



**RESEARCH**

# **Volunteer Firefighter Injuries**

## **Supporting Tables**

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Richard Campbell  
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## Volunteer Firefighter Injuries: Supporting Tables

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The tables in this document are a companion to the report of the same name. The tables show estimates of 2013–2017 annual averages. These estimates were derived from the US Fire Administration’s [National Fire Incident Reporting System \(NFIRS\)](#) and the NFPA annual fire department experience survey, and they include proportional shares of unknown or missing data.

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. For more information about NFIRS visit [www.nfirs.fema.gov](http://www.nfirs.fema.gov).

### **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 50,000 or more and a random sample, stratified by community size, of the smaller departments. Typically, roughly 3,000 surveys are returned, representing about one of every ten US municipal fire departments and about one third of the US population.

### **Projecting NFIRS to National Estimates**

As noted, NFIRS is a voluntary 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 factors correlated with 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 to 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 report, unknown data was assumed to have the same proportional distribution as the distribution where the data was known. The “Other” categories include cases specifically coded as “other” and cases coded in specific categories but with very low frequency. Note that the number of firefighter fireground injuries has been rounded to the nearest ten, and percentages are rounded to the nearest whole percent. Totals in tables may not equal sums due to rounding.

This update for 2013–2017 includes injuries that occurred at all fires (incident type 110-171), at the fireground (where injury occurred codes 5 and 6), and severity of injury (1 to 5). Except where otherwise noted, all 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.

## List of Tables

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Table	Volunteer Firefighters by:	Page
Table 1.	Month	3
Table 2.	Day of week	3
Table 3.	Time of day	4
Table 4.	Age	5
Table 5.	Gender	5
Table 6.	Type of incident	5
Table 7.	Property use	6
Table 8.	General location	6
Table 9.	Specific location	7
Table 10.	Severity of injury	7
Table 11.	Cause of injury	8
Table 12.	Activity when injured	9
Table 13.	Primary symptom	10
Table 14.	Primary body part	11
Table 15.	Injury factor	13

## Acknowledgements

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The National Fire Protection Association thanks all the fire departments and state fire authorities who participate in the NFIRS and the annual NFPA Fire Experience Survey. These firefighters are the original sources of the detailed data that make 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 [www.nfpa.org/research](http://www.nfpa.org/research).  
Email: [research@nfpa.org](mailto:research@nfpa.org)

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**Table 1.**  
**Volunteer Firefighter Fireground Injuries by Month**  
**2013–2017 Annual Averages**

<b>Month</b>	<b>Firefighter Injuries</b>	
January	580	(11%)
February	520	(10%)
March	500	(9%)
April	460	(9%)
May	390	(7%)
June	380	(7%)
July	590	(11%)
August	420	(8%)
September	350	(7%)
October	310	(6%)
November	400	(8%)
December	420	(8%)
<b>Total</b>	<b>5,330</b>	<b>(100%)</b>

Source: NFIRS 5.0 and NFPA Fire Experience Survey

**Table 2.**  
**Volunteer Firefighter Fireground Injuries by Day of Week**  
**2013–2017 Annual Averages**

<b>Day of Week</b>	<b>Firefighter Injuries</b>	
Sunday	900	(17%)
Monday	700	(13%)
Tuesday	710	(13%)
Wednesday	710	(13%)
Thursday	710	(13%)
Friday	720	(13%)
Saturday	880	(16%)
<b>Total</b>	<b>5,330</b>	<b>(100%)</b>

