



Economic Impact of Firefighter Injuries

2019-09-18|Birgitte Messerschmidt & Ben Evarts|Urban Fire Forum

AGENDA

Ben Evarts

- Data Collection & Methods
- Injury trends
- Injury types and scenarios
- Exposures and other hazards
- What this research doesn't cover

Birgitte Messerschmidt

- Fire Protection Research Foundation Project



How we get the data

PART VI FIRE SERVICE EXPOSURES AND INJURIES

Total number of firefighters that were exposed to infectious diseases (hepatitis, meningitis, HIV, other) in 2018 (severity 1, cause 4, and object 25, 51): _____

Total number of firefighters that were exposed to hazardous conditions (asbestos, chemicals, fumes, radioactive materials, other) in 2018 (severity 1, cause 4, and object 41, 52, 53, 56): _____

Total number of nonfatal firefighter injuries (not exposures) during all types of duty in 2018 (severity 1 (not exposures), and severity 2 thru 6): _____

On-Duty Fire Fighter Injuries (not exposures to infectious diseases) by Type of Duty, and Nature of Most Serious Injury
Departments using NFIRS 5.0 should include results on cases where severity is 1 (not exposures), and severity is 2 thru 6. Primary apparent symptom (PAS) codes are noted in parenthesis for each category. At non-fire emergencies includes EMS and rescue calls, and hazardous condition calls, while other on-duty includes inspection and maintenance duties.

Nature of Most Serious Injury (Primary Apparent Symptom (PAS) codes in parenthesis)	Type of Duty				
	(A) Responding to or Returning from Incidents	(B) At the Fire Ground	(C) At Non-Fire Emergencies	(D) Training	(E) Other On-Duty
1. Burns (PAS 12, 13, 14, 15)					
2a. Smoke or Gas Inhalation (PAS 01, 02)					
2b. Other Respiratory Distress (PAS 03, 44, 64, 65)					
3. Burn and Smoke Inhalation (PAS 11)					
4. Wound, Cut, Bleeding, Bruise (PAS 21–25, 35, 36, 72, 73)					
5. Dislocation, Fracture (PAS 31, 32, 63)					
6. Heart Attack or Stroke (PAS 41, 42, 43)					
7. Strain, Sprain, Muscular Pain (PAS 33, 34, and 98)					
8. Thermal Stress (frostbite, heat exhaustion) (PAS 57, 83–85)					
9. Other (PAS All other codes)					
10. TOTAL					

Other (please specify): _____

FIREGROUND INJURIES BY CAUSE

In the following table, include injuries that occurred at the fireground as reported in column B above. Report the number of injuries that occurred at the fireground by cause, based on the initial factor leading to the injury. Departments using NFIRS 5.0 can find cause and object involved in injury codes in parentheses.

1. Exposure to Fire Products (cause 4, object 47–49, 53, 64): _____
2. Exposure to Chemicals or Radiation (cause 4, object 52, 56): _____
3. Fall, jump, slip, trip (cause 1 to 3): _____
4. Overexertion, strain (cause 7): _____
5. Contact with object (cause 6): _____
6. Struck by (cause 5): _____
7. Extreme weather (cause 4, object 62): _____
8. Other: _____

Please report the number of injuries that resulted in lost time (severity 4 thru 6): _____

How many hours were lost as a result of these injuries? _____

FIRE DEPARTMENT VEHICLE CRASHES

Please report below the number of crashes involving fire department emergency vehicles or fire fighter's personal vehicles while responding to or returning from incidents in 2018. (If none, report 0).

