested for glucose (non-fasting) in 2006 and 2007 were found to be in the desirable range (less than 140 mg/dl), with only 2.7 percent found to be diabetic (greater than or equal to 200 mg/dl) and 5.9 percent pre-diabetic (between 140 and 199 mg/dl).
- Of the almost 2,000 firefighters tested for body fat in 2005, 44.7 percent were found to be obese (defined as 25 percent or more of body fat for men and 32 percent or more for women).

Results of the testing in 2008 were reported in a slightly different format.

- Of the approximately 1,650 firefighters tested at four shows, 47.5 percent were determined to have a high overall coronary risk rating, based on the National Institute of Health's "National Cholesterol Education Program."
- Cholesterol screening showed that 5.8 percent of the tested firefighters were at high risk levels (greater than or equal to 240 mg/dl) and 21.4 percent were at moderate risk (200-239 mg/dl).
- Blood pressure screenings found that 27.9 percent of the tested firefighters had high blood pressure; and 49.6 percent were prehypertensive. The remaining 22.5 percent had desired or ideal blood pressure readings.
- Body fat was measured again in 2008, and 41.5 percent of the tested firefighters were found to be at high risk and another 25.1 were found to be overweight.

Through this program, many firefighters have been tested more than once, have come to understand their personal level of risk, and have adopted a more heart-healthy lifestyle.

### **Ages of Firefighters**

The firefighters who died in 2008 ranged in age from 17 to 82, with a median age of 43 years. Nine were over age 70. Figure 5 shows the distribution of firefighter deaths by age and whether the cause of death was sudden cardiac death or not.

Sudden cardiac death accounts for a higher proportion of the deaths among older firefighters, as might be expected. More than half of the firefighters over age 40 who died in 2008 died of heart attacks

or other cardiac events. The youngest victim of sudden cardiac death was aged 24 and had severe atherosclerosis.

Figure 6 shows death rates by age, using career and volunteer firefighter fatality data for the five-year period from 2004 through 2008 and estimates of the number of career and volunteer firefighters in each age group from the NFPA's 2006 profile of fire departments (the mid-year in the range).<sup>5</sup>

The lowest death rates were for firefighters in their 20s. Their death rate was half the all-age average. Firefighters in their 30s had a death rate two-thirds the all-age average. The rate for firefighters aged 60 and over was almost four times the average. Firefighters aged 50 and over accounted for two-fifths of all firefighter deaths over the five-year period, although they represent fewer than one-fifth of all firefighters.

## **Fire Ground Deaths**

Of the 29 fire ground deaths, seven each were due to burns and sudden cardiac death, six each to asphyxiation and internal trauma, and one each to electrocution and gunshot. One other firefighter, who had been struck by a tree, bled to death before he reached the hospital.

Figure 7 shows the distribution of the 29 fire ground deaths by fixed property use. Seven of the firefighters were killed on wildland fires. Deaths on wildland fires over the past 10 years will be discussed in a separate section of this report.

Operations at vehicle fires resulted in the death of one firefighter, who was shot by a sniper in a nearby house.

Thirteen of the 21 firefighter deaths at structure fires occurred in residential properties. Fires in one- and two-family dwellings killed 12 of the 13 and one died in a fire in an apartment building. Three firefighters were killed in fires in manufacturing properties. Two firefighters were killed in fires in stores and two were killed in vacant houses. One firefighter was killed at an early-morning fire at a vocational school.

One of the structures had an automatic suppression system, which activated on two levels. The fire started on a loading dock outside the structure, with minimal extension to the interior. The firefighter was outside the structure when killed by equipment that fell from an aerial ladder.

To put the hazards of firefighting in various types of structures into perspective, the authors examined the number of fire ground deaths per 100,000 structure fires by property use. Estimates of the structure fire experience in each type of property were obtained from the NFPA's annual fire loss studies from 2003 through 2007 (the 2008 results are not yet available) and from the updated firefighter fatality

data for the corresponding years. The results are shown in Figure 8.

This figure illustrates that, although many more firefighter deaths occur at residential structure fires than at fires in any other type of structure, fires in vacant buildings and some nonresidential structures, such as mercantile, public assembly and manufacturing properties, are more hazardous to firefighters, on average. There were 7.8 fire ground deaths per 100,000 nonresidential structure fires from 2003 through 2007, compared to 3.3 deaths per 100,000 residential structure fires. The highest death rates over the five-year period occurred in stores and offices. This is a reflection, in part, of the nine deaths that occurred at a single store fire in 2007. The low rate in health care/correctional and educational buildings may reflect the fact that these occupancies are among the most regulated and most-frequently inspected and that their occupants are among the most likely to call the fire department to report fires while the fires are still in their early stages. The low rate in that five-year period for storage properties, which includes garages at dwellings, reflects the relatively small number of fatalities that have occurred in such structures in recent years.

### **Vehicle-Related Incidents**

In 2008, 29 firefighters died in 18 vehicle crashes (including 14 firefighters killed in four aircraft crashes). In addition to those deaths, four other firefighters were struck and killed by vehicles.

Fifteen of the 29 firefighters were killed in 12 crashes while responding to incidents.

- Three firefighters died when their air tanker crashed just after take-off on its way to drop a load of fire retardant on a wildland fire. An engine fire was observed just before the plane crashed.
- Two firefighters responding in a wildland fire apparatus driven at excessive speed for road conditions died instantly when their vehicle slammed into an embankment. Due to poor visibility in smoke, they did not notice that a bridge they were approaching had burned and collapsed. They were not wearing seatbelts. One was partially ejected.

Six of the 15 victims killed while responding to incidents were driving their personal vehicles:

- A firefighter driving to a dwelling fire went off the road to the right on a slight curve, struck a stop sign, then traveled straight across the intersecting road and struck trees before rolling down an embankment. He was speeding, was not wearing a seatbelt and was partially ejected from the vehicle. Alcohol was a factor in the crash.
- A firefighter responding to a motor vehicle crash after midnight lost control of his vehicle in the rain and hit a signpost and a tree. He was not wearing a seatbelt but was not ejected.

- Another firefighter responding to a motor vehicle crash lost control of his vehicle on a curve, overcorrected and overturned. He was speeding, was not wearing a seatbelt and was ejected.
- A firefighter whose vehicle was struck from behind while he attempted to make a U-turn to respond to a fire died six months later due to complications from his injuries.
- A firefighter responding to an EMS call on his motorcycle died in a crash, possibly as the result of striking a deer.
- A firefighter driving at excessive speed on a very foggy road lost control on a curve, went down an embankment and struck a tree. He was not wearing a seatbelt and was ejected.

Four of these 15 victims were driving or riding in pumpers or water tenders (tankers):

- While driving a pumper to an EMS call, a firefighter lost control of the vehicle and was ejected when it overturned. He was not wearing a seatbelt. Distracted driving was cited as a factor in the crash.
- A firefighter driving a tanker at excessive speed lost control of the vehicle on a sharp curve, causing it to overturn. He was wearing a seatbelt and was not ejected. He was responding on mutual aid to a dwelling fire.
- The driver of a pumper lost control when it went off the right side of a straight road, struck a ditch, and overturned. He was intoxicated, was not wearing a seatbelt and was ejected. His passenger, who was also not wearing his seatbelt, was not ejected and survived.
- A firefighter driving a pumper to a dwelling fire was killed when the vehicle overturned while he was making a left turn. He was wearing a seatbelt and was not ejected.

Eleven of the 29 firefighters were killed in three crashes while returning from incidents.

- In the largest-fatality incident in 2008, two pilots and seven federal contractors died when their helicopter crashed just after take-off. The firefighters were being ferried back to their base camp when the aircraft experienced a loss of power to the main rotor during the initial climb, crashing into trees and terrain in a remote wildland area. Four others on the helicopter survived.
- A firefighter driving back from a fire that was out on arrival lost control on a downhill curve and was ejected when it overturned. He was not wearing a seatbelt. Driver inexperience and excessive speed were cited as factors in the crash. The 30-year-old tanker did not have the safety features of a modern vehicle and the tank was not installed properly.
- A firefighter was driving an ambulance back from an EMS call it was hit head on by a

vehicle that crossed the centerline. He was wearing his seatbelt and was not ejected.

