

NFPA® RESEARCH

Municipal Firefighter Injuries on the Fireground: 2020–2024

Richard Campbell
January 2026

Copyright © 2026 National Fire Protection Association® (NFPA®)

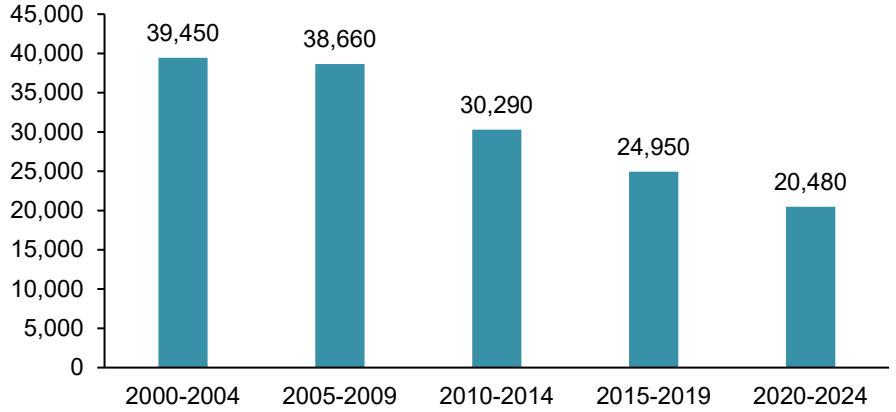
Key Findings

- Municipal firefighters in the United States experienced an estimated average of 20,480 non-fatal injuries on the fireground each year from 2020 through 2024.
- Injuries involving exposure to a hazard (such as heat, smoke, or toxic agents); overexertion or strain; slips or trips; and falls were the most common injuries experienced by firefighters on the fireground.
- Just over one-fifth of the fireground injuries (22 percent) resulted in lost work time, while just one-half of the injuries (51 percent) were report only and did not result in lost work time. Another 15 percent of the injuries required treatment by a physician, but no lost time, while 12 percent were classified as first aid only.
- Approximately two in five fireground injuries (44 percent) occurred outside at grade level, with another 35 percent of injuries occurring while firefighters were inside a structure, but not the attic.

This report reviews US municipal firefighter fireground injuries in the five-year period from 2020 through 2024. These data are estimates of the firefighter injury experience. Injuries are rounded to the nearest ten unless otherwise indicated. Note that the data presented in the body of the report represents the results for the major response categories. More detailed information is available in the accompanying tables.

NFPA estimates that municipal firefighters in the United States experienced an average of 20,480 injuries on the fireground each year from 2020 through 2024. By comparison, this five-year average represents a substantial decrease over the estimated five-year average of 24,950 injuries from 2015 through 2019 and continues a historical downward trend in fireground injuries since 2000, as shown in Figure 1.

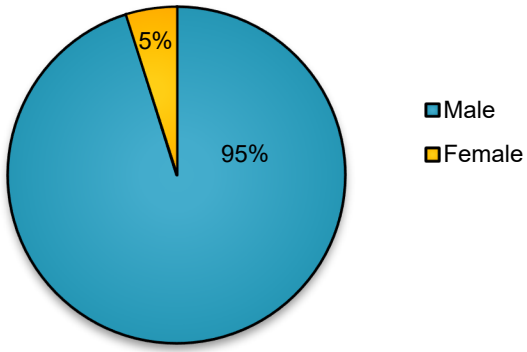
Figure 1. Fireground Injuries by Five-Year Average: 2000–2024



Fireground Injuries by Gender

The vast majority of the fireground injuries in 2020–2024 were sustained by male firefighters, with females accounting for just 5 percent of the overall injuries, as indicated in Figure 2. According to NFPA's recent report, *US Fire Department Profile*, women accounted for 9 percent of the overall firefighter workforce in 2020, which suggests that female firefighters may have experienced a disproportionately lower share of injuries relative to males.

