

Fire Department Overall Run Profile as Reported to the National Fire Incident Reporting System (2017)

Topical reports are designed to explore facets of the U.S. fire problem as depicted through data collected in the U.S. Fire Administration's National Fire Incident Reporting System. Each topical report briefly addresses the nature of the specific fire or fire-related topic, highlights important findings from the data, and may suggest other resources to consider for further information.

Findings

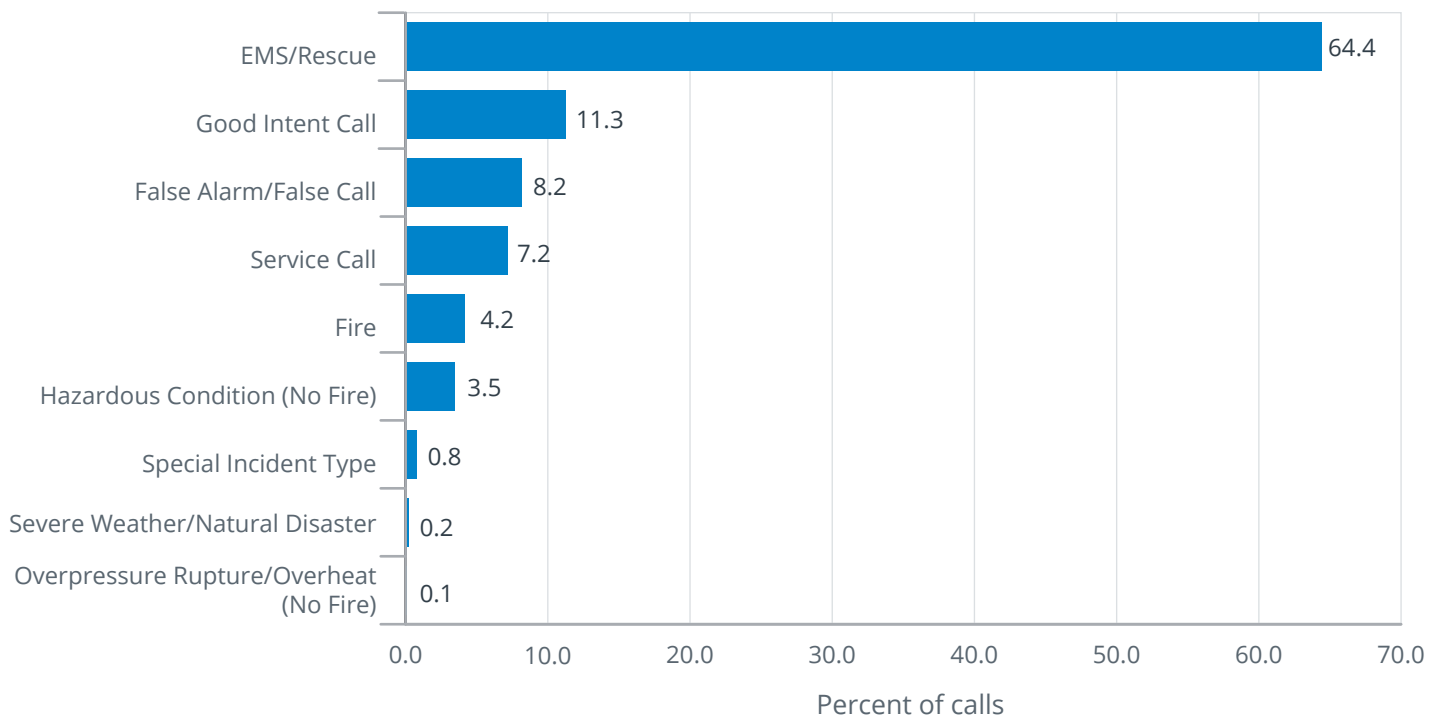
- In 2017, fire departments responded to 26,880,800 calls that were reported to the National Fire Incident Reporting System (NFIRS); this count reflects a 5% increase in the number of calls reported in 2016.
- Almost two-thirds (64%) of the reported calls to fire departments required Emergency Medical Services (EMS) and rescue services.
- Only 4% of all reported fire department runs were fire related.
- In 2017, fire runs were more prevalent on the weekends, whereas severe weather calls occurred more frequently on Mondays than any other day of the week.
- About half (51%) of the reported calls were to residential properties. Only 3% of these were fire related.
- Approximately 8% of reported runs involved mutual or automatic aid.

Fire departments provide invaluable services to communities nationwide. They respond to all types of emergency situations involving fires, explosions, rescues, medical emergencies, hazardous conditions, natural disasters and false alarms. They also respond to nonemergency service calls and good intent calls. Often, what is described to dispatchers does not reflect the actual incident type; nevertheless, fire departments are trained and prepared to respond to a wide variety of situations.¹

To understand the fire department's full role in a community, this topical report profiles fire department run activity as reflected in the 2017 NFIRS data.^{2,3} In 2017, fire departments across the U.S. responded to 26,880,800 calls as reported to the NFIRS.⁴ This count reflects a 5% increase in the number of calls reported in 2016.⁵

While "fire" is part of the department name, only 4% of runs made by fire departments actually involved fire, as shown in Figure 1. Runs in the EMS and rescue, good intent, false alarm, and service call incident type categories accounted for 91% of all reported runs.⁶ Specifically, 64% of all fire department runs were categorized as EMS and rescue. Good intent calls (11%), false alarms and false calls (8%), and service calls (7%) were the next most prevalent incident type categories, followed by fire.⁷ This percentage distribution of runs by major incident type category is comparable to that of the runs reported in 2016.⁸

Within the major incident type categories, EMS, medical assist, and dispatched and canceled enroute calls were the leading specific types of fire department runs.⁹ EMS calls accounted for 41% of all fire department runs. Medical assist calls accounted for 10% of runs, and fire departments were dispatched and canceled enroute in 7% of calls.

