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Fire Department Overall Run Profile as Reported to the National Fire Incident Reporting System (2019)

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 (NFIRS). 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 2019, fire departments responded to 28,534,400 calls that were reported to the NFIRS; this is a 6% increase in the number of calls reported in 2017.
- Almost two-thirds (65%) 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 2019, fire runs were more prevalent on Saturdays, whereas severe weather calls peaked on Sundays followed by a secondary peak on Thursdays.
- About half (52%) of the reported calls were to residential properties. Of these calls to residential properties, 70% required EMS or rescue services while only 3% 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 2019 NFIRS data.[2, 3] In 2019, fire departments across the U.S. responded to 28,534,400 calls as reported to the NFIRS.[4] This count reflects a 6% increase in the number of calls (26,880,800) reported to the NFIRS in 2017, the latest year in which these data were examined.[5]

While "fire" is part of the department name, only 4% of runs made by fire departments 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 92% of all reported runs.[6] Specifically, 65% 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 to the NFIRS in 2017.[8]

Within the major incident type categories, EMS, medical assist, and dispatched and canceled en route calls were the leading specific types of fire department runs.[9] EMS calls accounted for 43% of all fire department runs. Medical assist calls accounted for 9% of runs, and fire departments were dispatched and canceled en route in 7% of calls.

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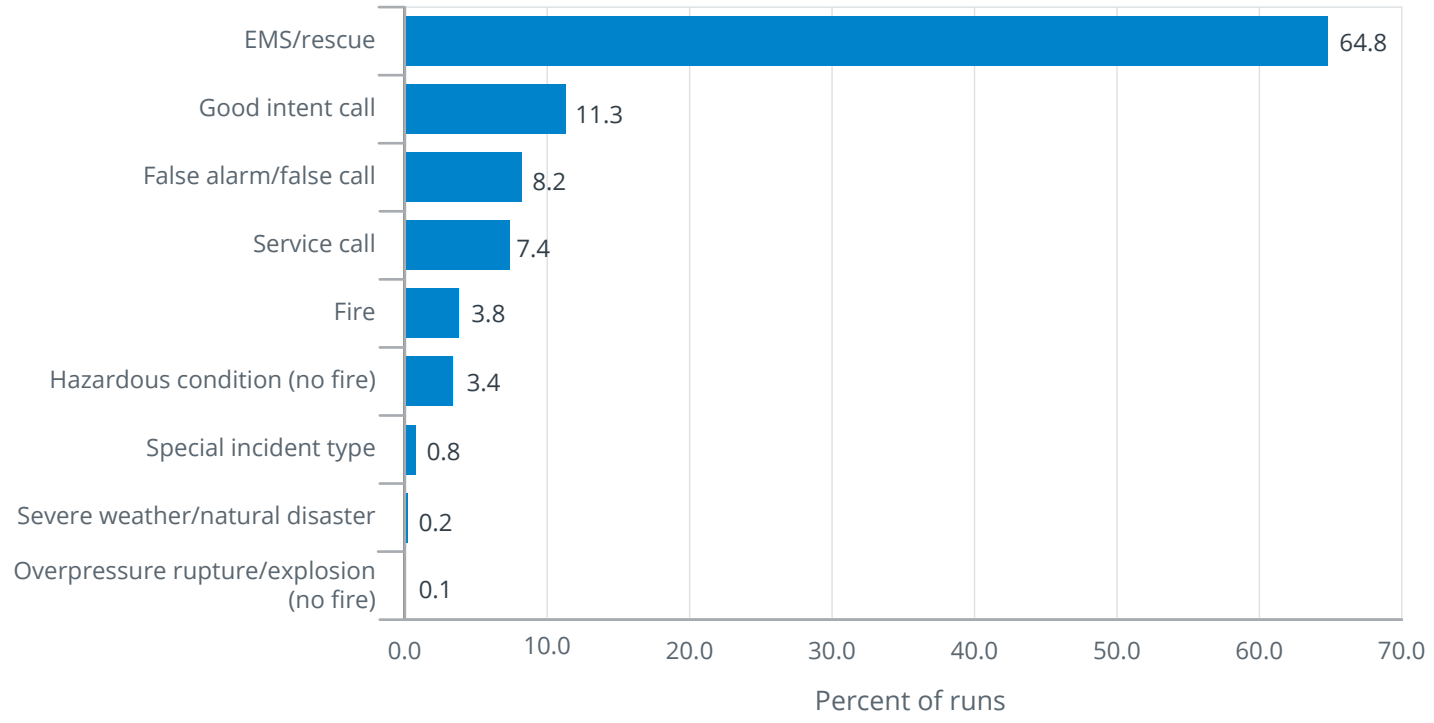
Figure 1. Fire department overall runs by major incident type category (Percent of runs, 2019)



