# Fire Department Overall Run Profile

These short topical reports are designed to explore facets of the U.S. fire problem as depicted through data collected in USFA'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:*

■ **Less than 10% of fire department runs are fires.**

■ **Over half of calls to fire departments require emergency medical service.**

■ **Approximately 11% of runs involve mutual or automatic aid.**

■ **Wireless telecommunication technologies create challenges for emergency dispatchers.**
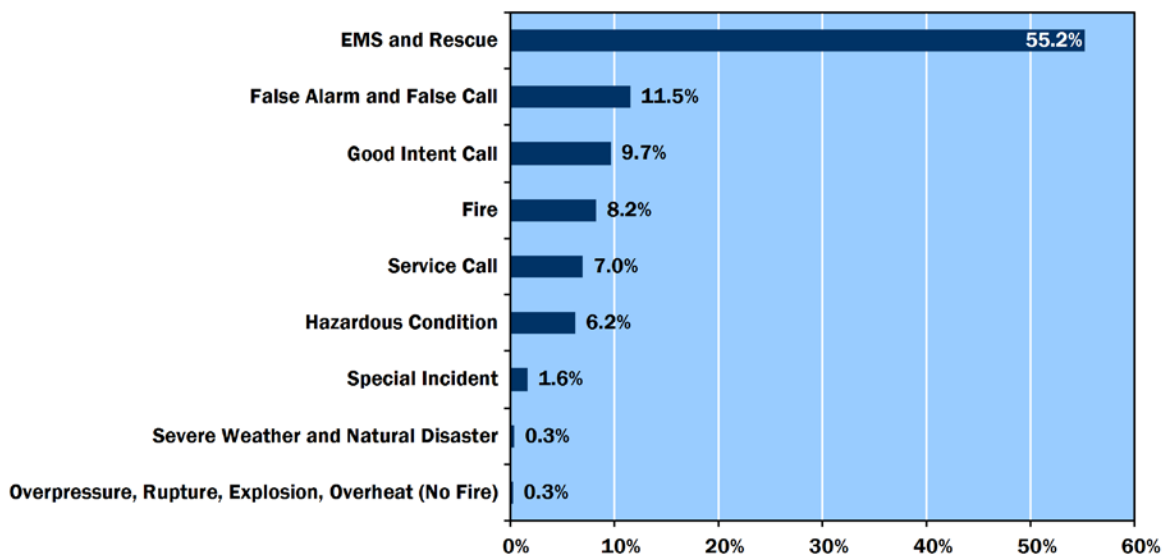
Fire departments provide invaluable services to communities nationwide. They respond to all types of emergency situations involving fires, explosions, rescues and medical emergencies, hazardous conditions, natural disasters, and false alarms. They also respond to nonemergency service calls and good intent calls. Often what is described to dispatchers does not reflect the actual incident; nevertheless, fire departments are trained and prepared to respond to a broad array of situations. To understand the full role fire departments play in a community, this topical report profiles fire department run activity as reflected in the National Fire Incident Reporting System (NFIRS) 2004 data.[1,2]

While "fire" is part of the department name, less than 10% of runs made by fire departments actually involve fire, as shown in Figure 1. Over half (55%) of all fire department runs are categorized as emergency medical services (EMS) and rescue. False alarms (12%) and good intent calls (10%) are the second and third most prevalent runs; actual fire runs are fourth at 8%.

### Figure 1. Fire Department Overall Runs by Incident Type (percent of runs, 2004)



Source: 2004 NFIRS 5.0 data

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## Emergency Calls

The official national emergency number is 9-1-1. Emergency calls are placed to Public Safety Answering Points (PSAP), typically city or county controlled, where a trained dispatcher is ready to route the call to local emergency medical, fire, and police services. PSAPs determine the location of calls by cross-referencing the telephone number against a location database.[3] However, new technology involving wireless telephones and voice-over-Internet protocol (VoIP) services such as cell phones and Internet connections (i.e., DSL, dial, 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.

