

Stop, drop, and roll: workplace hazards of local government firefighters, 2009

When compared with all workers, firefighters are injured in similar ways but at a much higher rate, with work-related injuries caused by “stress, exertion, and other medical-related issues” accounting for the largest number of deaths and with risks of fatal injuries 25.7 percent higher and nonfatal injuries and illnesses over two times greater

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Unlike those in many other professions, firefighters regularly face hazardous working conditions. Candidates undergo rigorous training and generally must pass written, physical, and medical examinations before they are allowed to work in hazardous working environments. Despite the prerequisites, the risk of fatal injuries is 25.7 percent higher and the risk of nonfatal injuries and illnesses to firefighters is over two times greater than to all workers. This article uses data from the Bureau of Labor Statistics (BLS) Survey of Occupational Injuries and Illnesses (SOII) and Census of Fatal Occupational Injuries (CFOI) to observe how often firefighters are injured at work, when they are hurt, where they are injured, and how their injuries compare with those of workers in other professions.

Since 1992, the CFOI has collected data on fatal occupational injuries, including volunteer workers who are exposed to the same work environments and perform the same work-related duties as paid employees.¹ CFOI data come from a variety of data sources, such as death certificates, state workers' compensation records, news media reports, and Occupational Safety and Health Administration (OSHA) reports. CFOI counts include only fatal in-

juries and exclude illness-related deaths, such as heart attacks and strokes, unless precipitated by an injury event.² CFOI data, to include all fatality data, cover workers in both private and government sectors.

In its study of the most frequent causes of fatalities in firefighting, the National Fire Protection Association (NFPA)³ found that “stress, exertion, and other medical-related issues” accounted for the largest number of deaths. In addition, these events or exposures generally resulted in “heart attacks or other sudden cardiac events.”⁴

Each year, the SOII collects nonfatal data covering private wage and salary workers⁵ from a sample of about 230,000 private industry establishments across the United States.⁶ The nonfatal data in this article cover cases with days away from work due to injuries or illnesses to career firefighters in local government as defined by SOII and does not include unpaid workers. Days-away-from-work cases are those that result in at least 1 full day of missed work, not including the day of injury or the beginning of the illness, and also may include days of job transfer or restricted activity. Nonvolunteer firefighters accounted for 29.3 percent of all firefighters in 2009 according to the NFPA.⁷ Data from the SOII are collected using the OSHA recordkeeping standards. Before the 2008 survey year, BLS did not produce the

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national estimates of work-related injuries and illnesses among the public sector (state and local government).⁸ In 2010 (survey year 2009), the BLS published national incidence rates for occupations in state and local government for the first time.

Nature of firefighters' work

Firefighters are prone to injury with incidence rates over two times higher than for all workers combined.⁹ The United States reportedly had nearly 1.4 million fires in 2009, amounting to \$12.5 billion in property damage.¹⁰ Fire departments in the United States responded to a fire every 23 seconds.¹¹ Because of the varied work, firefighters must be alert and ready throughout their shifts; they are frequently the first responders to a fire or other emergency. The following are examples of a career firefighter's nature of work based on the BLS *Occupational Outlook Handbook*:¹²

- Firefighters often stay for multiple days at a location where an emergency occurred, “rescuing trapped survivors and assisting with medical treatment.”
- Because firefighters may routinely encounter hazardous conditions, in addition to fire, that are dangerous to their health, heavy personal protective equipment is required to help shield their bodies from toxic or combustible gases and chemicals and materials emitting radiation.
- Firefighters require specific training and certifications before they are able to respond to emergencies.
- A firefighter's role is likely to change numerous times while the fire department is responding to an emergency.

In 2009, 197,660 nonfatal injuries and illnesses occurred in all occupations in local government; the figure for 2008 was 206,580. In addition, 13,900 nonfatal occupational injuries and illnesses to firefighters involving days

away from work were reported in 2009 in local government and 16,800 reported in 2008. (See table 1.)