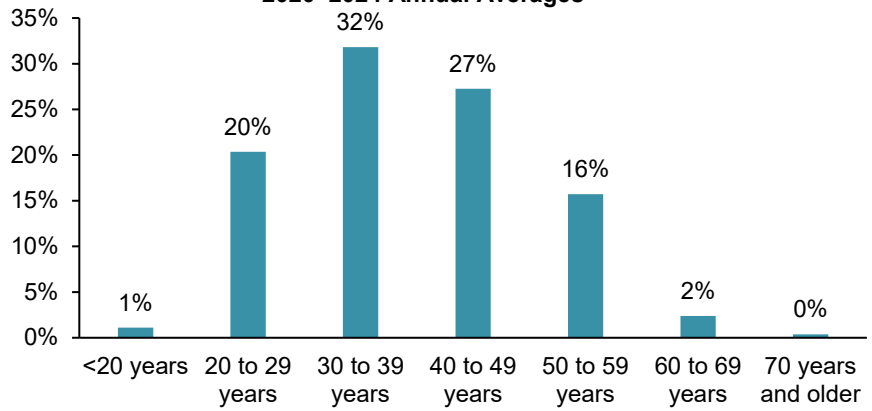
Figure 2. Fireground Injuries by Gender: 2020–2024 Annual Averages



Fireground Injuries by Age

Fireground injuries by age in 2020–2024 are shown in Figure 3. Firefighters in the 30 to 39 (32 percent) and 40 to 49 age groups (27 percent) accounted for the highest shares of injuries. Firefighters in the 20 to 29 age group (20 percent) and 50 to 59 age group (16 percent) accounted for most of the remaining fireground injuries.

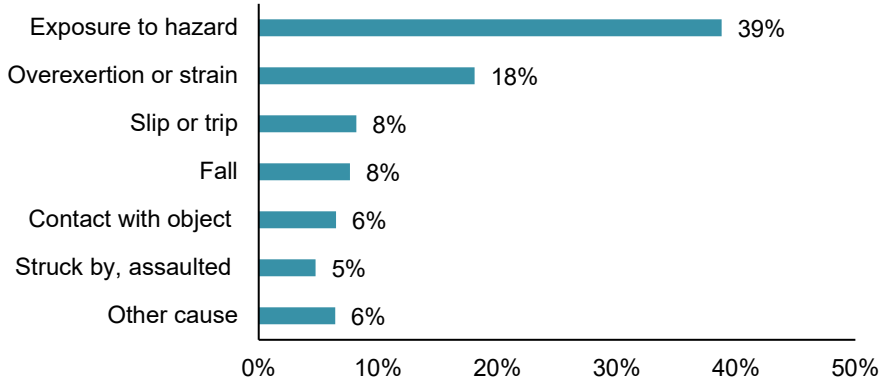
Figure 3. Fireground Injuries by Age: 2020–2024 Annual Averages



Leading Causes of Fireground Injuries

Figure 4 shows the leading causes of fireground injuries. As indicated, the largest share of fireground injuries (30 percent) was due to exposure to hazards (which involves exposure to fire products, such as heat or smoke), and nearly one in five injuries were caused by overexertion or strain (18 percent). Other leading causes of injury on the fireground included slips and trips and falls (each with 8 percent), contact with an object (6 percent), and being struck by or assaulted by a person, animal, or object (6 percent).

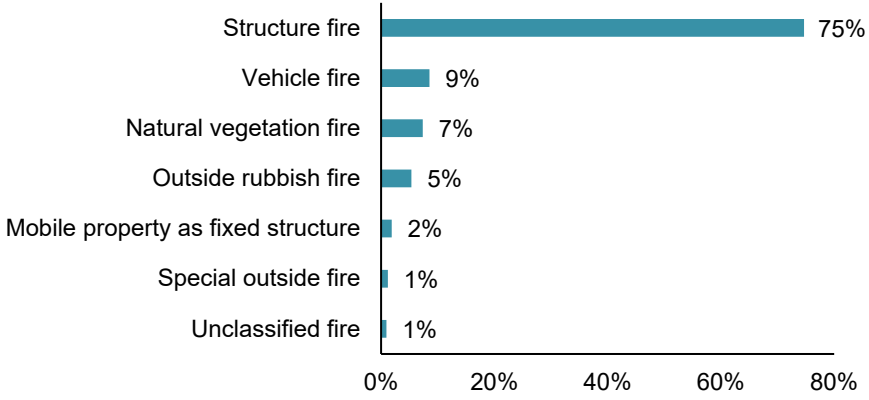
Figure 4. Leading Causes of Fireground Injuries: 2020–2024 Annual Averages