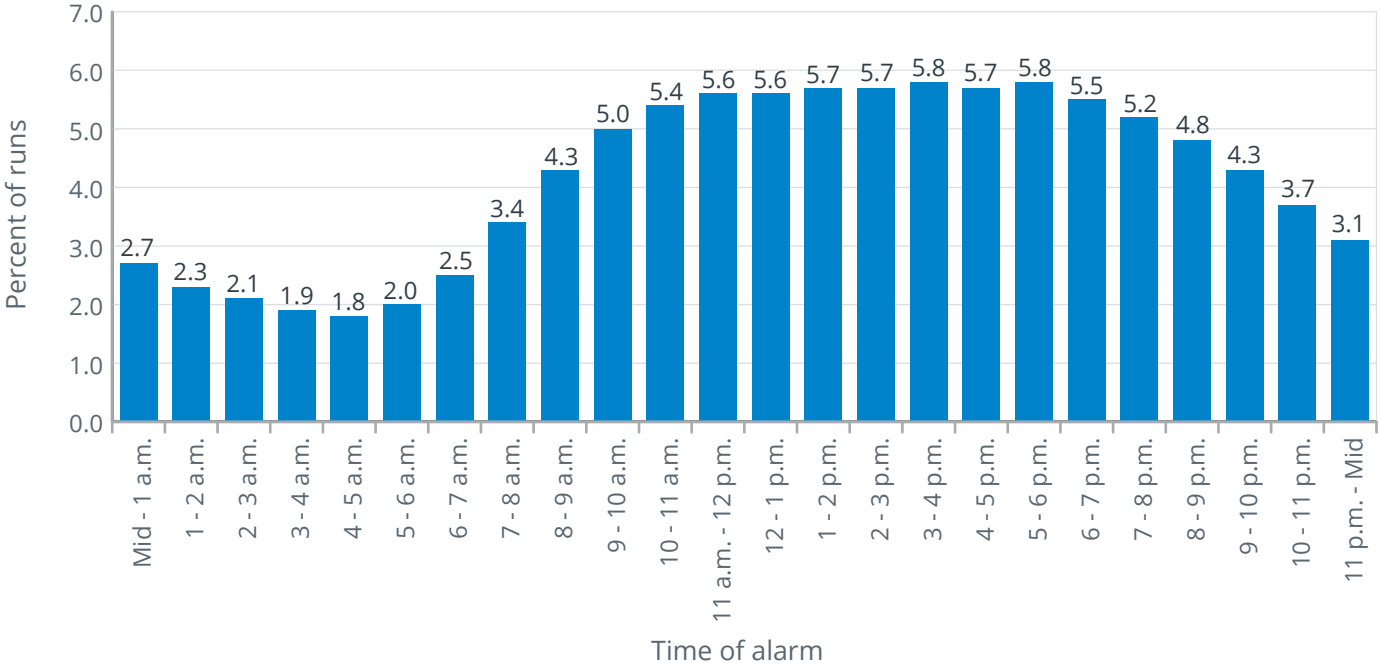
Source: NFIRS 5.0.

Hourly, weekly, monthly and seasonal profile of runs

Fire departments respond to incidents every day, at all times of the day. In 2019, 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.