The remaining fatal crashes occurred while firefighters were engaged in other emergency activities:

- A contract pilot was killed when his air tanker crashed just after dropping a load of slurry on a wildland fire. Strong winds and wind gusts were cited as factors in the crash. The drop zone was intended for a fire retardant drop, but the plane was carrying water and foam, which was not the correct application for the area.
- A firefighter who had an allergic reaction to an insect bite while operating on a wildland fire was killed in a helicopter crash while he was being transported to a hospital for treatment.
- A firefighter at the scene of a motor vehicle crash was sitting in his parked personal vehicle on a curve in the road, using the emergency lights on his vehicle to warn motorists of the crash ahead. A tractor-trailer truck attempted to change lanes but could not, and struck the firefighter's vehicle. Light snow created hazardous road conditions that were cited as a factor in the crash, as was the speed of the tractor-trailer and the fact that the firefighter was not wearing a seatbelt. He was partially ejected from his vehicle.

Of the 15 deaths in road vehicles mentioned above, 10 of the victims were not wearing seatbelts (five were ejected and three were partially ejected), three were wearing their seatbelts, and one crash involved a motorcycle. No information on seatbelt use was available for one of the crashes. Excessive speed was a factor in at least six of the 14 crashes, one of which resulted in two deaths. Two of the drivers were intoxicated. Other factors reported were driver inexperience, driver inattention, weather conditions and age of vehicle.

Four firefighters were struck by vehicles while assisting at crash scenes. Weather was a factor in one of the incidents, where an oncoming vehicle skidded on ice, striking and killing the firefighter and her patient. In two of the cases, the drivers of oncoming vehicles were not able to see the crash scenes -- in one case due to smoke and fog on the road and in the other because of the position of the wreck on one side of the road, and emergency lights on a vehicle on the opposite side of the road. There were no details provided in the fourth case.

NFPA publishes several standards related to road safety issues. *NFPA 1002, Standard on Fire Apparatus Driver/Operator Professional Qualifications*, identifies the minimum job performance requirements for firefighters who drive and operate fire apparatus, in both emergency and nonemergency situations. *NFPA 1451, Standard for a Fire Service Vehicle Operations Training Program*, provides for

the development of a written vehicle operations training program, including the organizational procedures for training, vehicle maintenance, and identifying equipment deficiencies. *NFPA 1911, Standard for the Inspection, Testing, Maintenance and Retirement of In-Service Automotive Fire Apparatus*, details a program to ensure that fire apparatus are serviced and maintained to keep them in safe operating condition. NFPA 1901, *Automotive Fire Apparatus*, addresses vehicle stability to prevent rollovers, and gives manufacturers options on how to provide it.

The provisions of NFPA 1500 include requirements that operators successfully complete an approved driver training program, possess a valid driver's license for the class of vehicle, and operate the vehicle in compliance with applicable traffic laws. All vehicle occupants must be seated in approved riding positions and secured with seatbelts before drivers move the apparatus, and drivers must obey all traffic signals and signs and all laws and rules of the road, coming to a complete stop when encountering red traffic lights, stop signs, stopped school buses with flashing warning lights, blind intersections and other intersection hazards, and unguarded railroad grade crossings. Passengers are required to be seated and belted securely and must not release or loosen seatbelts for any reason while the vehicle is in motion.

In related efforts, the USFA has formed partnerships with the IAFF, NVFC and IAFC to focus attention on safety while responding in emergency apparatus. Details can be found at [www.usfa.dhs.gov/fireservice/research/safety/vehicle.shtm](http://www.usfa.dhs.gov/fireservice/research/safety/vehicle.shtm).

But, the focus of vehicle safety programs should not be exclusively on fire department apparatus, since personal vehicles are the vehicles most frequently involved in road crashes. NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, includes a requirement that when members are authorized to respond to incidents or to fire stations in private vehicles, the fire department must establish specific rules, regulations, and procedures relating to the operation of private vehicles in an emergency mode.

Regarding emergency personnel operating on roadways, in late 2008, Federal Rule 23 C.F.R. Part 634 – Worker Visibility (High-Visibility Vests) became law, requiring anyone working on a federally-funded roadway to wear an ANSI 107-compliant high-visibility vest. An interim rule was also published that created an exemption for firefighters and others engaged on such roadways that allows them to wear NFPA-compliant retroreflective turn-out gear when directly exposed to flames, heat and hazardous material. NFPA 1500 requires firefighters working on traffic assignments where they are endangered by motor vehicle traffic to wear clothing with fluorescent and retroreflective material. The 2009 edition of NFPA 1901 requires that ANSI 207-compliant breakaway high-visibility vests be

carried on all new fire apparatus. Advice on compliance with the new Federal rule can be found at: [http://www.respondersafety.com/Articles/New\\_Federal\\_Rule\\_23\\_CFR\\_Part\\_634\\_Worker\\_Visibility\\_High-Visibility\\_Vests\\_.aspx](http://www.respondersafety.com/Articles/New_Federal_Rule_23_CFR_Part_634_Worker_Visibility_High-Visibility_Vests_.aspx). NFPA 1901 also requires reflective striping for improved visibility on new apparatus. Advice on how to improve visibility of existing apparatus can be found at: <http://www.respondersafety.com/MarkedAndSeen.aspx>.

### **Career/Volunteer Comparison**

The distribution of deaths of career and volunteer firefighters from local fire departments is shown in Figure 9. While the number of volunteer firefighter deaths continues to fluctuate between the mid-40s and mid-60s, the number of career firefighter deaths has returned to its plateau of close to 30 deaths each year, after a sharp increase in 2007. (Most of that increase was due to a nine-fatality incident in a furniture store in South Carolina.)

A breakdown of the fatality experience of the 85 career and volunteer firefighters killed in 2008 is shown in Table 1.

### **Other Findings**

Three firefighters were shot in separate incidents in 2008. There have been 32 fatal assaults in the 32 years of this study, but this is only the second time that there have been three separate incidents in a single year. Concerns have been expressed recently about attacks by the public on firefighters in the United Kingdom and Ireland, but these incidents weren't attacks of that type. There does not appear to be a pattern in these shootings -- one involving a sniper at an intentionally-set vehicle fire, one at a restaurant during an on-duty meal break and one at a crash scene when the firefighter was apparently mistaken for a police officer.

There were four deaths related to intentionally-set fires in 2008. Two were sudden cardiac deaths -- one during overhaul at a structure fire and the other while responding to a vehicle fire. One firefighter was killed in a roof collapse at an intentionally-set fire, and there was the shooting death just mentioned. From 1999 through 2008, 61 firefighters (6.1 percent of all on-duty deaths) died in connection with intentionally-set fires. The number of these deaths annually has been dropping since 1985, in part because of the decline in intentionally-set fires over the same period.

Over the past 10 years, 34 firefighter deaths have resulted from false calls, including malicious false alarms and alarm malfunctions. In 2008, sudden cardiac death claimed the life of one firefighter shortly after returning from a false alarm at a shopping mall.

## Summary

There were 103 on-duty firefighter deaths in 2008; the same number as in 2007. This continues the trend of approximately 100 deaths per year. Of the 103 victims, 85 were career or volunteer firefighters. Deaths of career and volunteer firefighters average 87 per year. An average of approximately 13 firefighters affiliated with state or federal land management agencies are killed on duty each year. In 2008, there were 18 victims in that category.

In most years, the number one cause of on-duty firefighter fatalities is sudden cardiac death. In 2008, however, the number of traumatic deaths was higher, but sudden cardiac death continues to account for approximately 40 percent of the deaths annually.

For the second consecutive year, there was a nine-fatality incident. In 2008, that incident was a helicopter crash. (In 2007, it was a structure fire.) In large part because of that crash, the number of vehicle crash deaths in 2008, overall, was the second highest since we began this study in 1977. There were 29 deaths in 18 crashes. In the 14 crashes involving road vehicles, there were 15 deaths. The majority of the victims were not wearing seatbelts.

The number of deaths on wildland fires fluctuates quite a bit from year to year. In 2008, there were 23 deaths associated with wildland fires, compared to six in 2007 and an average of 17 per year over the past 10 years. Details on these deaths and the trends over the past 10 years are covered in the accompanying special analysis.

The 2009 Fire/EMS Safety, Health and Survival Week (formerly known as Stand Down), was held in June, with the theme, "Protect Yourself: Your Safety, Health and Survival are Your Responsibility." The event, co-sponsored by IAFF and IAFC, focused on two areas which could have the most impact on reducing on-duty firefighter deaths -- safe driving and heart disease education and prevention. The week also singled out cancer education and prevention, structural size up, situation awareness and safety policies.