Injuries by Type of Fire Incident

The vast majority of fireground injuries (75 percent) occurred at structure fires, with another 9 percent of fires occurring in vehicles and 2 percent occurring in mobile properties used as fixed structures. The remaining fires at which injuries occurred were predominantly natural vegetation (7 percent) or outside rubbish fires (5 percent), with special outside fires and unclassified fires each accounting for 1 percent of the fires, as shown in Figure 5.

Figure 5. Fireground Injuries by Incident Type: 2020–2024 Annual Averages



Severity of Injury

Fireground injuries by severity are shown in Table A. Overall, 22 percent of the injuries resulted in lost work time, while just over half of the injuries (51 percent) were report only and did not result in lost work time. Another 15 percent of the injuries required treatment by a physician, but with no lost time, and 12 percent were classified as first aid only.

Table A. Fireground Injuries by Severity of Injury: 2020–2024 Annual Averages

Injury Severity	Total
Report only, including exposure	51%
Lost-time injury	22%
Lost time injury, moderate severity	20%
Lost time injury, severe	1%
Treated by physician, no lost time	15%
First aid only	12%

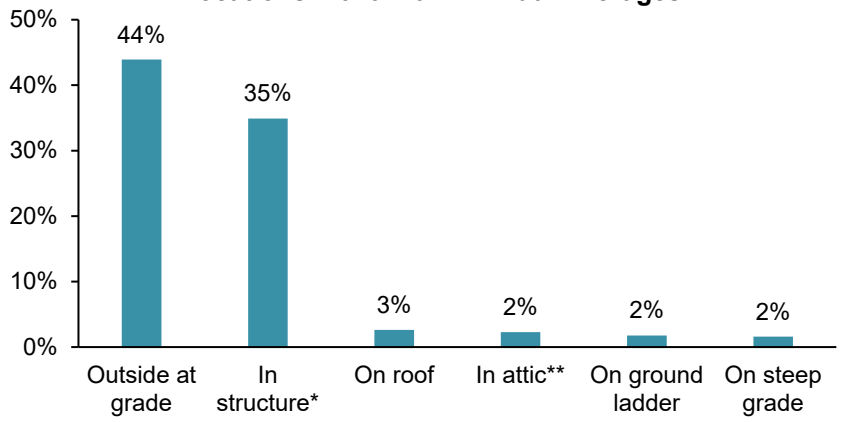
Injury Locations

Fireground injuries most often occurred outside at grade level (44 percent) or inside a structure, excluding the attic (35 percent), as shown in Figure 6. Smaller shares of injuries occurred while firefighters were on a roof, in an attic, on a ground ladder, or on a steep grade.

Activity When Injured

As indicated in Table B, more than three in five of the overall fireground injuries (63 percent) occurred when firefighters were involved in extinguishing fire activities, with 18 percent of these injuries related to handling charged hose lines. Another 17 percent of injuries were associated with suppression support activities and primarily overhaul (7 percent). More detailed information on injury-related activities can be found in the accompanying tables for this report.

Figure 6. Fireground Injuries by Leading Injury Locations: 2020–2024 Annual Averages



*In structure, excluding attic, roof, or wall.
**In attic or other confined structural space.