Figure 1. Fire department overall runs by major incident type category (Percent of runs, 2017)

Source: NFIRS 5.0.

Note: Total does not add up to 100% due to rounding.

Emergency calls

The official national emergency number is 911. Emergency calls are placed to Public Safety Answering Points (PSAPs), typically city or county controlled, where a trained dispatcher is ready to route the call to local emergency medical, fire and police services. Dispatchers at the PSAPs determine the location of calls by cross-referencing the telephone number against a location database.¹⁰ Technology involving wireless telephones and Voice over Internet Protocol services, such as cellphones and internet connections (e.g., DSL, dial-up and cable modems), make determining where the call is coming from more complex because the call is not associated with a fixed location. This can delay emergency response times. However, to improve the ability of emergency personnel to respond efficiently to callers placing wireless 911 calls, the Federal Communications Commission has taken steps to ensure that wireless service providers make location information automatically available to PSAPs.

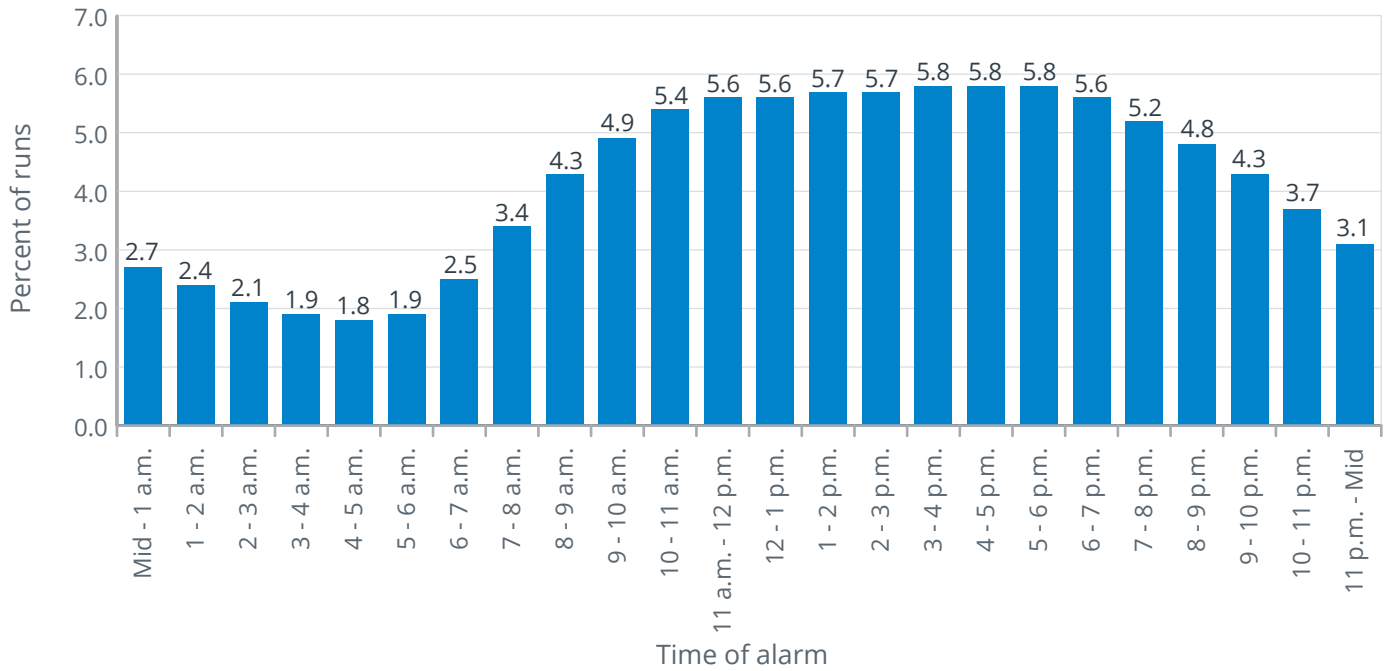
In some rural and remote areas, emergency calls connect directly to local fire stations. Presently, more and more rural area residences are in the process of establishing precise addresses for future PSAP capabilities.¹¹

Hourly, weekly, monthly and seasonal profile of runs

Fire departments respond to incidents every day, at all times of the day. In 2017, the demand for fire department services was relatively constant during the late morning through the early evening. Peak demand was from 3 to 6 p.m., as shown in Figure 2.