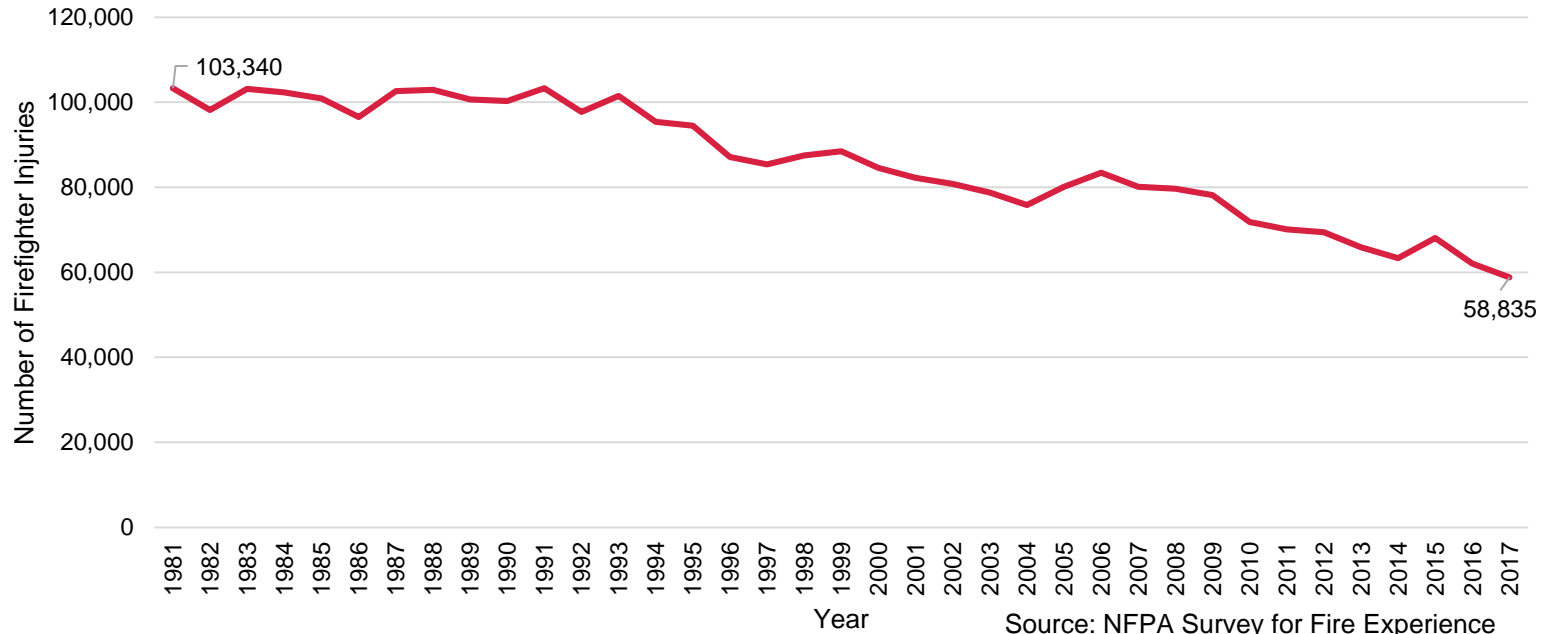
Accidents involving fire department emergency vehicles: _____ Resulting fire fighter injuries: _____

Accidents involving fire fighter's personal vehicles: _____ Resulting fire fighter injuries: _____