Demographics

The highest percentage of injury and illness cases in all the government sectors was the protective service occupations, in which firefighters are included. Protective service occupations had an incidence rate of 505.0 days of away-from-work cases per 10,000 full-time workers in 2009. As expected, men accounted for a large portion of injuries within the protective service occupational group. Of the 22.3 percent of women employed in the protective service occupational group, a more detailed look reveals that only 3.4 percent of them were employed as firefighters in 2009.¹³ Consequently, men sustained over 94.4 percent of the workplace injuries and illnesses that occurred among firefighters in 2009. Firefighters with more than 5 years of service accounted for 65.2 percent of the total injuries and illnesses in 2009. For all workers, 58.1 percent of injuries and illnesses occurred to workers who have been with their employer for more than 5 years.

Nonfatal injuries and illnesses

The BLS developed the Occupational Injury and Illness Classification System (OIICS) to present a reliable set of procedures for recording the characteristics of workplace injuries, illnesses, and fatalities. The SOII publishes four case characteristics to describe each incident that leads to an injury or illness resulting in at least 1 day away from work; in addition to these four characteristics, the CFOI publishes an additional characteristic (secondary source) to describe a fatal workplace injury. The circumstances of each case are classified on the basis of the BLS OIICS manual and the characteristics described in the following paragraphs.

Part of body affected is the part of body directly affected by the injury or illness, such as the back, fingers, or knees. Injuries and illnesses to the trunk, which includes the chest, back, shoulders, and abdomen, accounted for

Table 1. Percent change of injuries and illnesses with days away from work for firefighters in local government compared with all occupations in local government combined, 2008–2009

Characteristic	All occupations		Percent change from 2008–2009	Firefighters		Percent change from 2008–2009
	2009	2008		2009	2008	
Total injuries and illnesses	197,660	206,580	-4.3	13,900	16,800	-17.3

SOURCE: U.S. Bureau of Labor Statistics, Survey of Occupational Injuries and Illnesses.

the most nonfatal injuries and illnesses to firefighters in 2009. The number of days away from work due to injuries and illnesses to the trunk among firefighters was 6,450 in 2008 and 5,670 in 2009. More than 40.0 percent of injuries and illnesses to firefighters were to the trunk, whereas only 30.5 percent occurred to all workers in 2009. More specifically, when the trunk is considered, firefighters with injuries to the back accounted for 3,780 injuries in 2009 and 3,850 in 2008.

Event or exposure is the way in which the injury or illness was produced or inflicted. In 2009, most of the injuries and illnesses to firefighters were due to overexertion (28.6 percent) or from a particular incident of free bodily motion, which imposed stress or strain on some part of the body (18.1 percent).¹⁴ The duties of a firefighter may involve carrying, pushing, pulling, holding, turning, wielding,

throwing, or lifting, all of which may lead to overexertion. Firefighters had an incidence rate of 146.6 cases per 10,000 full-time workers for overexertion, while the incidence rate was 33.4 among all workers. Overexertion made up 18.1 percent of total injuries and illnesses for all local government workers in 2009, but 28.6 percent for firefighters. The total number of instances of overexertion involving days away from work fell from 5,100 in 2008 to 3,980 in 2009. A more detailed look at overexertion shows that overexertion in lifting accounted for 8.5 percent of total injuries and illnesses for all local government workers and was 13.6 percent for firefighters. As seen in table 2, contact with object or equipment, an event that would seem typical during a firefighter's work environment, occurs about as often as in all occupations combined.

Nature is the physical characteristics of the disabling

Table 2. Number and percent of nonfatal injuries and illnesses to firefighters in local government compared with all workers in local government, by event or exposure, 2009