In 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.[4]

## Hourly, Monthly, and Seasonal Profile of Runs

Fire departments respond to incidents every day, at all times of the day. The demand for fire department services is relatively constant during the late morning and early evening. Peak demand is in the late afternoon, as shown in Figure 2. Each type of run has its own characteristic daily profile, as shown in Figure 3. All runs are lowest in the very early morning hours and increase during the morning as activities begin. Most run types reach near-peak demand in mid-morning and remain relatively constant, with peak hours occurring in mid to late afternoon until early evening. Fire and severe weather runs are notable exceptions. Fire runs increase slowly but steadily during the day, peak during the dinner hour, and then steadily decrease. Severe weather runs have below-average demand until midafternoon, increase sharply through midevening, then decrease sharply during the late evening hours.

### Figure 2. Fire Department Overall Runs by Time of Day (percent of runs, 2004)
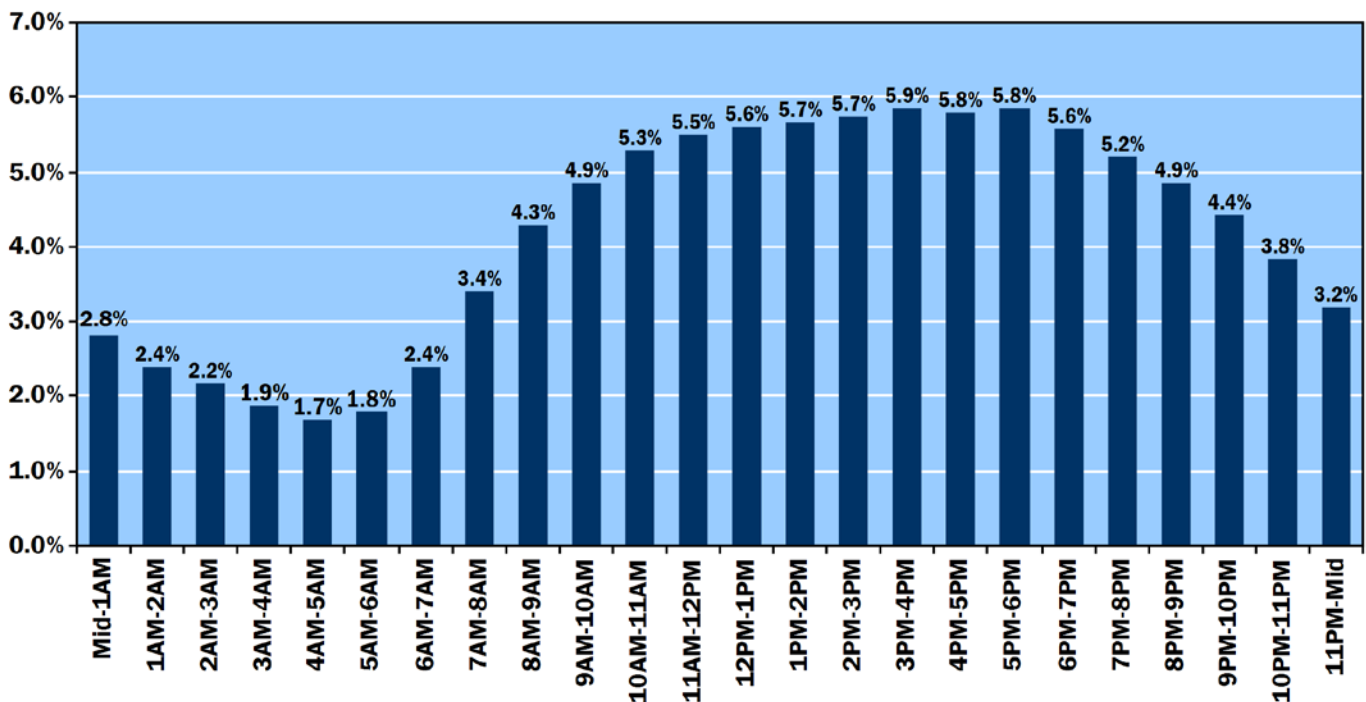