Source: NFIRS 5.0 and NFPA Fire Experience Survey

**Table 3.**  
**Volunteer Firefighter Fireground Injuries by Time of Day**  
**2013–2017 Annual Averages**

<b>Time of Day</b>	<b>Firefighter Injuries</b>	
Midnight–12:59 a.m.	210	(4%)
1:00–1:59 a.m.	140	(3%)
2:00–2:59 a.m.	190	(4%)
3:00–3:59 a.m.	180	(3%)
4:00–4:59 a.m.	150	(3%)
5:00–5:59 a.m.	160	(3%)
6:00–6:59 a.m.	160	(3%)
7:00–7:59 a.m.	120	(2%)
8:00–8:59 a.m.	120	(2%)
9:00–9:59 a.m.	120	(2%)
10:00–10:59 a.m.	190	(4%)
11:00–11:59 a.m.	200	(4%)
12:00–12:59 p.m.	240	(5%)
1:00–1:59 p.m.	310	(6%)
2:00–2:59 p.m.	340	(6%)
3:00–3:59 p.m.	330	(6%)
4:00–4:59 p.m.	320	(6%)
5:00–5:59 p.m.	340	(6%)
6:00–6:59 p.m.	280	(5%)
7:00–7:59 p.m.	280	(5%)
8:00–8:59 p.m.	320	(6%)
9:00–9:59 p.m.	200	(4%)
10:00–10:59 p.m.	230	(4%)
11:00–11:59 p.m.	190	(4%)
<b>Total</b>	<b>5,330</b>	<b>(100%)</b>

Source: NFIRS 5.0 and NFPA Fire Experience Survey

**Table 4.**  
**Volunteer Firefighter Fireground Injuries by Age**  
**2013–2017 Annual Averages**

<b>Age</b>	<b>Firefighter Injuries</b>	
Less than 20 years	390	(7%)
20 to 29 years	1,880	(35%)
30 to 39 years	1,160	(22%)
40 to 49 years	920	(17%)
50 to 59 years	640	(12%)
60 to 69 years	270	(5%)
70 years and older	80	(1%)
<b>Total</b>	<b>5,330</b>	<b>(100%)</b>

Source: NFIRS 5.0 and NFPA Fire Experience Survey

**Table 5.**  
**Volunteer Firefighter Fireground Injuries by Gender**  
**2013–2017 Annual Averages**

<b>Gender</b>	<b>Firefighter Injuries</b>	
Male	4,960	(93%)
Female	370	(7%)
<b>Total</b>	<b>5,330</b>	<b>(100%)</b>

Source: NFIRS 5.0 and NFPA Fire Experience Survey

**Table 6.**  
**Volunteer Firefighter Fireground Injuries by Type of Incident**  
**2013–2017 Annual Averages**

<b>Type of Incident</b>	<b>Firefighter Injuries</b>	
Structure fire	4,410	(83%)
Natural vegetation fire	390	(7%)
Vehicle fire	190	(4%)
Fire in mobile property used as a fixed structure	160	(3%)
Outside rubbish fire	80	(2%)
Unclassified fire	40	(1%)
Special outside fire	40	(1%)
<b>Total</b>	<b>5,330</b>	<b>(100%)</b>

Source: NFIRS 5.0 and NFPA Fire Experience Survey

**Table 7.**  
**Volunteer Firefighter Fireground Injuries by Property Use**  
**2013–2017 Annual Averages**

<b>Property Use</b>	<b>Firefighter Injuries</b>	
Residential	3,700	(69%)
Outside or special property	560	(11%)
Storage	440	(8%)
Mercantile or business	210	(4%)
Industrial, utility, defense, agriculture, mining	130	(2%)
Assembly	110	(2%)
Manufacturing, processing	100	(2%)
Educational	30	(1%)
Other	30	(1%)
<b>Total</b>	<b>5,330</b>	<b>(100%)</b>

Source: NFIRS 5.0 and NFPA Fire Experience Survey

**Table 8.**  
**Volunteer Firefighter Fireground Injuries by General Location**  
**2013–2017 Annual Averages**

<b>General Location</b>	<b>Firefighter Injuries</b>	
At scene, outside	3,620	(68%)
At scene, in structure	1,710	(32%)
<b>Total</b>	<b>5,330</b>	<b>(100%)</b>

Source: NFIRS 5.0 and NFPA Fire Experience Survey

**Table 9.**  
**Volunteer Firefighter Fireground Injuries by Specific Location**  
**2013–2017 Annual Averages**

<b>Specific Location</b>	<b>Firefighter Injuries</b>	
Outside at grade	2,590	(49%)
In structure, excluding attic, roof, or wall	1,470	(28%)
On ground ladder	130	(2%)
On steep grade	120	(2%)
On roof	100	(2%)
In motor vehicle	60	(1%)
In attic or other confined structural space	60	(1%)
On aerial ladder or in basket	50	(1%)
In ditch or trench	40	(1%)
On vertical surface or ledge	40	(1%)
Unspecified location	590	(11%)
Other known location	70	(1%)
<b>Total</b>	<b>5,330</b>	<b>(100%)</b>

