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# Fire Fighter Fatality Investigation and Prevention Program Evaluation

## Volume I:
## Final Report

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Prepared for

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# Executive Summary

The purpose of this report is to document the findings of the evaluation of the Fire Fighter Fatality Investigation and Prevention Program (FFFIPP). The FFFIPP is a program of the National Institute for Occupational Safety and Health (NIOSH) that conducts investigations of firefighter line-of-duty deaths and formulates recommendations for preventing future deaths and injuries. NIOSH communicates the findings from FFFIPP investigations via publications and presentations, and through collaborative research and policy activities with partner organizations in the fire service. Publications include Line of Duty Death reports, NIOSH Alerts, Health Hazard Evaluation reports, and special documents such as NIOSH Workplace Solutions and the Pocket Guide to Chemical Hazards.

The publications are disseminated to fire departments through the mail, e-mail, conferences, and other venues and are available on the Internet through the NIOSH home page. The NIOSH reports are produced in both hard copy and electronic formats, and are available via mailing lists or through the NIOSH website. About once a year, NIOSH sends a packet of five or six reports to all 30,000 fire departments in the United States. Summaries of the NIOSH reports are also published in fire service trade journals.

The purpose of this evaluation was to

1. assess the effects of FFFIPP recommendations and information products on the safety knowledge, attitudes, and behavior of the nation's firefighters, and
2. identify possible strategies for improving the impact of the FFFIPP, including improvements in the approaches used by

NIOSH to disseminate the findings from FFFIPP investigations.

The evaluation is based on data from two sources: (1) a national survey of fire departments and (2) a series of focus groups with frontline firefighters.

NIOSH issued several hundred recommendations during the first 5 years of the FFFIPP. Many of these recommendations overlap or duplicate one another. For this evaluation, NIOSH identified 31 "key" recommendations, 22 involving traumatic injury fatalities and 9 involving cardiovascular disease (CVD) fatalities. From this list, 17 recommendations were selected to serve as sentinel recommendations for the evaluation. The selections were based on frequency of mention in FFFIPP reports, specificity of the recommendation, and balance among the categories of safety recommendations. The evaluation focused on the impacts of these sentinel FFFIPP recommendations in firefighter training, standard operating procedures, safety practices, and the safety environment of the fire departments.

## FIRE DEPARTMENT SURVEY

The Fire Department Survey was mailed to the Fire Chiefs of a stratified random sample of 3,000 fire departments across the country during spring 2006. The sample includes

- all 208 fire departments that had experienced a FFFIPP investigation as of December 31, 2003,
- a random sample of 215 fire departments where a firefighter fatality had occurred but no FFFIPP investigation had been conducted,
- the 10 largest fire departments, because of their unique status, and
- a stratified random sample of 2,575 fire departments where there had not been a fatality as of December 31, 2003. This sample includes representative subpopulations defined by geographic location, department type (career and volunteer), jurisdiction size, and population density.

The overall response rate for the survey was 54.9%.

## FIREFIGHTER FOCUS GROUPS

A series of six focus groups was conducted with frontline firefighters in order to collect additional information. The focus

groups took place during March and April 2006 and included participants from both career and volunteer fire departments and from departments in both rural and urban jurisdictions.

## FINDINGS

**Awareness of the FFFIPP.** The picture that emerges from the evaluation suggests that the FFFIPP has a low profile within the fire service. Most officers are familiar with NIOSH, and most have seen and read a FFFIPP report. Over half, however, are not familiar with the FFFIPP itself, particularly with the process of identifying incidents to investigate, conducting the investigation, and reporting findings.

Fire department officers learn about FFFIPP recommendations primarily through NIOSH mailings, trade publications, and websites. NIOSH recommendations have been used by some 11,000 fire departments to update the content of their training programs on personal protective equipment (PPE), Self-contained Breathing Apparatus (SCBA), Personal Alert Safety System (PASS) devices, Incident Command System, traffic hazards, radio communications, and other topics. Fire departments post information from NIOSH on fire station bulletin boards and brief firefighters about the recommendations during regular staff meetings. Nevertheless, two fifths of fire departments do not disseminate information from NIOSH to frontline firefighters at all.

**Implementation of FFFIPP Recommendations.** The majority of fire departments in the country require firefighters to be trained on five of the six types of recommendations addressed in this evaluation: use of PPE, fighting structure fires, driving safety, use of radio communication devices, the Incident Command System, and maintenance of SCBA. However, only 7% of the fire departments have a required physical fitness training program, and most fire departments do not require firefighters to be screened for CVD risk factors and CVD.

Most fire departments ensure that firefighters responsible for driving emergency vehicles receive driver training before being allowed to operate the vehicles, though frontline firefighters say they need to be trained to the class of the vehicle, and home responders need additional training. Most fire departments require their firefighters to wear seat belts while in emergency

vehicles, though frontline firefighters say many still are not using them.

The survey results suggest that most fire departments

- have enough PASS devices for all of their firefighters to use when fighting structure fires. Almost all fire departments report that their firefighters use their PASS devices at least "most of the time."
- have SCBA for their firefighters and perform SCBA maintenance "after every time they are used," though few have chemical/biological/radiological/nuclear (CBRN) SCBA. Firefighters in almost all fire departments reportedly use their SCBA at least "most of the time" while fighting structure fires. Many fire departments, however, say that their firefighters still have to share facepieces.
- have Automated External Defibrillators (AEDs) and perform routine maintenance on the AEDs. The AEDs are usually kept on the emergency vehicles and/or at the fire station.
- have radios or other two-way communication devices while responding to structure fires at least "most of the time."

According to the Fire Department Survey, Incident Command is established by most fire departments on a routine basis. The tasks that fire departments most often say are part of an Incident Commander's responsibilities include all three of the tasks identified in NIOSH recommendations: conduct an initial assessment, monitor location of all firefighters at the scene, and develop and initiate a risk management plan. Incident Commanders in only about half of all fire departments usually assign an Incident Safety Officer (ISO). However, focus group participants identified the failure to implement Incident Command as one of their most common safety concerns.

**Barriers and Facilitators.** About a third of all fire departments say they are sometimes unable to establish Rapid Intervention Teams (RITs) because there are not enough firefighters at the scene of the fire. This was reinforced in the focus group discussions: firefighters said that among their main safety concerns was the failure to routinely use RITs.

Among the barriers that many fire departments face in implementing FFFIPP recommendations is insufficient funding for equipment, personnel, and training. For example, a third of all fire departments do not have enough funding for personally fitted SCBA facepieces for all of their firefighters. The lack of

adequate equipment also hinders some departments from implementing other FFFIPP-recommended safety practices. For example, a quarter of all fire departments say their firefighters are not able to sit comfortably in their seat belts while wearing turnout gear in emergency vehicles. Other barriers identified are not enough personnel available at the scene and the situation on the fireground (e.g., the fire is not large enough). Firefighter resistance does not appear to be a significant reason FFFIPP-recommended safety practices are not followed.

Among the factors that can encourage safe practices are experience with an on-duty firefighter fatality, experience with a FFFIPP investigation, financial and legal penalties, an officer's attention to specific safety issues, and union representation. FFFIPP investigations, for example, appear to reduce perceived barriers to using PASS devices and individual SCBA facepieces.

The kinds of fire departments that most likely follow NIOSH's safety guidelines are career fire departments in large, urban jurisdictions in the Northeast. Fire departments that have experienced a firefighter fatality are also more likely than others to implement many of the NIOSH recommendations.

**Dissemination Methods.** Firefighters say that learning about specific incidents helps them develop safer work practices, and they appreciate that the Line of Duty Death (LODD) reports are unbiased. However, only about half of officers agree that NIOSH reports are practical, easy to understand, specific, and concrete. These tend to be officers in large urban jurisdictions. Officers suggest that the recommendations be made stronger, more straightforward, and less generic, and that they take into consideration the size and resources of the department. Some also recommend outside expert review of FFFIPP reports.

Firefighters think the LODD reports are generally well designed, but recommend making it easier to skim through them by making more effective use of headings and headlines, adding more visual aids to clarify the fire scene (a timeline, a diagram of the fire scene, and more photos), and including information about the victim(s). They also recommend that NIOSH prepare summary documents with statistics showing the number of deaths and injuries due to specific unsafe practices, using communication techniques employed by the print media. Firefighters also want to receive the LODD reports as soon as possible after an incident.

Fire department officers also want help translating FFFIPP recommendations into actionable items for their departments. There is particular interest in receiving ready-made training material (including PowerPoint presentations and lesson plans) based on the LODD reports. Other management tools that would be helpful include sample standard operating procedures based on FFFIPP recommendations.

The most common recommendation from firefighters is for improvements in the ways FFFIPP materials are disseminated and marketed. For example, firefighters recommend that NIOSH update the FFFIPP mailing list and e-mail listserv, implement procedures for refreshing these lists regularly, and better advertise the lists. Most firefighters have not visited the NIOSH website. One recommendation is that NIOSH create a banner with the NIOSH website address to post on fire station bulletin boards and redesign the website to make it more firefighter-friendly.

Finally, firefighters suggest that NIOSH develop coordinated campaigns around specific issues, focusing on one issue at a time, to raise awareness throughout the fire service.

## IMPLICATIONS

Following are the key implications from the evaluation:

- Small, volunteer departments have the greatest challenges to following safety guidelines.
- Existing resources limit safety practices.
- Gaps in knowledge and attitudes also limit safety.
- FFFIPP investigations and LODD reports provide useful information.
- Fire departments need additional information in the LODD reports.
- Firefighters and fire departments need information presented in additional formats.
- FFFIPP materials need to be better marketed and distributed.
- Increasing awareness will likely improve safety practices.

## RECOMMENDATIONS

The recommendations that emerge from these findings are as follows:

### Outreach Efforts

1. Enhance outreach efforts to small, rural, and volunteer fire departments.

### Technical Assistance

2. Develop documents about recommended equipment, training, or procedures that could be used to justify budget requests.
3. For smaller, volunteer departments, provide additional technical assistance for preparing grant applications.

### NIOSH Web Site

4. Improve the FFFIPP website with a firefighter-friendly page that connects broad topics with recommendations and action items, with links to specific FFFIPP LODD reports and other FFFIPP materials and resources.

### Outreach

5. Contact fire departments that experience a firefighter fatality or "near miss" incident, regardless of whether an investigation is planned. Partnering with other organizations as needed, provide relevant FFFIPP materials and offer technical assistance to help address safety issues.

### LODD Reports

6. Continue developing and disseminating LODD reports.
7. Continue providing all four sections of the current reports, including a summary, investigation results, discussion, and recommendations.
8. Consider the use of formatting, headings, and headlines to enhance the messages communicated both in individual LODD reports and over the LODD series.

### Content of the LODD Reports

9. To improve accessibility and information, incorporate more photos, timelines, diagrams, and other visual aids into FFFIPP reports.
10. Review the investigation protocol, particularly the sources used for developing technical recommendations. Consider using an outside panel of experts to review findings.

**Ancillary Materials**

11. Help transfer knowledge gained from FFFIPP investigations by creating training tools based on FFFIPP reports, including PowerPoint slides and lesson plans. Incorporate photos, timelines, diagrams, and other visual aides.
12. Expand the production of existing publications such as Safety First, Workplace Solutions, and Hazard IDs to include additional topics. Make use of graphics, statistics, and other tools to communicate the level of risk and practical steps firefighters and fire departments can take to promote safety.
13. Explore new technology for disseminating the findings of FFFIPP investigations in a public service campaign format. Use videos, public service channels, and Internet streaming video to present safety messages on each key FFFIPP recommendation. These messages should draw from multiple fatality investigations and should employ public safety advocacy techniques.

**Distribution of FFFIPP Materials**

14. Ensure NIOSH materials reach all fire departments by instituting new measures to maintain a complete and up-to-date mailing list.
15. Ensure that NIOSH e-mail lists are up to date.

**Marketing**

16. Improve the promotion of the FFFIPP website. Create a poster suitable for fire department station bulletin boards with the NIOSH website featured prominently.
17. Consider coordinated promotional campaigns on single themes.
18. Develop additional mechanisms for raising awareness about the FFFIPP across the fire service and the public.

# 1 Introduction

## 1.1 PURPOSE OF THE REPORT

This report documents the results of the Fire Fighter Fatality Investigation and Prevention Program (FFFIPP) Evaluation. The evaluation was conducted by RTI International under contract to the Centers for Disease Control and Prevention (CDC) for the National Institute for Occupational Safety and Health (NIOSH). The purpose of the evaluation was to assess the impact of FFFIPP recommendations and information products and to recommend improvements to the program.

## 1.2 BACKGROUND

Each year, some 100 firefighters in the United States die in the line of duty.[1] Another 95,000 are injured each year (NIOSH, 2006). Firefighters perform a wide range of services for the American public. Their work is dangerous. In 2004, the nation's 1.1 million firefighters responded to 22.6 million calls, including 1.6 million fires; 14 million medical aid calls; 2.1 million false alarms; 984,000 mutual aid calls; 354,000 hazardous

[1]The U.S. Fire Administration (USFA) reports that there were 115 on-duty firefighter fatalities in the United States in 2005 (USFA, 2006), while NFPA reports 87 on-duty firefighter deaths that year (Fahy and LeBlanc, 2006). Beginning in 2004, USFA's criteria for defining a firefighter fatality were expanded as a result of the Hometown Heroes Survivors Benefit Act of 2003, which accounts for some of the difference. The act "presumes that a heart attack or stroke are in the line of duty if the firefighter was engaged in nonroutine stressful or strenuous physical activity while on duty and the firefighter becomes ill while on duty or within 24 hours of engaging in such activity. Prior to the Act, federal survivors' benefits for firefighters were not generally paid for heart attacks or strokes, regardless of the circumstances" (USFA, 2006, p. 7).

materials; 671,000 hazardous conditions; and 2.8 million other incidents (National Fire Protection Association [NFPA], 2005).

*A third of on-duty deaths occur en route to or from an incident.*

About a third of on-duty firefighter fatalities occur on the fireground (Fahy and LeBlanc, 2006). These deaths are typically due to sudden cardiac death, asphyxiation, internal trauma, electrocution, burns, crushing injuries, and stroke during fire extinguishment and suppression support activities. Another third of on-duty deaths occur en route to or from an incident, in motor vehicle and other accidents. Ten percent of firefighter fatalities take place during training (Fahy and LeBlanc, 2006), such as apparatus and equipment drills, physical fitness activities, live fire training, underwater/dive training, and classes or seminars (Fahy, 2006). Firefighters also die while performing nonemergency on-duty activities and at nonfire emergencies.

*Almost half of all on-duty firefighter fatalities are due to cardiovascular causes.*

Over half of all on-duty firefighter fatalities are from traumatic injuries, including internal trauma, asphyxiation, crushing injuries, burns, drowning, and electrical shock. Other firefighter fatalities (about 45%) are due to cardiovascular causes, primarily sudden cardiac deaths (heart attacks) from stress or overexertion. NFPA reports that sudden cardiac death accounts for two out of five fatalities "on the fireground and while responding to and returning from alarms" and over 50% of the deaths during training activities, particularly during apparatus and equipment drills (Fahy, 2005, p. 6; 2006, p. 2). Many victims include firefighters who had previous heart attacks or had undergone bypass surgery, angioplasty, or stent placement (Fahy, 2005).

*The long-term trend in firefighter fatalities at structure fires is declining, but the "rate of deaths due to traumatic injuries while operating inside structures" has increased.*

The long-term trend in firefighter fatalities at structure fires is declining, but because the annual number of structure fires is also declining, the "rate of deaths due to traumatic injuries while operating inside structures" has actually increased (Fahy, 2002, p. 2). Similarly, although the number of sudden cardiac deaths declined by about a third from the late 1970s to the early 1990s, the number of deaths since then has remained 40 to 50 each year (Fahy, 2005).