Table B. Fireground Injuries by Activity: 2020–2024 Annual Averages

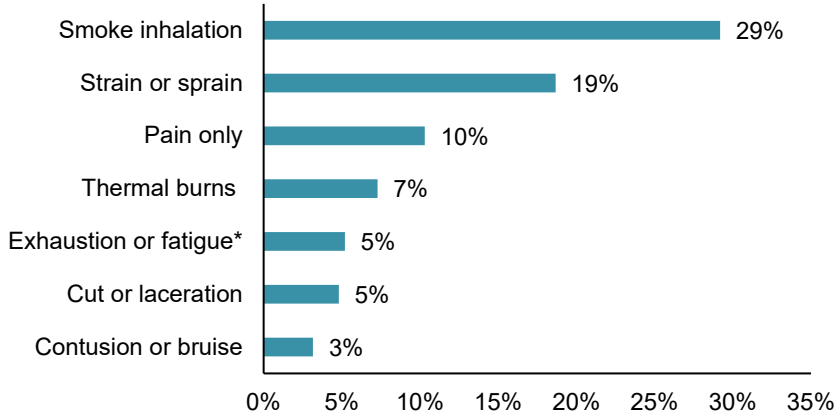
Activity	Total
Extinguishing fire*	63%
Unclassified extinguishing**	39%
Handling charged hose lines	18%
Using hand tools in extinguishment	5%
Suppression support	17%
Overhaul	7%
Unclassified suppression support	5%
Other incident scene activity	7%
EMS or rescue	4%
Access or egress	3%
Operating fire department apparatus	3%

*Extinguishing fire or neutralizing incident
**Unclassified extinguishing fire or neutralizing incident

Primary Symptom of Injury

Smoke inhalation was the most common overall injury symptom experienced by firefighters, accounting for over one-quarter of the fireground injuries (29 percent). Strain and sprain injuries, regularly a leading injury symptom, accounted for just under one in five overall fireground injuries (19 percent), while one in ten fireground injuries (10 percent) were classified as pain only. Other leading types of injury included thermal burns (7 percent), exhaustion or fatigue (5 percent), cuts or lacerations (5 percent), and contusions or bruises (3 percent). A complete list of injury symptoms is available in the accompanying tables.

Figure 7. Fireground Injuries by Primary Symptom: 2020–2024 Annual Averages



*Exhaustion or fatigue, including heat exhaustion

Primary Body Part Injured

Fireground injuries most often involved the internal organs (27 percent of injuries), lower extremities (17 percent), and upper extremities (15 percent), while injuries to multiple body parts accounted for 12 percent of the injuries, as shown in Table C. Other common areas of injury included the head, neck, and shoulders (each with 9 percent of the injury total, and the thorax (6 percent). Injuries to the abdominal area and the spine each accounted for 2 percent of the injuries.

Table C. Fireground Injuries by Primary Body Part Injured: 2020–2024 Annual Averages

Primary Body Part	Injuries
Internal	27%
Lower extremities	17%
Upper extremities	15%
Multiple parts	12%
Head	9%
Neck and shoulders	9%
Thorax	6%
Abdominal area	2%
Spine	2%
Other	1%

Factors Contributing to Injuries

Injury reports sometimes include limited information on the factors that contributed to the fireground injuries. As shown in Table D, factors relating to fire development (such as smoke conditions) contributed to just over half of the overall fireground injuries (52 percent), while slippery or uneven surfaces contributed to 17 percent. Collapses of structural elements or falling objects contributed to a substantial share of injuries (9 percent). Holes or being lost, caught, trapped, or confined, and vehicle or apparatus factors contributed to comparatively smaller shares of the injuries.