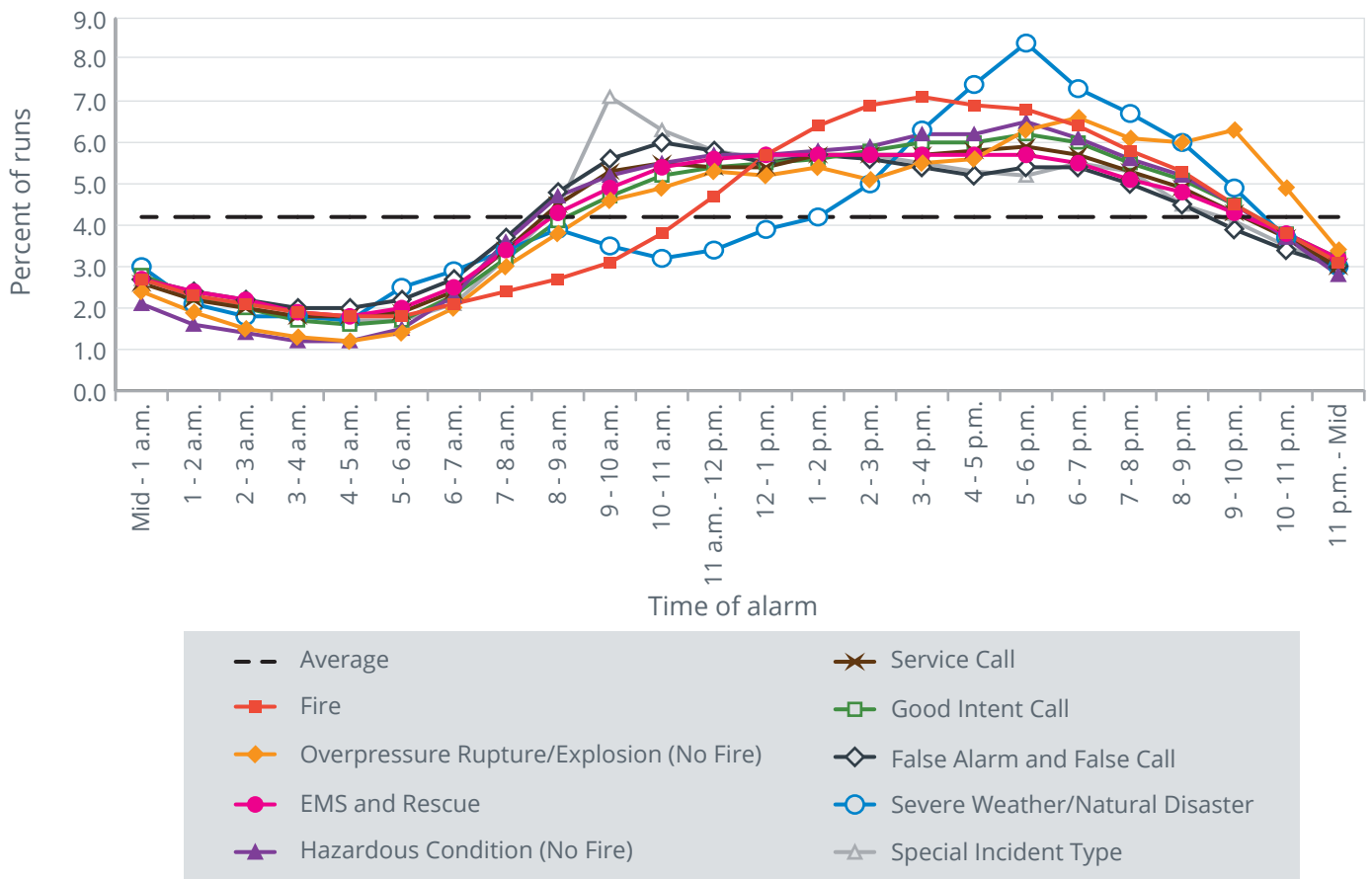
Each type of run has its own characteristic daily profile, as shown in Figure 3. All runs were lowest in the very early morning hours and increased during the morning as daily activities began. Most run types reached near peak demand in midmorning and remained relatively constant with peak hours occurring in the mid-to-late afternoon, until early evening. Fire, severe weather and special incident (e.g., citizen complaint) runs were notable exceptions. Fire runs increased slowly but steadily during the day, peaked during the late afternoon, and then steadily decreased. Severe weather runs had below average demand until midafternoon, increased sharply through late afternoon and early evening, then decreased sharply during the late evening hours. Special incident runs had below-average demand until 8 a.m., peaked late morning, and continued to decline with two small peaks in the midafternoon and early evening hours.

Figure 2. Fire department overall runs by time of day (Percent of runs, 2017)



Source: NFIRS 5.0.

Figure 3. Fire department overall runs by time of day and major incident type category (Percent of runs, 2017)