## References

1. The NFPA's files for firefighter on-duty fatal injuries are updated continually for all years.
2. For this report, the term *volunteer* refers to any firefighter whose principal occupation is not that of a full-time, paid member of a fire department. The term *career* refers to any firefighter whose occupation is that of a full-time, paid fire department member.
3. For this report, the term *motor vehicle-related incident* refers to motor vehicle collisions

(including aircraft and boats) and rollovers, as well as to incidents such as falls from or struck by vehicles where the involvement of the vehicle played an integral role in the death.

4. The categories for cause of injury and nature of injury are based on the 1981 edition of NFPA 901, *Uniform Coding for Fire Protection*.

5. Michael J. Karter, Jr., "U.S. Fire Department Profile Through 2006," NFPA Fire Analysis and Research Division, Quincy, Massachusetts, November 2007.

## **Credits**

This study is made possible by the cooperation and assistance of the United States fire service, the Public Safety Officers' Benefits Program of the Department of Justice, CDC's National Institute for Occupational Safety and Health, the United States Fire Administration, the Forest Service of the U.S. Department of Agriculture, and the Bureau of Indian Affairs and the Bureau of Land Management of the U.S. Department of the Interior. The authors would also like to thank Carl E. Peterson, recently retired from NFPA's Public Fire Protection Division, and Thomas Hales, MD, MPH, of CDC-NIOSH, for their assistance on the study.

## **U.S. Department of Justice Death, Disability and Educational Benefits for Public Safety Officers and Survivors**

**Line of duty deaths:** The Public Safety Officers' Benefits (PSOB) Act, signed into law in 1976, provides a federal death benefit to the survivors of the nation's federal, state, local and tribal law enforcement officers, firefighters, and rescue and ambulance squad members, both career and volunteer, whose deaths are the direct and proximate result of a traumatic injury sustained in the line of duty. The Act was amended in 2000 to include FEMA employees performing official, hazardous duties related to a declared major disaster or emergency. Effective December 15, 2003, public safety officers are covered for line-of-duty deaths that are a direct and proximate result of a heart attack or stroke, as defined in the Hometown Heroes Survivors Benefits Act of 2003.

A 1988 amendment increased the amount of the benefit from \$50,000 to \$100,000 and included an annual cost-of-living escalator. On October 1 of each year, the benefit increases as a result. The enactment of the USA PATRIOT bill in 2001 increased the benefit to \$250,000. The current benefit is \$315,746, tax free.

A decedent's spouse and minor children usually are the eligible beneficiaries. Generally, in cases in which the public safety officer had no surviving spouse or eligible children, the death benefit is to be awarded to either the individual most recently designated as beneficiary for PSOB benefits with the officer's public safety agency, organization, or unit, or, if there is no designation of beneficiary of PSOB benefits on file, then to the individual designated as beneficiary under the most recently executed life insurance policy on file at the time of death. (*See* 42 U.S.C. § 3796(a)(4) for specific details.) If no individuals qualify under 42 U.S.C. § 3796(a)(4), then the benefit is paid to the public safety officer's surviving parents.

**Line of duty disability:** In 1990, Congress amended the PSOB benefits program to include permanent and total disabilities that occur on or after November 29, 1990. The amendment covers public safety officers who are permanently unable to perform any gainful employment in the future. PSOB is intended for those few, tragic cases where an officer survives a catastrophic, line of duty injury. Only then, in the presence of the program's statutory and regulatory qualifying criteria, will PSOB's disability benefit be awarded. The bill's supporters anticipated that few PSOB disability claims would be eligible annually.

**Public Safety Officers' Educational Assistance Program (PSOEA):** An additional benefit, signed into law in October 1996 and amended in 1998, provides an educational assistance allowance to the spouse and children of public safety officers whose deaths or permanent and total disabilities qualify under the PSOB Act. This benefit is provided directly to dependents who attend a program of education at an eligible education institution and are the children or spouses of covered public safety officers. It is retroactive to January 1, 1978, for beneficiaries who have received or are eligible to receive the PSOB benefit. Students may apply for PSOEA funds for up to 45 months of full-time classes. As of October 1, 2008, the maximum benefit a student may receive is \$915 per month of full-time attendance.

**Further benefits information:** To initiate a claim for death benefits, to receive additional information on filing a disability claim or to receive additional information about coverage, call, email, or write the Public Safety Officers' Benefits Program, Bureau of Justice Assistance, Office of Justice Programs, U.S. Department of Justice, 810 7<sup>th</sup> Street, N.W., Washington DC 20531. The telephone number is (888) 744-6513 and the email address is [ASKPSOB@usdoj.gov](mailto:ASKPSOB@usdoj.gov). PSOB death claims can now be filed online as well, at: <https://www.psob.gov>.

**Table 1**  
**Comparison of On-Duty Deaths Between**  
**Career and Volunteer Firefighters, 2008\***

	Career Firefighters		Volunteer Firefighters	
	Number of Deaths	Percent of Deaths	Number of Deaths	Percent of Deaths
<b>Type of duty</b>				
Responding to or returning from alarms	1	4 %	26	45 %
Operating at fire ground	12	44	12	21
Operating at non-fire emergencies	3	11	8	14
Training	2	7	5	9
Other on-duty	9	33	7	12
<b>TOTALS</b>	<b>27</b>	<b>100 %</b>	<b>58</b>	<b>100 %</b>
<b>Cause of fatal injury</b>				
Exertion/stress/other related	11	41 %	30	52 %
Struck by or contact with object	3	11	20	34
Caught or trapped	8	30	5	9
Fell	1	4	3	5
Assault	3	11	0	0
Exposure to electricity	1	4	0	0
<b>TOTALS</b>	<b>27</b>	<b>100 %</b>	<b>58</b>	<b>100 %</b>
<b>Nature of fatal injury</b>				
Sudden cardiac death	9	33 %	26	45 %
Internal trauma	3	11	21	36
Burns	5	19	2	3
Asphyxiation (including smoke inhalation)	3	11	3	5
Stroke/aneurysm	1	4	3	5
Gunshot wounds	3	11	0	0
Crushing	1	4	1	2
Sickle cell trait	1	4	0	0
Electrocution	1	4	0	0
Septic shock	0	0	1	2
Heat stroke	0	0	1	2
<b>TOTALS</b>	<b>27</b>	<b>100 %</b>	<b>58</b>	<b>100 %</b>
<b>Rank</b>				
Firefighter	15	56 %	41	71 %
Company officer	9	33	5	9
Chief officer	3	11	12	21
<b>TOTALS</b>	<b>27</b>	<b>100 %</b>	<b>58</b>	<b>100 %</b>

	Career Firefighters		Volunteer Firefighters	
	Number of Deaths	Percent of Deaths	Number of Deaths	Percent of Deaths
<b>Ages of Firefighters</b>				
<b>All deaths</b>				
20 and under	1	4 %	2	3 %
21 to 25	1	4	8	14
26 to 30	0	0	5	9
31 to 35	4	15	4	7
36 to 40	5	19	4	7
41 to 45	4	15	5	9
46 to 50	6	22	3	5
51 to 55	4	15	5	9
56 to 60	1	4	4	7
61 to 65	1	4	6	10
66 to 70	0	0	4	7
Over 70	0	0	8	14
TOTALS	27	100 %	58	100 %

**Ages of Firefighters**  
**Sudden cardiac deaths only**

21 to 25	0	0 %	1	4 %
31 to 35	1	11	1	4
36 to 40	0	0	1	4
41 to 45	3	33	3	12
46 to 50	2	22	3	12
51 to 55	2	22	4	15
56 to 60	1	11	1	4
61 to 65	0	0	5	19
66 to 70	0	0	1	4
over 70	0	0	6	23
TOTALS	9	100 %	26	100 %