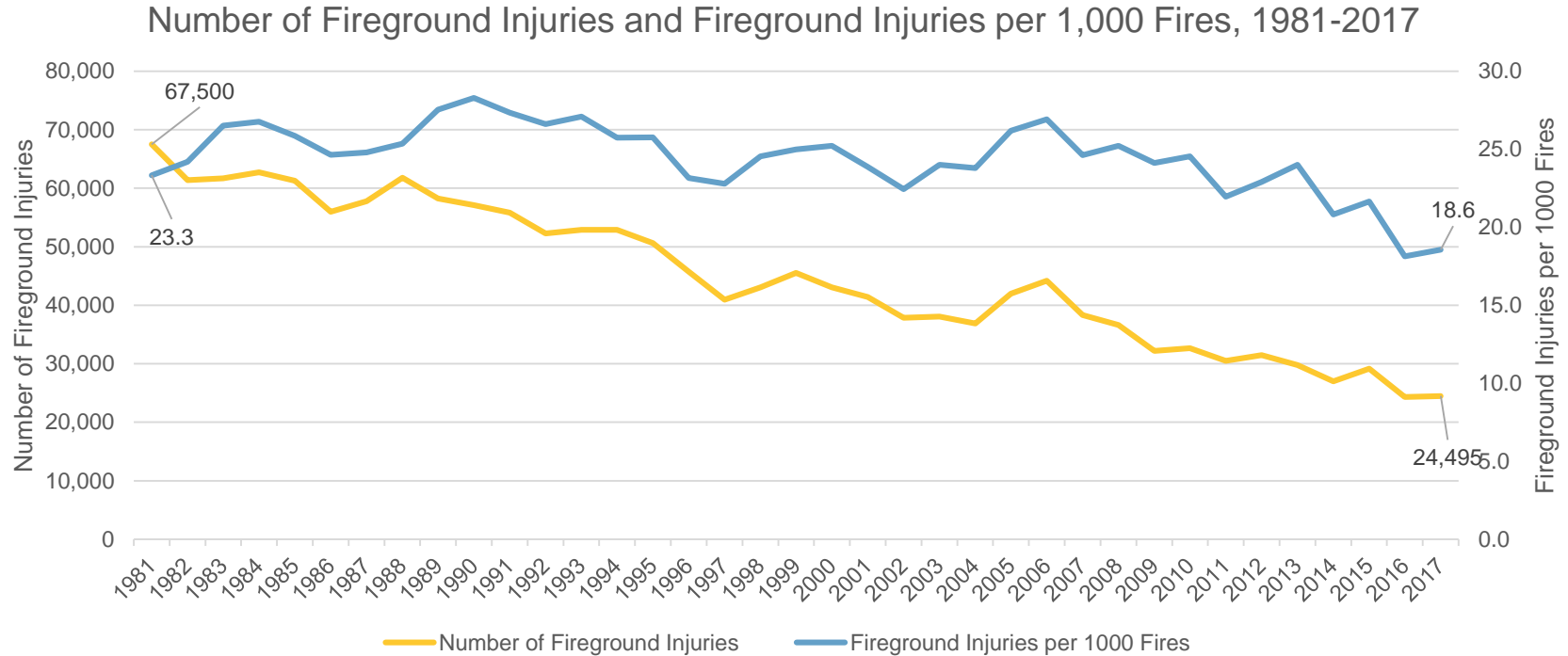


Good news, injuries are falling

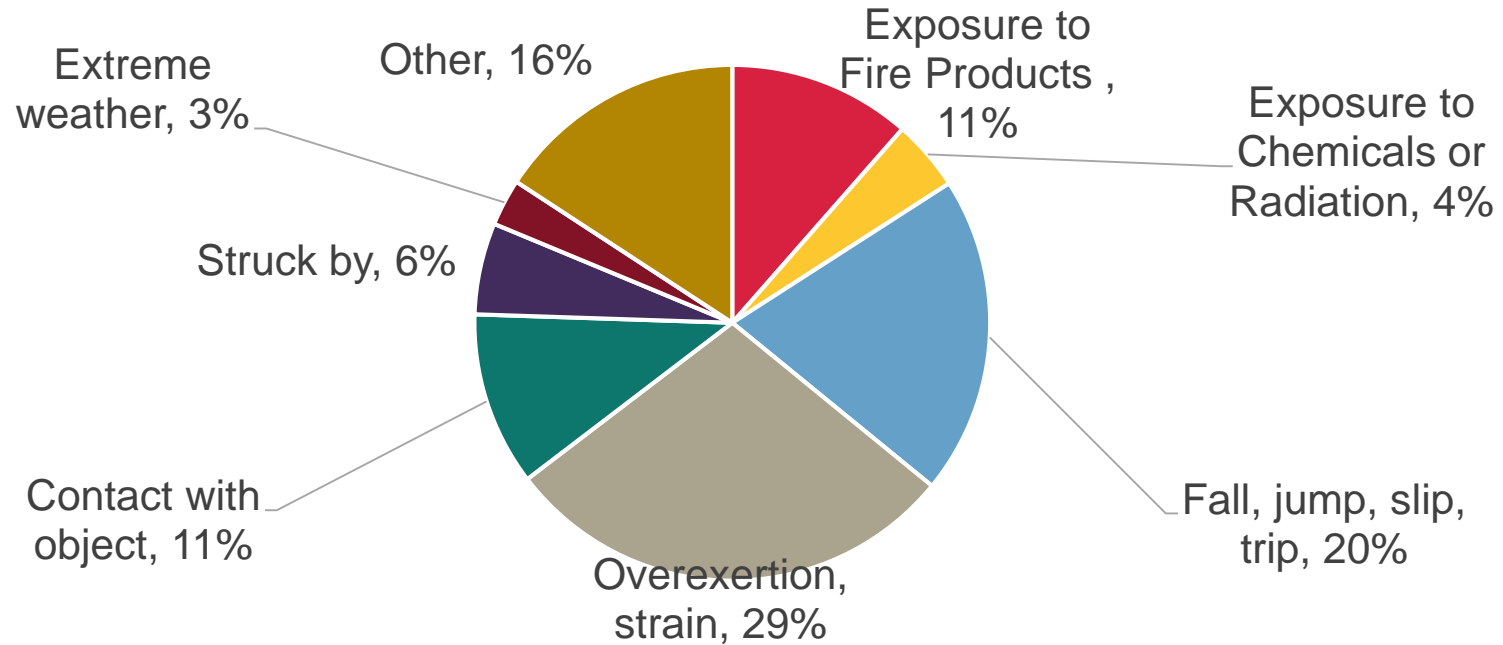
Total Firefighter Injuries by Year, 1981-2017