*Most fire departments are small, all-volunteer departments serving a rural community.*

Most fire departments are small, all-volunteer departments serving a rural community (USFA, 2002). There are an estimated 30,400 fire departments in the United States. Of these, 1,917 (6.3%) departments are staffed by paid, career firefighters; 1,242 (4.1%) are mostly career;[2] 4,084 (13.4%) are mostly volunteer; and 23,157 (76.2%) are all volunteer.[3] Of the 1.1 million firefighters in the United States, about three fourths are volunteer firefighters; only one fourth are career firefighters (Karter, 2005). Career firefighters tend to be located in large, metropolitan areas, whereas volunteer firefighters are more likely to serve in less densely populated areas. Among career firefighters, about three quarters are in communities that protect 25,000 or more people. Almost all volunteer firefighters (95%) are in departments that protect fewer than 25,000. Over half of all volunteer firefighters are located in small, rural departments that protect fewer than 2,500 people (Karter, 2005).

*The rate of fatalities among career firefighters is higher than for volunteer firefighters.*

Studies by USFA and NFPA show that, numerically, more volunteer firefighters are killed in the line of duty each year than career firefighters. Overall, the rate of fatalities among career firefighters is higher than for volunteer firefighters. USFA found that, in the year 2000, full-time career personnel accounted for 33% of firefighter fatalities but only 26% of American fire service fatalities (USFA, 2002). However, the rates of sudden cardiac death are comparable for volunteer and career firefighters. NFPA found that of the 440 victims of sudden cardiac death from 1995 through 2004, 307 (72.4%) were volunteer firefighters, and 117 (27.6%) were career firefighters (Fahy, 2005).[4]

There may also be regional differences in the rates of firefighter fatalities. Based on per capita state-level data, fatalities at

[2]Mostly career departments are made up of 51% to 99% career firefighters. Mostly volunteer departments are made up of 51% to 99% volunteer firefighters.

[3]Statistics cited in this paragraph differ from the summary statistics obtained in the sample frame used for the Fire Department Survey. The sample frame is discussed in Section 3.1. Differences in the population counts are a result of the narrower target population for the Fire Department Survey (Section 3.1.1) and differences resulting from use of different data sources.

[4]In addition, 16 (3.6%) were employees of state or federal wildland management agencies, the military, or an industrial fire department; or prison inmates working on a wildland firefighting crew.

structural fires are more common in the densely populated eastern United States. Fatalities in wildland incidents are more common in the West. Fatalities related to motor vehicle crashes show no regional pattern (USFA, 2002).

## 1.3 FIRE FIGHTER FATALITY INVESTIGATION AND PREVENTION PROGRAM

The impetus for creating the FFFIPP emerged in the 1990s with the recognition that further efforts were needed to address the continuing problem of occupational firefighter fatalities. In fiscal year 1998, Congress appropriated funds for NIOSH to "conduct fatality assessment and control evaluation investigations to gather information on factors that may have contributed to traumatic occupational fatalities, identify causal factors common to firefighter fatalities, provide recommendations for prevention of similar incidents, formulate strategies for effective intervention, and evaluate the effectiveness of those interventions" (NIOSH, 2006, p. 1).

*NIOSH conducts investigations of firefighter line-of-duty deaths to formulate recommendations for preventing future deaths and injuries.*

NIOSH conducts investigations of firefighter line-of-duty deaths to formulate recommendations for preventing future deaths and injuries. NIOSH also conducts investigations of nonfatal injuries. The goals of the program are to

- better define the magnitude and characteristics of line-of-duty deaths among firefighters,
- develop recommendations for the prevention of deaths and injuries, and
- disseminate prevention strategies to the fire service (CDC, 2006).

*The program does not enforce compliance with safety and health standards and does not determine fault or blame.*

The program uses the Fatality Assessment and Control Evaluation (FACE) model to conduct investigations. Each investigation results in a report summarizing the incident and includes recommendations for preventing future similar events.[5] For cardiovascular deaths, NIOSH investigations include assessing the contribution of personal and workplace factors. Personal factors include identifying individual risk factors for coronary artery disease. The workplace evaluation

[5]NIOSH's FACE program is a research program designed to identify and study fatal occupational injuries. The goal of the FACE program is to prevent occupational fatalities across the nation by identifying and investigating work situations presenting high risk for injury, and by then formulating and disseminating prevention strategies to those who can intervene in the workplace (CDC, 2006c).

involves estimating the immediate physical demands placed on the firefighter and the firefighter's acute exposure to hazardous chemicals, assessing efforts by the fire department to screen for coronary artery disease risk factors, and developing fitness and wellness programs (CDC, 2006a). Personal and fire department identifiers are not included in the NIOSH investigative reports.

The FFFIPP is a research and dissemination program. The program does not enforce compliance with safety and health standards and does not determine fault or blame. As a research program, its aim is to learn from the events and prevent future similar events (CDC, 2006). Enforcement is primarily the responsibility of state occupational safety and health administrations. Although the U.S. Occupational Safety and Health Administration (OSHA) does not have jurisdiction over public sector employees, 24 states and 2 territories[6] have their own occupational safety and health program under a plan approved and monitored by OSHA.[7] State standards are required to be identical to, or at least as effective as, the federal OSHA standard.

*NIOSH develops recommendations based on consensus and mandatory standards.*

NIOSH develops recommendations based on consensus and mandatory standards, such as standards promulgated by NFPA and OSHA, firefighting practices recommended in fire service texts, and findings and recommendations presented in the safety and medical literature (NIOSH, 2006). Recommendations are directed to fire departments, manufacturers, municipalities, standard-setting bodies, and research organizations. The recommendations have most frequently been directed to fire departments. They include recommendations involving cardiovascular health, fitness and wellness programs, standard operating procedures or guidelines, communications, incident command, motor vehicles, personal protective equipment, strategies and tactics, rapid intervention teams, and staffing

[6]The states with OSHA programs include Alaska, Arizona, California, Connecticut, Hawaii, Indiana, Iowa, Kentucky, Maryland, Michigan, Minnesota, Nevada, New Jersey, New York, New Mexico, North Carolina, Oregon, Puerto Rico, South Carolina, Tennessee, Utah, Vermont, Virginia, Washington, Wyoming, and the Virgin Islands (U.S. Department of Labor, 2003).

[7]These "state plans" are approved and monitored by OSHA, which provides up to 50% of an approved plan's operating costs. A state plan program, including the job safety and health standards that employers are required to meet, must be "at least as effective" as OSHA.

(NIOSH, 2004). FFFIPP investigations may suggest the need for new research or prevention efforts or for new or revised regulations to protect workers. As of February 2006, NIOSH had conducted 324 fatality investigations in 48 states. These include 175 traumatic injury incidents and 149 cardiovascular/medical incidents. These investigations have spawned over 600 recommendations.

*NIOSH communicates the findings from FFFIPP investigations in publications and presentations.*

NIOSH communicates the findings from FFFIPP investigations via publications and presentations and through collaborative research and policy activities with partner organizations in the fire service. Publications include the following:

- Line of Duty Death reports based on individual investigations that highlight firefighter risks and provide safety recommendations
- NIOSH Alerts on specific issues (such as truss system failures)
- Health Hazard Evaluation reports based on epidemiological studies of workplace exposures (such as electrical hazards during wildland fire operations)
- special reports such as NIOSH Workplace Solutions (on issues such as live fire training and training dives), fact sheets, and pocket guides

The publications are disseminated to targeted audiences through the mail, e-mail, conferences, and other venues, and are available on the Internet through the NIOSH home page (www.cdc.gov/niosh/homepage.html). The NIOSH reports are produced in both hard copy and electronic formats (including CD-ROM), and are available via mailing lists or through the NIOSH website. About once a year, NIOSH sends a packet of five to six reports to all 30,000 fire departments in the United States. Summaries of the NIOSH reports are also published in fire service trade journals.[8] NIOSH staff also disseminate findings and reports in presentations at fire service conferences.

NIOSH works collaboratively with other agencies and organizations to further its mission. These partnerships include a joint public health advisory with the Food and Drug Administration on oxygen resuscitators that was widely

[8]These include *Firehouse, Fire Rescue, Fire Chief, NFPA Journal, Responder Safety, Responder Magazine*, and *Wildland Fire* (NIOSH, 2006).

distributed to the fire service, along with a training video on safe handling of oxygen systems; participation in NFPA and USFA committees on the cardiovascular health of firefighters; a joint publication with the Federal Railroad Administration on railroad crossing safety; and contributions to NFPA standards through NIOSH participation on NFPA's Occupational Safety and Health Technical Committee, which ensures that findings and recommendations from FFFIPP investigations are reflected in the revised standards.[9]

In developing the FFFIPP, NIOSH has periodically consulted key stakeholders from across the nation's fire service. The original stakeholder meeting took place in January 1998 and led to "the focus on conducting line-of-duty death investigations to identify factors contributing to firefighter fatalities, and to disseminate this information to fire departments across the country" (NIOSH, 2006, p. 1). A second stakeholder meeting was convened in March 2006 "to identify ways in which NIOSH might improve upon the program" (NIOSH, 2006, p. 1).

## 1.4 STRUCTURE OF THE REPORT

This report documents the methods used and the results obtained for the evaluation. In Section 2, we present the conceptual framework that guided the evaluation and the overall data collection approach. Section 3 has information on the methods used for collecting the evaluation data, including instrument development, stakeholder interviews, focus groups, survey sample selection, survey protocol, data management, and analytic methods. Sections 4 through 7 present a synthesis of the results of the qualitative and quantitative data analysis. Section 8 integrates the results of analysis and provides recommendations for NIOSH to consider.

The appendices included in Volume II provide additional documentation about the study. These include the survey analysis tables, details about statistical methods, and the complete set of data collection documents, including the survey

[9]The first were the 2003 edition of *NFPA 1582, Standard on Comprehensive Occupational Medical Program for Fire Departments* and the 2005 edition of *NFPA 1581, Standard on Fire Department Infection Control Program*. NIOSH is also involved in the ongoing revision of *NFPA 1584, Recommended Practice on Rehabilitation of Members Operating at Incident Scene Operations and Training Exercises,* and *NFPA 1982, Standard on Personal Alert Safety Systems (PASS)*.

questionnaire, focus group protocol, study brochure, letters to sample members, and a sample of announcements used to encourage participation in the evaluation.

# 2 Approach to the Evaluation

The purpose of this evaluation was to

1. assess the effects of Fire Fighter Fatality Investigation and Prevention Program (FFFIPP) recommendations and information products on the safety knowledge, attitudes, and behavior of the nation's firefighters, and
2. identify possible strategies for improving the impact of the FFFIPP, including improvements in the approaches used by the National Institute for Occupational Safety and Health (NIOSH) to disseminate the findings from FFFIPP investigations.

The evaluation was thus intended to serve both impact evaluation and performance monitoring functions. It also aimed to identify factors that serve as barriers for fire departments in implementing FFFIPP recommendations.

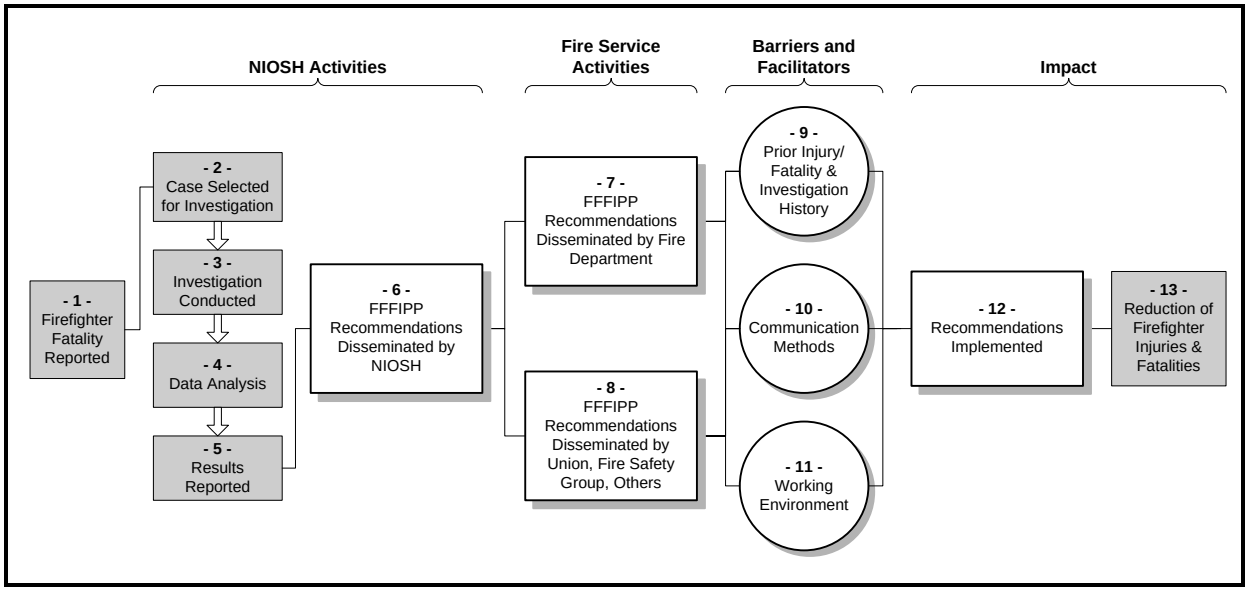
The evaluation was composed of two parts: (1) a national survey of fire departments and (2) a series of focus groups with frontline firefighters. Broadly speaking, these two components address the following five questions:

- To what extent are FFFIPP recommendations being implemented in the nation's fire departments?
- How are FFFIPP recommendations being implemented?
- What factors, if any, hinder fire departments' ability to implement FFFIPP recommendations?
- What characteristics of fire departments facilitate their adherence to FFFIPP recommendations?
- What changes are appropriate, if any, in the content or format of recommendations developed by NIOSH?

## 2.1 CONCEPTUAL FRAMEWORK

The logic model that serves as the conceptual framework for the evaluation shows how FFFIPP activities are expected to help reduce the incidence of firefighter fatalities and serious injuries (***Exhibit 2-1***).[10] It depicts a general sequence of events involving NIOSH Activities, Fire Service Activities, Barriers and Facilitators, and Impact. The FFFIPP's activities begin when a firefighter fatality is reported to NIOSH (Item 1 in the model). NIOSH reviews the fatality report and makes a determination about whether to investigate the case (Item 2). If selected, the case is investigated (Item 3), the data are analyzed (Item 4), and the results are reported in an official report (Item 5). NIOSH then produces and disseminates the report to fire departments and others across the country (Item 6). These reports are "outputs" of the FFFIPP, the direct result of program activities.

**Exhibit 2-1. Logic Model for the Evaluation of the FFFIPP**




As a result of FFFIPP recommendations, the fire departments can be expected to make certain changes. These "outcomes" are specific changes in knowledge, attitudes, behaviors, or safety practices expected to result from FFFIPP

[10]Programs are rarely as linear as depicted in this logic model. They involve dynamic interrelationships that do not necessarily follow a sequential order. Logic models depict assumed causal connections, not direct cause-effect relationships.

recommendations. In the short term, fire departments and other organizations can be expected to disseminate the information from FFFIPP reports to fire department officers and firefighters (Items 7 and 8). These short-term outcomes link to medium-term outcomes such as providing training to firefighters, developing standard operating procedures, or purchasing equipment (Item 12). These are the kind of organizational changes expected to result from FFFIPP recommendations. These changes, in turn, link to the longer-term outcome, or impact, of reduced firefighter injury and fatality (Item 13), the ultimate intended consequence of the program.

The model also reflects the expectation that various barriers and facilitators can affect the influence of the dissemination activities (Items 9 through 11). Barriers can include such things as safety climate and methods of communication, as well as "work environment" factors such as geography, staffing patterns, and available resources. Enabling resources, or facilitators, may include a high level of awareness (as a result, perhaps, of a recent firefighter fatality), as well as available funding, equipment, supplies, facilities, and staff.

*Specific evaluation questions emanated from the logic model and served as the foundation for the items in the Fire Department Survey and Firefighter Focus Group discussions.*

Specific evaluation questions emanated from the logic model and served as the foundation for the items in the Fire Department Survey and Firefighter Focus Group discussions. These are listed in ***Exhibit 2-2***. Questions listed under "NIOSH Dissemination Activities" are related to the following research question and are addressed in Sections 4 and 7:

- What changes are appropriate, if any, in the content or format of recommendations developed by NIOSH?

Questions listed under "Barriers and Facilitators" address the following research questions and are explored in Section 6:

- What factors, if any, hinder fire departments' ability to implement FFFIPP recommendations?
- What characteristics of fire departments facilitate their adherence to FFFIPP recommendations?