**Fire ground deaths by fixed property use**

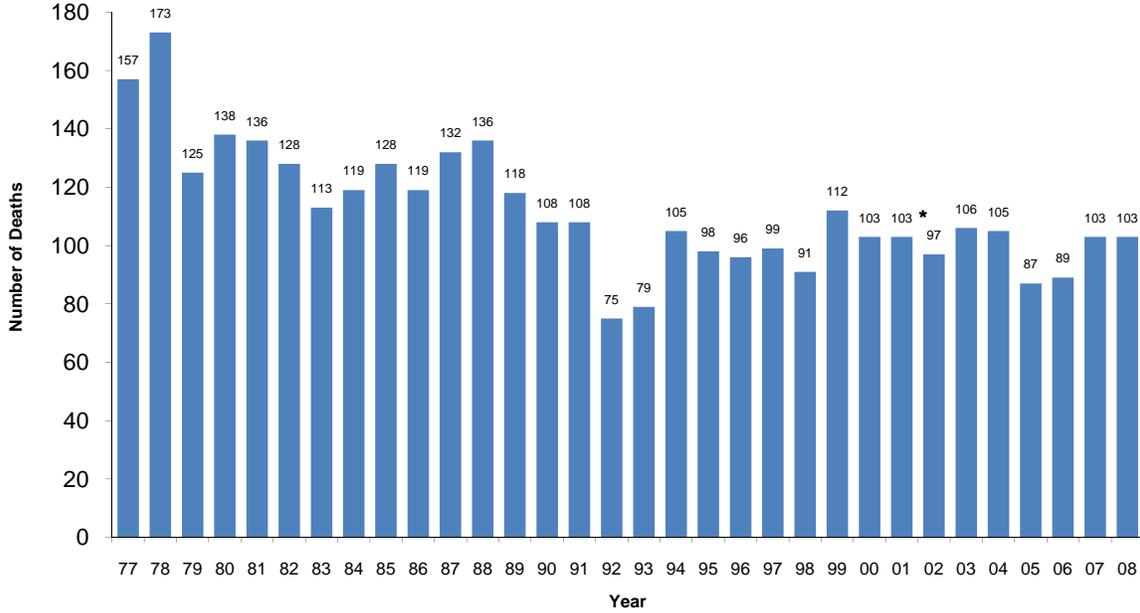
Dwellings and apartments	5	42 %	8	67 %
Manufacturing	2	17	1	8
Vacant dwellings	2	17	0	0
Stores	1	8	1	8
Wildland	1	8	1	8
School	0	0	1	8
Vehicle	1	8	0	0
TOTALS	12	100 %	12	100 %

	Career Firefighters		Volunteer Firefighters	
	Number of Deaths	Percent of Deaths	Number of Deaths	Percent of Deaths
<b>Years of service</b>				
5 or less	4	15 %	19	33 %
6 to 10	5	19	6	10
11 to 15	3	11	4	7
16 to 20	4	15	4	7
21 to 25	5	19	4	7
26 to 30	4	15	3	5
over 30	2	7	13	22
Not reported	0	0	5	9
<b>TOTALS</b>	<b>27</b>	<b>100 %</b>	<b>58</b>	<b>100 %</b>
<b>Attributes of fire ground deaths**</b>				
Intentionally-set fires	3		0	
Search and rescue operations	1		2	
<b>Motor vehicle crashes</b>	<b>1</b>		<b>14</b>	
<b>False alarms</b>	<b>0</b>		<b>1</b>	

\* This table does not include the 18 victims who were employees of or contractors for state or federal land management agencies, or members of reservation- or prison-based wildland firefighting crews.

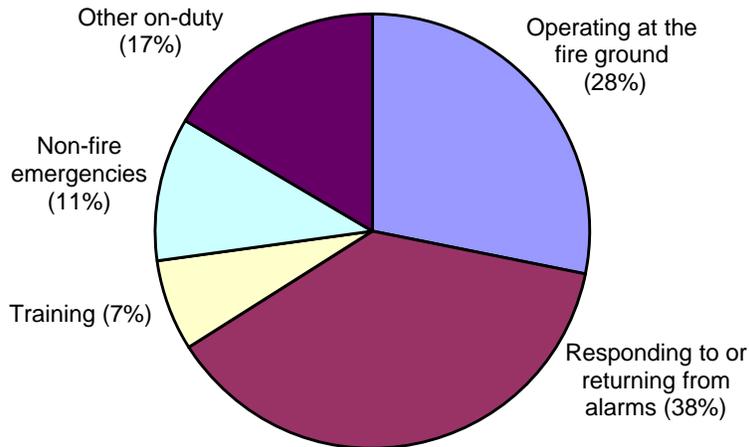
\*\* Because these attributes are not mutually exclusive, totals and percentages are not shown.

**Figure 1**  
**On-Duty Firefighter Deaths - 1977-2008**

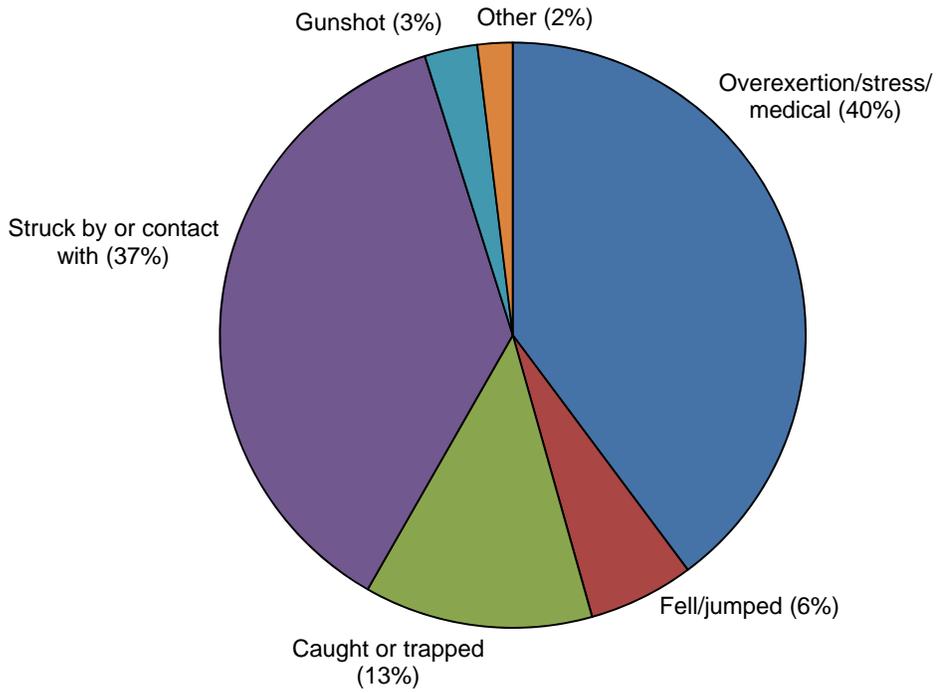


\* excluding the 340 firefighter deaths at the World Trade Center

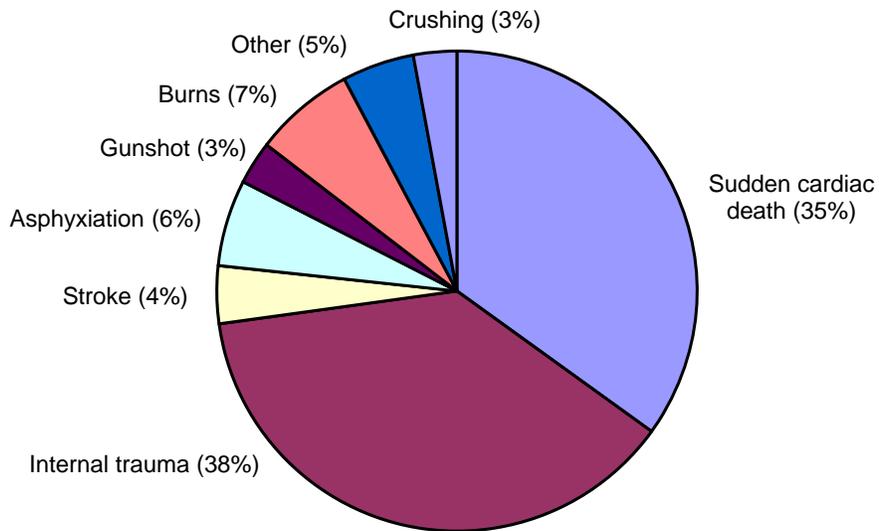
**Figure 2**  
**Firefighter Deaths by Type of Duty - 2008**