Event or exposure	All workers		Firefighters		
	Number	Percent	Number	Percent	Median days
Total nonfatal injuries and illnesses	197,660	100.0	13,900	100.0	11
Contacts with object equipment	33,060	16.7	2,350	16.9	8
Struck by object	16,250	8.2	1,180	8.5	8
Struck against object	11,220	5.7	890	6.4	5
Falls	47,760	24.2	2,480	17.8	19
Falls to lower level	12,400	6.3	1,030	7.4	20
Falls on same level	32,780	16.6	1,360	9.8	17
Bodily reaction and exertion	73,160	37.0	6,940	49.9	12
Bodily reaction	29,740	15.0	2,520	18.1	11
Bending, climbing, crawling, reaching, twisting	10,460	5.3	790	5.7	20
Slip, trip, loss of balance without fall	8,460	4.3	780	5.6	11
Bodily reaction, n.e.c.	5,940	3.0	630	4.5	9
Overexertion	35,740	18.1	3,980	28.6	11
Overexertion in lifting	16,860	8.5	1,890	13.6	6
Repetitive motion	3,670	1.9	220	1.6	22
Exposed to harmful substance	9,130	4.6	1,170	8.4	10
Transportation accidents	13,650	6.9	420	3.0	111
Fires and explosions	390	—	220	1.6	10
Fire, unintended or uncontrolled	290	—	180	1.3	27
Fire, unspecified	160	—	140	1.0	32
Fire in residence, building, or other structure	100	—	30	—	4
Explosion	80	—	30	—	2
All other	31,460	15.9	2,330	16.8	NA

NOTES: Dashes indicate numbers are less than 1 percent. n.e.c. = not elsewhere classified. NA = not applicable.

SOURCE: U.S. Bureau of Labor Statistics, Survey of Occupational Injuries and Illnesses.

injury or illness, such as heat burns, sprains and strains, or bruises. Not surprisingly, on the basis of firefighters' job duties, sprains and strains were the top nature of injury and illness to firefighters in 2009. (See table 3.) Firefighters frequently climb ladders, carry hoses, and maneuver through doors, walls, and debris, all while carrying heavy protective equipment, which makes them more susceptible to sprains and strains compared with all workers. In 2009, sprains and strains for all workers in the local government made up of 42.5 percent of injuries. As shown in table 3, sprains and strains among firefighters accounted for 50.4 percent of all injuries. In addition, firefighters had an incidence rate of 257.9 per 10,000 full-time workers for sprains and strains, compared with 78.6 for all workers in the local government. Heat burns in 2009 made up only 1.3 percent of all injuries for all workers. But in firefighting the proportion of heat burns (6.3 percent) was nearly five times that of all occupations combined.

Source is the object, substance, exposure, or bodily motion that directly produced or inflicted the disabling condition, such as persons, vehicles, or floors. Firefighters' unique work environment differs compared with that of all workers and may include working in or on smoky conditions, slippery and uneven surfaces, collapsing floors, and collapsing structures. Vehicle accidents and exposure to flames and carbon monoxide smoke are also frequently experienced.¹⁵ Firefighters experience hazardous working conditions when locating and rescuing occupants who are unable to leave the building without assistance. As seen in table 4, "injured or ill

worker"¹⁶ (2,380) was followed by "other than injured or ill worker"¹⁷ (1,220) and, together, accounted for the majority of injuries or illnesses to firefighters. Nearly 20.9 percent of injuries or illnesses to firefighters were from floors, walkways, or ground surfaces compared with 24.2 percent of those to all workers.

Nature-part-source-event

Firefighters typically work in unique environments, and their nonfatal injuries and illnesses reflect that. One of the hazardous job duties of firefighters includes putting out fires, which increases their risk to burns, and the combinations that further examine how firefighters typically are injured while at work. The combinations of nature, part of body affected, source of the injury or illness, and event or exposure can better explain how an injury or illness occurs from start to finish.

Sprains and strains were the most widespread nature of injury to firefighters in 2009, as mentioned previously, and further investigating this nature will help explain nonfatal injuries to this occupation. A few examples, common for firefighters, help explain the occupational hazards to these workers. The first common combination involves the bodily motion or position of the injured or ill worker. Among firefighters, 970 injuries and illnesses were found with sprains or strains, of which the part of body was the lower extremities, the source was bodily motion or position of the injured or ill worker, and the event was bodily reaction and exer-

Table 3. Nonfatal injuries and illnesses involving days away from work to firefighters in local government, by nature, 2009