Questions listed under "Impact" address the following research questions and are addressed in Section 5:

- To what extent are FFFIPP recommendations being implemented in the nation's fire departments?
- How are FFFIPP recommendations being implemented?

**Exhibit 2-2. Evaluation Questions**

**NIOSH DISSEMINATION ACTIVITIES**

**FFFIPP Recommendations Disseminated by NIOSH**

- Are senior fire department officers (fire chiefs, safety officers, and training officers) familiar with FFFIPP reports? Do senior fire department officers receive FFFIPP reports? Do senior fire department officers read FFFIPP reports?

**FIRE SERVICE ACTIVITIES**

**FFFIPP Recommendations Disseminated by Union, Fire Safety Groups, Others**

- To what extent do fire department staff learn about FFFIPP recommendations through other organizations?

**FFFIPP Recommendations Disseminated by Fire Department**

- Do FFFIPP reports receive appropriate wider distribution? To what extent did fire departments disseminate FFFIPP recommendations to firefighters? How is the information disseminated within the department? To what extent was training made available on FFFIPP recommendations?
- What are the fire departmental policies and practices associated with FFFIPP recommendations?

**BARRIERS AND FACILITATORS**

**Prior Injury/Fatality and Investigation History**

- Does a recent firefighter fatality affect the adherence to recommendations?
- Does a recent FFFIPP investigation affect adherence?

**Nature of the Recommendations**

- How can FFFIPP reports be made more useful? Does NIOSH provide useful and practical recommendations? What changes are appropriate, if any, in the content or format of recommendations developed by NIOSH?
- How can dissemination methods be improved? Does NIOSH present the findings of FFFIPP investigations in ways that are accessible to fire department staff? Who is responsible for disseminating new policies/fire safety practices to the firefighters and officers? Are needed supporting materials available to fire departments?

**Work Environmental Factors**

- To what extent do limited financial resources affect fire departments' ability to implement FFFIPP recommendations?
- To what extent do fire departments have enough personal protective gear for their firefighters?
- What characteristics of fire departments appear to facilitate adherence to FFFIPP recommendations?

**IMPACT**

**Recommendations Implemented**

- To what extent did fire departments implement recommendations identified in FFFIPP reports?

## 2.2 SENTINEL RECOMMENDATIONS

*NIOSH issued several hundred recommendations during the first 5 years of the FFFIPP.*

NIOSH issued several hundred recommendations during the first 5 years of the FFFIPP, including 609 recommendations focused specifically on traumatic injuries. Many of these recommendations overlap or duplicate one another. In preparation for this evaluation, NIOSH developed an inventory of these recommendations and rank ordered them by frequency of mention in FFFIPP investigation reports (NIOSH, 2004). NIOSH then categorized the resulting recommendations by domain of activity, producing two lists of "Top Ten" domains, each with one to six recommendations associated with it. One Top Ten list was produced for recommendations emanating from investigations of traumatic injury fatalities, another for recommendations resulting from investigations of cardiovascular disease (CVD) fatalities on the job. This process identified 31 "key" recommendations, 22 involving traumatic injury fatalities and 9 involving CVD fatalities. The recommendations for traumatic injury fatalities are categorized into the following domains:

- Incident Command—6 recommendations
- Motor vehicle: drive—4 recommendations
- Motor vehicle: seat belts—1 recommendation
- Equipment: maintenance—2 recommendations
- Rapid Intervention Teams—1 recommendation
- Staffing—1 recommendation
- Personal protective equipment (PPE): Clothing—1 recommendation
- PPE: Personal Alert Safety System (PASS)—2 recommendations
- Radio communications—4 recommendations

In consultation with NIOSH, we selected a small subset of these 33 key recommendations for use in this evaluation. The selection of recommendations took the following into account:

- The number of times the recommendation was made in a FFFIPP investigation report. To select measures that had highest relevance to the mission and objectives of the FFFIPP, recommendations that appeared more frequently in FFFIPP reports were more likely to be selected for the evaluation.

- The specificity of the recommendation. To build reliable and valid measures of performance, recommendations that involved specific actions were more likely to be selected than those that did not.
- The comprehensiveness of the resulting set of recommendations. To balance the evaluation, recommendations were selected that allowed coverage of as many as possible of the topic domains covered by FFFIPP reports.

*Seventeen recommendations served as the sentinel recommendations for this evaluation.*

The resulting list of 17 recommendations served as the sentinel recommendations for this evaluation. They are listed in ***Exhibit 2-3***. The data collection strategy focused on the impacts of these FFFIPP recommendations in the training, standard operating procedures, safety practices, and safety environment of the fire departments.

## 2.3 INSTITUTIONAL REVIEW BOARD APPROVAL

RTI's Institutional Review Board reviewed and approved the procedures for the FFFIPP evaluation to ensure that all necessary protections of participants were in place prior to study implementation.

## 2.4 OMB APPROVAL

In accordance with the Paperwork Reduction Act of 1980, the Office of Management and Budget (OMB) reviewed and approved the evaluation plans and study documents before data collection began. The OMB number is 0920-0697.

**Exhibit 2-3. Sentinel Recommendations for the FFFIPP Evaluation**

**DOMAIN #1: INCIDENT COMMAND**

**Recommendation #1**: Fire Departments should establish and implement an Incident Command System with written standard operating procedures for all firefighters.

**Recommendation #2:** Ensure that the Incident Command always maintains close accountability for all personnel at the fire scene.

**Recommendation #3:** Ensure that Incident Command conducts an initial size-up of the incident before initiating firefighting efforts and continually evaluates the risk versus gain during operations at an incident.

**Recommendation #4:** Ensure that a separate Incident Safety Officer, independent from the Incident Commander, is appointed.

**DOMAIN #2: MOTOR VEHICLE SAFETY**

**Recommendation #1:** Ensure that all firefighters riding in emergency fire apparatus are wearing and are properly belted and secured by seat belts.

**Recommendation #2:** Ensure all drivers of fire department vehicles are responsible for the safe and prudent operation of the vehicle under all conditions.

**Recommendation #3:** Ensure all drivers of fire department vehicles receive driver training at least twice a year and document the training.

**DOMAIN #3: EQUIPMENT**

**Recommendation #1:** Develop and implement a preventive maintenance program to ensure that all Self-contained Breathing Apparatus are adequately maintained.

**Recommendation #2:** Fire departments, emergency medical services, and other users of automated external defibrillators should follow the manufacturers' instructions to replace battery packs immediately when the unit indicates a low battery or replace battery message.

**Recommendation #3:** Fire departments should develop and implement a policy requiring the use of Personal Protective Equipment and protective clothing.

**DOMAIN #4: RADIO COMMUNICATION**

**Recommendation #1:** Fire departments should ensure those firefighters who enter hazardous areas, e.g., burning or suspected unsafe structures, are equipped with two-way communications with incident command.

**Recommendation #2:** Ensure that firefighters are equipped with a radio that does not bleed over, cause interference, or lose communication under field conditions.

**DOMAIN #5: SAFETY ON THE FIREGROUND**

**Recommendation #1:** Ensure that a Rapid Intervention Team is established and in position immediately upon arrival.

**Recommendation #2:** Fire departments should strictly enforce the wearing and use of PASS devices when firefighters are involved in firefighting, rescue, and other hazardous duties.

**Recommendation #3:** Ensure that officers enforce and firefighters wear their SCBAs whenever there is a chance they might be exposed to a toxic or oxygen-deficient atmosphere, including the initial assessment.

**DOMAIN #6: FITNESS/WELLNESS**

**Recommendation #1:** Fitness/wellness programs should be mandatory.

**Recommendation #2:** Conduct medical evaluations to screen firefighters for coronary artery disease (CAD) risk factors and CAD.

# 3 Methodology

The data for this evaluation came from a nationwide mail survey of fire departments and a series of focus groups with frontline firefighters. Together, the survey and focus groups provide information on how the Fire Fighter Fatality Investigation and Prevention Program (FFFIPP) information products have been used and highlight issues related to safety procedures for fighting structure fires, enforcement of safety policies, and general attitudes toward safety. The Fire Department Survey was directed at Fire Chiefs and took place between February and June 2006. The data from the focus groups complemented the Fire Department Survey by providing descriptions of the ways in which the FFFIPP affected the knowledge, attitudes, behaviors, and safety practices of frontline firefighters.

In the following sections, we describe the methods used to collect the survey and focus group data, including the participant selection and recruitment process, instrument development, data collection protocol, and analysis design for each of these two evaluation components. These elements of the evaluation methodology were developed in consultation with the National Institute for Occupational Safety and Health (NIOSH) and a number of stakeholders from the fire service. Representatives of the stakeholder organizations who provided advice and consultation during the evaluation are listed in ***Exhibit 3-1***.

**Exhibit 3-1. Stakeholders Consulted for the FFFIPP Evaluation**

| | |
|---|---|
| Robert Solomon, Assistant Vice President<br>Building & Life Safety Codes[a]<br>National Fire Protection Association (NFPA) | Daniel Gregory, Chairman<br>Fire Department Safety Officers Association (FDSOA) |
| Nelson Bryner, Director<br>Fire Fighter Technology Group<br>National Institute of Standards and Technology | Sandy Davis, Vice Chairman<br>FDSOA |
| | Mary McCormack, Executive Director<br>FDSOA |
| Heather Schafer, Executive Director<br>National Volunteer Fire Council (NVFC) | |
| | Rich Maddox, Eastern Director<br>FDSOA |
| Charlie Dickinson, Deputy United States Fire Administrator<br>United States Fire Administration (USFA) | Phil Chovan, Eastern Director<br>FDSOA |
| Al Conners, Assistant to the Deputy United States Fire Administrator<br>USFA | Larry Anderson, Western Director<br>FDSOA |
| Bruce Varner<br>International Association of Fire Chiefs (IAFC) | Bob Finley, Program Manager<br>FDSOA |

[a]The draft evaluation materials were also reviewed by several staff at NFPA in addition to Mr. Solomon.

## 3.1 FIRE DEPARTMENT SURVEY

*The Fire Department Survey was mailed to the Fire Chiefs of a stratified random sample of 3,000 fire departments across the country.*

The Fire Department Survey was mailed to the Fire Chiefs of a stratified random sample of 3,000 fire departments across the country. This section describes our procedures for designing and selecting sample members for the Fire Department Survey, developing and testing the questionnaire, conducting the survey, analyzing the data, and conducting the nonresponse follow-up survey and analysis.

### 3.1.1 Target Population

The unit of analysis for the Fire Department Survey is the fire department. Fire departments are defined here as departments in the 50 United States and the District of Columbia that are listed in the NFPA database and that are involved with fire suppression. Fire departments that are excluded from the sample frame include fire training schools and those agencies that keep records but are not responsible for fire suppression. Also excluded are fire departments on military bases,

commercial departments at businesses, and fire departments associated with airports and harbors.

### 3.1.2 Sample Design

The Fire Department Survey used a cross-sectional design with stratified random sampling. We selected a probability sample of 3,000 fire departments representing 10% of the approximately 30,000 fire departments in the United States. The sampling frame came from a database maintained by NFPA,[11] supplemented with information from NIOSH's Division of Safety Research.

The sample for the Fire Department Survey includes the following:

- all 208 fire departments that had experienced a FFFIPP investigation as of December 31, 2003
- a random sample of 215 fire departments where a firefighter fatality had occurred but no FFFIPP investigation had been conducted, including 120 fatalities due to traumatic injuries and 95 due to cardiovascular disease (CVD)
- the 10 largest fire departments, because of their unique status
- a stratified random sample of 2,575 fire departments where there had not been a fatality as of December 31, 2003

*The goal of the sampling design was to help determine factors that influence the extent to which FFFIPP recommendations are implemented by the departments.*

The goal of the sampling design was to help determine factors that influence the extent to which FFFIPP recommendations are implemented by the departments. In particular, the sample is designed to determine the impact of firefighter fatality investigations and previous firefighter fatalities on the knowledge, behavior, attitudes, and safety practices of firefighters. These factors thus define the high-priority strata for the sample selection: experience with a firefighter fatality and experience with a FFFIPP investigation, plus the 10 largest fire departments.

Four of the five high priority strata were selected with certainty for the sample selection. These are (1) previous firefighter fatality investigation following a traumatic injury fatality, (2) previous firefighter fatality investigation following a CVD

[11] There were 30,611 departments on the NFPA list, of which 30,308 are involved with fire suppression. In comparison, the USFA Census list covers only about 19,000 fire departments.

fatality, (3) traumatic injury fatality and no investigation, and (4) the 10 largest fire departments.[12] All fire departments on the sample frame that are categorized into one of these four groups were selected for the Fire Department Survey sample.

The fifth high priority stratum consists of those fire departments that had a CVD fatality but no FFFIPP investigation. It was considered a noncertainty stratum because some fire departments on the sample frame that fall within this stratum were not selected. There are 189 fire departments in this stratum on the sample frame. We selected 95 of these departments to provide a stratum sample size commensurate with the other high-priority strata. Because three high-priority strata are certainty strata and this stratum had a sample selected at a rate of 50%, the resulting variance of any comparison estimates was expected to be sufficiently small for the data analyses.

Factors that previous studies have shown to influence fire department practices include geographic location, department type (career and volunteer), department size, and population density.[13] A representative sample of subpopulations defined by each of these is included as additional strata in the sample design. The additional strata were defined by the interaction of the following variables:

- Census region (Northeast, South, Midwest, and West)
- department type (volunteer, career, or combination)
- jurisdiction size (size of population served: large, medium, or small)
- jurisdiction type (population density: rural versus urban)

The definitions of these variables are provided in ***Exhibit 3-2***. Within each of these noncertainty strata, the sample of fire departments was selected randomly and with equal probability.

The final sample for the survey is described in ***Exhibit 3-3***.

[12]The 10 departments are the California Department of Forestry, Los Angeles City Fire Department, Los Angeles County Fire Department, Miami-Dade Fire-Rescue, Houston Fire Department, Chicago Fire Department, New York City Fire Department, Arkansas Forestry Commission, San Bernardino County Fire Department, and Philadelphia Fire Department.

[13]See, for example, Fahy, 2005, 2006; Karter et al., 2005; and Fahy and LeBlanc, 2006.

**Exhibit 3-2. Definitions of the Stratification Variables**

| | |
|---|---|
| **Census region** | The U.S. Census Bureau's definition of the four geographic regions as applied to the state in which the fire department is located. The four geographic regions will be defined as follows:<br>1. **Northeast**—Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont<br>2. **South**—Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, West Virginia, plus the District of Columbia<br>3. **Midwest**—Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin<br>4. **West**—Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming |
| **Department type** | Percentage of firefighters who are paid, career versus volunteer firefighters:<br>1. **All career**—100% career firefighters<br>2. **Mostly career**—51% to 99% career firefighters<br>3. **Mostly volunteer**—1% to 50% career firefighters<br>4. **All volunteer**—100% volunteer firefighters |
| **Jurisdiction type** | The population density of the area served by a fire department (population protected by square miles covered):[a]<br>1. **Urban**—fire departments with at least 825 persons per square mile<br>2. **Rural**—fewer than 825 persons per square mile |
| **Jurisdiction size** | Size of protected population as reported on the NFPA database:<br>1. **Large**—at least 50,000 persons protected<br>2. **Medium**—at least 5,000 and fewer than 50,000 persons protected<br>3. **Small**—fewer than 5,000 persons protected |

[a]This definition assumes that 65% of the fire department's coverage area would be considered the central area, and 35% of the coverage area would be considered the surrounding area. In the 2000 Census, the U.S. Census Bureau defines "urban" as all territory, population, and housing units located within an urbanized area or an urban cluster. The Census Bureau defines urbanized areas and urban clusters as densely populated areas that consist of core block groups or blocks with a population density of at least 1,000 people per square mile and surrounding census blocks that have an overall density of at least 500 people per square mile (U.S. Census, 2003).