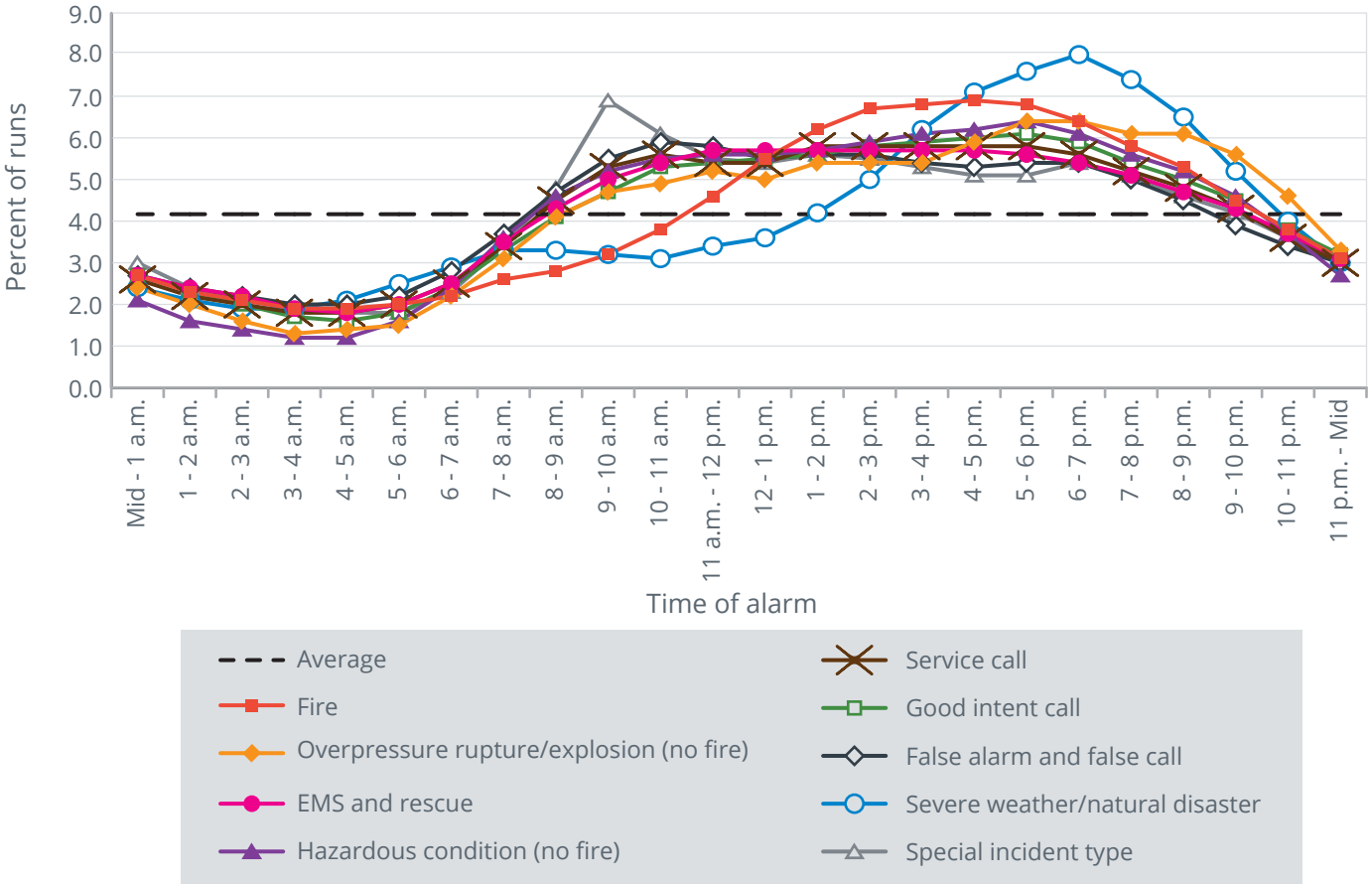
Each type of run has its own characteristic daily profile, as shown in Figure 3. All runs were lowest in the very early morning hours and increased during the morning as daily activities began. Most run types reached near peak demand in midmorning and remained relatively constant with peak hours occurring 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 2 small peaks in the midafternoon and early evening hours.

Figure 2. Fire department overall runs by time of day (Percent of runs, 2019)



Source: NFIRS 5.0.
Note: Total does not add up to 100% due to rounding.

Figure 3. Fire department overall runs by time of day and major incident type category (Percent of runs, 2019)