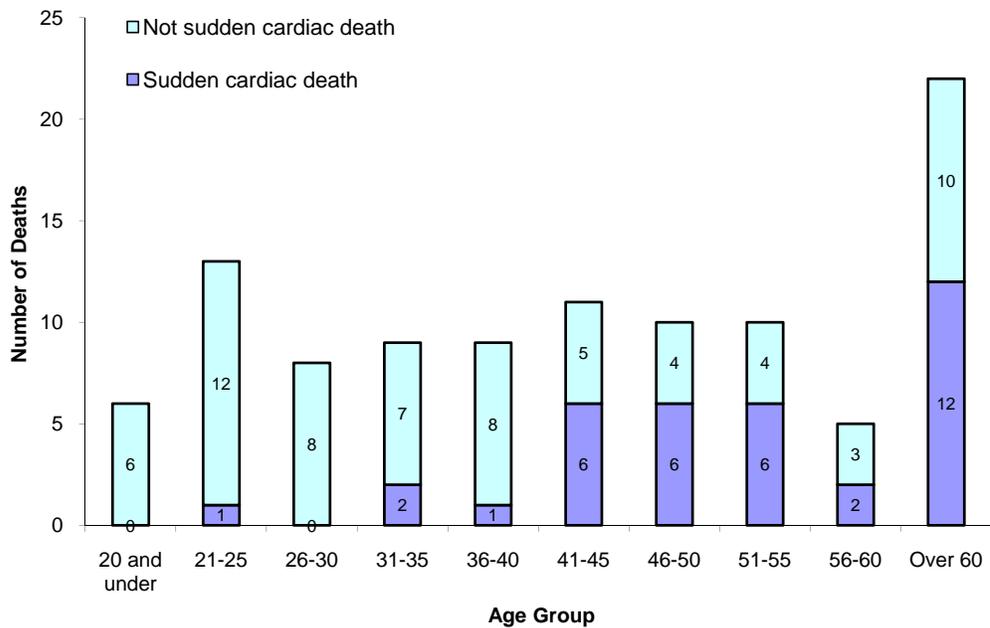
**Figure 3  
Firefighter Deaths by Cause of Injury -- 2008**



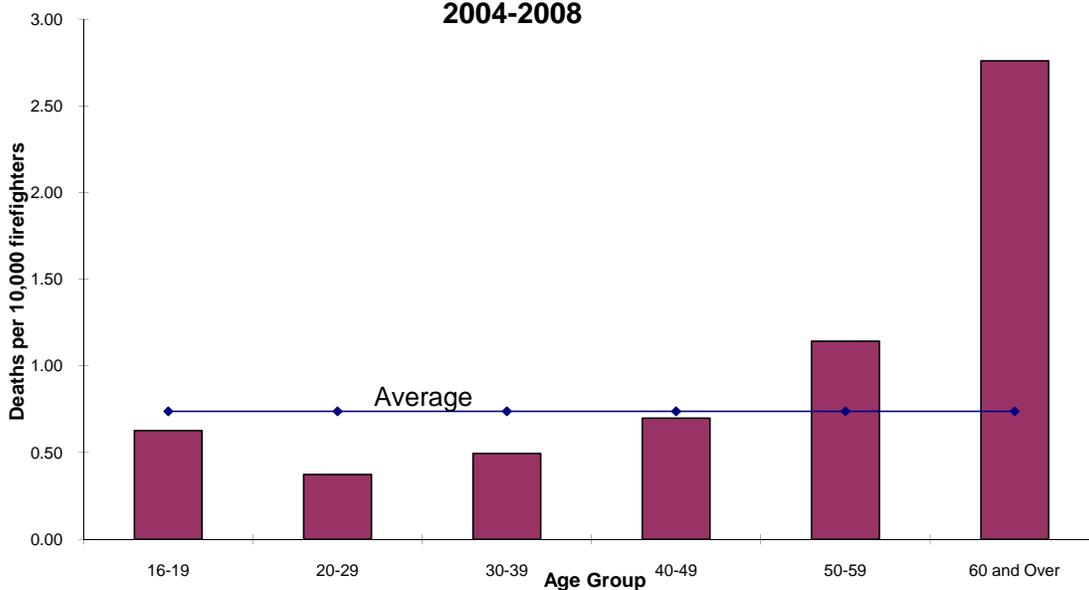
**Figure 4  
Firefighter Deaths by Nature of Injury -- 2008**



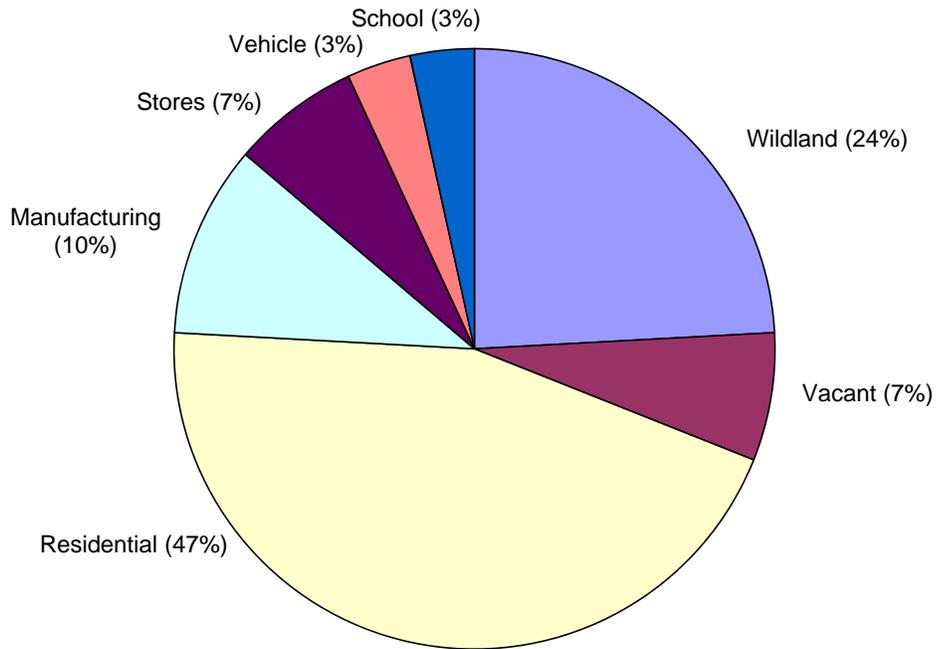
**Figure 5**  
**On-Duty Firefighter Deaths**  
**by Age and Cause of Death -- 2008**