**Exhibit 3-3. Fire Department Population and Sample Distribution**

| Characteristic | Population | | Sample | |
|---|---|---|---|---|
| | N | Percent | n | Percent |
| **Total** | **29,849** | **100.0** | **3,000** | **100.0** |
| **High-priority strata** | | | | |
| **Total** | 519 | 1.7 | 425 | 14.2 |
| **Strata** | | | | |
| Previous FFFIPP investigation involving a traumatic injury fatality | 117 | 0.4 | 117 | 3.9 |
| Previous FFFIPP investigation involving a CVD fatality | 91 | 0.3 | 91 | 3.0 |
| Traumatic injury fire fighter fatality without investigation | 120 | 0.4 | 120 | 4.0 |
| CVD fire fighter fatality without investigation | 189 | 0.6 | 95 | 3.2 |
| 10 largest fire departments[a] | 2 | 0.0 | 2 | 0.1 |
| **Remainder strata** | | | | |
| **Total** | 29,330 | 98.3 | 2,575 | 85.8 |
| **Census region** | | | | |
| Northeast | 6,438 | 21.6 | 542 | 18.1 |
| South | 10,029 | 33.6 | 879 | 29.3 |
| Midwest | 9,059 | 30.3 | 780 | 26.0 |
| West | 3,804 | 12.7 | 374 | 12.5 |
| **Rural/urban** | | | | |
| Rural | 19,424 | 65.1 | 1,555 | 51.8 |
| Urban | 4,776 | 16.0 | 613 | 20.4 |
| Unknown | 5,130 | 17.2 | 407 | 13.6 |
| **Size (defined by population protected)** | | | | |
| Large (at least 50,000 persons) | 727 | 2.4 | 279 | 9.3 |
| Medium (5,000–49,999 persons) | 8,826 | 29.6 | 752 | 25.1 |
| Small (0–4,999 persons) | 19,777 | 66.3 | 1,544 | 51.5 |
| **Department type** | | | | |
| All career | 1,365 | 4.6 | 359 | 12.0 |
| All volunteer | 10,006 | 33.5 | 816 | 27.2 |
| Combination | 17,959 | 60.2 | 1,400 | 46.7 |

[a]Eight of the 10 largest fire departments are counted in the other high-priority strata.

Note: Population estimates are counts from the sample frame.

### 3.1.3 Questionnaire Design

*The Fire Department Survey was directed to fire department officers.*

The Fire Department Survey was directed to fire department officers (the Chief, the Safety Officer, the Training Officer, or some combination of these officers) in the selected fire departments.

*Questionnaire items address the impact of the FFFIPP as related to the sentinel FFFIPP recommendations.*

Items for the Fire Department Survey questionnaire address the key questions about the impact of the FFFIPP as related to the sentinel FFFIPP recommendations. The questionnaire was designed to capture information about the knowledge, behavior, attitudes, and safety practices of fire department officers and firefighters, and to identify barriers or other issues affecting implementation of FFFIPP recommendations. Performance indicators for the impact of FFFIPP recommendations concern changes in the knowledge, behavior, attitudes, and safety practices at the management level. Questionnaire items related to safety practices focus on

- standard operating procedures (or standard operating guidelines),
- standard performance requirements,
- content and timing of training offered to firefighters,
- communication of safety practices and standards, and
- investment in and maintenance of firefighter safety equipment.

Two types of questions were developed to capture the impact of the sentinel recommendations on knowledge, behavior, attitudes, and safety practices. One consists of direct questions with language closely tied to the language of the recommendations. The second are questions designed to capture the general approach conveyed by the recommendations. These latter questions bridge more than one specific recommendation or set of recommendations.

The questionnaire is provided in Exhibit A-1 in Appendix A.

### 3.1.4 Quality Testing

A draft of the questionnaire was first tested through a series of cognitive interviews with officers and firefighters. The revised questions were then reviewed in accordance with RTI's Question Appraisal System (QAS), which analyzes questionnaire items in relation to the tasks required of the respondents (to

understand and respond to the questions) and evaluates the structure and effectiveness of the questionnaire form itself.[14]

### 3.1.5 Data Collection Methodology

In this section, we describe the specific procedures used in the Fire Department Survey. These include the mail survey, efforts to encourage participation, data receipt and coding, quality control, and data file preparation. The data collection process for the Fire Department Survey included the following basic steps:

- a lead letter and a brochure describing the evaluation
- presurvey stakeholder publicity
- a questionnaire packet mailed with a cover letter; pre-addressed, postage-paid return envelope; and a complementary CD-ROM with FFFIPP information products
- a reminder letter
- a second reminder letter with a second copy of the questionnaire, sent by priority mail

The lead letter addressed to the Fire Chief was sent to each fire department via regular U.S. Postal Service mail (Exhibit A-2 in Appendix A). Enclosed with the letter was a brochure describing the evaluation (Exhibit A-3 in Appendix A). The letter explained the purpose of the study, provided contact names and phone numbers for further information, and encouraged the fire departments to participate in the evaluation.

*A number of stakeholder organizations also helped to elicit support for the Fire Department Survey.*

A number of stakeholder organizations also helped to elicit support for the Fire Department Survey by posting announcements on their websites and sending information about the survey via e-mail to members of their listservs. Sample announcements are shown in Exhibit A-4, Appendix A. Among the organizations that posted or e-mailed announcements were NIOSH, IAFC, FDSOA, NFPA, and NVFC. These promotional activities were coordinated with the launch

[14]RTI's Question Appraisal System (QAS-99) is a coding system with an item taxonomy that describes the cognitive demands of the questionnaire and documents the question features that are likely to lead to response error. These potential errors include comprehension, task definition, information retrieval, judgment, and response generation. This appraisal analysis was used to identify possible revisions in item wording, response wording, questionnaire formats, and question ordering or instrument flow.

of the Fire Department Survey so that announcements typically appeared a month before the launch of the survey.

One week after the lead letters were mailed to the fire departments, we mailed the Fire Department Survey questionnaire with a cover letter from NIOSH and a postage-paid return envelope (Exhibit A-5 in Appendix A). Also enclosed was a showcard that displayed the covers of sample FFFIPP information materials (Exhibit A-6 in Appendix A). These materials were sent to the selected fire departments via regular U.S. Postal Service mail. This cover letter included contact telephone numbers for respondents to call with questions or concerns about the survey. Participation was also encouraged by offering the FFFIPP CD-ROM as an incentive. The Fire Chief or another senior officer (e.g., Captain, Safety Officer, Training Officer, or Lieutenant) was asked to complete the survey.

*A series of mail follow-ups was also used to minimize survey nonresponse.*

A series of mail follow-ups was also used to minimize survey nonresponse. First, a reminder letter was sent to all of the selected fire departments 10 days after the Fire Department Survey was mailed (Exhibit A-7 in Appendix A). These letters were sent to the selected fire departments via regular U.S. Postal Service mail. The letter thanked those who had already completed and returned the questionnaire, stressed the importance of the survey, and encouraged a prompt response from those fire departments that had not yet responded.

Approximately 3 weeks after the first reminder letter, a second copy of the questionnaire was sent, with a second reminder letter to nonrespondents, by priority (FedEx) mail (Exhibit A-8 in Appendix A). The reminder letter again thanked those who had already participated and encouraged those who had not responded to do so as soon as possible.

### 3.1.6 Data Receipt and Coding

As completed questionnaires were received at RTI, they were reviewed for completeness and logged in. The questionnaire data were then scanned, and the text in the open-ended questions was keyed and verified. The responses to all the open-ended questions were coded.

### 3.1.7 Eligibility and Response Rates

Eligibility rates were calculated for the Fire Department Survey to estimate the number of fire departments that were included in the sample frame but are not members of the eligible target

population. The eligibility and response rates for the Fire Department Survey are summarized in ***Exhibit 3-4***. A description of the procedures used for calculating these rates is provided in Appendix B. The overall eligibility rate was 98.5%. The response rate was 54.9%.

### 3.1.8 Estimates and Weighting

Statistical analysis weights enable the estimation of population parameters that are consistent with the sample design by scaling the disproportionalities between the study respondents and the population at large. The weights may be viewed as inflation factors that account for the number of eligible fire departments in the sample frame that each fire department represents. The basic component of an analysis weight is the selection probability that is specified by the sample design. Adjustments were made to the weights to compensate for potential biases attributable to differential response and coverage among sample members. Exhibit B-1 in Appendix B provides documentation on how the analysis weights were assigned to the selected fire departments.

### 3.1.9 Analysis

*We investigate whether there are systematic differences that can be attributed to specific fire department characteristics, experience with FFFIPP investigations, and firefighter fatalities.*

The analytic approach to the survey data was developed in collaboration with NIOSH. The analysis is primarily descriptive and exploratory. First, we present the findings about the key evaluation questions. For each question, we then investigate whether there are systematic differences that can be attributed to specific fire department characteristics (region, type of jurisdiction, size of department, and type of department), experience with FFFIPP investigations, and firefighter fatalities. Throughout the analysis, information from the Fire Department Survey is supplemented with available information derived from the focus groups.

First, the evaluation addresses the sets of questions focused on the impact and outcomes of the program. What were the outcomes of FFFIPP recommendations? To what extent are FFFIPP recommendations being implemented in the nation's fire departments? How are FFFIPP recommendations being implemented? Following are some specific questions regarding these issues:

**Exhibit 3-4. Fire Department Survey: Sample Sizes, Eligibility Rates, and Response Rates**

| Characteristic | Sample Size | Eligibility Rate | Response Rate |
|---|---|---|---|
| **Total** | **3,000** | **98.5** | **54.9** |
| **High-priority strata** | | | |
| **Total** | 425 | 98.4 | 62.7 |
| **Strata** | | | |
| Previous FFFIPP investigation involving a traumatic injury fatality | 117 | 100.0 | 70.9 |
| Previous FFFIPP investigation involving a cardiovascular CVD fatality | 91 | 95.6 | 66.7 |
| Traumatic injury fire fighter fatality without investigation | 120 | 98.3 | 54.2 |
| Cardiovascular disease fire fighter fatality without investigation | 95 | 98.9 | 60.6 |
| 10 largest fire departments[a] | 2 | 100.0 | 0.0 |
| **Remainder strata** | | | |
| **Total** | 2,575 | 98.5 | 53.6 |
| **Census region** | | | |
| Northeast | 542 | 99.6 | 49.3 |
| South | 879 | 98.2 | 50.2 |
| Midwest | 780 | 98.3 | 59.1 |
| West | 374 | 97.9 | 56.8 |
| **Rural/urban** | | | |
| Rural | 1,555 | 98.8 | 53.6 |
| Urban | 613 | 98.9 | 68.0 |
| Unknown | 407 | 96.8 | 31.7 |
| **Size (defined by population protected)** | | | |
| Large (at least 50,000 persons) | 279 | 98.2 | 77.0 |
| Medium (5,000–49,999 persons) | 752 | 98.9 | 63.3 |
| Small (0–4,999 persons) | 1,544 | 98.3 | 44.7 |
| **Department type** | | | |
| All career | 359 | 98.9 | 76.3 |
| All volunteer | 816 | 97.5 | 50.8 |
| Combination | 1,400 | 98.9 | 49.5 |

[a]Eight of the 10 largest fire departments are counted in the other high priority strata.

Note: Eligibility and response rates displayed in this table are unweighted percentages.

- Are senior fire department officers (Fire Chiefs, Safety Officers, and Training Officers) familiar with FFFIPP reports? Do senior fire department officers receive FFFIPP reports? Do senior fire department officers read FFFIPP reports?
- To what extent do fire department staff learn about FFFIPP recommendations through other organizations?
- Do FFFIPP reports receive appropriate wider distribution? To what extent did fire departments disseminate FFFIPP recommendations to firefighters? How is the information disseminated within the department? To what extent was training made available on FFFIPP recommendations?
- What are the fire department policies and practices associated with FFFIPP recommendations?

Next, the analysis addresses the extent to which specific sentinel FFFIPP recommendations have had an impact on firefighters' knowledge, attitudes, behaviors, and safety practices. Following is the central evaluation question:

- To what extent did fire departments implement recommendations identified in FFFIPP reports?

The next set of questions explores the role of various barriers and facilitators. It addresses these questions:

- What factors, if any, hinder fire departments' ability to implement FFFIPP recommendations?
- What enablers existed to facilitate change?
- What characteristics of fire departments are related to adherence to FFFIPP recommendations?

*The overall differences between types of fire departments were tested for statistical significance.*

The overall differences between types of fire departments were tested for statistical significance. The null hypothesis for these tests is that the difference between population estimates among two groups of fire departments is zero. All population estimates generated from the Fire Department Survey data also have accompanying estimates of standard errors and confidence intervals.[15]

[15]Standard errors were computed using the SUDAAN statistical software to properly account for the complex sample design in this study. SUDAAN was also used to estimate the standard error, confidence intervals, and significance of differences in estimates between subpopulations of interest. SUDAAN provided asymmetric confidence interval bounds that use the design-based variance estimates. Asymmetric confidence intervals are preferable to symmetric ones because the coverage properties tend to be better, particularly for small proportions.

A set of six analysis tables was generated to display the findings for each sample stratum. These tables are provided in Appendix B, by stratum: Census region (Exhibit B-2), jurisdiction type (Exhibit B-3), jurisdiction size (Exhibit B-4), department type (Exhibit B-5), experience with a FFFIPP investigation and fatality (Exhibit B-6), and experience with a firefighter fatality, by type of fatality (Exhibit B-7). Each set consists of three separate tables:

- The first table (labeled "a" in each set) answers such questions as, "Does awareness of FFFIPP reports vary significantly by type of department?" It displays row percentages and column significant differences. The superscripts to the right of the row percentage estimates identify statistically significant differences (at the .05 level) between the percentage estimate and what is displayed in the corresponding columns for that particular row. Note that the numbers displayed in the "total" column always equal 100.0%.
- The second table (labeled "b" in each set) displays asymmetric 95% confidence intervals associated with column percentages.
- The third table (labeled "c" in each set) displays sample sizes. The primary reason for including this table is to provide information on which estimates may be relatively imprecise or unreliable because of insufficient sample size.

Because most fire departments are small, volunteer departments, the findings reported in these analysis tables will not necessarily reflect the conditions at the firefighter level. To supplement the fire department–level analysis, therefore, an additional set of tables was developed to display findings at the firefighter level of analysis. These tables are provided in Appendix C.

To examine the combined explanatory effects of region, jurisdiction type, jurisdiction size, department type, and experience with a FFFIPP investigation and fatality, multivariate logistic regression models are also examined. The tables for this analysis are also provided in Appendix C.

### 3.1.10 Nonresponse Analysis

*A stratified random sample of approximately 10% of nonresponders was contacted by telephone, and a shortened version of the original survey was administered to assess any nonresponse bias.*

After the fire department mail survey was completed, we drew a sample of nonresponders for further follow-up to assess any nonresponse bias. A stratified random sample of approximately 10% of nonresponders was contacted by telephone, and a shortened version of the original survey was administered to gather data to assess any nonresponse bias. The total sample for the nonresponse follow-up survey was 215 fire departments.

The nonresponse survey instrument included 16 of the questions from the original 62-question survey instrument, selected in consultation with NIOSH (Exhibit D-1 in Appendix D). Items were selected from each of the sections of the original questionnaire to ensure an appropriate coverage of issues.

Telephone interviewers in RTI's call center followed a script to determine eligibility, identify an appropriate respondent, and obtain informed consent for the interview (Exhibit D-2 in Appendix D). The interviews took about 5 minutes to administer. The telephone interviewers were given a "frequently asked questions" document to assist with questions the fire department personnel had about the survey (Exhibit D-3 in Appendix D).

Of the 215 fire departments selected for this nonresponse survey, we received responses from 132. In addition, 3 fire departments refused, 4 were determined to be ineligible (no longer independently functioning department, etc.), and we were unable to contact 76. The response rate was thus 62.6%.

Exhibit B-8 in Appendix B provides findings from the nonresponse analysis. The results suggest that nonresponse bias may exist for at least some of the response options in the Fire Department Survey. Significant differences are found in 10 of the 13 questionnaire items tested. Across the nonresponse questionnaire, these significant differences between the two groups of respondents are found in 18 of the 61 response options. It should be noted, however, that these results are inconclusive for 6 of the 13 questionnaire items (i.e., in 6 response options) because skip patterns in the nonresponse questionnaire differ from those in the Fire Department

Survey.[16] Nevertheless, the results of the nonresponse analysis suggest that the Fire Department Survey data contain some nonresponse bias. The results should be viewed with this caveat in mind. In the following sections of this report, the findings where this caveat applies are noted.