The number and likelihood of fireground injuries has also been falling

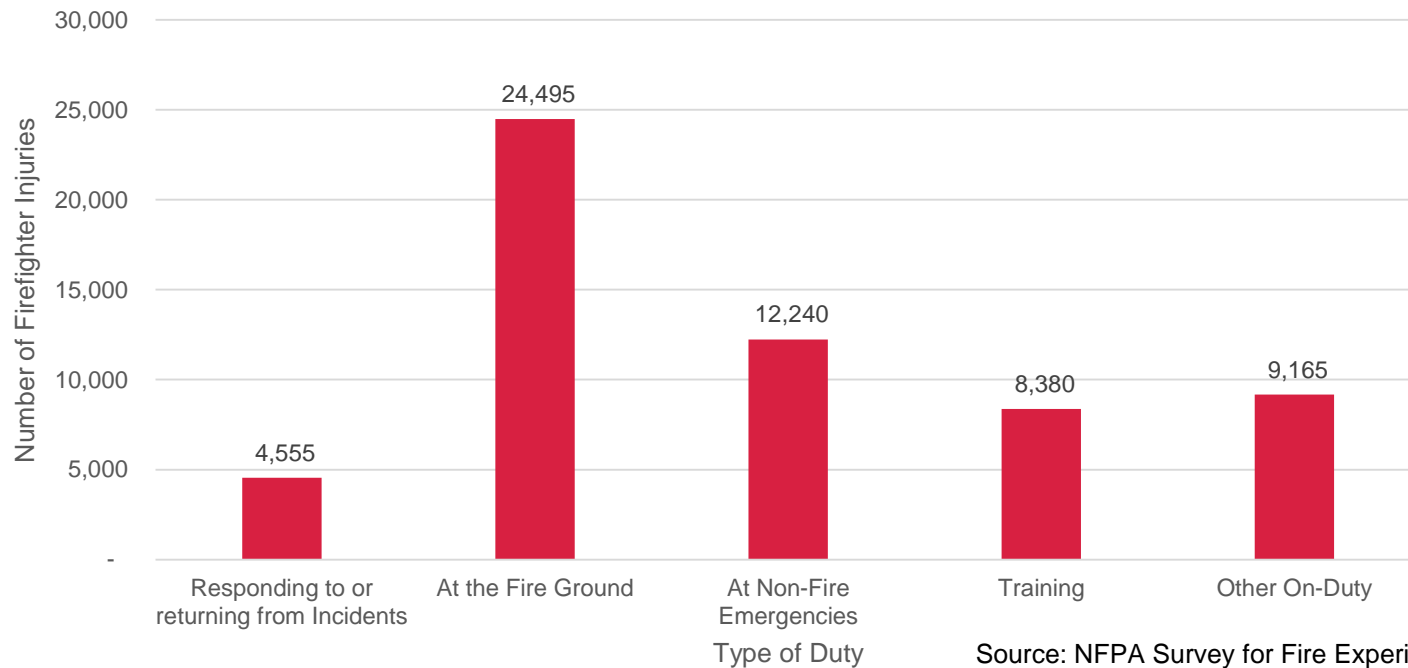


Fireground injuries by cause, 2017



Source: NFPA Survey for Fire Experience

Injuries don't only occur at fires



Source: NFPA Survey for Fire Experience



Exposures and hazardous conditions

- 7,345 exposures to infections diseases
- 44,530 exposures to hazardous conditions

Source: NFPA Survey for Fire Experience



What this doesn't cover and the future

- Response Rates and Survey Data
- Exposures over time
- Emerging issues

A photograph of a row of firefighter lockers. Each locker is a red metal cabinet with a white interior. On the top shelf of each locker is a black and yellow fire helmet. A tan fire jacket with reflective yellow stripes hangs from a silver bar in the middle of each locker. On the bottom shelf, there are various bags and equipment, including blue and white gear bags. The entire scene is framed by a red border.