**Figure 6**  
**On-Duty Death Rates per 10,000 Career**  
**and Volunteer Firefighters**  
**2004-2008**

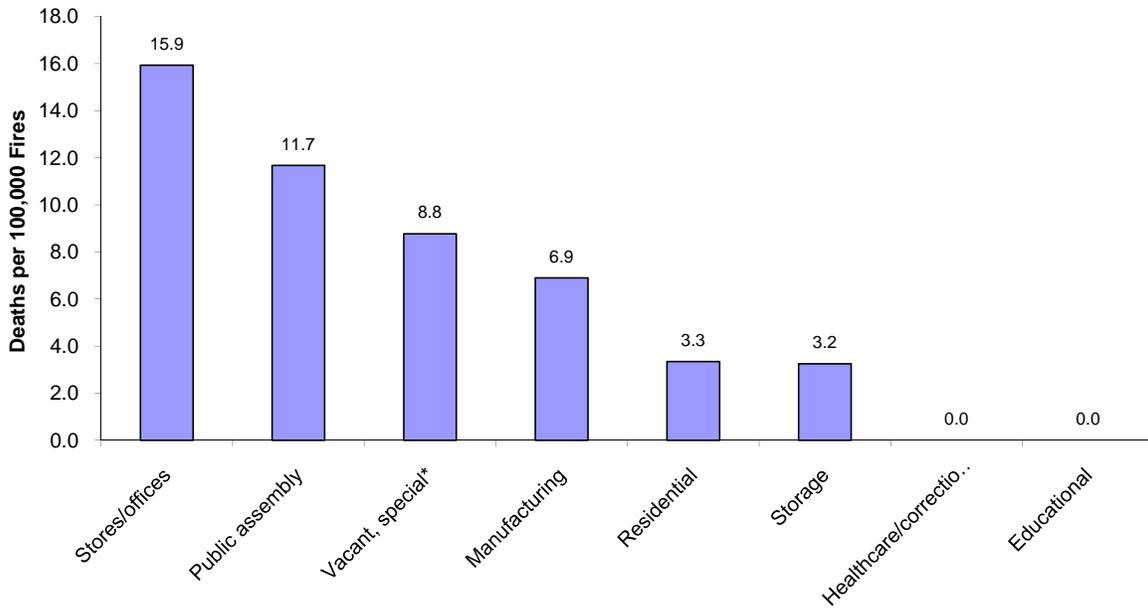


**Figure 7**  
**Fire Ground Deaths by Fixed Property Use -- 2008\***



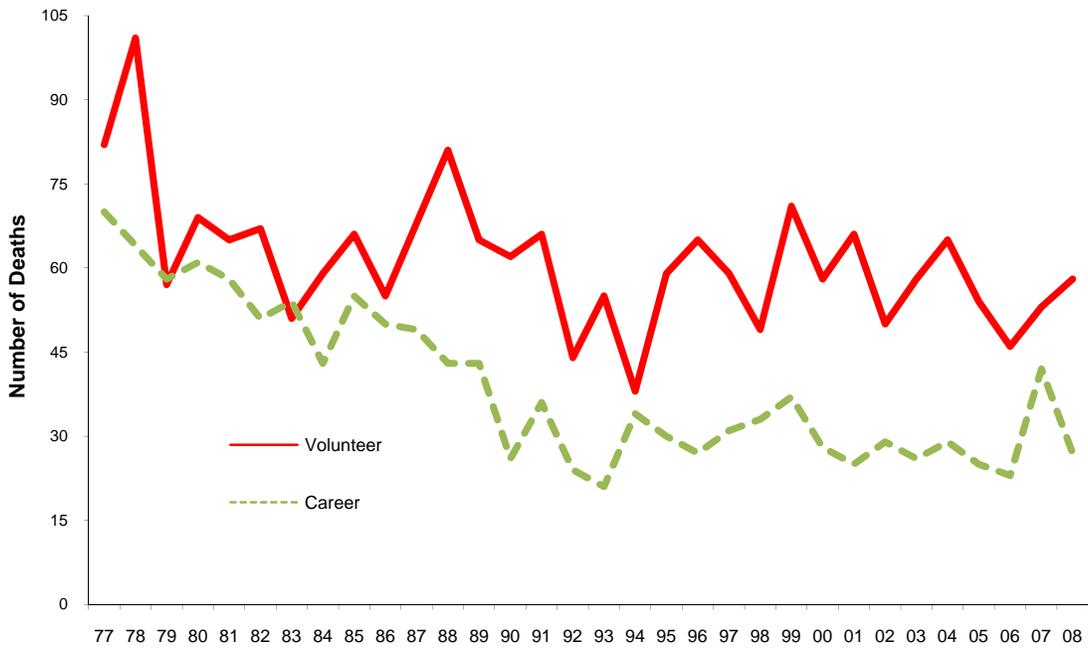
\* There were 29 deaths on the fire ground in 2008.

**Figure 8**  
**On-Duty Fire Ground Deaths per 100,000 Structure Fires 2003-2007**



\* Includes idle buildings, buildings under construction and demolition, etc.

**Figure 9**  
**Career and Volunteer Firefighter Deaths**  
**1977 - 2008\***



\* excluding the 340 firefighter deaths at the World Trade Center in 2001

## **SELECTED FIREFIGHTER FATALITY INCIDENTS**

### **Fire officer trapped in apartment fire**

At 7:16 p.m. on January 3, firefighters were called to a fire in a 25-story, high-rise apartment building of fire-resistive construction. Personnel from the first engine and ladder companies, dressed in full protective ensembles including self-contained breathing apparatus (SCBA), took the elevator to the 12th story. From there, they walked up to the next level, where they connected their hose to the standpipe connection before continuing to the fire-involved apartment on the 14th story.

The 40-year-old officer of the engine company entered the apartment ahead of his crew through the front door, which the occupants had inadvertently propped open with a rug as they left the unit, and began searching for victims and for the fire. Shortly afterward, the rest of the engine company passed through the smoke and heat that had spread into the corridor through the apartment's open door, advanced the hose into the unit, and joined in the search.

When the extreme heat of the fire shattered the apartment's windows, the wind blew in and intensified the blaze. Firefighters continued working until the low-air alarms on their SCBA started sounding, and all but the officer found their way out of the apartment. The officer was later found with his face-piece off by subsequently arriving firefighters. The cause of his death was listed as burns and smoke inhalation.

Investigators determined that a 6-year-old boy who lived in the apartment had been playing with fire. Two other firefighters suffered burns during the blaze, and one suffered smoke inhalation injuries.

### **Fire captain electrocuted**

On January 6, a first-alarm assignment of two engines, a rescue vehicle, an elevating platform, and an acting chief was dispatched at 7:13 a.m. to a possible working fire in a three-story, wood-frame structure that had been converted from a single-family dwelling to a three-unit dwelling. They arrived at the scene in one to three minutes to find a large volume of smoke coming from the building. They entered the building and began firefighting and primary search and rescue operations.

Seven minutes after the initial dispatch, while the fire captain and a firefighter from the elevating platform were searching the basement, a second alarm was sounded, and the electric utility company was asked to respond. When the captain's low air alarm went off, he and the firefighter left the building.

At 7:28 a.m., an engine company operating in the building asked that the roof be ventilated. Before this could be done, however, the overhead power lines had to be de-energized. The incident commander asked the representative from the electric utility, in a face-to-face conversation, to shut off power to the lines on both streets. Sometime later, the representative told the incident commander that the power had been cut. However, the only power line that was de-energized was the line from the street to the building.

In another face-to-face conversation, the incident commander told the fire captain of the elevating platform that the power had been shut down and that he wanted him to use the elevating platform to ventilate the roof. The captain and the firefighter got a power saw and climbed into the platform of the elevating platform, with the captain at the controls. As the platform approached the wires, the firefighter, who had squatted on the platform, heard an electric arcing noise and looked up to see the high-voltage overhead power line on the captain's back. The arcing stopped as the captain fell into the platform.

Firefighters on the ground saw smoke coming from the platform, and a nearby officer helped a firefighter on the turntable lower the platform. They checked the captain's vital signs, and, finding none, took him to a hospital where he was pronounced dead.

The current also shocked the firefighter who had been in the platform with the captain and two others standing next to the truck. They were treated for burns and released. An elderly couple died in the fire.

### **Struck by vehicle**

During a freezing rain storm on January 22, a 24-year-old, pregnant woman lost control of her car and crashed into a rocky cliff. The woman was not injured, but she wanted to make sure her unborn baby was not hurt, so she called for an ambulance at 9:00 a.m. The ambulance and an assistant fire chief responded to the scene.

The assistant chief conducted an initial examination and determined that the woman could walk to the ambulance. As they made their way along the shoulder of the road, a passing 18-wheel tractor-trailer truck slid into the car in front it and sideswiped a parked deputy sheriff's cruiser before hitting both the assistant fire chief and the young woman. The woman died instantly, and the assistant fire chief died that evening at the hospital.

### **Sudden cardiac death during training**

On the morning of February 21, a 48-year-old firefighter trainee participating in the fourth day of an eight-day Basic Firefighter Module 1 with Live Fire course at the state fire academy was to participate with his class in the maze drill. The drill included the following four elements: the disoriented firefighter, the skip breathing/emergency by-pass procedures, the restricted passage with SCBA, and the retreat to safe haven evolutions.

During the drill, which was conducted on the second level of the training tower, the trainees were required to wear full protective ensembles, including SCBA. When the class started at 7:00 a.m. at the lower level of the training tower, the students made sure their SCBA's cylinders were filled to the proper level. They were then given last-minute instructions on performing the elements of the maze drill, and the drill itself started at 8:00 a.m.

At 9:18 a.m., it was the victim's turn. He put on his face piece, which had been lined with wax paper to obscure his vision, and entered the maze to complete the skip breathing element. He was

monitored by one of the instructors and completed the element in 18 minutes but collapsed in cardiac arrest as he left the drill area.

Instructors, EMTs, and other trainees began treatment immediately. They carried him down to the lower level, where someone noted that his pulse had stopped, and started cardiopulmonary resuscitation. He was taken by ambulance to a local hospital, where medical personnel stabilized him so he could be transported to a regional hospital. Further testing showed that he had suffered a severe hypoxic brain injury due to lack of oxygen during resuscitation efforts. His condition did not improve, and he was removed from life support the following day. He died later that day. The autopsy report showed that the firefighter had an enlarged heart and suffered from severe atherosclerotic and hypertensive cardiovascular disease.

The fire department did not require pre-placement and annual medical evaluations including medical clearance for respirator use. The state fire academy requires a medical affidavit certifying that trainees are in good physical condition, as determined by a medical examination, but neither the trainee nor the fire department submitted one in this case.