## 3.2 FIREFIGHTER FOCUS GROUPS

The focus groups with frontline firefighters captured aspects of the FFFIPP's influence that could not be fully assessed in a survey; information collected through the focus groups contributed to a greater understanding of how the FFFIPP influences fire departments and their officers and firefighters. The primary objectives of the focus groups were to

- identify the impact of the FFFIPP on the knowledge of fire department officers,
- identify the impact of the FFFIPP on fire department operations (on, for example, the content of training, standard operating procedures, and standard operating guidelines),
- identify the impact of the FFFIPP on fire safety practices, and
- explore how the organizational climate of fire departments contributes to the overall safety environment in which firefighters work.

The focus groups also contributed information about the barriers and facilitators that influence the impact of FFFIPP recommendations. Understanding contextual factors and how they shape the impact of the FFFIPP provides valuable information for future efforts to improve the FFFIPP.

*A series of six focus groups was conducted with frontline firefighters.*

A series of six focus groups was conducted during March and April 2006. The focus group participants were all frontline firefighters. The following sections provide details about the focus group methodology.

### 3.2.1 Participant Recruitment and Selection

Participants for the focus groups were selected using a targeted, convenience sampling approach. The composition of these focus groups was designed to reflect the primary

[16]Questions in the Fire Department Survey allow respondents to skip Questions 11, 11b, 45, 47, 50, and 50a; the telephone-administered nonresponse survey did not include these skip patterns.

groupings represented in the Fire Department Survey design. Every effort was made to recruit participants who represented the various kinds of fire department characteristics, including size (small, medium, large), type of department (career, volunteer), and type of jurisdiction (urban, rural).

Focus group participants were recruited through advance e-mail and web announcements, as well as during the Fire Department Instructors Conference (FDIC).[17] A number of stakeholder organizations posted information about the focus groups on their websites and encouraged participation through e-mails to the members of their listservs. Among the organizations that posted or e-mailed announcements were NIOSH, FDSOA, NFPA, and NVFC. A sample announcement is provided as Exhibit E-1 in Appendix E.

We developed a screening script to ensure that the sample of focus group participants matched the target goals (Exhibit E-2 in Appendix E). The method used to select firefighters, officers, or senior administrators for the focus groups was a quota sampling method. Although this approach does not ensure statistical representation, the goal of these focus groups was to elaborate on issues related to the implementation of safety guidelines rather than provide estimates of safety behavior.

### 3.2.2 Characteristics of the Participants

The six groups included one focus group consisting of all volunteer firefighters, one focus group consisting of all career firefighters, and four focus groups consisting of a mix of career and volunteer firefighters. Details on the characteristics of the focus group participants are provided in ***Exhibit 3-5***.

### 3.2.3 Focus Group Protocol

*Two of the groups were conducted in jurisdictional settings.*

The locations for the focus group discussions were determined in consultation with NIOSH and stakeholder representatives. Two of the groups were conducted in jurisdictional settings in North Carolina. One setting is a career fire department in a midsized city in central North Carolina. The other is an all-volunteer department located in a small, rural community in south-central North Carolina. One department is unionized; the

[17] We wish to acknowledge the assistance of the FDSOA, which generously allowed RTI staff to recruit participants at its FDIC booth.

**Exhibit 3-5. Characteristics of Focus Group Participants**

| Number of Participants | 34 |
|---|---|
| **Career-volunteer** | |
| Career firefighters | 16 |
| Volunteer firefighters | 18 |
| **Gender** | |
| Male | 29 |
| Female | 5 |
| **Urban-rural jurisdiction** | |
| Urban | 5 |
| Suburban | 14 |
| Rural | 15 |
| **Region** | |
| Northeast | 6 |
| South | 22 |
| Midwest | 6 |
| West | 0 |
| **Unionized** | |
| Yes | 15 |
| No | 19 |

*The remaining four focus groups were conducted at a national conference.*

other is not. The remaining four focus groups were conducted with firefighters attending the annual FDIC in Indianapolis, Indiana. Conducting the focus groups at a national conference provided the greatest level of access to a wide variety of fire department personnel from around the country and from departments of different size, career status, jurisdiction, and background.

Participants in the focus groups were asked to read and sign a written informed consent form to participate in the focus groups (Exhibit E-3 in Appendix E). Before each focus group, the moderator, or interviewer, reviewed the consent form with the participants to ensure that they understood their rights and were participating voluntarily. The consent forms were printed in duplicate so that one copy could be retained by the research subject and the other by project staff.

Using a semistructured Focus Group Moderator Guide to organize the discussion, the focus groups targeted issues related to knowledge of FFFIPP recommendations, procedures for disseminating safety information, and other issues related to firefighter safety (Exhibit E-4 in Appendix E). Moderators brought samples of FFFIPP information materials for discussion, as well as a Lifeline Handout (Exhibit E-5 in Appendix E), in case participants became uncomfortable while talking about safety issues.

### 3.2.4 Analysis

*The focus groups yielded a rich store of qualitative data on the problems and safety concerns of firefighters.*

The focus groups yielded a rich store of qualitative data on the problems and safety concerns of firefighters. Using simple thematic analysis techniques, we compiled a list of the major themes in the focus group participant responses to questions about the safety climate, dissemination of safety recommendations, and impact of the FFFIPP on firefighter safety.

# 4 Findings: Awareness of FFFIPP Recommendations

This section explores the extent to which the National Institute for Occupational Safety and Health's (NIOSH's) outreach efforts have raised awareness in the fire service about NIOSH, the Fire Fighter Fatality Investigation and Prevention Program (FFFIPP), and FFFIPP recommendations.[18] The picture that emerges from the survey data suggests that the FFFIPP has a low profile within the fire service. However, fire department officers are familiar with FFFIPP reports and with NIOSH. Most officers are familiar with NIOSH, and most have seen and read a FFFIPP report. Over half, however, are not familiar with the FFFIPP itself, particularly with the process of identifying incidents to investigate, conducting the investigation, and reporting findings.

Fire department officers learn about FFFIPP recommendations primarily through NIOSH mailings. Other primary sources of information are trade publications and websites (NIOSH's and others'). Fire departments pass along the information from FFFIPP reports to their firefighters in a variety of ways. For example, NIOSH recommendations have been used by some 11,000 fire departments (40.2% of all study-eligible fire

[18]Of the 1,751 respondents to the Fire Department Survey, 70.2% are Fire Chiefs, 2.8% are Safety Officers, 6.5% are Training Officers, 14.3% are other officers, 2.2% are administrative assistants, 1.7% are firefighters, and 0.8% are other fire department staff. Throughout this discussion, we refer to this group of respondents collectively as "fire department officers" or "fire departments." We use these two terms interchangeably, depending on the context.

*NIOSH recommendations have been used by some 11,000 fire departments to update the content of their training programs.*

departments in the country) to update the content of their training programs. The training topics that have been most often influenced by NIOSH recommendations are personal protective equipment (PPE), Self-contained Breathing Apparatus (SCBA), Personal Alert Safety System (PASS) devices, Incident Command System, traffic hazards, and radio communications.

In addition to using NIOSH recommendations to train their firefighters, fire departments post information from NIOSH on fire station bulletin boards and brief firefighters about the recommendations during regular staff meetings. Nevertheless, two fifths of fire departments do not disseminate information from NIOSH to frontline firefighters at all.

Fire departments that are most likely to receive and disseminate information from NIOSH are those in the Northeast, fire departments in large or urban jurisdictions, career fire departments, fire departments that have experienced a fatality (regardless of the nature of the fatality),[19] and fire departments that have been the subject of a FFFIPP investigation.

Details about firefighters' awareness of FFFIPP recommendations follow. The discussion is organized by research question. It addresses three broad questions:

- Are senior fire department officers familiar with the FFFIPP?
- Are fire department officers familiar with FFFIPP recommendations?
- Are FFFIPP recommendations disseminated to firefighters?

The survey questionnaire items that capture answers to these questions are discussed in turn. For each questionnaire item, we first present the overall findings across all fire departments and then report statistically significant differences across the five categories of fire departments (region, department type, size of jurisdiction, jurisdiction type, and experience with on-duty firefighter fatalities and FFFIPP investigations). A summary of the response patterns related to these fire department characteristics is provided in ***Exhibit 4-1***. Where appropriate, the survey findings are supplemented with findings from the focus groups. The analysis tables on which the survey findings are based are provided in Appendix B. Exhibit B-2 reports the results by Census region (Northeast, South, Midwest, or West). Exhibit B-3 reports the results by department type (all career, all volunteer, or combination). Exhibit B-4 provides the results by type of jurisdiction (rural or urban). Exhibit B-5 provides the results by size of jurisdiction served (large, medium, or small). Exhibit B-6 has the results by fatality and FFFIPP investigation

[19]Fatalities are categorized as due to either traumatic injury or cardiovascular disease.

**Exhibit 4-1. Characteristics of Fire Departments Where FFFIPP Recommendations Are Most Widely Disseminated**

| Questionnaire Item | | Overall Percent | Fire Department Characteristics | | | | |
|---|---|---|---|---|---|---|---|
| | | | Region | Jurisdiction Type | Size of Jurisdiction | Type of Department | Fatality/ Investigation |
| 8. | Familiar with NIOSH | 67.4 | NE | U | L | C | F, I |
| 9. | Familiar with the FFFIPP | 45.7 | — | U | L | C | F, I |
| 10. | Receive NIOSH recommendations in a variety of ways | 3.6–67.8 | NE, W | U | L | C | F |
| 11. | Train firefighters based on NIOSH recommendations | 40.2 | NE | U | L | C | F |
| 43. | Have seen NIOSH reports frequently | 38.9 | NE, W | U | — | C | F, I |
| 44. | Receive NIOSH reports via the Internet | 24.7 | W | U | — | C | — |
| 45. | Read Line of Duty Death reports | 53.3 | W | U | L | C | — |
| 50. | Disseminate information to firefighters | 60.7 | — | U | — | C | F |
| 50A. | Use a variety of methods to disseminate information to firefighters | 1.1–44.2 | NE | U | — | C | F, I |
| 53. | Familiar with other NIOSH materials | 12.5–57.4 | NE | U | L | C | F, I |

Note: NE = Northeast; W = West; U = urban; L = large; C = career; F = prior fatality; I = prior FFFIPP investigation; — = does not apply (no significant pattern).

Source: Fire Department Survey.

(fatality and investigation, fatality and no investigation, or no fatality). Finally, Exhibit B-7 provides the results by type of fatality (traumatic, cardiovascular, or no fatality). The final part of this section presents firefighter-level estimates of these issues. It is based on information provided by the fire departments (in Question 57 of the survey) on the number of firefighters who work at the fire department.

## 4.1 ARE SENIOR FIRE DEPARTMENT OFFICERS FAMILIAR WITH THE FFFIPP? (Q8, 9)

Although most fire department officers are familiar with NIOSH, over half are not familiar with the FFFIPP. Even among fire departments with a prior fatality, a third of officers in

departments that had not had a FFFIPP investigation are "not at all" or "not very familiar" with the FFFIPP. The focus group discussions also suggest that frontline firefighters are not very familiar with either NIOSH or the FFFIPP.

### 4.1.1 Awareness of NIOSH (Q8)

*Most fire department officers are familiar with NIOSH.*

Most fire department officers (67.4%) are familiar with NIOSH.[20] Officers who are less familiar with NIOSH tend to be located in the Midwest or West, in small jurisdictions, and in departments with a mixture of career and volunteer staff. Following are the statistically significant differences in the pattern of responses.

**Region.** Fire department officers in the Northeast are significantly more likely to be "somewhat" or "very familiar" with NIOSH, compared with officers in the South and West. The combined percentages for these two responses are

- Northeast, 78.0%,
- South, 67.3%,
- Midwest, 61.1%, and
- West, 64.0%.

**Jurisdiction Type.** Fire department officers in urban jurisdictions are more likely to be very familiar with NIOSH than those in rural jurisdictions. The percentages are

- urban, 83.7%, and
- rural, 66.0%.

See ***Exhibit 4-2***.[21]

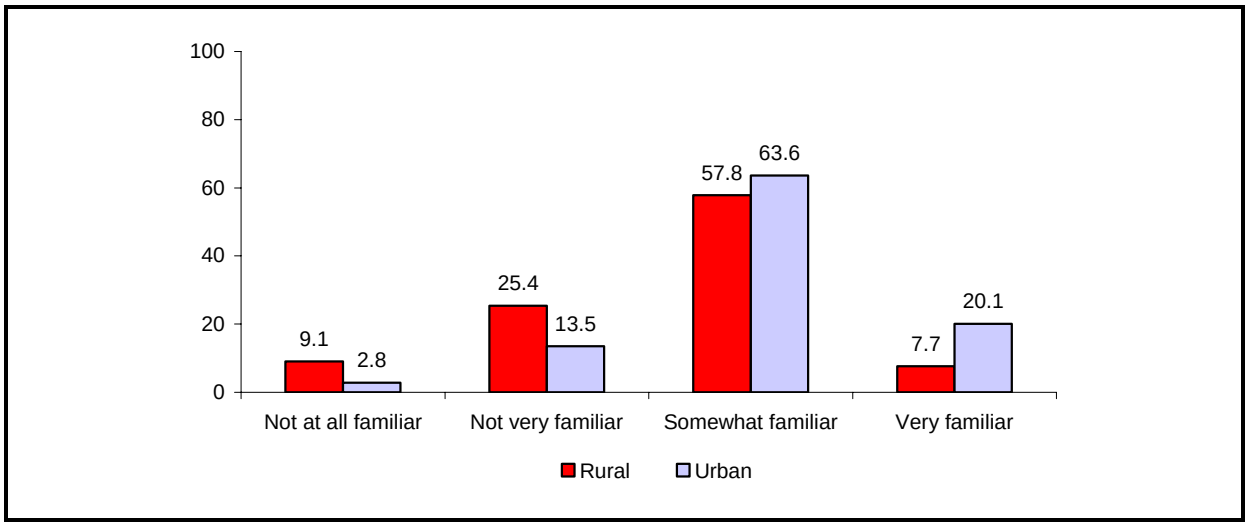
*The larger the jurisdiction, the more likely the fire department officer is somewhat or very familiar with NIOSH.*

**Size of Jurisdiction.** The larger the jurisdiction, the more likely the fire department officer is somewhat or very familiar with NIOSH compared with officers in medium and small jurisdictions. Almost all fire department officers (93.6%) in large jurisdictions and four fifths (80.2%) of officers in medium-sized jurisdictions report that they are somewhat or very familiar with NIOSH. This is significantly more than the proportions of officers in small jurisdictions (60.6%).

[20] All percentages in this report are based on weighted data unless otherwise specified.

[21] Throughout this and subsequent chapters, bar charts are provided to illustrate statistically significant findings from the Fire Department Survey. We do not provide bar charts for those questions for which patterns are not statistically significant.

**Exhibit 4-2. How Familiar Are You with NIOSH? (Question 8), by Jurisdiction Type (Percent)**




**Type of Department.** Officers in career fire departments are more likely than officers from volunteer and combination career-volunteer fire departments to be somewhat or very familiar with NIOSH. The percentages are

- career, 86.3%,
- volunteer, 69.4%, and
- combination, 64.7%.