Source: 2004 NFIRS 5.0 data

## Figure 3. Fire Department Overall Runs by Time of Day
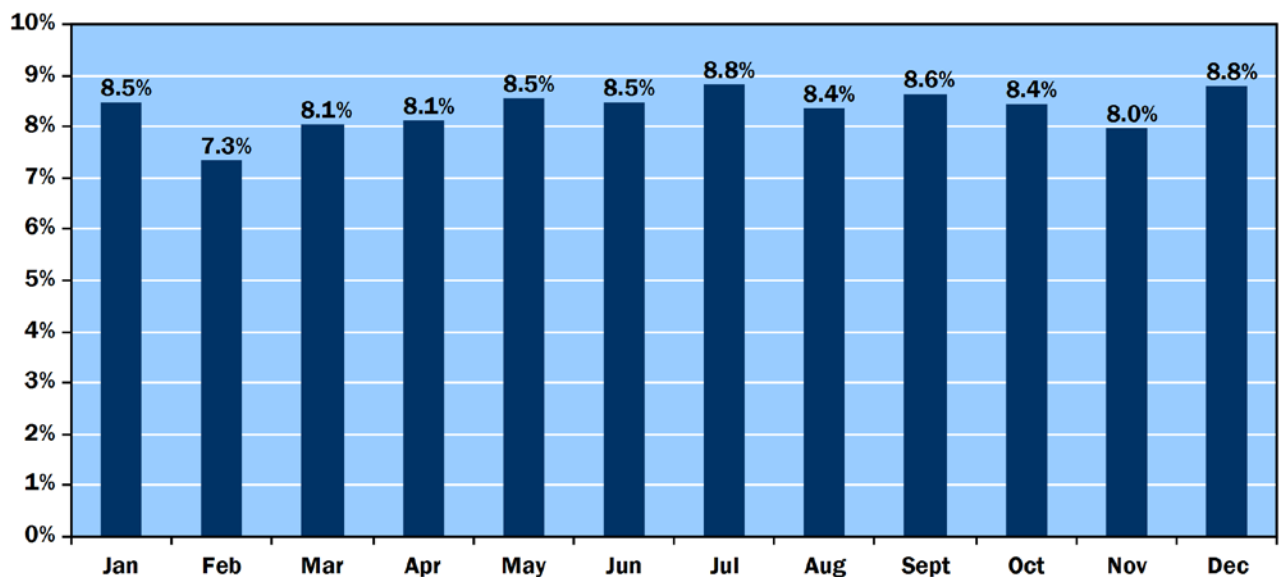## (percent of runs, 2004)
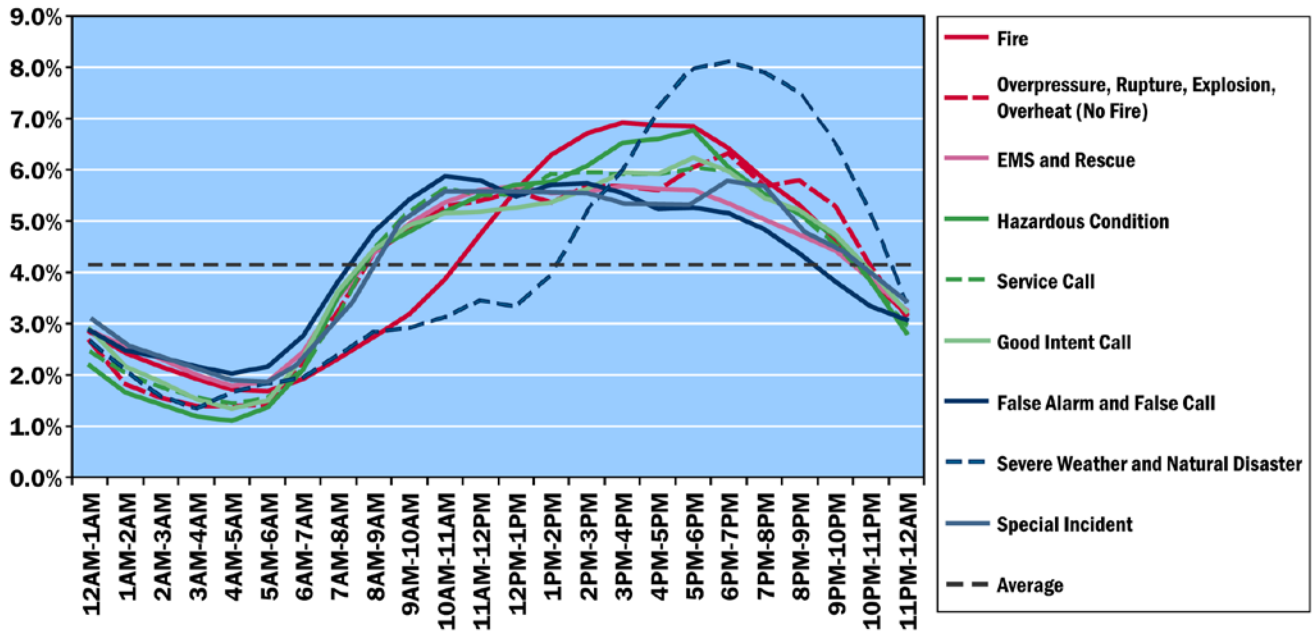