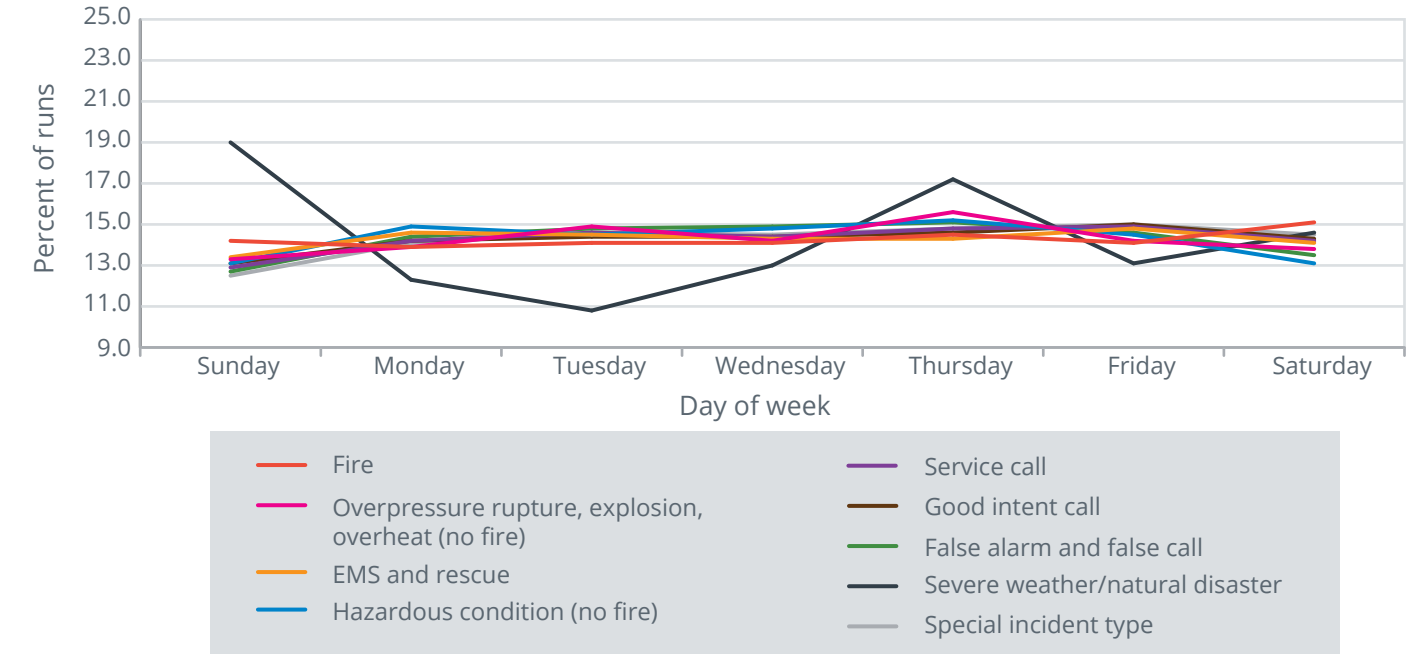
Source: NFIRS 5.0.

Overall, fire department runs followed a consistent pattern by day of the week, except for calls to fires, explosions or overpressure ruptures, and severe weather events (Figure 4). In 2019, severe weather calls peaked on Sundays followed by a secondary peak on Thursdays. Half of the severe weather events reported on Sundays occurred in February (20%), June (18%) and January (12%).[10] Fire calls were more prevalent on Saturdays, whereas explosion or overpressure rupture calls were more frequent on Thursdays.

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

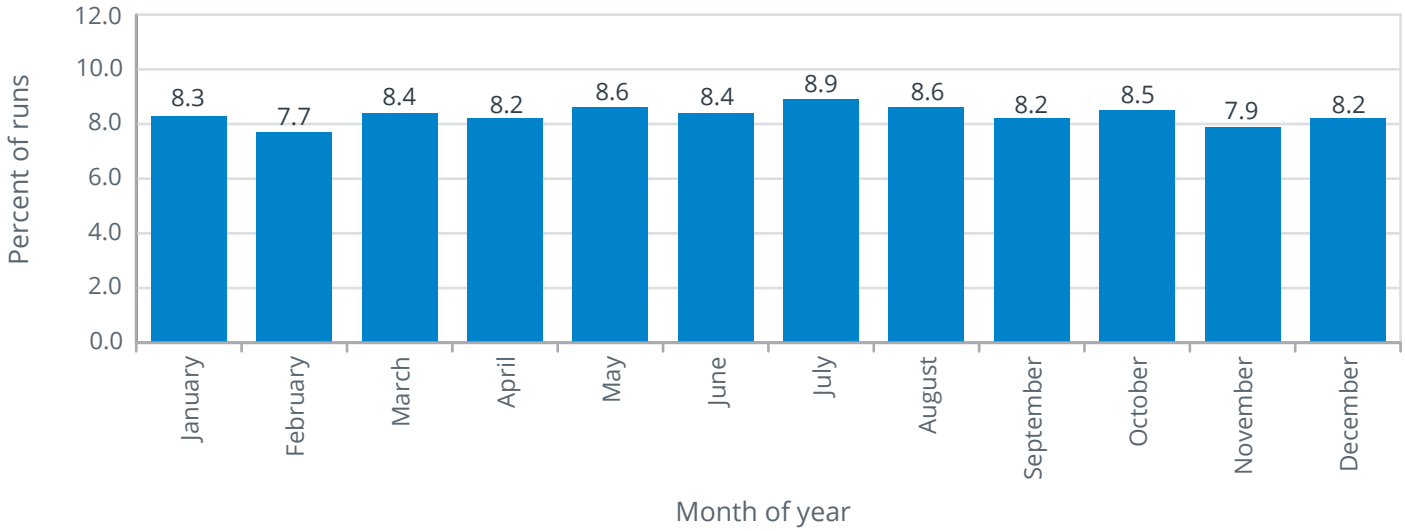
EMS and rescue responses were the most prevalent fire department responses each season, as shown in Figure 6.[11] This is to be expected as 65% of all fire department runs were categorized as EMS and rescue. Overall, the percentage distribution of the type of runs remained relatively consistent for each season.