Fire Protection Research Foundation Study

Research Team

- David Butry, Chief of Applied Economics Office, NIST
- Stanley Gilbert, Economist, NIST
- David Webb, Economist, NIST
- Jennifer Taylor, Director, Center for Firefighter Injury Research and Safety Trends (FIRST) & Associate Professor, Drexel University



Objectives & Goals

- To assess the economic impact of firefighter injuries in the US.
 - NFPA's firefighter injury studies indicate that the rate of firefighter injury per fire incident is not declining at the same rate as the number of fire incidents.
 - A deeper understanding of the costs associated with these injuries will illuminate their impact on the Nation's resources dedicated to fire safety and provide benchmarks to evaluate strategies to reduce these numbers in the future
- Focus of presentation is on linking existing injury statistics with existing economic loss estimates



'Injury Typology'

- Injuries
 - E.g., burns, fractures
- Illnesses & Occupational Disease
 - E.g., post-traumatic stress disorder, cancer
- Health Exposures
 - E.g., HIV exposure



General Approach

- Characterize the annual number and types of firefighter injuries using existing data sources
 - *NFPA's Survey of Fire Departments*
 - *National Fire Incident Reporting System (NFIRS)*
 - *Bureau of Labor Statistics (BLS) Survey of Occupational Injuries and Illnesses*
- Research direct and indirect costs of injuries reported in the economic literature
- Establish and utilize a framework to assess and benchmark these costs



Advantages of Linking Cost Estimates to Injury Statistics

- Provides an injury metric that accounts for consequences
 - The total economic impact is driven by both the number and type of injuries
 - Linking allows more significant injuries to be valued (weighted) higher
- Ability to track injury costs and losses by year



Injury Data Sources (Annual & Nationwide)

Category	NFPA	NFIRS	SOII
Sample	Survey: <i>US Fire Departments</i> (n = 2769)	Partial Census: <i>US Fire Incidents</i> (n = 928 160)	Survey: <i>US Employers</i> (n ≅ 200 000)
Number of Injuries	Number of Injuries and Exposures	Number of Injuries and Exposures	Number of Injuries, Illnesses, Exposures
Firefighter Characteristics		Affiliation Age Physical Condition Just Prior to Injury Responses	Affiliation (Paid-Only) Age Length of Service with Employer Hours Worked
Cause of Injury	Cause of Injury	Cause of Firefighter Injury Factor Contributing to Injury	Event or Exposure
Type of Injury	Nature of Injury	Primary Apparent Symptom Object Involved in Injury Primary Body Part Injured	Nature of Injury, Illness Primary Source of Injury, Illness Secondary Source of Injury, Illness Part of Body Affected
Activity	Type of Duty	Activity at Time of Injury Where Injury Occurred Specific Location Where Injury Occurred	
Severity	Lost Time	Severity (<i>minimum is first aid treatment</i>) Taken To	Number of Days Away from Work Cases with Job Transfer or Restriction

SOII: Survey of Occupational Injuries and Illnesses (US Bureau of Labor Statistics)



Measured Economic Impacts

After matching statistics with costs reported in the economic literature, three ranges ('tiers') of aggregated estimates were produced:

- Tier 1: Impacts \leq \$100 million
 - *Based on lower bound ranges of reported per injury cost data*
- Tier 2: \$100 million < Impacts < \$1 billion
 - *Based on literature limited (1) to a subset of injuries or (2) based on workers compensation claims only.*
- Tier 3: Impacts > \$1 billion
 - Range from \$1.2 billion to \$18 billion
 - Dropping highs/lows: \$1.6 billion to \$5.9 billion



Key Challenges

- Injury data sources cover different pieces of the firefighter injury story
 - Long term occupational disease lacking
 - Occupational disease not tracked for volunteer firefighters at all
- Existing economic injury cost data varies
 - Focuses on direct medical costs and some include work or productivity losses
 - Estimates based on physical injuries
 - Mental health, illnesses, and occupation disease lacking
 - Most studies based on general population or entire workforce
 - Little data specific to firefighters exist



Data Collection Needs

- Tracking incidence of occupational disease and long-term health consequences
 - Data can help establish links to exposure for long term disease
 - To establish links requires better and more consistent reporting of incidents
- Better understanding of mental health and post-traumatic stress injuries, impact on fire departments, and direction of future trends
- Better understanding of costs related to:
 - Direct and indirect cost data specific to firefighting activities
 - Injury litigation and backfill



Incentives for Increased Data Collection

- To reduce the frequency and severity of injuries, illnesses, health exposures, and occupational disease
- To improve cost management by establishing industry injury cost benchmarks.
 - This data can inform discussions with decision makers.
 - Fire departments can compare costs to costs found in the report to see how injuries and costs compare with peers.
- To estimate return-on-investment on activities and equipment to enhance firefighter health
- To create friendly competitions between battalions or to provide recognition at national conferences



Mechanisms to Increase Data Collection and Early Warning

- Use of pre-existing systems/tools through following channels:
 - NFORS & Fire Exposure Module
 - NFIRS
 - CAD
 - Workers compensation reports of injuries
- Link hospital discharge data with industry and occupation data
- Regular health screenings