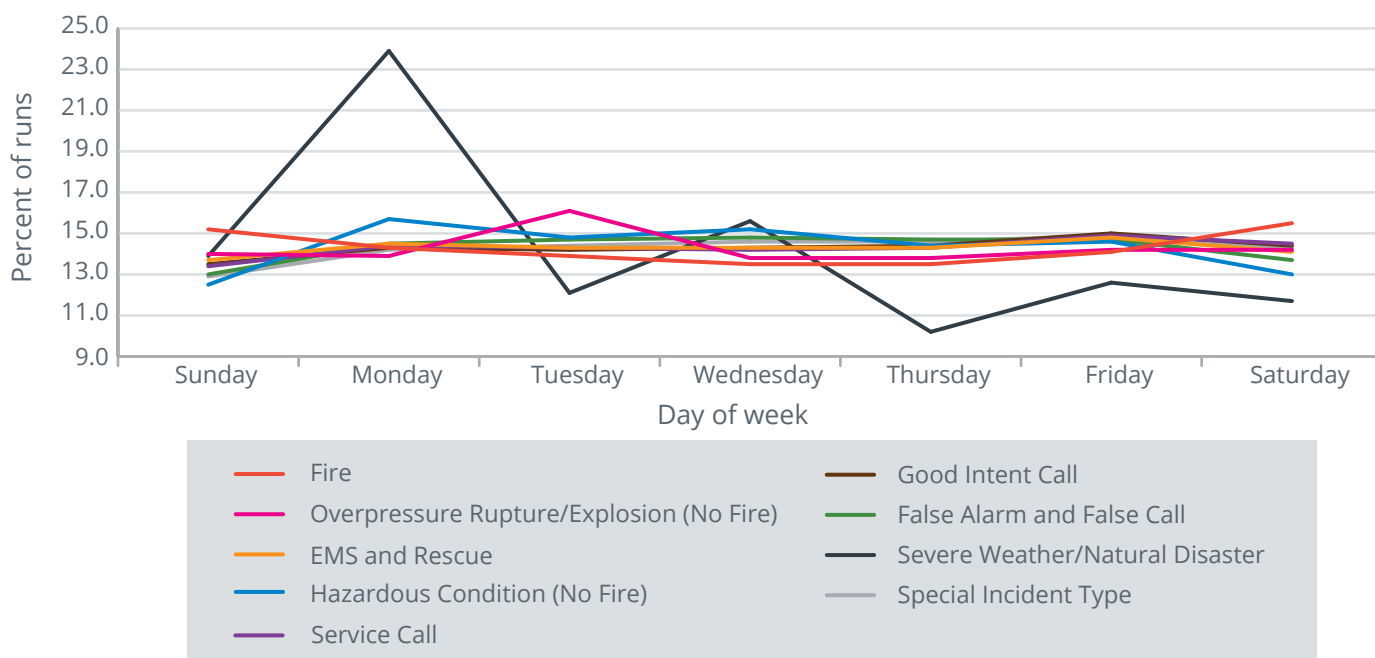
Source: NFIRS 5.0.

Overall, fire department runs followed a fairly consistent pattern by day of the week, except for calls to fires, hazardous conditions, explosions or overpressure ruptures, and severe weather events (Figure 4). In 2017, fire departments responded to more severe weather calls reported on Mondays than any other day of the week; 63% of these weather events reported on Mondays occurred in September (27%), October (24%) and May (12%).¹² Fire calls were more prevalent on the weekends, whereas hazardous condition runs and explosion or overpressure rupture calls were more frequent on Mondays and Tuesdays, respectively.

The occurrence of runs on a monthly basis was relatively constant. However, there was a slight increase in runs during January and July (Figure 5).

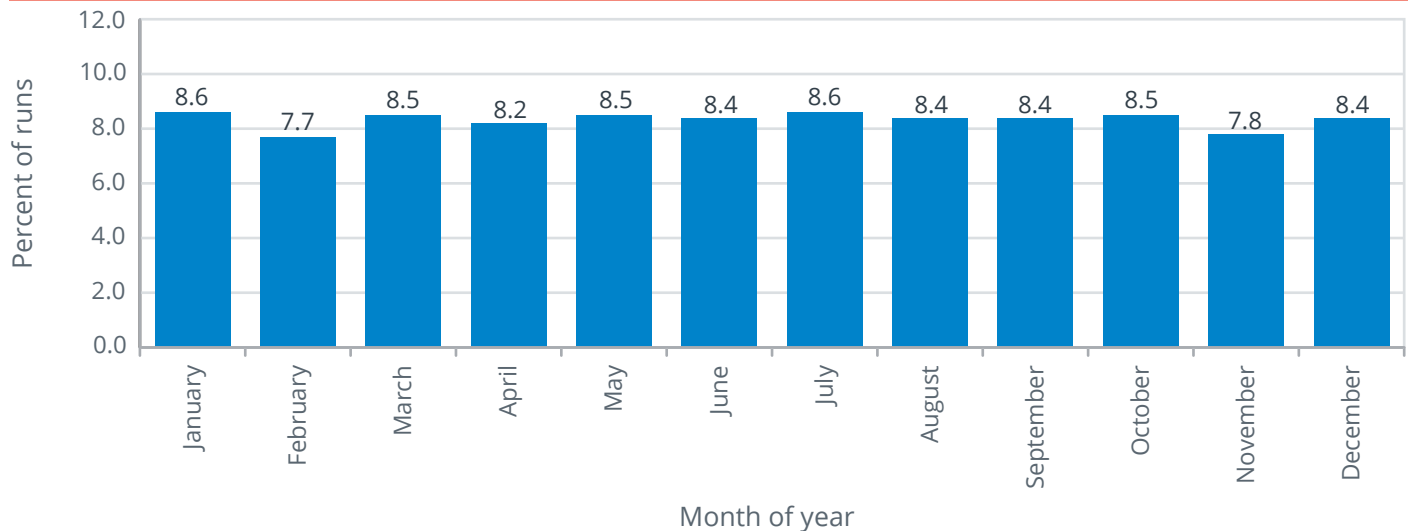
EMS and rescue responses were the most prevalent fire department responses each season, as shown in Figure 6.¹³ This is to be expected as 64% of all fire department runs were categorized as EMS and rescue. Overall, the percentage distribution of the type of runs remained relatively consistent for each season.