### **Apparatus crash while responding**

On March 28 at 9:42 a.m., a firefighter driving a 3,000-gallon (11,360-liter) fire department water tender (tanker) to a mutual-aid call died when he failed to negotiate a 90° right-hand turn posted for 10 miles (16 kilometers) per hour. The firefighter was unfamiliar with the route and had to ask for directions over the radio twice. The new directions required him to return to an intersection he had already gone through. As he drove back using a different route, he entered the turn and the tanker's front left tire went off the road onto the soft shoulder. The tanker continued down into the ditch, rolling over onto the driver's side and glancing off several trees before crashing into one. The cab of the truck was crushed against the tree, pinning the driver inside.

A wrecker was called to pull the tanker away from the tree in order to extricate the firefighter. He was pulled from the cab 45 minutes later, stabilized, and flown to a trauma center, where he was pronounced dead. The cause of death was listed as blunt force trauma to the head.

As a result of this incident, NIOSH suggested that tankers be driven at a safe and reasonable speed, that firefighters be familiar with their routes, and that tankers possibly be staffed with a minimum of two firefighters. The second firefighter could act a second pair of eyes, as well as operate warning devices, check maps, and act as a spotter for backing operations. He could also assist with hose connections, portable tank deployment, and other necessary tasks.

For further information on this case refer to [www.cdc.gov/niosh/fire/reports/face200810.html](http://www.cdc.gov/niosh/fire/reports/face200810.html).

### **Struck by object at fireground**

At 3:53 p.m. on April 8, a 24-year-old deputy fire chief directing operations at a plastics manufacturing facility in full protective ensemble, including SCBA, was struck by a motorized water monitor and died instantly. A firefighter standing next to him was knocked to the ground, but he was not seriously injured.

The monitor, which had been attached to the second section of an aerial ladder that had been raised 67 feet (20 meters) at a 60° angle, was launched from the aerial ladder when the waterway was pressurized, flying 75 feet (23 meters) before it hit the deputy chief. The monitor weighed over 200 pounds (91 kilograms) with its mounting bracket and 30 feet (9 meters) of aluminum pipe. The monitor, which could be attached to the tip of the aerial ladder or the second section by changing an anchor pin from one hole to another in a flat pin receiver plate, was normally attached to the second section so it would not interfere with rapid rescue attempts. During set-up operations, a probationary firefighter was sent to change the setting from the second section to the tip. After the fire, the anchor pin was found on the ground under the point where the receiver plate would normally be when the anchor pin is being changed. Investigators concluded that the pin had not been properly installed.

The fire started in an area containing wood and plastic pallets, and was caused by careless disposal of smoking materials. It grew rapidly and spread up the exterior wall, although sprinklers kept the interior of the building relatively free of fire.

For further information on this case refer to [www.cdc.gov/niosh/reports/face200812.html](http://www.cdc.gov/niosh/reports/face200812.html). Also see a NIOSH *Safety Advisory* concerning this hazard at: [www.cdc.gov/niosh/fire/SafetyAdvisory06242008.html](http://www.cdc.gov/niosh/fire/SafetyAdvisory06242008.html).

### **Gunshot**

At 5:42 a.m. on July 21, firefighters were dispatched to the scene of a pick-up truck fire. The first apparatus to arrive was an engine company with a crew of four, followed by a rescue vehicle driven by a firefighter. The driver of the engine parked his vehicle near the pickup truck, and the crew, dressed in full personal protective ensembles, got off the engine and started setting up to extinguish the fire.

As one of the firefighters, a rookie with less than a year on the fire department, took the hose and started advancing it toward the truck, he was struck in the head and killed by a gunshot fired by a sniper from a nearby house.

Two police officers who responded were also wounded before the stand-off ended when the sniper set fire to the house, killing himself.

### **Struck by tree**

An 18-year-old part-time wildland firefighter was fatally injured on July 25 when he was struck by a falling tree. He was one of three firefighters on scene assigned as a Class B faller, which allowed him to cut down trees 8 to 24 inches (20 to 60 centimeters) in diameter that were in danger of falling on their own.

The tree crushed his leg, and his team called for medical personnel at 1:50 p.m. Once freed and treated, the firefighter was hoisted into a United States Coast Guard helicopter for transport to the hospital. He died during the flight of cardiac arrest brought on by loss of blood.

### **Fire shelter deployment**

On July 26, two fire personnel were scouting a wildland fire caused by lightning that they were supposed to take charge of as division supervisors the following day. As they climbed a steep incline in a rugged area of the forest, the wind unexpectedly changed, causing the fire to burn toward them rapidly. One of the two, a 49-year-old fire chief, decided to deploy his fire shelter (aluminized tent) on a ridge. The other, a line officer, kept going until he reached a road where he deployed his own fire shelter. The line officer escaped uninjured, but the chief died as a result of burns and smoke inhalation. No facts as to why the shelter didn't save the chief's life were available.

### **Helicopter crash**

At 7:41 p.m. on August 5, a helicopter shuttling fire crews from the scene of a wildfire crashed on take off, killing the pilot and eight firefighters. The co-pilot and three other firefighters were injured.

The crews were being evacuated due to deteriorating weather conditions, and the helicopter had already made two trips, returning to the helibase to refuel. After it picked up its third load of passengers, the helicopter's main rotor lost power on its initial climb, and the vehicle crashed. A post-crash fire consumed the helicopter.

An investigation by the National Transportation Safety Board (NTSB) is ongoing. The reason for the loss of power was not available. For further information, visit [www.nts.gov/nts/brief.asp?ev\\_id=20080820X01266&key=1](http://www.nts.gov/nts/brief.asp?ev_id=20080820X01266&key=1).

### **Equipment failure**

Two contract firefighters were injured, one fatally, at 7:00 p.m. on August 25 when they jumped from a grader after its brakes failed and it started rolling backward. The two were in the process of improving road conditions and access for firefighters operating on a wildland fire complex. The 77-year-old operator hit his head when he jumped and was airlifted to a hospital, where he died of his injuries 17 days later. The other firefighter was also taken to a hospital, where he was treated for an ankle injury and released.

### **Motor vehicle crash while responding**

On November 7, a 17-year-old firefighter responding to a structure fire at 1 a.m. in his own vehicle was killed in a crash. The firefighter first went off the right side of the road after entering a curve, then overcorrected, crossing the roadway and going off the left side of the road and down an embankment. The vehicle flipped several times on the way down before crashing into an electric power box. The driver, who was not wearing a seatbelt, was ejected from the vehicle and died at the scene. Excessive speed, unfamiliarity with the road, and thick fog were cited as factors responsible for the crash.

### **Roof collapse**

One firefighter died and four others were injured during a fire in a vacant two-story house on November 15. The fire department received a 911 call at 5:06 a.m. from neighbors who discovered the fire in the 1,200-square-foot (111-square-meter), wood-frame dwelling, which had been boarded up. The fire was intentionally set on the second level, where a flammable liquid poured in several areas had been ignited with an open flame device.

When they arrived six minutes after the alarm, fire companies found the second level fully involved, with flames issuing from all the windows, the roof eaves, and the soffits, weakening the roof structure. Two of the engine companies began applying water on the blaze through their deck guns, extinguishing a large amount of fire before they emptied their tanks. The crew of the third engine company, dressed in full protective ensembles including SCBA, entered the front door with a 1½-inch (38 millimeter) hose after prying off the boards. They made their way to the second level and were overhauling and extinguishing hot spots when the roof collapsed, trapping them.

Other firefighters managed to free them from the debris, but the 39-year-old victim, who was trapped face down under heavy wood structural members and covered by debris, was later pronounced dead at the hospital. The cause of death was listed as mechanical asphyxiation.



## The United States Fire Service

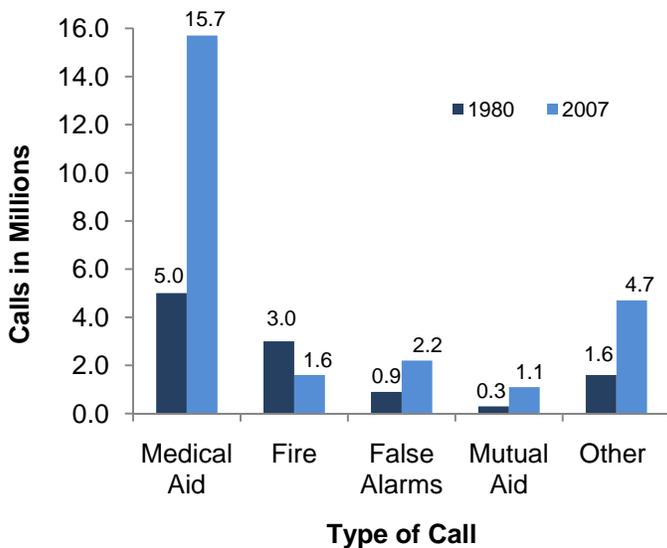
1,148,800 firefighters from 30,185 local fire departments protected the United States in 2007.