Source: 2004 NFIRS 5.0 data

The average occurrence of runs on a monthly basis is relatively constant. Consistent with the Fourth of July and winter holidays, there is a slight increase in runs during July and December (Figure 4). Seasonally, EMS responses are the most prevalent fire department responses, as shown in Figure 5.[5] Although very small in number, severe weather and natural disaster runs are more prevalent during the spring and summer.
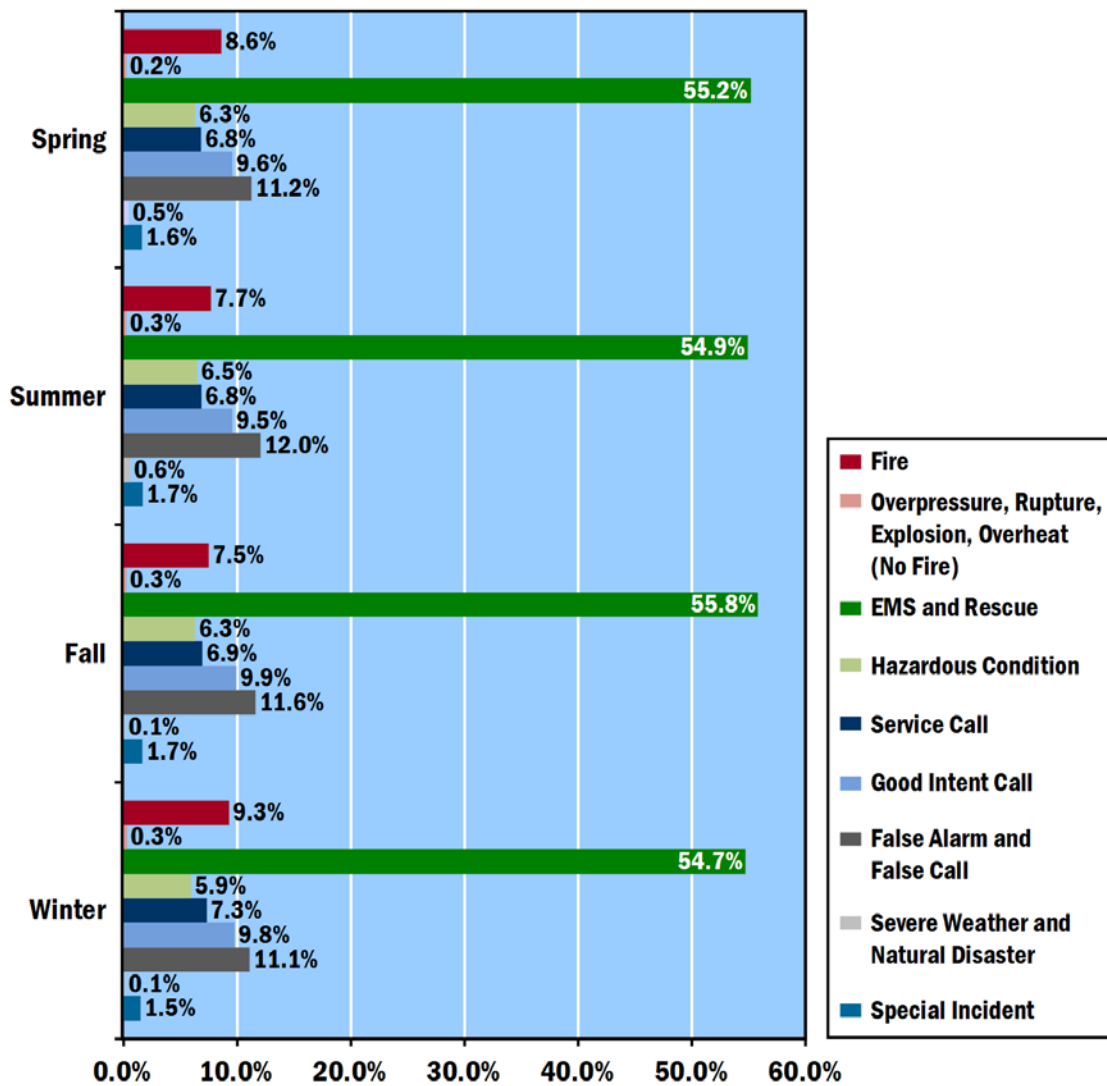
## Figure 4. Fire Department Overall Runs by Month
## (percent of runs, 2004)