Figure 4. Fire department overall runs by major incident type category and day of week (Percent of runs, 2017)



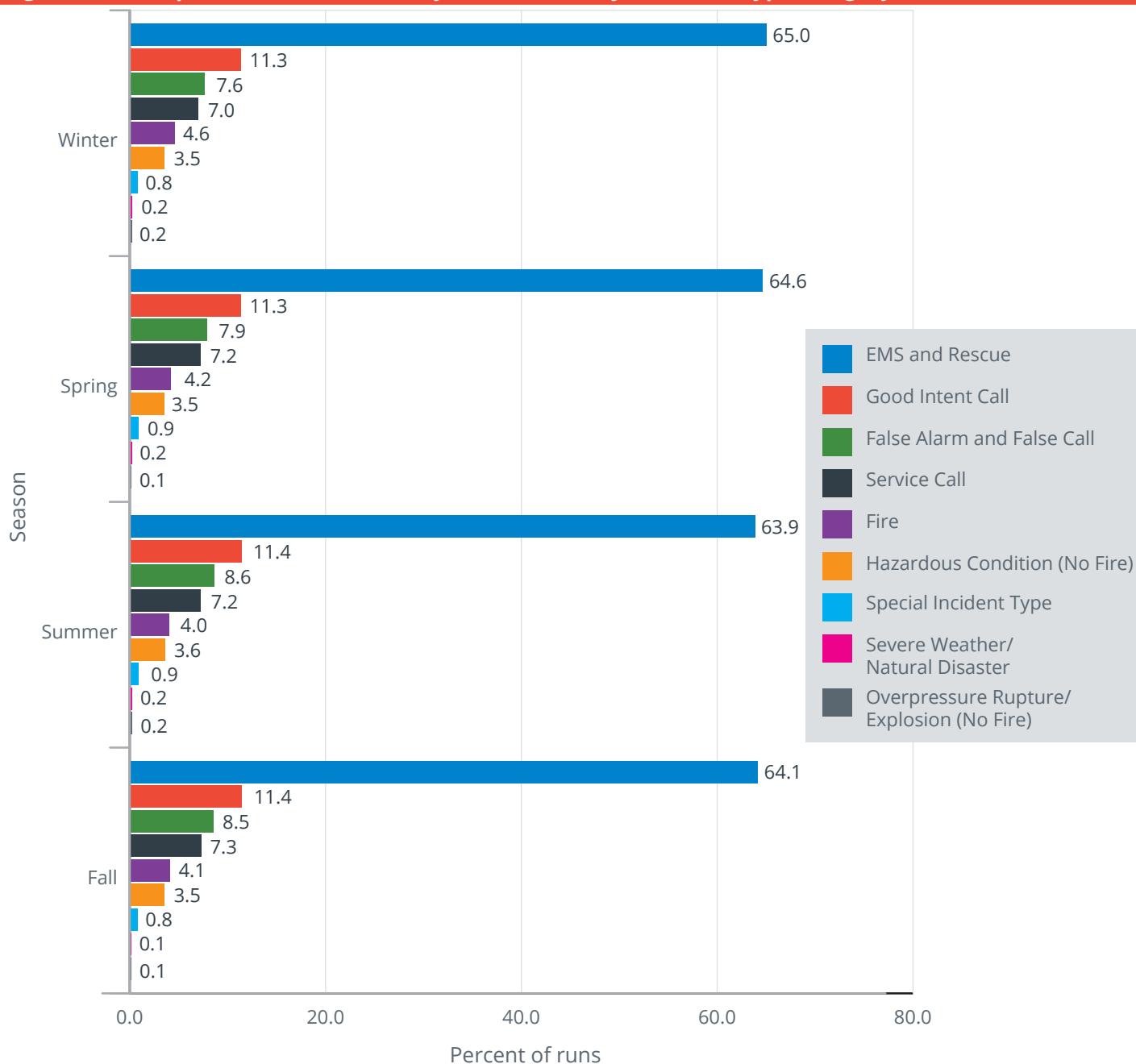
Source: NFIRS 5.0.

Figure 5. Fire department overall runs by month (Percent of runs, 2017)



Source: NFIRS 5.0.

Figure 6. Fire department overall runs by season and major incident type category (Percent of runs, 2017)



Source: NFIRS 5.0.

Note: For the winter, spring and fall distributions of runs, the totals do not add up to 100% due to rounding.

Regional profile of runs

Fire departments in the South reported the most runs in 2017; 41% of all runs occurred in this region (Table 1).¹⁴ This is to be expected as 38% of the U.S. population resided in the South in 2017.¹⁵

For all regions, most calls to fire departments required EMS and rescue services (Figure 7). The Midwestern, Southern and Western regions reported the highest percentages of EMS and rescue runs ranging from 66% to 68%; the Northeast region had the lowest percentage at 52%. Some fire departments in the Northeast still limit their role to traditional fire suppression services and others have only recently taken on EMS roles. This situation may explain