- 28% (323,350) are career firefighters.
- 72% (825,450) are volunteer firefighters.

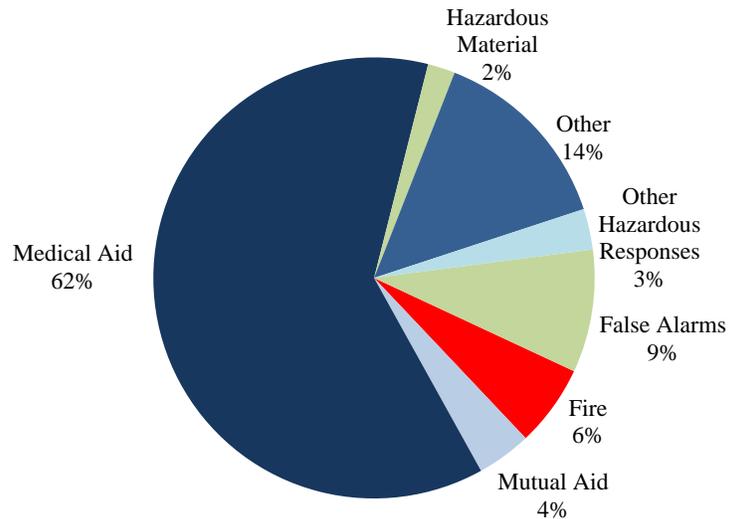
The fire service does more than fight fires.

- Medical aid responses have tripled since 1980.
- Only 6% of fire department calls in 2007 were due to actual fires.

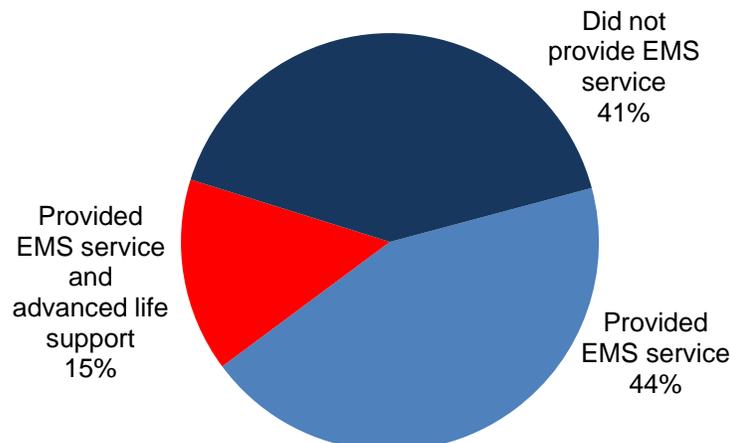
Comparison of Fire Department Calls  
 In 1980 and 2007



Fire Department Calls in 2007



Fire Department Provision of Emergency Medical Service  
 2005-2007 Annual Averages

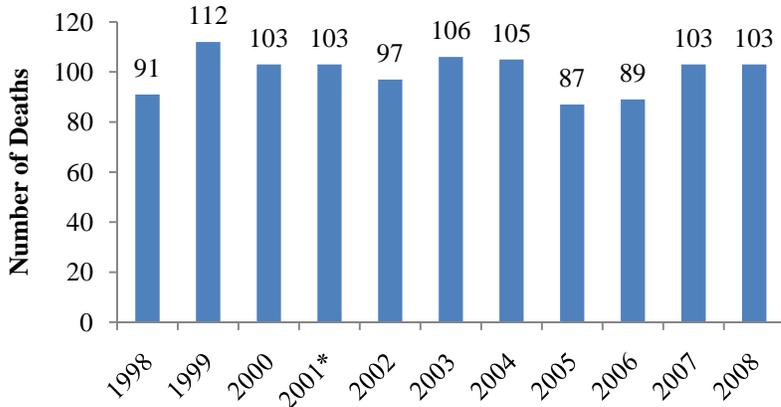


## Firefighter Fatalities

103 firefighters were fatally injured in 2008.

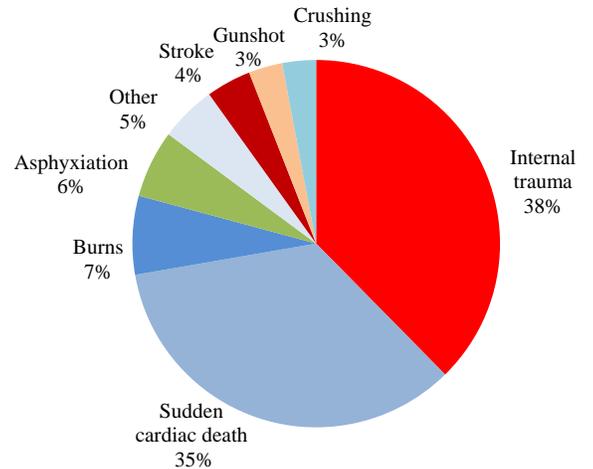
- Sudden cardiac death caused 36 of the fatalities.
- 29 firefighters died on the fireground.
- Residential structure fires accounted for the largest share of fireground deaths (13 deaths).

On-Duty Firefighter Deaths: 1998-2008



\*excluding the 340 firefighter deaths at the World Trade Center

Firefighter Deaths by Nature of Injury 2008

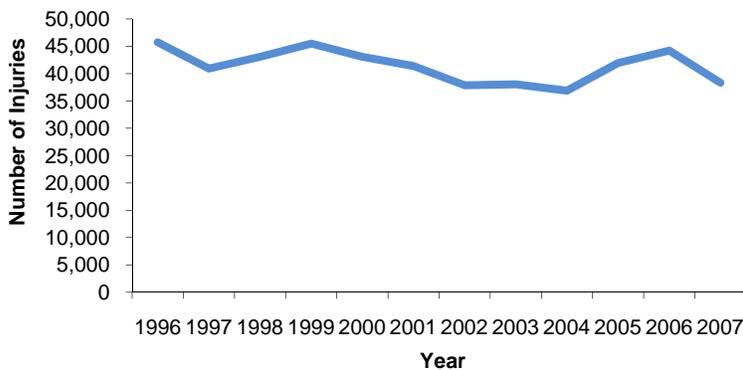


## Firefighter Injuries

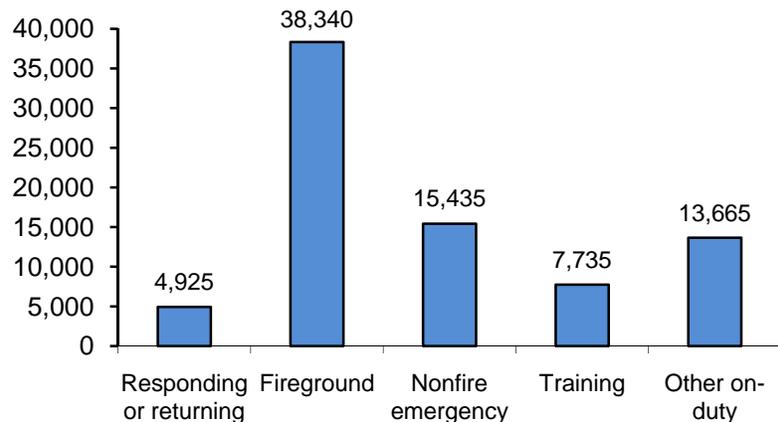
80,100 firefighters were injured in 2007.

- Strain, sprain, and muscular pain were the leading type of injury.
- 48% (38,340) of the injuries occurred on the fireground.

Firefighter Injuries at the Fireground: 1996-2007



Firefighter Injuries by Type of Duty 2007



Sources: *U.S. Fire Department Profile Through 2007*, by Michael J. Karter, Jr., *Fire Loss in the United States During 2007*, by Michael J. Karter, Jr., *Firefighter Fatalities in the United States-2008*, by Rita F. Fahy, Paul R. LeBlanc and Joseph L. Molis, and *U.S. Firefighter Injuries 2007*, by Michael J. Karter, Jr., and Joseph L. Molis.