Figure 4. Fire department overall runs by major incident type category and day of week (Percent of runs, 2019)



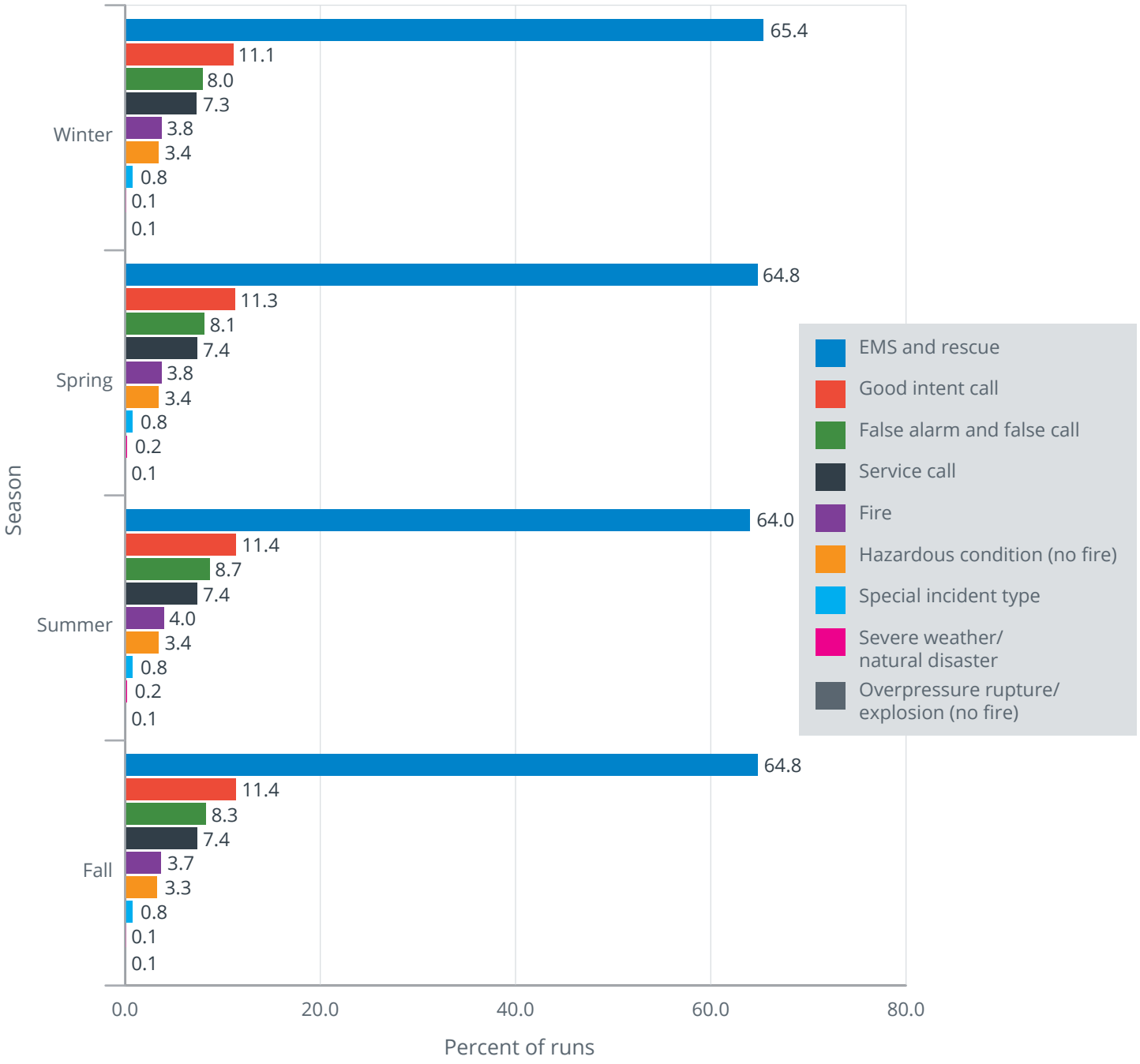
Source: NFIRS 5.0.