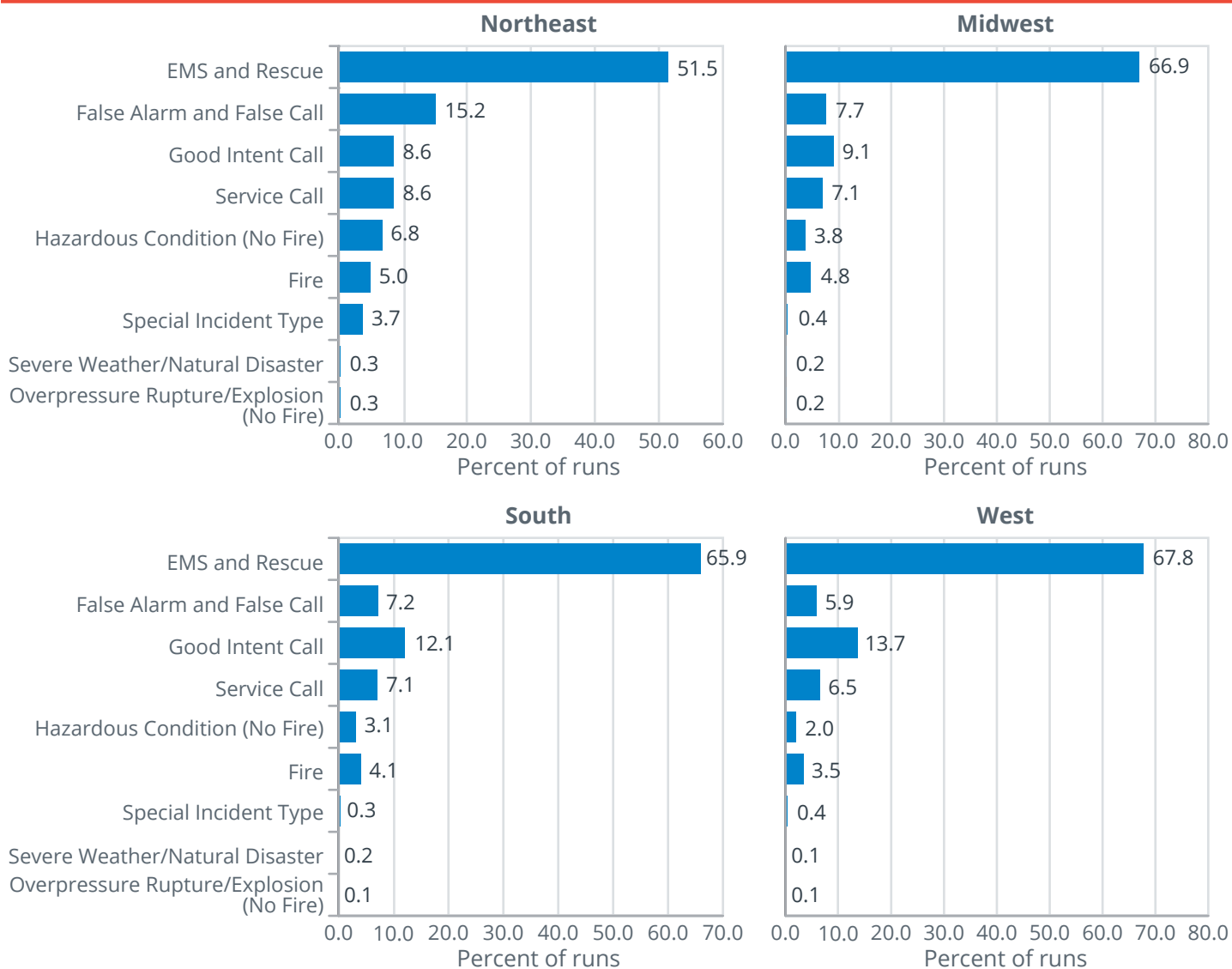
the disparity between the percentages of EMS runs in the Northeast and the rest of the nation.¹⁶ Special incidents, such as citizen complaints, represented 4% of all runs in the Northeastern region, which was the highest out of all the regions. False alarm calls were also highest in the Northeast (15%), whereas good intent calls were highest in the West.

Table 1. Fire department overall runs by region (Percent of runs, 2017)

Region	Percent
Northeast	14.9
Midwest	20.3
South	41.4
West	23.4
Total	100.0

Source: NFIRS 5.0.

Figure 7. Fire department overall runs by region and major incident type category (Percent of runs, 2017)



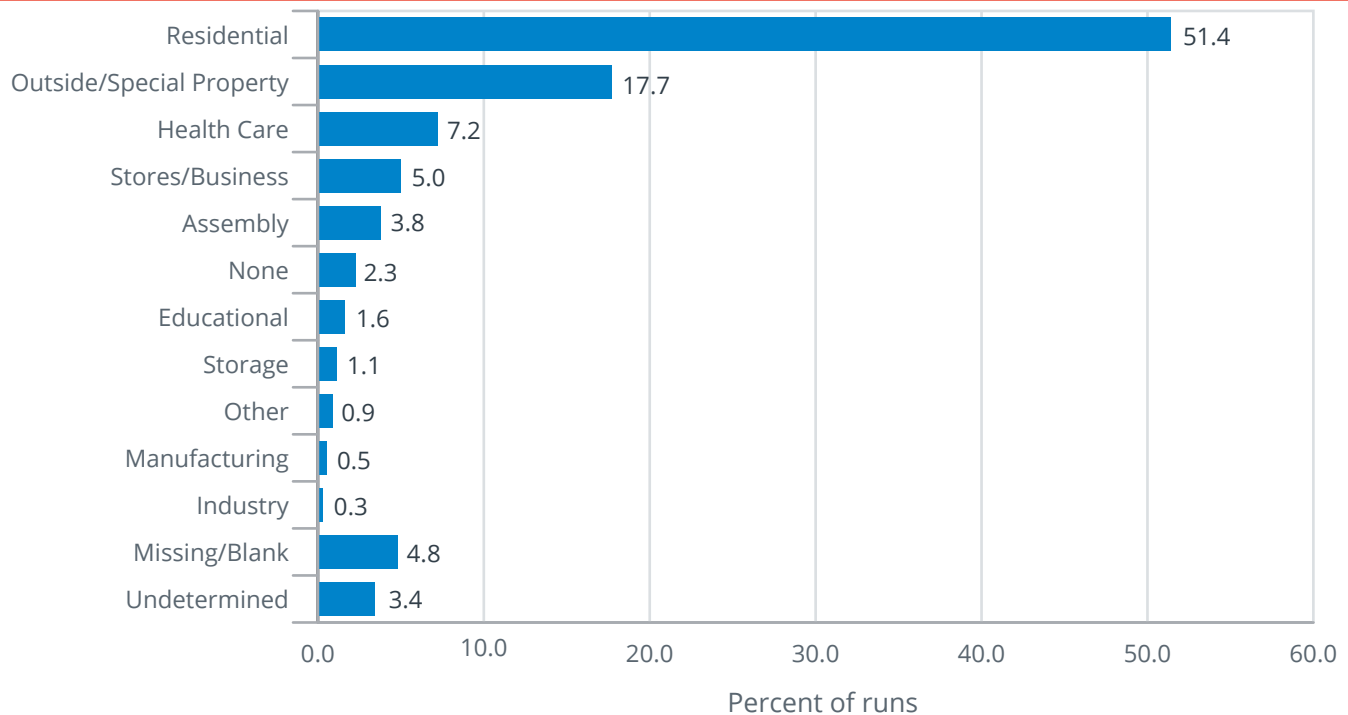
Source: NFIRS 5.0.