Source: 2004 NFIRS 5.0 data

**Figure 5. Seasonal Distribution of Fire Department Overall Runs
(percent of runs, 2004)**



Source: 2004 NFIRS 5.0 data

## Regional Fires

For all regions, most calls to fire departments require EMS and rescue services.[6] The Western region has the highest percentage of EMS and rescue runs at 64%; the Northeast region has the lowest percentage at 40% (Figure 6). A number of fire departments in the Northeast still limit their role to traditional fire suppression services and have taken on EMS roles only recently. This may explain the disparity between the percentages of EMS runs in the Northeast and the rest of the Nation.[7] Special incidents, such as citizen complaints, represent 6% of all runs in the Northeast, which is the highest of all the regions. False alarm calls also were highest in the Northeast (17%), followed by the Midwestern (11%) and Southern (10%) regions.

## Figure 6. Regional Distribution of Fire Department Overall Runs
## (percent of runs, 2004)

### Northeast

| Category | Percent |
|---|---|
| Fire | 7.8% |
| Overpressure, Rupture, Explosion, Overheat (No Fire) | 0.3% |
| EMS and Rescue | 40.0% |
| Hazardous Condition | 7.9% |
| Service Call | 9.3% |
| Good Intent Call | 11.8% |
| False Alarm and False Call | 16.6% |
| Severe Weather and Natural Disaster | 0.3% |
| Special Incident | 6.0% |

### South

| Category | Percent |
|---|---|
| Fire | 8.7% |
| Overpressure, Rupture, Explosion, Overheat (No Fire) | 0.2% |
| EMS and Rescue | 57.7% |
| Hazardous Condition | 6.3% |
| Service Call | 6.1% |
| Good Intent Call | 9.9% |
| False Alarm and False Call | 10.2% |
| Severe Weather and Natural Disaster | 0.4% |
| Special Incident | 0.4% |