Nature of the injury or illness	Total cases	Percent
All selected natures	13,900	100.0
Traumatic injuries and disorders	12,940	93.1
Traumatic injuries to bones, nerves, spinal cord	670	4.8
Traumatic injuries to muscles, tendons, ligaments, joints, etc.	7,030	50.6
Sprains and strains	7,010	50.4
Open wounds	640	4.6
Cuts, lacerations	600	4.3
Surface wounds and bruises	1,130	8.1
Bruises, contusions	1,050	7.6
Burns	870	6.3
Heat burns, scalds	870	6.3
Other traumatic injuries and disorders	1,930	13.9
Nonspecified injuries and disorders	1,840	13.2
Back pain, hurt back	560	4.0
Soreness, pain, hurt, except the back	860	6.2

SOURCE: U.S. Bureau of Labor Statistics, Survey of Occupational Injuries and Illnesses.

Table 4. Nonfatal injuries and illnesses involving days away from work to firefighters in local government, by source, 2009

Source of the injury or illness	Total cases
All Selected Sources	13,900
Containers	840
Persons, plants, animals, and minerals	4,160
Person—injured or ill worker	2,380
Bodily motion or position of injured, ill worker	2,230
Person—other than injured or ill worker	1,220
Health care patient or resident of health care facility	980
Structures and surfaces	3,270
Floors, walkways, ground surfaces	2,900
Floors	1,080
Floor of building	930
Ground	940
Tools, instruments, and equipment	2,440
Tools, instruments, and equipment, unspecified	650
Other tools, instruments, and equipment	550
Vehicles	910
Highway vehicle, motorized	880
Other sources	1,300
Atmospheric and environmental conditions	610
Fire, flame, smoke	540

SOURCE: U.S. Bureau of Labor Statistics, Survey of Occupational Injuries and Illnesses.

tion. Common occurrences that led firefighters to bodily reaction and exertion were sprains or strains to the lower extremities of the body induced by a free movement of the body or its parts with no impact involved. (See table 5.) Another common combination for firefighters was overexertion, resulting in sprains and strains to the trunk section of the body, while trying to rescue a person from hazardous environments. Among firefighters, 870 injuries and illnesses occurred, in which the nature was sprains or strains, of which the part of body was the trunk, the source was person other than injured or ill worker, and the event was overexertion (590 of which were overexertion in lifting). The final firefighter combination includes an injury that rarely occurs in most other occupations—heat burns. Among firefighters in which 380 injuries and illnesses were found, the nature was heat burns, the part of body was multiple body parts, the source was steam, and the event was contact with hot objects or substances.

Median days away from work

In 2009, firefighters had a median number of days (11) away from work that was 3 days longer than the num-

ber of days (8) of all other workers in local government. Table 6 displays the number of injuries and illnesses to local government firefighters that involved days away from work by event or exposure in 2009.

Fatal injuries and illnesses

In 2009, firefighters had 29¹⁸ fatal work-related injuries compared with 44 in 2008. As with nonfatal injuries and illnesses, men accounted for a majority of fatal injuries to firefighters. In fact, all the firefighters who were fatally injured in 2009 were men. Fatal injuries to firefighters occurred mostly in the government sector (96.6 percent), with 86.2 percent (25) occurring in local government. Older firefighters ages 55 to 64 and 65 and over incurred 20.7 and 10.3 percent, respectively, of all fatal occupational injuries to firefighting in 2009. However, firefighters in these age groups experienced a much lower percentage of nonfatal injuries and illnesses in 2009 than in 2008. Only 3.8 percent of all nonfatal injuries and illnesses to firefighters were ages 55 to 64, while 0.4 percent were age 65 or over.

White non-Hispanic firefighters constituted 86.2 percent of all fatal injuries to firefighters in 2009. While firefighters typically are associated with putting out fires or entering burning buildings as their call of duty, 10 fatal injuries that occurred to firefighters resulted from vehicular and transportation operations. (See table 7.) Firefighters frequently travel at high speeds, responding to calls, increasing the likelihood of collisions.

Among firefighters, the typical nonfatal injury or illness is different from a typical fatal injury. A majority of nonfatal injuries and illnesses to firefighters result from falls, contact with objects or equipment, overexertion, and bodily reaction. Of the 29 firefighters who were fatally injured, over one-third were killed in transportation incidents, which resulted from highway incidents and firefighters struck by a vehicle or mobile equipment. (See table 8.) Seven fatal injuries were caused by fires and explosions, of which six were the result of a fire in a residence, building, or other structure.