Note: For the Midwest and South distributions of runs, the totals do not add up to 100% due to rounding.

Property use

In 2017, about half of all calls involved residential properties (51%) followed by outside or special properties (18%), as shown in Figure 8.¹⁷ Generally, 70% of all reported calls to residences required EMS and rescue services. Service calls (9%) and false alarm calls (8%) accounted for an additional 17% of all residential calls. Only 3% of the reported calls to residences were fire related.

Figure 8. Fire department overall runs by major property use category (Percent of runs, 2017)



Source: NFIRS 5.0.

Aid

Aid offers additional resources to fire departments for large-scale or specialized incidents, or when response time to an incident is faster by another jurisdiction. Aid is given or received, either automatically or mutually, for a specific incident. Automatic aid involves prearranged agreements according to hazard conditions, jurisdictions or incidents requiring special equipment. Mutual aid is generally requested on a reactive basis as resources are depleted at the incident.

Informal and formal aid relationships vary depending on the location or the type of the incident. Innovative aid relationships, which focus on improving the allocation of resources and response times, continue to augment the advancement of fire department services. Overall, 8% of fire department runs involve giving or receiving aid, either mutual or automatic (Table 2).

Small rural areas generally follow informal agreements where it is understood that large-scale incidents will require all available resources from several community fire departments and that each department sustains its own resources when providing aid. However, informal relationships in rural areas are giving way to more formal relationships between jurisdictions as rural areas experience huge growth and do not have the resources to contain the fire demands that increasingly point toward “metropolitan risk” levels.¹⁸

Formal aid relationships provide better access to resources. Many local jurisdictions and states maintain exemplary aid systems. The key issues facing aid agreements deal with liability and reimbursement. Resolving these issues results in better fire services. The Emergency Management Assistance Compact and Urban Search and Rescue teams have

greatly improved the ability to overcome these issues and move resources from state to state. The National Mutual Aid System was developed to manage greater threats facing the United States, including terrorism and natural disasters.¹⁹

Types of aid

While 92% of all fire department runs were not aid-related, the level of aid runs varies with the type of incident. Aid given and aid received runs were more prevalent for fire incidents than for any other incident type category. Good intent calls and explosion or overpressure rupture incidents also involved aid more often than other types of incidents (Table 2).

Table 2. Fire department overall runs by major incident type category and general type of aid (Percent of runs, 2017)

Major incident type category	Aid		Total	No aid	Total
	Aid received	Aid given			
Fire	10.7	20.0	30.7	69.3	100.0
Overpressure Rupture/Explosion (No Fire)	7.4	5.4	12.9	87.1	100.0
EMS and Rescue	2.6	3.1	5.7	94.3	100.0
Hazardous Condition (No Fire)	4.3	4.7	9.0	91.0	100.0
Service Call	1.5	5.8	7.3	92.7	100.0
Good Intent Call	2.9	12.5	15.3	84.7	100.0
False Alarm and False Call	4.2	3.6	7.8	92.2	100.0
Severe Weather/Natural Disaster	4.4	6.4	10.8	89.2	100.0
Special Incident Type	2.1	2.6	4.6	95.4	100.0
Overall	3.1	5.2	8.3	91.7	100.0

Source: NFIRS 5.0.

Note: Totals may not add up due to rounding.

NFIRS Data specifications for overall fire department runs

Data for this report were extracted from the NFIRS Public Data Release (full, all-incident data) file for 2017 (released February 2019). Only Version 5.0 data were extracted.

- Overall fire department runs were defined using Incident Types 100 to 911 (excluding Incident Type 110):

NFIRS major incident type category	Description
100-173	Fire (Excludes Incident Type 110)
200-251	Overpressure Rupture/Explosion (No Fire)
300-381	EMS and Rescue
400-482	Hazardous Condition (No Fire)
500-571	Service Call
600-672	Good Intent Call
700-751	False Alarm and False Call
800-815	Severe Weather/Natural Disaster
900-911	Special Incident Type

Note: More details regarding the specific NFIRS incident types are available in the “NFIRS Complete Reference Guide,” January 2015: <https://www.usfa.fema.gov/data/nfirs/support/documentation.html>.