### Midwest

| Category | Percent |
|---|---|
| Fire | 8.8% |
| Overpressure, Rupture, Explosion, Overheat (No Fire) | 0.3% |
| EMS and Rescue | 58.3% |
| Hazardous Condition | 6.1% |
| Service Call | 6.7% |
| Good Intent Call | 7.7% |
| False Alarm and False Call | 11.1% |
| Severe Weather and Natural Disaster | 0.4% |
| Special Incident | 0.6% |

### West

| Category | Percent |
|---|---|
| Fire | 7.0% |
| Overpressure, Rupture, Explosion, Overheat (No Fire) | 0.2% |
| EMS and Rescue | 64.0% |
| Hazardous Condition | 3.7% |
| Service Call | 6.1% |
| Good Intent Call | 10.0% |
| False Alarm and False Call | 8.1% |
| Severe Weather and Natural Disaster | 0.1% |
| Special Incident | 0.8% |

Source: NFIRS 5.0 data

## *Property Distribution*

Most calls involve residential properties (51%) followed by outside or special properties, as shown in Figure 7.

Generally, 64% of all calls to residences require EMS and rescue services. False alarms account for 10% of calls to residences. Only 6% of calls to residences relate to fire.

**Figure 7. Fire Department Overall Runs by Property Type
(percent of runs, 2004)**
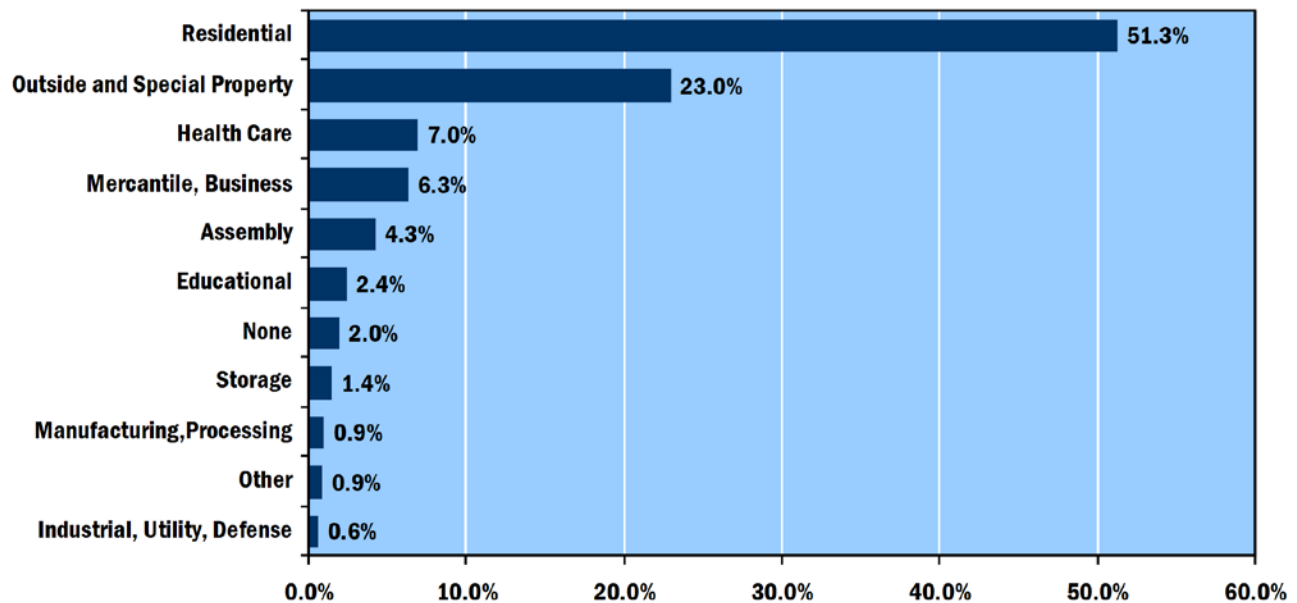


Source: 2004 NFIRS 5.0 data

## 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 either 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 generally is 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. Eleven percent of fire department runs involve giving or receiving aid, either mutual or automatic.