As seen in table 7, the worker activity¹⁹ of the deceased firefighters included vehicular and transportation operations, protective service activities, and all other activities. A closer look at protective service activities shows that in 2009, five firefighters lost their lives while fighting a fire and three died while rescuing or evacuating. Surprisingly, five firefighters died while teaching or giving/receiving training. From 2005 to 2009, 50 firefighters died in 24 different multiple-fatality incidents. A multiple-fatality incident is when the death of at least two workers results

Table 5. The narrative behind the nature-part-source-event characteristics of injuries and illnesses to firefighters in local government, 2009

Nature	Part of body affected	Source of the injury or illness	Event or exposure	Total cases	Narrative ¹
Sprains and strains	Lower extremities	Bodily motion or position of injured, ill worker	Bodily reaction and exertion	970	A firefighter had a sprain or strain to his lower extremities (lower limbs) induced by a free movement of the body or its parts, with no impact involved.
Sprains and strains	Trunk	Person—other than injured or ill worker	Overexertion	870	A firefighter sprains his trunk from overexertion with a person
Sprains and strains	Trunk	Person—other than injured or ill worker	Overexertion in lifting	590	A firefighter sprains his trunk from over-exertion in lifting a person
Heat burns, scalds	Multiple body parts	Steam, vapors, liquids, n.e.c.	Contact with hot objects or substances	380	A firefighter burns multiple body parts from coming into contact with hot objects or substances involving steam, vapors, or liquids
Heat burns, scalds	Head	Fire, flame, smoke	Contact with hot objects or substances	320	A firefighter burns his head from coming into contact with fire, flame, or smoke

¹ Narratives are examples of what might occur and are not actual occurrences.

NOTE: n.e.c. = not elsewhere classified.
SOURCE: U.S. Bureau of Labor Statistics, Survey of Occupational Injuries and Illnesses.

Table 6. Median days firefighters in local government were away from work, by selected events in local government, 2009

Event or exposure	Median days	Total cases	Percent of total
All selected events	11	13,900	100.0
Contact with objects and equipment	8	2,350	16.9
Struck against object or equipment	5	890	6.4
Struck by object or equipment	8	1,180	8.5
Falls	19	2,480	17.8
Falls to lower level	20	1,030	7.4
Falls on same level	17	1,360	9.8
Falls to floor, walkway, or other surface	18	1,240	8.9
Bodily reaction and exertion	12	6,940	49.9
Bodily reaction	11	2,520	18.1
Bending, climbing, crawling, reaching, twisting	20	790	5.7
Slip, trip, and loss of balance without fall	11	780	5.6
Bodily reaction, n.e.c.	9	630	4.5
Overexertion	11	3,980	28.6
Overexertion in lifting	6	1,890	13.6
Overexertion in pulling or pushing objects	12	630	4.5
Overexertion in holding, carrying, turning, or wielding objects	30	1,130	8.1
Exposure to harmful substances or environments	10	1,170	8.4
Contact with temperature extremes	7	800	5.8
Contact with hot objects or substances	18	750	5.4

NOTE: n.e.c. = not elsewhere classified.

SOURCE: U.S. Bureau of Labor Statistics, Survey of Occupational Injuries and Illnesses.

Table 7. Fatal occupational injuries incurred to all firefighters, by selected characteristics, 2005–2009

Worker activity	2005	2006	2007	2008	2009	2005–2009
Vehicular and transportation operations	14	17	20	20	10	81
Driving, operating	10	11	17	11	4	53
Automobile	3	—	—	—	—	8
Truck	—	7	14	9	—	39
Bicycle, motorcycle	—	—	—	—	—	3
Riding in, on	—	4	—	8	3	20
Aircraft	—	—	—	7	—	10
Truck	—	—	—	—	3	10
Directing, flagging traffic	—	—	—	—	—	4
Using or operating tools, machinery	—	—	—	—	—	3
Protective service activities	11	22	27	17	9	86
Fighting a fire	7	16	21	13	5	62
Rescuing or evacuating	—	6	4	—	3	17
Protective service activities, n.e.c.	—	—	—	—	—	7
Materials handling operations	—	—	—	—	—	3
Physical activity, ¹ n.e.c.	—	—	—	—	3	7
All other activities	—	—	—	—	5	11
Teaching, giving, or receiving training	—	—	—	—	5	8