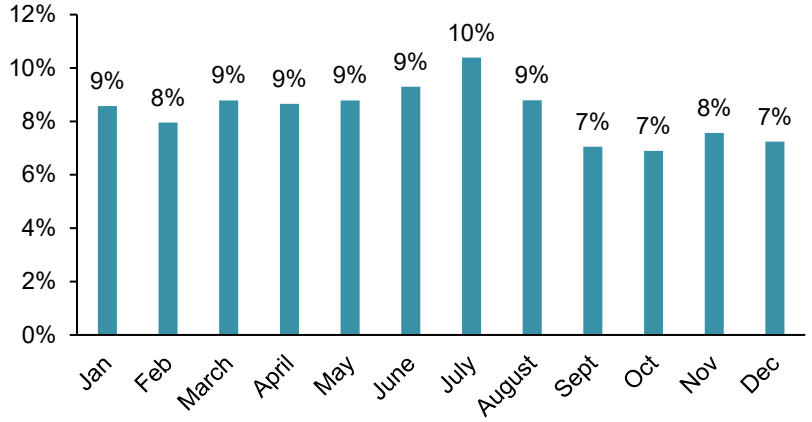
Table D. Fireground Injuries by Factor Contributing to Injury: 2020–2024 Annual Averages

Injury Factor	Injuries
Fire development	57%
Slippery or uneven surfaces	17%
Collapse or falling object	9%
Holes	3%
Lost, caught, trapped, or confined	1%
Vehicle or apparatus	1%

Injuries by Month

Fireground injuries were highest in June (9.3 percent) and July (10.4 percent) and lowest in September (7.1 percent) and October (6.9 percent), potentially reflecting the influence of working in warmer versus more temperate weather conditions. March, May, and August, each with 8 percent of the fireground injuries, accounted for the next highest shares of injuries.

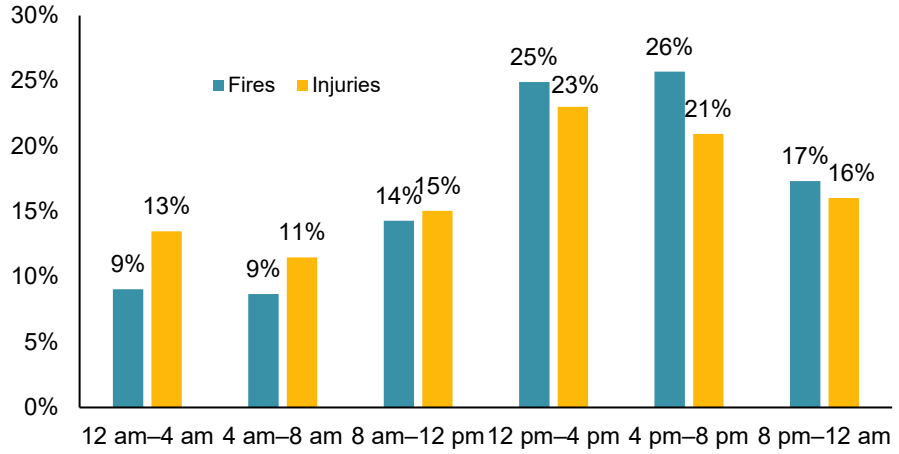
Figure 8. Fireground Injuries by Month: 2020–2024 Annual Averages



Injuries by Time of Day

Just over half of the fireground injuries (51 percent) occurred in fires that took place between 12 p.m. and 8 p.m., but these were the hours with the largest shares of fires, as shown in Figure 9. As the figure indicates, injuries were low relative to the number of fires during this time period. Although there were fewer fires between midnight and 8 a.m., injuries were higher relative to the share of fires at these hours. Such factors as working in dark environments or sleep disturbance may play a role in this injury pattern.

Figure 9. Fireground Injuries and Fires by Time of Day: 2020–2024 Annual Averages



Acknowledgments

The National Fire Protection Association thanks all the fire departments and state fire authorities who participate in the National Fire Incident Reporting System (NFIRS) and the annual NFPA fire experience survey. These firefighters are the original sources of the detailed data that makes this analysis possible. Their contributions allow us to estimate the size of the fire problem.

We are also grateful to the US Fire Administration for its work in developing, coordinating, and maintaining NFIRS.

To learn more about research at NFPA visit nfpa.org/research.