➤ Additionally, the major property use categories used in this report are defined as follows:

NFIRS major property use category	Description
100-186	Assembly
200-256	Educational
300-365	Health Care, Detention and Correction
400-464	Residential
500-599	Stores/Businesses
600-679	Industry
700	Manufacturing
800-899	Storage
900-984	Outside/Special Property
000	Property Use, Other
NNN	None
UUU	Undetermined

Note: For a complete listing of the NFIRS Property Use Codes, view the NFIRS 5.0 Complete Reference Guide: <https://www.usfa.fema.gov/data/nfirs/support/documentation.html> (January 2015).

To request additional information, visit <https://www.usfa.fema.gov/contact.html>. [Provide feedback on this report.](#)

Notes:

¹The incident type is defined as the actual situation that emergency personnel found on the scene when they arrived.

²National Fire Incident Reporting System (NFIRS) 5.0 contains both converted NFIRS 4.1 data and native NFIRS 5.0 data. This topical report includes only incident types that reflect native 5.0 data. Incident Type 110 (structure fire, other) is not included in this analysis as it is a “conversion only” code. That is, Incident Type 110 is technically a version 4.1 incident and, as such, is not included in this analysis. Aid runs, usually excluded in incident-based analyses, are included in the data for this report.

³“Runs” or “calls” have different meanings for different fire departments. As NFIRS incident data reflects summary data from individual fire departments (not from individual fire stations in a fire department), a “run” or “call” as used in this topical report means the fire department’s collective response to an incident. “Runs” and “calls” are used interchangeably.

⁴The count of NFIRS runs is rounded to the nearest 100. The actual count of NFIRS runs used for the analyses in this report was 26,880,841. This count reflects only runs that were identified as valid and released by the states to the NFIRS. Runs with Incident Type 110 (conversion only code) were excluded from the analyses. By comparison, the National Fire Protection Association (NFPA) estimated that there were 34,683,500 fire department responses in 2017 (NFPA, “Fire Loss in the United States During 2017,” October 2018).

⁵U.S. Fire Administration (USFA), Topical Fire Report Series, “Fire Department Overall Run Profile as Reported to the NFIRS (2016),” Volume 19, Issue 5 (August 2018).

⁶For a description of how the major incident type categories are defined in the NFIRS, refer to the section of this report regarding NFIRS data specifications for overall fire department runs.

⁷The total percentage for the Emergency Medical Services (EMS), Good Intent, False Alarm, and Service Call incident type categories does not add up to 91% due to rounding.

⁸USFA, Topical Fire Report Series, “Fire Department Overall Run Profile as Reported to the NFIRS (2016),” Volume 19, Issue 5 (August 2018).

⁹Within the major incident type categories in the NFIRS, there are many subcategories. For example, EMS Calls and Medical Assist Calls are two specific subcategories of the EMS and Rescue incident type category.

¹⁰“Emergency Communications,” Federal Communications Commission, Consumer & Governmental Affairs Bureau, <https://www.fcc.gov/consumers/guides/emergency-communications> (accessed March 21, 2019).

¹¹Idaho County, “Rural Addressing,” <http://idahocounty.org/commissioners/rural-addressing/> (accessed March 21, 2019).

¹²The 2017 NFIRS data showed that of the severe weather and natural disaster runs that occurred on Mondays in September, 43% of the runs were located in Georgia, 26% in Florida, and 18% in South Carolina. Although there was not one specific severe weather event that caused the spike on Mondays in 2017, 26% of all severe weather and natural disaster runs that occurred on Mondays happened on one single day — Monday, September 11. Hurricane Irma impacted Florida, Georgia and South Carolina on Monday, Sept. 11. Hurricane Irma made landfall in Florida as a Category 4 storm on the morning of Sept. 10.

¹³In this report, winter is defined as January through March; spring is defined as April through June; summer is defined as July through September; fall is defined as October through December.

¹⁴The regions of the U.S. are defined by the U.S. Census Bureau as the **Northeast** (Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island and Vermont); **South** (Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia and West Virginia); **Midwest** (Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota and Wisconsin); and **West** (Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington and Wyoming).

¹⁵U.S. Census Bureau, Population Division. July 1, 2017 population estimates from Table 1. Annual Estimates of the Resident Population for the United States, Regions, States and Puerto Rico: April 1, 2010 to July 1, 2018 (NST-EST2018-01), Release Date: December 2018, <https://www.census.gov/data/tables/time-series/demo/popest/2010s-national-total.html>.

¹⁶USFA, Topical Fire Report Series, "Fire Department Overall Run Profile," Volume 7, Issue 4 (December 2007).

¹⁷For a description of how the major property use categories are defined in the NFIRS, refer to the section of this report regarding NFIRS data specifications for overall fire department runs.

¹⁸USFA, Topical Fire Report Series, "Fire Department Overall Run Profile," Volume 7, Issue 4 (December 2007).

¹⁹Federal Emergency Management Agency (FEMA), Resource Management and Mutual Aid, "National Mutual Aid System," <https://www.fema.gov/resource-management-mutual-aid> (accessed March 21, 2019).