¹ Some activities include walking, sitting, running, and climbing ladders or stairs.
 NOTES: Dashes indicate no data reported or data that do not meet publication criteria. n.e.c. = not elsewhere classified. Census of Fatal Occupational Injuries counts exclude illness-related deaths unless precipitated by an injury event.
 SOURCES: U.S. Department of Labor, U.S. Bureau of Labor Statistics, and Census of Fatal Occupational Injuries.

Table 8. Fatal injuries to all firefighters, by event or exposure, 2009

Event or exposure	Number of fatal injuries to firefighters	Percent of fatal injuries to firefighters
Total fatal injuries	29	100.0
Falls	6	20.7
Falls to lower level	4	13.8
Exposure to harmful substances or environments	4	13.8
Transportation incidents	11	37.9
Highway incidents	7	24.1
Worker struck by vehicle, mobile equipment	4	13.8
Fires and explosions	7	24.1

NOTE: Percentages may not sum to 100 because of rounding.
 SOURCE: U.S. Bureau of Labor Statistics, Census of Fatal Occupational Injuries.

specific duty to each firefighter that requires a great deal of teamwork and organization.²¹

DESPITE THE EXTENSIVE TRAINING and wearing of personal protective equipment, firefighters regularly encounter workplace hazards that result in injury or death. The most common nonfatal injuries to firefighters when performing their duties resulted from bodily reaction and overexertion. Old and young, regardless of age and experience, firefighters in the local government with nonfatal injuries and illnesses had an incidence rate two times higher (511.8²²) compared with all workers (184.8) in 2009. Men accounted for the majority of fatal and nonfatal injury cases because of the high proportion employed in this occupation. The types of events that led to fatal occupational injuries among firefighters (such as transportation accidents) differed from those that led to nonfatal occupational injuries and illnesses (overexertion). Just as workers in general, firefighters had more fatal injuries due to transportation incidents than any other type of event. While responding to calls, firefighters often travel at

from a single incident.²⁰ Fighting fires is not a one-person job. At the scene of a fire, the superior officer assigns a

high speeds, which increases the likelihood of a collision. Much of the data in 2009 show that when compared with

all other workers, firefighters are injured in similar ways but at a much higher rate. □

Notes

¹ Volunteer workers must also meet the CFOI work-relationship criteria to be considered. For more information on fatal work-related injuries to volunteer workers, see Matthew M. Gunter, “Fatal Occupational Injuries to Volunteer Workers, 2003–07,” *Compensation and Working Conditions Online* (U.S. Bureau of Labor Statistics, December 15, 2010), <http://www.bls.gov/opub/cwc/sh20101213ar01p1.htm>.

² Because of the latency period of many occupational illnesses and the resulting difficulty associated with linking illnesses to work, compiling a complete count of all fatal illnesses in a given year is difficult. For more information on CFOI, see U.S. Bureau of Labor Statistics, “Occupational Safety and Health Statistics, Part III, Census of Fatal Occupational Injuries, CFOI Collection Methods,” *BLS Handbook of Methods*, Chapter 9 (last modified September 15, 2012), http://www.bls.gov/opub/hom/homch9.htm#CFOI_collection.

³ The NFPA provides statistical data and analysis on injuries and illnesses involving career firefighters. For more information on the NFPA, visit <http://www.nfpa.org>.

⁴ Rita F. Fahy, Paul R. LeBlanc, and Joseph L. Molis, “Firefighter Fatalities in the United States—2009 and U.S. Fire Service Fatalities in Structure Fires, 1977–2009” (National Fire Protection Agency, June 2010), <http://www.nfpa.org/assets/files/pdf/2009fff.pdf>.