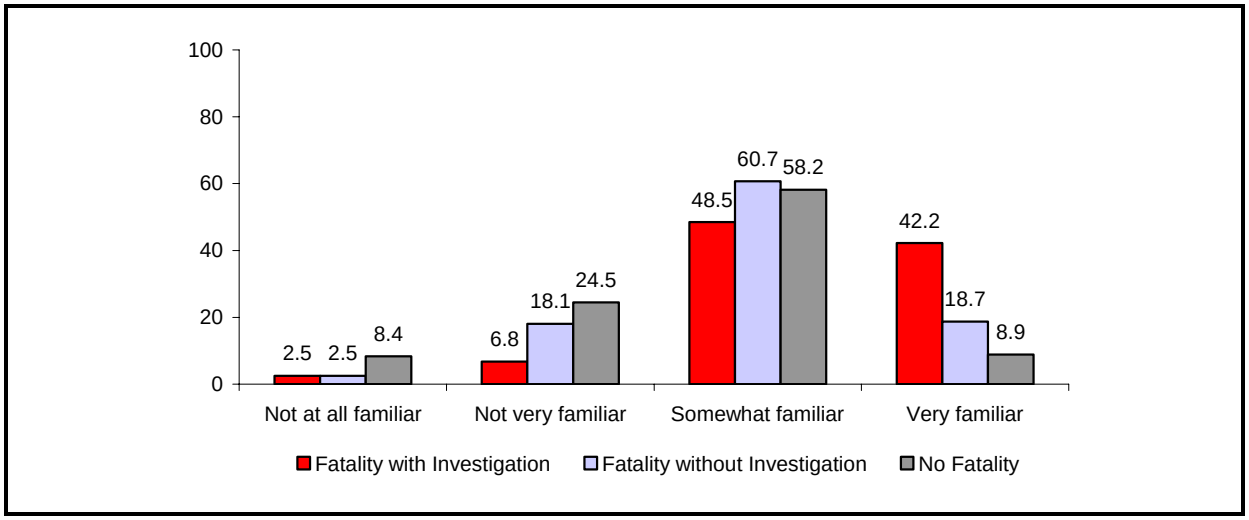
**Experience with On-Duty Fatality and FFFIPP Investigation.** Both experience with an on-duty firefighter fatality and experience with a FFFIPP investigation increase the likelihood that the officer is familiar with NIOSH. Among fire departments that have experienced a firefighter fatality, officers in those that have had a FFFIPP investigation are significantly more likely to be very aware of NIOSH than those that have not had an investigation (42.2% and 18.7%, respectively).[22] Officers in fire departments that have experienced a firefighter fatality (regardless of their experience with a FFFIPP investigation) are also more likely than those in fire departments that had not experienced a fatality to be somewhat or very familiar with NIOSH. The combined proportions are

[22]There are no statistically significant patterns based on whether the fatality was classified as traumatic or cardiovascular. In fact, none of the analyses for this evaluation yielded significant results on this stratum. For simplicity, therefore, this factor is not discussed in the remaining sections of this report.

- fatality with investigation, 90.7%,
- fatality without investigation, 79.4%, and
- no fatality, 67.1%.

See ***Exhibit 4-3***.

**Exhibit 4-3. How Familiar Are You with NIOSH? (Question 8), by Fatality and FFFIPP Investigation (Percent)**




### 4.1.2 Awareness of the FFFIPP (Q9)

Over half (54.3%) of all fire department officers are not at all or not very familiar with the FFFIPP. The FFFIPP is best known among officers in all-career fire departments, departments in the Northeast and West, departments in large and urban jurisdictions, and departments that have experienced a FFFIPP investigation. Details about these patterns are as follows.[23]

**Region.** Fire department officers in the West are significantly more likely than those in the South and Midwest to be very familiar with the FFFIPP. The percentages are

- Northeast, 9.5%,
- West, 13.4%,
- South, 6.7%, and
- Midwest, 5.5%.

Of the four regions, a larger percentage of fire department officers in the Northeast are familiar with the FFFIPP. Over half

[23]The nonresponse analysis suggests there is nonresponse bias related to the response options "somewhat familiar" and "very familiar." See Exhibit B-8a in Appendix B for details.

of fire department officers in the South (56.4%) and Midwest (59.3%) are not at all or not very familiar with the FFFIPP.

**Jurisdiction Type.** Officers in urban fire departments are more likely to be somewhat or very familiar with the FFFIPP, compared with those in rural fire departments. The percentages are

- urban, 65.9%, and
- rural, 43.6%.

Over half of officers in rural fire departments (56.5%) are not at all or not very familiar with the FFFIPP.

*Almost two thirds of officers in small jurisdictions are not familiar with the FFFIPP.*

**Size of Jurisdiction.** The larger the jurisdiction, the more likely the fire department officer is somewhat or very familiar with the FFFIPP, compared with officers in medium and small fire departments. The percentages are

- large, 74.5%,
- medium, 58.6%, and
- small, 38.8%.

Almost two thirds of officers in small jurisdictions (61.3%) are not at all or not very familiar with the FFFIPP. See ***Exhibit 4-4***.

**Type of Department.** Officers in career fire departments are more likely to be familiar with the FFFIPP than those in volunteer and combination career-volunteer fire departments. The percentages that are somewhat or very familiar with NIOSH are

- career, 70.5%,
- volunteer, 45.9%, and
- combination, 43.6%.

Over half of the officers in volunteer (54.0%) and combination (56.5%) fire departments are “not at all” or “not very familiar” with the FFFIPP.

**Experience with On-Duty Fatality and FFFIPP Investigation.** Both experience with an on-duty firefighter fatality and experience with a FFFIPP investigation increase the likelihood that the officer is familiar with the FFFIPP. Officers in fire departments who had experienced an on-duty firefighter fatality are significantly more likely to say they are “very familiar” with the FFFIPP than those in fire departments with no

fatality, regardless of whether there had been a FFFIPP investigation. The percentages are

- fatality with investigation, 42.9%,
- fatality without investigation, 16.5%, and
- no fatality, 7.5%.

Among fire department officers who had experienced an on-duty firefighter fatality and a FFFIPP investigation, 90.6% are somewhat or very familiar with the FFFIPP. See ***Exhibit 4-5.***

**Exhibit 4-4. How Familiar Are You with the FFFIPP? (Question 9), by Size of Jurisdiction (Percent)**

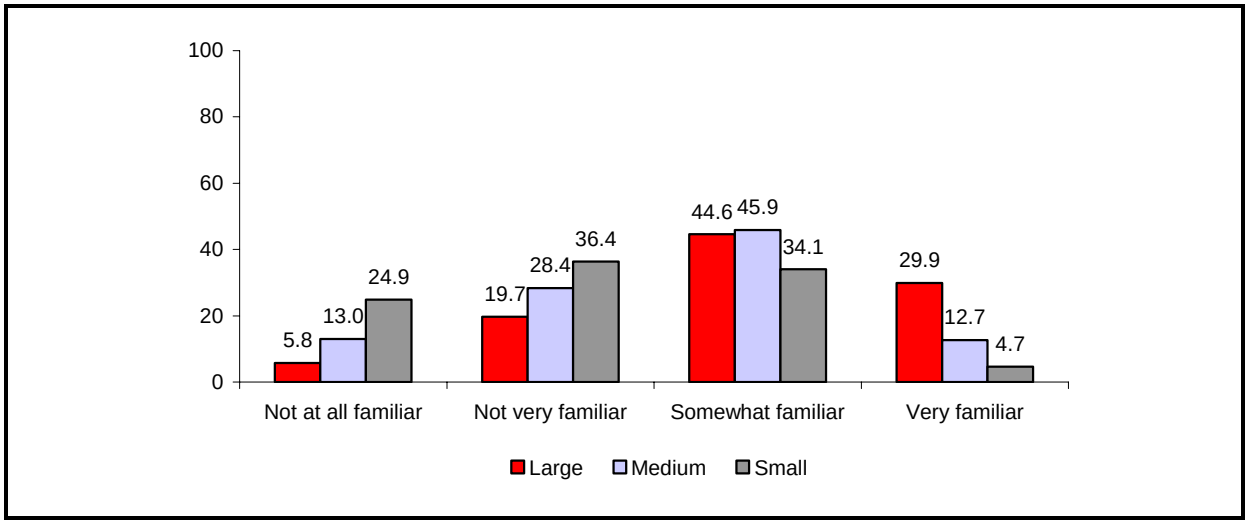
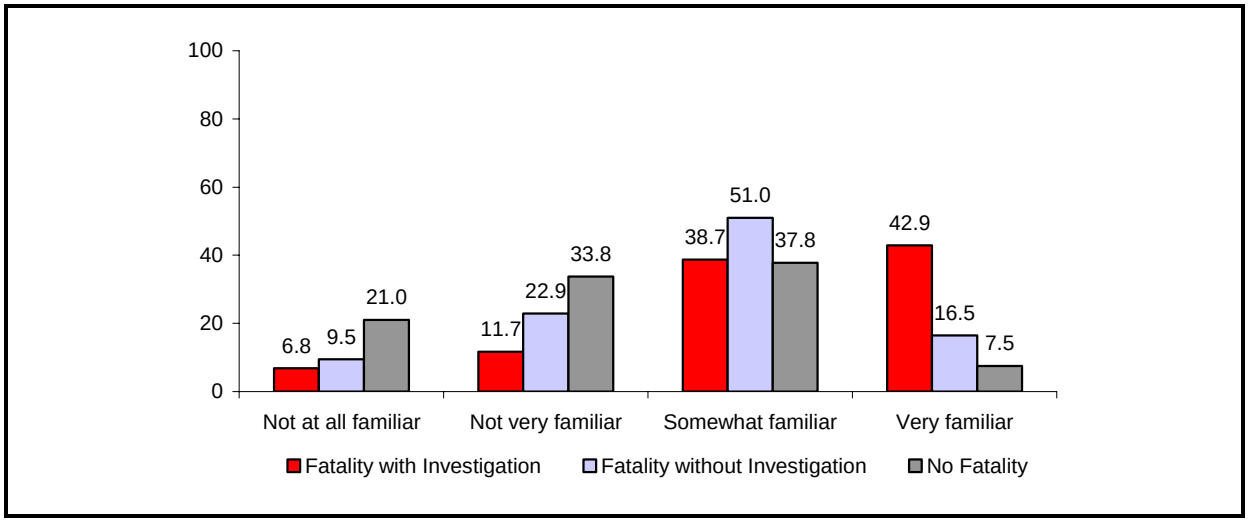



**Exhibit 4-5. How Familiar Are You with the FFFIPP? (Question 9), by Fatality and FFFIPP Investigation (Percent)**



## 4.2 ARE FIRE DEPARTMENT OFFICERS FAMILIAR WITH FFFIPP RECOMMENDATIONS? (Q10, 43, 44, 45, 53)

Fire departments learn about FFFIPP recommendations through a variety of sources, primarily NIOSH mailings, trade publications, links from websites, such as the National Fire Protection Association (NFPA) and Firehouse, and the NIOSH website. NIOSH mailings have the greatest reach, particularly among fire departments with a prior fatality, those with career firefighters, and those in jurisdictions that are in the Northeast. The NIOSH website is used most often to obtain FFFIPP reports by fire departments in large jurisdictions. Information is disseminated by fire departments to the firefighters primarily through training, in posting the FFFIPP report on the station bulletin board, and by way of regular staff meetings.

Three quarters of all fire department officers have seen a FFFIPP report. Most fire departments recall receiving FFFIPP reports sent to them by NIOSH through the mail. Many fire department officers also get their FFFIPP reports from the Internet, from colleagues in other departments, and at conferences and other meetings.

*A quarter of all fire department officers do not recall seeing any NIOSH materials.*

Three quarters of the fire department officers recall seeing a FFFIPP report. Over half of all fire department officers have read a FFFIPP report within the previous 12 months. The majority also report that they have seen NIOSH's Pocket Guide to Chemical Hazards. However, less than a third recall seeing an Alert. A quarter of all fire department officers do not recall seeing any NIOSH materials, and relatively few recall having seen other FFFIPP materials such as the FFFIPP CD-ROM, Hazard IDs, the respirator maintenance program guide, or the Workplace Solutions publication.

### 4.2.1 How Do Fire Department Officers Learn about FFFIPP Recommendations? (Q10)

Fire departments learn about FFFIPP recommendations through a variety of sources. In order of frequency, these are

- NIOSH mailings, 67.8% of all fire departments,
- trade publications, 47.2%,
- links from websites such as NFPA and Firehouse, 28.2%,
- NIOSH website, 24.3%,

- other firefighters or fire departments, 22.9%,
- seminars or other training opportunities, 16.4%,
- media reports, 14.9%,
- state conferences, 11.5%,
- national conferences, 3.6%, and
- other, 1.1%.

*Among fire departments that are aware of FFFIPP recommendations, NIOSH mailings appear to reach equally across regions, types of departments, and size and density of the jurisdictions served.*

NIOSH mailings have a significantly wider reach among fire departments that have had a fatality and a FFFIPP investigation. None of the other five characteristics had significant differences regarding NIOSH mailings. Among fire departments that are aware of FFFIPP recommendations, NIOSH mailings appear to reach equally all regions, types of departments, and size and density of the jurisdictions served.

The NIOSH website, on the other hand, has a significantly greater reach among fire departments in the Northeast and West, career fire departments, fire departments in large or urban jurisdictions, and fire departments with a prior firefighter fatality (regardless of whether the fatality was investigated).

Details about the patterns of responses follow.

**Region.** Fire department officers in the Northeast and West are more likely than those in the South or Midwest to get information from the NIOSH website. The percentages are

- Northeast, 29.1%,
- South, 21.8%,
- Midwest, 20.2%, and
- West, 32.0%.

Officers in the Northeast are more likely than those in the South and Midwest to get information from

- other websites (34.6%, 26.3%, 23.7%, and 33.1%, respectively),
- other firefighters and fire departments (28.4%, 20.8%, 20.0%, and 25.6%),
- seminars or other training opportunities (23.1%, 13.8%, 13.6%, and 18.1%), and
- media reports (22.2%, 11.6%, 13.0%, and 15.3%).

The outreach methods that have the greatest reach are mailings and the website. These methods are most effective in reaching the following types of departments:

- prior fatality and investigation: NIOSH mailings (84.7%)
- prior fatality, no investigation: NIOSH mailings (74.0%)
- career fire departments: NIOSH mailings (72.4%)
- fire departments in large jurisdictions: NIOSH website (72.3%)
- fire departments in the Northeast: NIOSH mailings (71.0%)
- rural fire departments: NIOSH mailings (71.0%)
- combination career-volunteer fire departments: NIOSH mailings (69.2%)

Fire departments in the Northeast are also less likely than those in the South, Midwest, or West to not receive any information about NIOSH recommendations (5.0%, 13.2%, 11.5%, and 15.4%).

There are no significant differences by region with respect to NIOSH mailings, trade publications, or state conferences. See ***Exhibit 4-6.***

**Jurisdiction Type.** Fire department officers in urban jurisdictions are more likely than those in rural jurisdictions to receive information about NIOSH recommendations from

- national conference presentations (9.9% and 2.8% for urban and rural departments, respectively),
- state-level conference presentations (16.3% and 9.8%),
- trade publications (56.7% and 45.9%),
- the NIOSH website (42.0% and 21.8%), or
- links from other websites (36.8% and 28.9%).

There are no significant differences in patterns for NIOSH mailings, other firefighters and fire departments, seminars and other training opportunities, or media reports. See ***Exhibit 4-7.***

**Size of Jurisdiction.** The larger the jurisdiction served by the fire department, the more likely the fire department received information from each of the sources noted above. The differences are significant for most of the items, except media reports; 14.6% of fire departments in small jurisdictions report that they do not receive any information about NIOSH recommendations. See ***Exhibit 4-8.***

**Type of Department.** Officers in career fire departments are more likely than officers in volunteer or combination career-volunteer departments to get information about NIOSH recommendations from

- national conference presentations (14.3%, 5.3%, and 1.9%, for career, volunteer, and combination departments, respectively),
- seminars and other training opportunities (23.5%, 15.2% and 16.4%),
- the NIOSH website (55.2%, 26.2% and 20.7%), or
- links from other websites (43.2%, 26.5% and 27.9%).