Email: research@nfpa.org

NFPA No. USS02

Resources

https://www.cdc.gov/niosh/centers/firefighter-safety-and-health.html

https://www.nvfc.org/firefighters/resources/

https://www.usfa.fema.gov/a-z/health-safety-wellness/

https://www.iafc.org/about-iafc/sections/vcos/resources/safety-and-health

https://firefighterhealthsafety.org/about/docs-resources/

How National Estimate Statistics Are Calculated

The statistics in this analysis are estimates derived from the National Fire Incident Reporting System (NFIRS) and the National Fire Protection Association's (NFPA) annual survey of US fire departments. NFIRS is a voluntary system by which participating fire departments report detailed factors about the fires to which they respond. Roughly two-thirds of US fire departments participate, although not all of these departments provide data every year. Fires reported to federal or state fire departments or industrial fire brigades are not included in these estimates.

NFIRS provides the most detailed incident information of any national database not limited to large fires. NFIRS is the only database capable of addressing national patterns for fires of all sizes by specific property use and specific fire cause. NFIRS also captures information on the extent of flame spread and automatic detection and suppression equipment. For more information about NFIRS, visit http://www.nfirs.fema.gov/.

NFIRS has a wide variety of data elements and code choices. The NFIRS database contains coded information. Many code choices describe several conditions. These cannot be broken down further. For example, area of origin code 83 captures fires starting in vehicle engine areas, running gear areas, or wheel areas. It is impossible to tell the portion of each from the coded data.

NFPA's fire department experience survey provides estimates of the big picture.

Each year, NFPA conducts an annual survey of fire departments that enables us to capture a summary of fire department experience on a larger scale. Surveys are sent to all municipal departments protecting populations of 5,000 or more and a random sample, stratified by community size, of the smaller departments. Typically, a total of roughly 3,000 surveys are returned, representing about one of every ten US municipal fire departments and about one-third of the US population.

The survey is stratified by the size of the population protected to reduce the uncertainty of the final estimate. Small rural communities have fewer people protected per department and are less likely to respond to the survey. A larger number must be surveyed to obtain an adequate sample of those departments. (NFPA also makes follow-up calls to a sample of the smaller fire departments that do not respond to confirm that those that did respond are truly representative of fire departments of their size.) On the other hand, large city departments are so few in number and protect such a large proportion of the total US population that it makes sense to survey all of them. Most respond, resulting in excellent precision for their part of the final estimate.

The survey includes the following information: (1) the total number of fire incidents, civilian deaths, and civilian injuries, as well as the total estimated property damage (in dollars) for each of the major property use classes defined in NFIRS; (2) the number of on-duty firefighter injuries by type of duty and nature of illness; (3) the number and nature of non-fire incidents; and (4) information on the type of community protected (e.g., county versus township versus city) and the size of the population protected, which is used in the statistical formula for projecting national totals from sample results. The results of the survey are published in the annual report *Fire Loss in the United States*.

Projecting NFIRS to National Estimates

As noted, NFIRS is a voluntary reporting system. Different states and jurisdictions have different reporting requirements and practices. Participation rates in NFIRS are not necessarily uniform across regions and community sizes, which are both factors correlated with the frequency and severity of fires. This means NFIRS may be susceptible to systematic biases. No one at present can quantify the size of these deviations from the ideal, representative sample, so no one can say with confidence that they are or are not serious problems. But there is enough reason for concern that a second database — the NFPA survey — is needed to project NFIRS to national estimates and project different parts of NFIRS separately. This multiple calibration approach makes use of the annual NFPA survey where its statistical design advantages are strongest.

In this analysis, only data originally collected in NFIRS 5.0 is included in the calculations of the 2018–2022 national estimates for firefighter injuries in structure fires.

This update for 2018–2022 includes injuries that occurred at all fires (incident type 110–171) and at the fireground (injury occurred codes 5 and 6), as well as the severity of the injuries (from 1 to 5). Except where otherwise noted, all the tables are based on fireground injuries that occurred at all fires. The national annual estimates of firefighter injuries were weighted for the individual years using total fireground injuries from the annual NFPA fire experience survey.

In this report, unknown data was assumed to have the same proportional distribution as the distribution where the data was known. The “Other” category includes cases specifically coded as “Other” and cases coded in specific categories but with very low frequency.