Figure 5. Fire department overall runs by month (Percent of runs, 2019)



Source: NFIRS 5.0.
Note: Total does not add up to 100% due to rounding.

Figure 6. Fire department overall runs by season and major incident type category (Percent of runs, 2019)



Source: NFIRS 5.0.
Note: For the spring and fall distributions of runs, the total percentages do not add up to 100% due to rounding.

Regional profile of runs

Fire departments in the South reported the most runs in 2019; 41% of all runs occurred in this region (Table 1).[12] This is to be expected as 38% of the U.S. population resided in the South in 2019.[13]

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 53%. 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.[14]

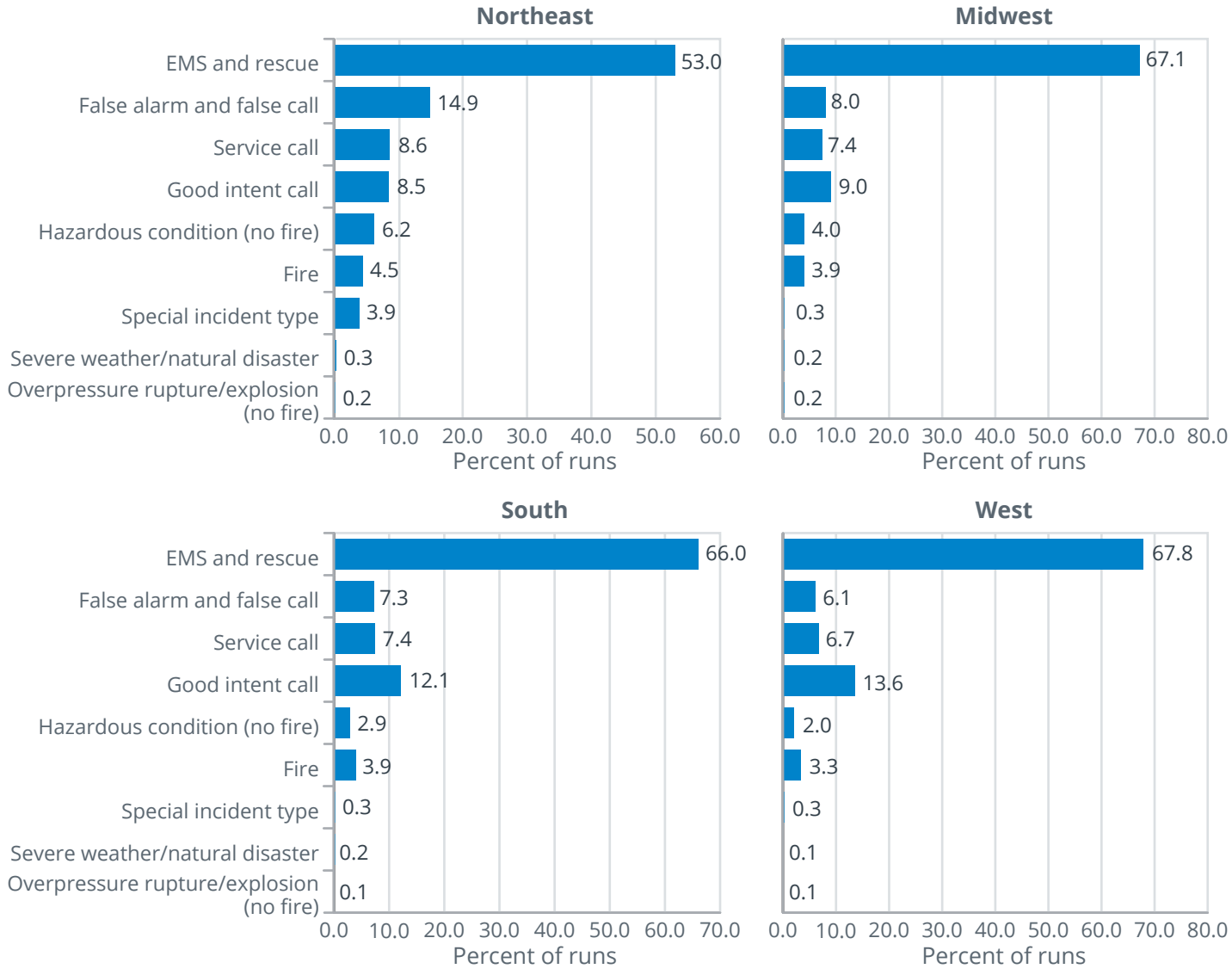
Special incidents, such as citizen complaints, represented 4% of all runs in the Northeastern region, which was the highest out of all the regions. False alarm calls were also highest in the Northeast (15%), whereas good intent calls were highest in the West (14%).