**Exhibit 4-6. How Does Your Department Receive Information about NIOSH's Firefighter Safety and Health Recommendations? (Question 10), by Region (Percent)**

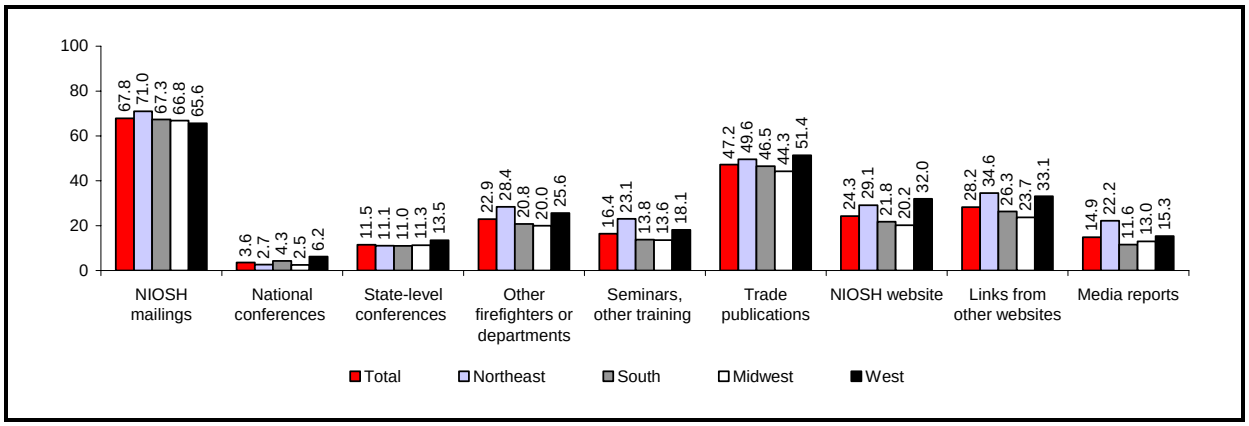



**Exhibit 4-7. How Does Your Department Receive Information about NIOSH's Firefighter Safety and Health Recommendations? (Question 10), by Jurisdiction Type (Percent)**

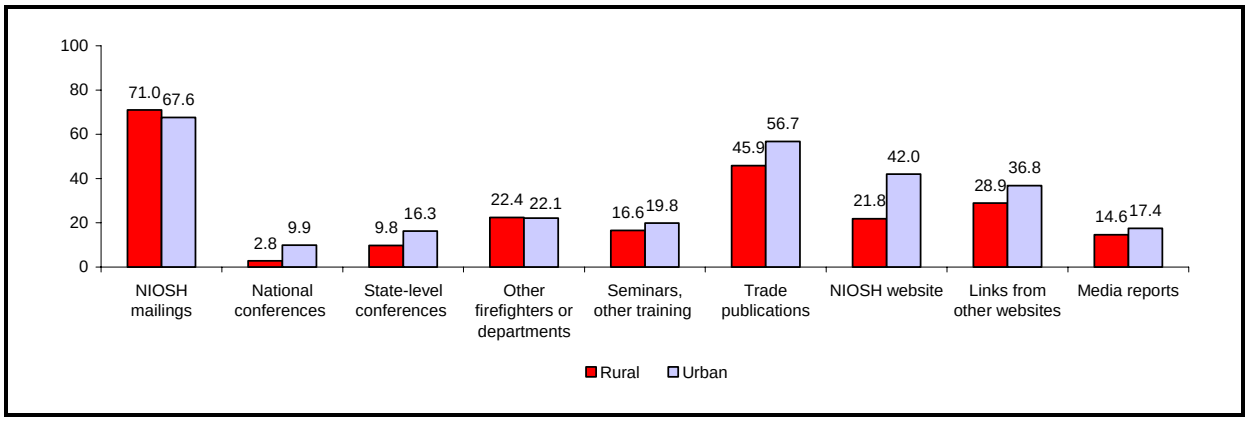
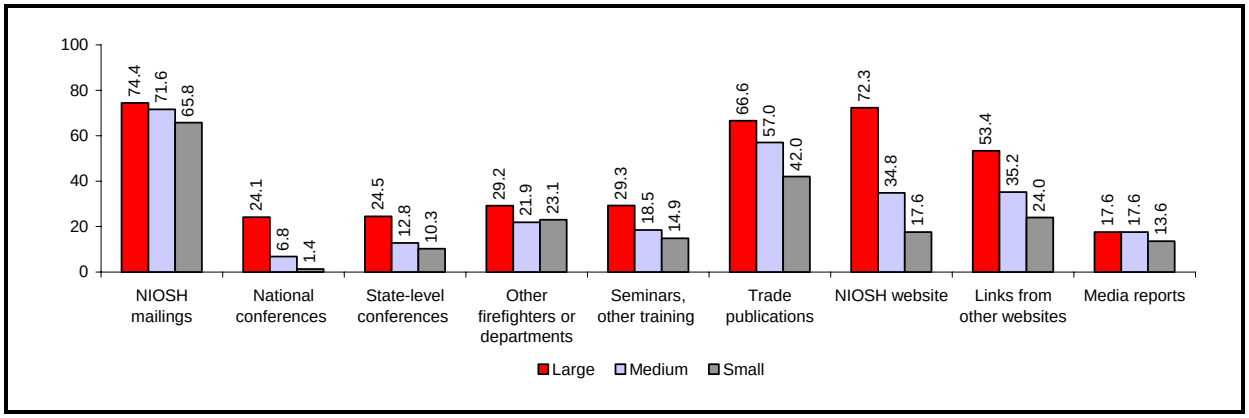



**Exhibit 4-8. How Does Your Department Receive Information about NIOSH's Firefighter Safety and Health Recommendations? (Question 10), by Size of Jurisdiction (Percent)**



There are no significant differences by region with respect to NIOSH mailings, other firefighters and fire departments, and media reports. See ***Exhibit 4-9.***

**Experience with On-Duty Fatality and FFFIPP Investigation.** Not surprisingly, fire departments with a prior firefighter fatality and a FFFIPP investigation are more likely than fire departments that have not had a firefighter fatality to recall receiving information about NIOSH recommendations from NIOSH mailings. The percentages are

- fatality with investigation, 84.7%,
- fatality without investigation, 74.0%, and
- no fatality, 67.6%.

Officers in fire departments without a prior firefighter fatality are more likely to report they have not received any information about NIOSH recommendations than officers in fire departments that have a prior fatality. The percentages are

- fatality with investigation, 2.9%,
- fatality without investigation, 4.0%, and
- no fatality, 11.3%.

See ***Exhibit 4-10.***

### 4.2.2 Familiarity with FFFIPP Line of Duty Death Reports (Q43)

Fire department officers who report being most familiar with FFFIPP reports are those in the Northeast and West, in large or urban jurisdictions, in career fire departments, in departments that had experienced an on-duty firefighter death, and in departments that had experienced a FFFIPP investigation.

**Region.** Officers in fire departments in the Northeast and West are significantly more likely to have seen a FFFIPP report than officers in the South and Midwest. Almost a third of fire department officers in the South and Midwest have never seen a FFFIPP report. The percentages are

- Northeast, 21.6%,
- South, 30.2%,
- Midwest, 29.0%, and
- West, 21.3%.

**Exhibit 4-9. How Does Your Department Receive Information about NIOSH's Firefighter Safety and Health Recommendations? (Question 10), by Type of Department (Percent)**

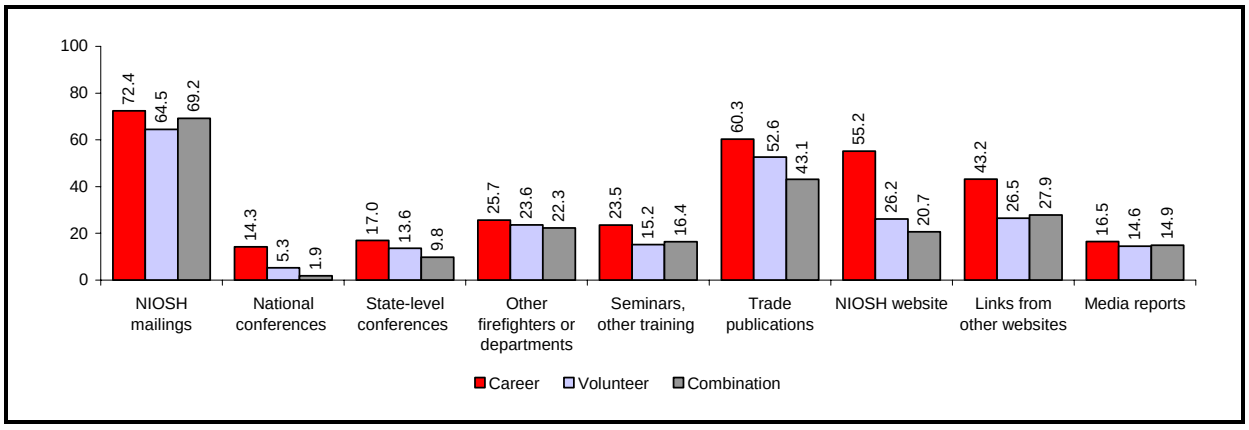
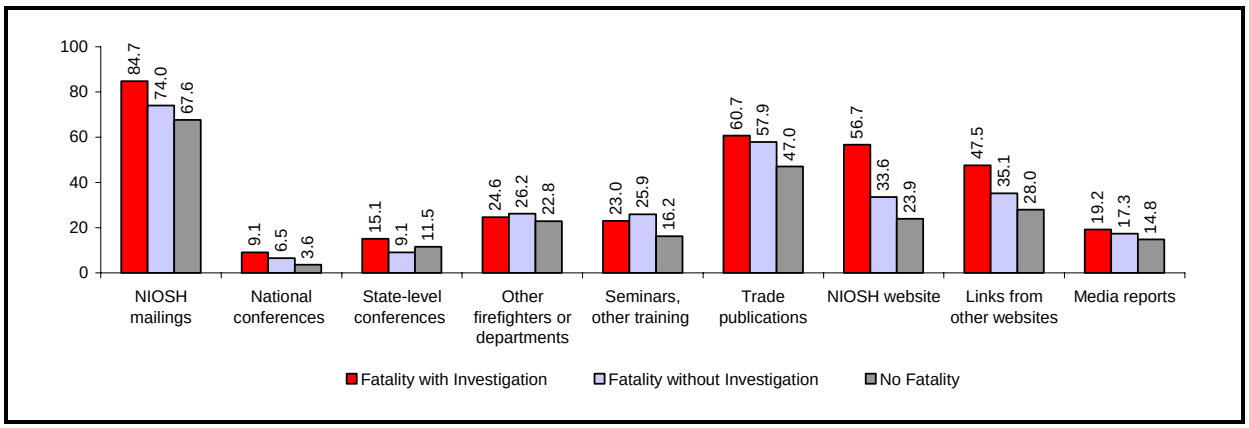



**Exhibit 4-10. How Does Your Department Receive Information about NIOSH's Firefighter Safety and Health Recommendations? (Question 10), by Fatality and FFFIPP Investigation (Percent)**




*Fire department officers in urban jurisdictions are more likely to have seen a FFFIPP report than those in rural jurisdictions.*

**Jurisdiction Type.** Fire department officers in urban jurisdictions are more likely to have seen a FFFIPP report than those in rural jurisdictions (87.3% and 72.5%, respectively). Officers in urban fire departments also report receiving FFFIPP reports more frequently (47.2% of officers in urban departments had seen a report "several times per year," compared with only 32.1% of those in rural jurisdictions). More than a quarter (27.6%) of rural fire department officers had never seen a report. See ***Exhibit 4-11.***

**Size of Jurisdiction.** The larger the fire department's jurisdiction, the more likely and more frequently the fire department officers have seen a FFFIPP report. Two thirds of officers in large jurisdictions (65.2%) have seen a FFFIPP report "several times per year" or at least "once a month," compared

with only half (48.6%) of those in medium jurisdictions and a third (33.5%) of those in small jurisdictions. One third of the officers in small jurisdictions (32.2%) have never seen a FFFIPP report.

**Type of Department.** Officers in career fire departments are more likely to report receiving FFFIPP reports than those in volunteer or combination career-volunteer departments. Only 15.9% of officers in career fire departments say they "never" receive FFFIPP reports, compared with 23.5% of those in volunteer and 29.4% in combination fire departments.

**Experience with On-Duty Fatality and FFFIPP Investigation.** Experience with both a firefighter fatality and a FFFIPP investigation increases the likelihood that the fire department officer has seen a FFFIPP report. Over two thirds (68.9%) of officers in fire departments with both a prior fatality and FFFIPP investigation report that they have received a FFFIPP report several times per year or at least once a month. This compares with just over one third (38.6%) of officers in fire departments that had experienced neither a fatality nor an investigation. Officers in fire departments that had no prior fatality are also significantly more likely than those in departments with a prior fatality (with or without a FFFIPP investigation) to report having never seen a FFFIPP report. The proportions are

- fatality with investigation, 8.2%,
- fatality without investigation, 11.1%, and
- no fatality, 27.1%.

See ***Exhibit 4-12.***

### 4.2.3 How FFFIPP Reports Are Obtained (Q44)

*Fire departments most often obtain FFFIPP reports through the mail.*

Fire departments most often obtain FFFIPP reports through the mail, regardless of the region, type of department, size or type of jurisdiction, or experience with a FFFIPP-investigated fatality. However, although NIOSH sends FFFIPP reports to every fire department in the country, only 56% of the respondents to the Fire Department Survey recall receiving FFFIPP reports from NIOSH via mail. The only significant difference across the five characteristics was among officers in fire departments without a fatality: they are less likely to have seen a FFFIPP report.

**Exhibit 4-11. How Often Have You Seen NIOSH Reports That Describe Recent Firefighter Fatalities and Make Recommendations for Avoiding Similar Incidents? (Question 43), by Jurisdiction Type (Percent)**

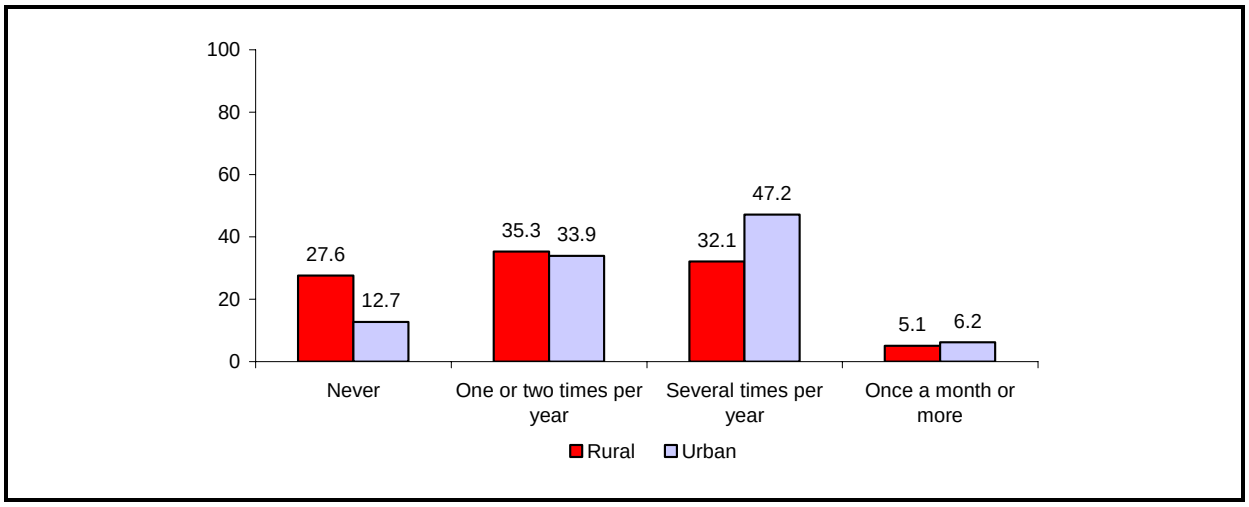
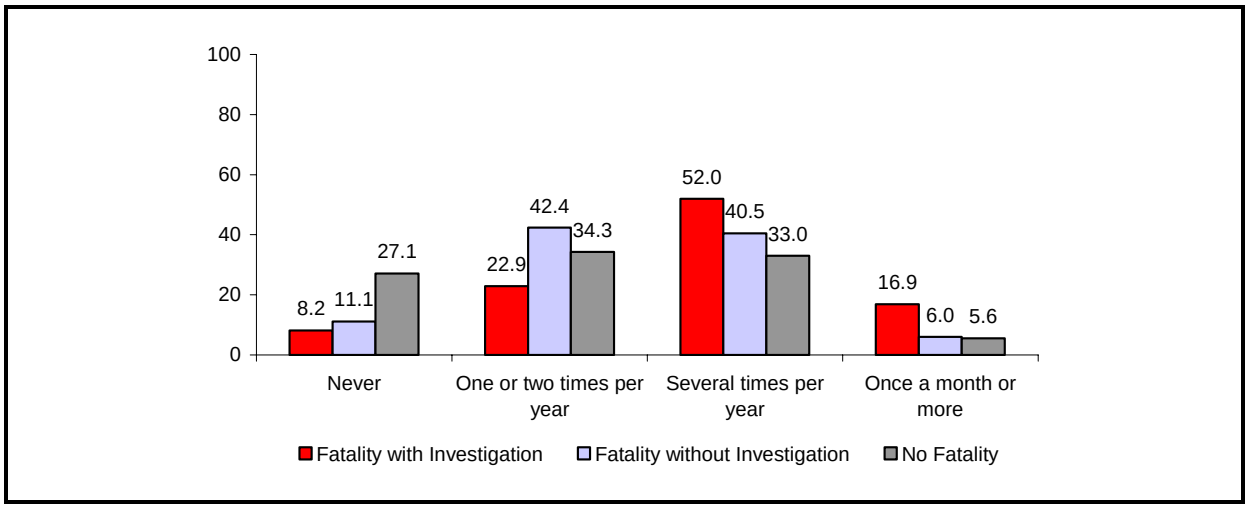



**Exhibit 4-12. How Often Have You Seen NIOSH Reports That Describe Recent Firefighter Fatalities and Make Recommendations for Avoiding Similar Incidents? (Question 43), by Fatality and FFFIPP Investigation (Percent)**




*About one fourth of fire department officers download FFFIPP reports from the Internet.*

About one fourth (24.7%) of fire department officers report that they download FFFIPP reports from the Internet, 10% get them from colleagues in other departments, and 6.9% obtain FFFIPP reports at conferences and other meetings. Fire department officers are significantly more likely to download FFFIPP reports if their jurisdictions are large, urban, and in the West, or if they are in career departments or departments that had a prior FFFIPP investigation. Less than a quarter of fire department officers in jurisdictions that are small, rural, Southern, or Midwestern, or in departments that had no prior

firefighter fatality download FFFIPP reports. Even in the Northeast, only 27.7% of the fire department officers report that they download FFFIPP reports.