⁵ Employees not considered employees under the Occupational Safety and Health Act of 1970 are unpaid volunteers, sole proprietors, partners, family members of farm employers, and domestic workers in a residential setting. For more information, see Occupational Safety and Health Administration, “The Regulation and Related Interpretations for Recording and Reporting Occupational Injuries and Illnesses,” *OSHA Recordkeeping Handbook*, <http://www.osha.gov/recordkeeping/handbook/index.html>.

⁶ For more information on SOII and the reliability of the estimates, see “Occupational Safety and Health Statistics, Survey of Occupational Injuries and Illnesses,” http://www.bls.gov/opub/hom/homch9.htm#background_part2l; and “Reliability of Estimates,” p. 9, <http://www.bls.gov/opub/hom/pdf/homch9.pdf>.

⁷ Michael J. Karter, Jr., and Gary P. Stein, *U.S. Fire Department Profile Through 2009* (National Fire Protection Agency, Fire Analysis and Research Division, October 2010), p. 3, <http://firecompany4.com/wp-content/uploads/2010/07/National-Volunteer-Firefighters-Profile-2009.pdf>.

⁸ For more information on injuries and illnesses among the public sector, see Jeffery D. Brown, “Nonfatal injuries and illnesses in State and local government workplaces in 2008,” *Monthly Labor Review*, February 2011, p. 33, <http://www.bls.gov/opub/mlr/2011/02/art3full.pdf>.

⁹ Data on nonfatal injuries are from the “Survey of Occupational Injuries and Illnesses,” http://www.bls.gov/opub/hom/homch9.htm#SOII_estimation.

¹⁰ Michael J. Karter, Jr., “Fire Loss in the United States During 2009” (National Fire Protection Agency, Fire Analysis and Research Division, August 2010), p. iii, <http://www.nfpa.org/assets/files/PDF/FireLoss2009.pdf>.

¹¹ *Ibid.*, p. i.

¹² Bureau of Labor Statistics, U.S. Department of Labor, “Fire Fighters,” *Occupational Outlook Handbook, 2010–11 Edition*, <http://www.bls.gov/ooh/Protective-Service/Firefighters.htm>.

¹³ See “Household data annual averages, Employed persons by detailed occupation, sex, race, and Hispanic or Latino ethnicity, 2009” (U.S. Bureau of Labor Statistics, Current Population Survey), [ftp://ftp.bls.gov/pub/special.requests/lf/aa2009/aat11.txt](http://ftp.bls.gov/pub/special.requests/lf/aa2009/aat11.txt).

¹⁴ For more information on bodily motion, see “Event or Exposure,” *Occupational Injury and Illness Classification Manual* (U.S. Bureau of Labor Statistics, September 2007), http://www.bls.gov/iif/osh_oiiics_2_4.pdf.

¹⁵ “Firefighters,” *Occupational Outlook Handbook, 2010–11 Edition*, <http://www.bls.gov/ooh/Protective-Service/Firefighters.htm>.

¹⁶ This major group classifies bodily conditions and self-induced bodily motion injuries. See *Occupational Injury and Illness Classification Manual*, http://www.bls.gov/iif/osh_oiiics.htm.

¹⁷ This major group classifies injuries or illnesses inflicted by family members, coworkers and former coworkers, patients, as well as persons unknown to the injured worker. See *Occupational Injury and Illness Classification Manual*, http://www.bls.gov/iif/osh_oiiics.htm.

¹⁸ This number includes paid and volunteer firefighters.

¹⁹ Census of Fatal Occupational Injuries defines “worker activity” as the activity of the worker at the time of the fatal injury.

²⁰ For more information on multiple fatality incidents, see Dino Drudi and Mark Zak, “Work-related multiple-fatality incidents,” *Monthly Labor Review*, October 2004, p. 35, <http://www.bls.gov/opub/mlr/2004/10/art2full.pdf>.

²¹ *Occupational Outlook Handbook, 2010–11 Edition*, “Fire Fighters,” <http://www.bls.gov/ooh/Protective-Service/Firefighters.htm>.

²² Occupational incidence rates involving days away from work are per 10,000 full-time workers (working 40 hours a week and 50 weeks a year).