Table 1. Fire department overall runs by region (Percent of runs, 2019)

Region	Percent
Northeast	14.5
Midwest	20.5
South	40.9
West	24.1
Total	**100.0**

Source: NFIRS 5.0.

Figure 7. Fire department overall runs by region and major incident type category (Percent of runs, 2019)

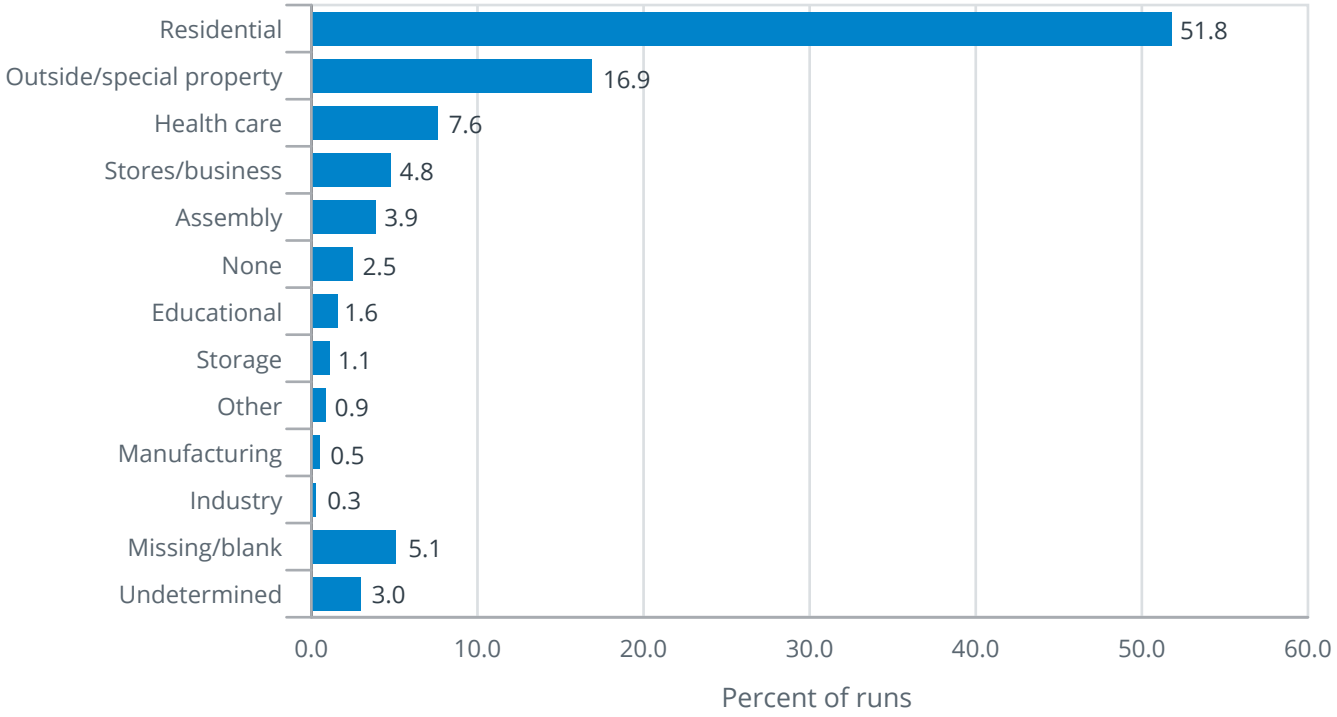


Source: NFIRS 5.0.
Note: For the Northeast, Midwest and South distributions of runs, the total percentages do not add up to 100% due to rounding.

Property use

In 2019, about half of all calls involved residential properties (52%) followed by outside or special properties (17%), as shown in Figure 8.[15] Generally, 70% of all reported calls to residences required EMS and rescue services. Service calls (9%) and false alarm calls (9%) accounted for an additional 18% 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, 2019)



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).