Source: NFIRS 5.0 and NFPA Fire Experience Survey

**Table 10.**  
**Volunteer Firefighter Fireground Injuries by Severity of Injury**  
**2013–2017 Annual Averages**

<b>Severity of Injury</b>	<b>Firefighter Injuries</b>	
Treated by physician, not a lost-time injury	2,040	(38%)
First aid only	1,270	(24%)
Report only, including exposure	940	(18%)
Lost-time injury, moderate severity	930	(17%)
Lost-time injury, severe	110	(2%)
Lost-time injury, life threatening	30	(1%)
<b>Total</b>	<b>5,330</b>	<b>(100%)</b>

Source: NFIRS 5.0 and NFPA Fire Experience Survey



**Table 11.**  
**Volunteer Firefighter Fireground Injuries by Cause of Injury**  
**2013–2017 Annual Averages**

Cause of Injury	Firefighter Injuries	
Overexertion or strain	1,370	(26%)
Exposure to hazard	1,060	(20%)
Contact with object	710	(13%)
Slip or trip	640	(12%)
Fall	600	(11%)
Struck or assaulted by person, animal, or object	430	(8%)
Other cause	520	(10%)
<b>Total</b>	<b>5,330</b>	<b>(100%)</b>

Source: NFIRS 5.0 and NFPA Fire Experience Survey

**Table 12.**  
**Volunteer Firefighter Fireground Injuries by Activity When Injured**  
**2013–2017 Annual Averages**

<b>Activity When Injured</b>	<b>Firefighter Injuries</b>	
Extinguishing fire or neutralizing incident	2,750	(52%)
Handling charged hose lines	1,470	(28%)
Using hand tools in extinguishment activity	370	(7%)
Other known extinguishing or neutralizing activity	40	(1%)
Unclassified extinguishing fire or neutralizing incident	870	(16%)
Suppression support	1,260	(24%)
Overhaul	560	(11%)
Ventilation with hand tools	90	(2%)
Ventilation with power tools	80	(1%)
Salvage	60	(1%)
Forcible entry	50	(1%)
Unclassified suppression support	420	(8%)
Other incident scene activity	530	(10%)
Picking up tools, equipment, or hose on scene	130	(2%)
Moving tools or equipment around scene	120	(2%)
Laying hose	100	(2%)
Catching hydrant	40	(1%)
Other incident scene activity	140	(3%)
Operating fire department apparatus	210	(4%)
Operating engine or pumper	140	(3%)
Operating aerial ladder or platform	30	(1%)
Other operating fire department apparatus	40	(1%)
Driving or riding vehicle	140	(3%)
Getting off fire department vehicle	90	(2%)
Riding fire department vehicle	20	(0%)
Other driving or riding vehicle	40	(1%)
EMS or rescue	130	(2%)
Searching for victim	60	(1%)
Rescuing fire victim	40	(1%)
Other EMS or rescue activity	30	(1%)
Other known activity	60	(1%)
Incident investigation, during incident	40	(1%)
Administrative, communications, station, or other activity	20	(0%)
Unclassified activity	90	(2%)
<b>Total</b>	<b>5,330</b>	<b>(100%)</b>

Source: NFIRS 5.0 and NFPA Fire Experience Survey

**Table 13.**  
**Volunteer Firefighter Fireground Injuries by Primary Symptom**  
**2013–2017 Annual Averages**

Primary Symptom	Firefighter Injuries	
Strain or sprain	850	(15%)
Exhaustion or fatigue, including heat exhaustion	560	(10%)
Cut or laceration	500	(9%)
Thermal burns	450	(8%)
Pain only	400	(7%)
Smoke inhalation	310	(5%)
Contusion or bruise, minor trauma	280	(5%)
Dizziness, fainting, or weakness	230	(4%)
Breathing difficulty or shortness of breath	200	(4%)
Fracture	190	(3%)
Cardiac symptoms	170	(3%)
Swelling	130	(2%)
Penetrating stab or puncture wound	110	(2%)
Dehydration	110	(2%)
Eye trauma, avulsion	70	(1%)
Abrasion	70	(1%)
Nausea	60	(1%)
Dislocation	50	(1%)
Scald burn	50	(1%)
Vomiting	50	(1%)
Hazardous fumes inhalation	50	(1%)
Sickness, other	40	(1%)
Crushing	40	(1%)
Electric shock	30	(1%)
Burns and smoke inhalation	30	(1%)
Disorientation	30	(1%)
Other known symptom	140	(3%)
Unclassified symptom	100	(2%)
<b>Total</b>	<b>5,330</b>	<b>(100%)</b>