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 meet the fire demands that increasingly point toward "metropolitan risk" levels.[8]

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 (EMAC) and Urban Search-and-Rescue (USAR) teams have greatly improved the ability to overcome these issues and move resources from State to State. A national aid and resource system initiative is in development to manage greater threats facing the United States, including terrorism and natural disasters.[9]

## Types of Aid

While about 90% of fire department runs are not aid-related, the level of aid runs varies with the type of incident. Fire, good-intent call, and explosion or overpressure rupture incidents involve aid runs more often than other types of incidents (Table 1). A more detailed analysis of aid relationships and resulting runs is necessary to draw definitive conclusions on the use and frequency of aid.

### Table 1. Fire Department Overall Runs by General Type of Aid
### (percent of incidents, 2004)

| Run Type | Aid | | | No Aid | Total |
|---|---|---|---|---|---|
| | Aid Received | Aid Given | Total | | |
| Fire | 9.7% | 16.0% | 25.7% | 74.3% | 100.0% |
| Overpressure, Rupture, Explosion, Overheat (No Fire) | 7.1% | 5.9% | 13.0% | 87.0% | 100.0% |
| EMS and Rescue | 3.3% | 4.7% | 8.0% | 92.0% | 100.0% |
| Hazardous Conditions | 4.0% | 4.4% | 8.4% | 91.6% | 100.0% |
| Service Call | 1.8% | 9.6% | 11.4% | 88.6% | 100.0% |
| Good-Intent Call | 2.9% | 12.2% | 15.1% | 84.9% | 100.0% |
| False Alarm and False Call | 4.7% | 4.5% | 9.2% | 90.8% | 100.0% |
| Severe Weather and Natural Disaster | 4.6% | 6.7% | 11.3% | 88.7% | 100.0% |
| Special Incident | 2.1% | 2.5% | 4.5% | 95.5% | 100.0% |
| **OVERALL** | **3.9%** | **6.7%** | **10.5%** | **89.5%** | **100.0%** |

Source: 2004 NFIRS 5.0 data

Note: Totals may not add due to rounding

## *Conclusion*

When a call comes to 9-1-1 for emergency assistance, a trained PSAP dispatcher will locate the call from a location database and route the call to the appropriate local emergency medical, fire, and police services. However, new communication technologies such as wireless telephones and voice-over-Internet protocols make determining a call's location challenging, because the call is not associated with a fixed location. If a call is made from a cell phone or an Internet connection, make sure to give the exact location of the emergency to the 9-1-1 dispatcher and call back if the call is dropped or disconnected.

Some emergencies exceed local area resources requiring mutual aid from other jurisdictions. Formalized aid agreements help manage resource and fire service demand. A national mutual aid and resource management initiative stems from recent devastating incidents involving natural disasters and terrorist acts.

*To request additional information or to comment on this report, visit*
http://www.usfa.dhs.gov/applications/feedback/

## Notes:

[1] NFIRS 5.0 contains both converted NFIRS 4.1 data and native NFIRS 5.0 data. This topical report includes only 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.

[2] "Runs" or "calls" have different meanings for different fire departments. As NFIRS incident data reflect 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.

[3] "Communicating During Emergencies," Federal Communications Commission, Consumer & Governmental Affairs Bureau, http://www.fcc.gov/cgb/consumerfacts/emergencies.html

[4] Idaho County, "Rural Addressing," http://www.idahocounty.org/idaho/commissioners/rural_addressing.htm

[5] Winter is defined as January–March; spring is defined as April–June; summer is defined as July–September; fall is defined as October-December.

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

[7] Discussions with Dr. Harold Cohen, former EMS officer and current Sr. Analyst at the TriData Division of System Planning Corporation.

[8] Discussions with Mr. Patrick Simpson, former Fire Chief and current Sr. Analyst at the TriData Division of System Planning Corporation.

[9] FEMA, "National Mutual Aid and Resource Management Initiative Frequently Asked Questions," http://www.scd.state.hi.us/NIMS/FAQ_6_09_04.doc