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.[16] 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, 2019)

Major incident type category	Aid			No aid	Total
	Aid received	Aid given	Total		
Fire	11.2	20.4	31.7	68.3	100.0
Overpressure rupture/explosion (no fire)	8.2	5.9	14.1	85.9	100.0
EMS and rescue	2.8	3.3	6.1	93.9	100.0
Hazardous condition (no fire)	4.3	4.8	9.1	90.9	100.0
Service call	1.4	5.3	6.8	93.2	100.0
Good intent call	2.9	12.6	15.4	84.6	100.0
False alarm and false call	4.0	3.4	7.4	92.6	100.0
Severe weather/natural disaster	4.4	6.7	11.0	89.0	100.0
Special incident type	1.5	1.8	3.3	96.7	100.0
Overall	**3.2**	**5.2**	**8.4**	**91.6**	**100.0**

Source: NFIRS 5.0.
Note: Totals may not add up to 100% 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 2019 (released January 2021). Only Version 5.0 data were extracted.

- Overall fire department runs were defined using the major incident type categories as follows:

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: For a complete listing of the specific NFIRS Incident Types, view the NFIRS 5.0 Complete Reference Guide: https://www.usfa.fema.gov/downloads/pdf/nfirs/NFIRS_Complete_Reference_Guide_2015.pdf (January 2015).

- The major property use categories 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 specific NFIRS Property Use codes, view the NFIRS 5.0 Complete Reference Guide: https://www.usfa.fema.gov/downloads/pdf/nfirs/NFIRS_Complete_Reference_Guide_2015.pdf (January 2015).

- The major aid categories are defined as follows:

NFIRS major aid category	Description
1-2	Aid received
3-5	Aid given
N	No aid given or received

Note: For a complete listing of the NFIRS aid given or received codes, view the NFIRS 5.0 Complete Reference Guide: https://www.usfa.fema.gov/downloads/pdf/nfirs/NFIRS_Complete_Reference_Guide_2015.pdf (January 2015).

To request additional information, visit: https://www.usfa.fema.gov/contact.html. Provide feedback on this report.

Notes:

[1]The incident type is defined as the actual situation that emergency personnel found on the scene when they arrived.
[2]National 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.
[4]The count of NFIRS runs is rounded to the nearest 100. The actual count of NFIRS runs used for the analyses in this report was 28,534,363. This count reflects only runs that were identified as valid and released by the states to the NFIRS before Aug. 15, 2020. 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 37,272,000 fire department responses in 2019 (NFPA Journal, "Fire Loss in the United States in 2019," September 2020).
[5]U.S. Fire Administration (USFA), Topical Fire Report Series, "Fire Department Overall Run Profile as Reported to the NFIRS (2017)," Volume 20, Issue 1 (May 2019).
[6]For 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.
[7]The total percentage for the emergency medical services (EMS), good intent, false alarm and service call incident type categories does not add up to 92% due to rounding.
[8]USFA, Topical Fire Report Series, "Fire Department Overall Run Profile as Reported to the NFIRS (2017)," Volume 20, Issue 1 (May 2019).

[9]Within the major incident type categories in the NFIRS, there are many subcategories. For example, EMS calls and medical assist calls are 2 specific subcategories of the EMS and rescue incident type category.

[10]The 2019 NFIRS data showed that of the severe weather and natural disaster runs that occurred on Sundays in February, 34% of the runs were in Ohio and 28% in Pennsylvania. Although there was not 1 specific severe weather event that caused the spike on Sundays in 2019, 19% of all severe weather and natural disaster runs that occurred on Sundays happened on 1 single day — Sunday, Feb. 24, 2019. According to the National Weather Service, a long duration high wind event occurred across Ohio and Pennsylvania on Sunday, Feb. 24, 2019. Wind gusts of 50-60 mph were common with some locations experiencing gusts of over 60 mph (https://www.weather.gov/cle/event_february24highwinds).

[11]In 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.

[12]The 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).

[13]U.S. Census Bureau, Population Division. July 1, 2019 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, 2019 (NST-EST2019-01), Release Date: December 2019, https://www.census.gov/data/tables/time-series/demo/popest/2010s-national-total.html.

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

[15]For 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.

[16]For a description of how the major aid categories are defined in the NFIRS, refer to the section of this report regarding NFIRS data specifications for overall fire department runs.