Source: NFIRS 5.0 and NFPA Fire Experience Survey

**Table 14.**  
**Volunteer Firefighter Fireground Injuries by Primary Body Part**  
**2013–2017 Annual Averages**

<b>Primary Body Part</b>	<b>Firefighter Injuries</b>	
Upper extremities	1,160	(22%)
Hand and fingers	740	(14%)
Wrist	150	(3%)
Arm: lower, not including elbow or wrist	120	(2%)
Arm: upper, not including elbow or shoulder	80	(1%)
Elbow	70	(1%)
Lower extremities	1,070	(20%)
Knee	360	(7%)
Ankle	360	(7%)
Lower leg	160	(3%)
Foot and toes	140	(3%)
Upper leg	60	(1%)
Head	770	(14%)
Eye	170	(3%)
Ear	100	(2%)
Nose	50	(1%)
Mouth: includes lips, teeth, and interior	50	(1%)
Unclassified head	400	(7%)
Multiple parts	610	(11%)
Multiple body parts: whole body	460	(9%)
Multiple body parts: upper part of body	130	(2%)
Multiple body parts: lower part of body	20	(0%)
Neck and shoulders	540	(10%)
Shoulder	320	(6%)
Neck	190	(4%)
Throat	30	(0%)
Internal	480	(9%)
Trachea and lungs	310	(6%)
Heart	80	(2%)
Stomach	20	(0%)
Unclassified internal	70	(1%)
Thorax	370	(7%)
Chest	200	(4%)
Back, except spine	170	(3%)

**Table 14.**  
**Volunteer Firefighter Fireground Injuries by Primary Body Part**  
**2013–2017 Annual Averages (continued)**

Primary Body Part	Firefighter Injuries	
Abdominal area	130	(2%)
Hip, lower back, or buttocks	70	(1%)
Abdomen	40	(1%)
Pelvis or groin	20	(0%)
Spine	120	(2%)
Unclassified body part	80	(1%)
<b>Total</b>	<b>5,330</b>	<b>(100%)</b>

Source: NFIRS 5.0 and NFPA Fire Experience Survey

**Table 15.**  
**Volunteer Firefighter Fireground Injuries by Injury Factor**  
**2013–2017 Annual Averages**

Injury Factor	Firefighter Injuries	
Fire development	1,000	(19%)
Fire progress, including smoky conditions	720	(14%)
Explosion	80	(2%)
Flashover	40	(1%)
Unclassified fire development	120	(2%)
Slippery or uneven surfaces	1,000	(19%)
Uneven surface, including holes in the ground	300	(6%)
Icy surface	290	(6%)
Wet surface includes water/soap/foam, etc.	100	(2%)
Loose material on surface	90	(2%)
Unclassified slippery or uneven surfaces	210	(4%)
Collapse or falling object	730	(14%)
Falling objects	220	(4%)
Ceiling collapse	140	(3%)
Floor collapse	110	(2%)
Roof collapse	80	(2%)
Wall collapse	40	(1%)
Unclassified collapse or falling object	140	(3%)
Holes	150	(3%)
Vehicle or apparatus	120	(2%)
Firefighter standing on apparatus	50	(1%)
Unclassified vehicle or apparatus	70	(1%)
Lost, caught, trapped, or confined	80	(1%)
Operating in confined structural areas	50	(1%)
Unclassified lost, caught, trapped, or confined	30	(1%)
Hostile acts	20	(0%)
Other unclassified factor	780	(15%)
None	1,450	(27%)
<b>Total</b>	<b>5,330</b>	<b>(100%)</b>

Source: NFIRS 5.0 and NFPA Fire Experience Survey