Significant differences in the patterns of responses for this question follow.

**Region.** Fire department officers in the West are significantly more likely than those in the South and Midwest to download reports from the Internet. The percentages are

- Northeast, 27.7%,
- South, 22.4%,
- Midwest, 21.7%, and
- West, 32.7%.

*The NIOSH website is used most often to obtain FFFIPP reports by fire departments in large jurisdictions.*

**Jurisdiction Type.** Fire department officers in urban jurisdictions are more likely than those in rural fire departments to download reports from the Internet (40.7% and 23.6% in urban and rural departments, respectively) or to obtain them at conferences and other meetings (13.6% and 5.9%). See ***Exhibit 4-13.***

**Size of Jurisdiction.** Fire department officers in large jurisdictions are considerably more likely than those in medium or small jurisdictions to

- download FFFIPP reports from the Internet (63.4%, 35.8%, and 18.2% for large, medium, and small jurisdictions, respectively) or
- obtain FFFIPP reports at conferences and other meetings (22.5%, 8.6%, and 5.6%).

See ***Exhibit 4-14***.

**Type of Department.** Officers in career fire departments are almost twice as likely as those in volunteer and combination career-volunteer fire departments to obtain FFFIPP reports

- at conferences and other meetings (17.8%, 8.4%, and 5.2% for career, volunteer, and combination departments, respectively) or
- on the Internet (48.4%, 27.8%, and 21.0%).

**Experience with On-Duty Fatality and FFFIPP Investigation.** Officers in fire departments that had experienced a fatality and a FFFIPP investigation are more likely

than those that had not to download FFFIPP reports from the Internet. The percentages are

- fatality with investigation, 51.6%,
- fatality without investigation, 35.5%, and
- no fatality, 24.4%.

See ***Exhibit 4-15***.

**Exhibit 4-13. How Does Your Department Receive the NIOSH Firefighter Fatality Investigation Reports? (Question 44), by Jurisdiction Type (Percent)**

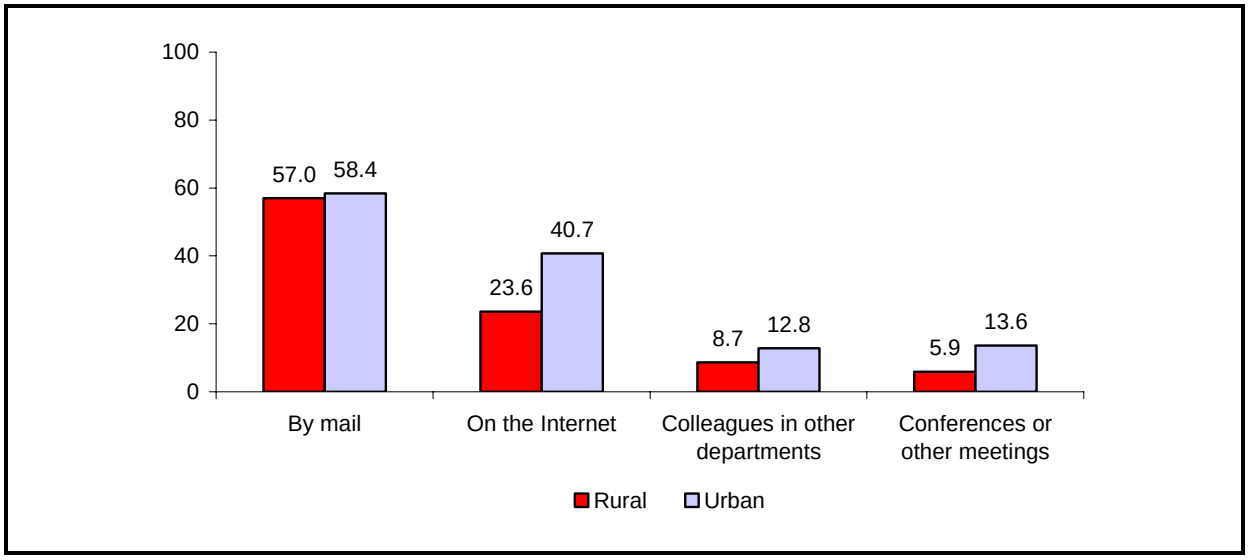



**Exhibit 4-14. How Does Your Department Receive the NIOSH Firefighter Fatality Investigation Reports? (Question 44), by Size of Jurisdiction (Percent)**

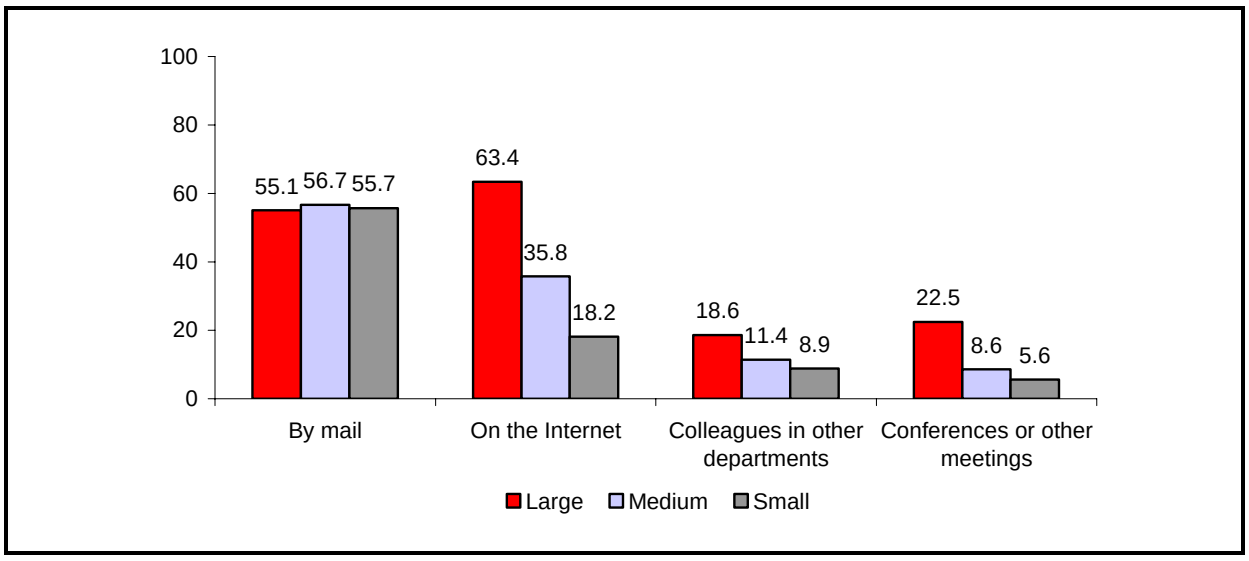
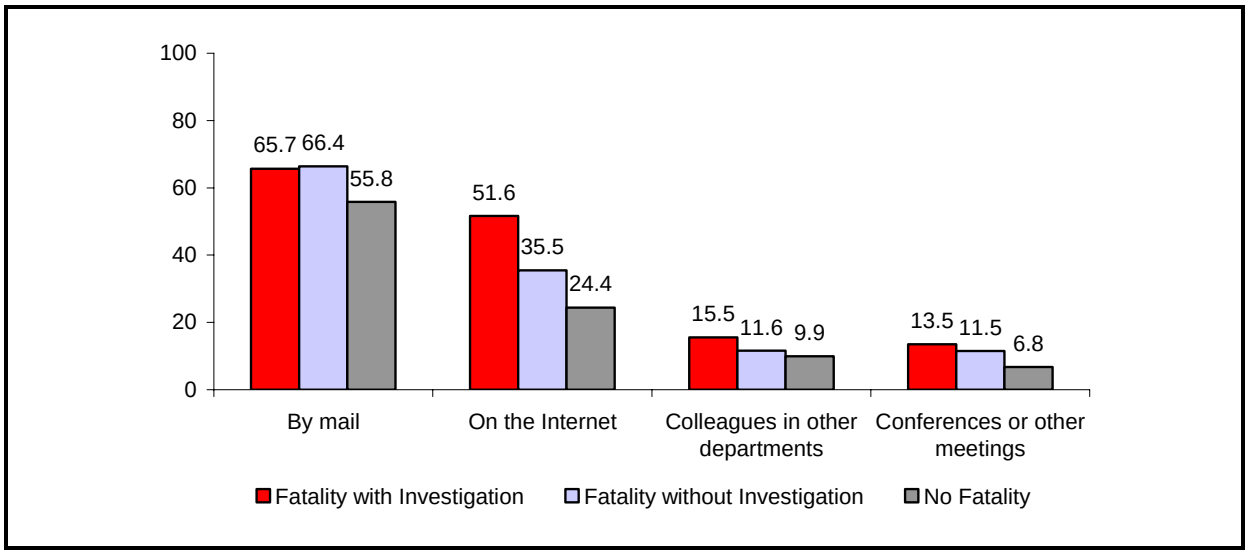


**Exhibit 4-15. How Does Your Department Receive the NIOSH Firefighter Fatality Investigation Reports? (Question 44), by Fatality and FFFIPP Investigation (Percent)**




### 4.2.4 Do Senior Fire Department Officers Read FFFIPP Reports? (Q45)

*Over half of all fire department officers have read a FFFIPP report within the previous 12 months, but many skip the discussion section.*

Over half (53.0%) of all fire department officers have read a FFFIPP report within the previous 12 months. These respondents tend to read the summary, investigation results, and recommendations sections of the FFFIPP report but often skip the discussion section. The percentages of respondents who read these four sections are 54.2%, 54.0%, 32.2%, and 52.1%, respectively.

Fire department officers are significantly more likely to have read part or all of a FFFIPP report if their jurisdiction is large, urban, or in the West, or if the department is career, has a prior firefighter fatality, or has a prior FFFIPP investigation.

**Region.** Fire department officers in the West are significantly more likely than those in the South or Midwest to have read a FFFIPP report in the previous 12 months. The percentages are

- Northeast, 57.7%,
- South, 49.8%,
- Midwest, 50.7%, and
- West, 61.6%.

See ***Exhibit 4-16.***

**Jurisdiction Type.** Officers in urban jurisdictions are significantly more likely than those in rural jurisdictions to have

read a FFFIPP report in the previous 12 months (72.7% and 51.9%, respectively). See ***Exhibit 4-17.***

**Size of Jurisdiction.** Over four fifths of fire department officers in large jurisdictions have read a FFFIPP report in the past 12 months, significantly more than the rate for officers in medium and small jurisdictions. The percentages are

- large, 83.7%,
- medium, 65.5%, and
- small, 46.8%.

See ***Exhibit 4-18.***

**Type of Department.** Officers in career fire departments are more likely than those in volunteer or combination career-volunteer departments to have read a FFFIPP report in the previous 12 months. The percentages are

- career, 69.2%,
- volunteer, 56.5%, and
- combination, 50.3%.

See ***Exhibit 4-19.***

**Experience with On-Duty Fatality and FFFIPP Investigation.** Over four fifths of officers in fire departments where a FFFIPP investigation had been conducted report having read a FFFIPP report in the previous 12 months. Officers in departments with a prior firefighter fatality and a prior FFFIPP investigation are significantly more likely than officers in departments without either to have read a FFFIPP report in the previous 12 months. The percentages are

- fatality with investigation, 83.1%,
- fatality without investigation, 68.6%, and
- no fatality, 53.0%.

See ***Exhibit 4-20.***

**Exhibit 4-16. Have You Read Part or All of a NIOSH Firefighter Fatality Investigation Report in the Last 12 Months? (Question 45), by Region (Percent)**

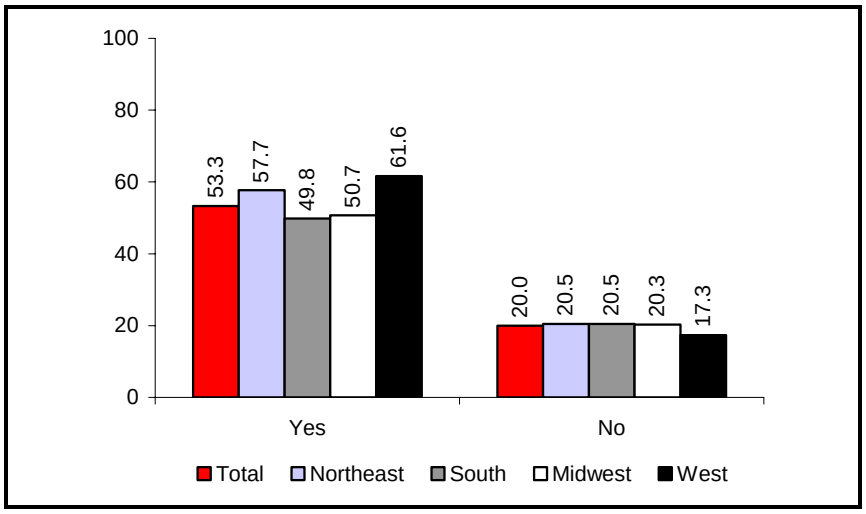



**Exhibit 4-17. Have You Read Part or All of a NIOSH Firefighter Fatality Investigation Report in the Last 12 Months? (Question 45), by Jurisdiction Type (Percent)**

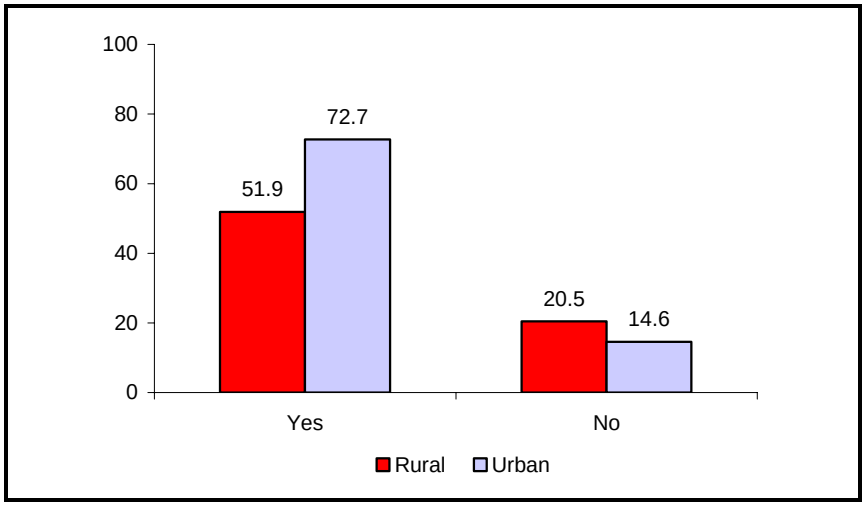



**Exhibit 4-18. Have You Read Part or All of a NIOSH Firefighter Fatality Investigation Report in the Last 12 Months? (Question 45), by Size of Jurisdiction (Percent)**

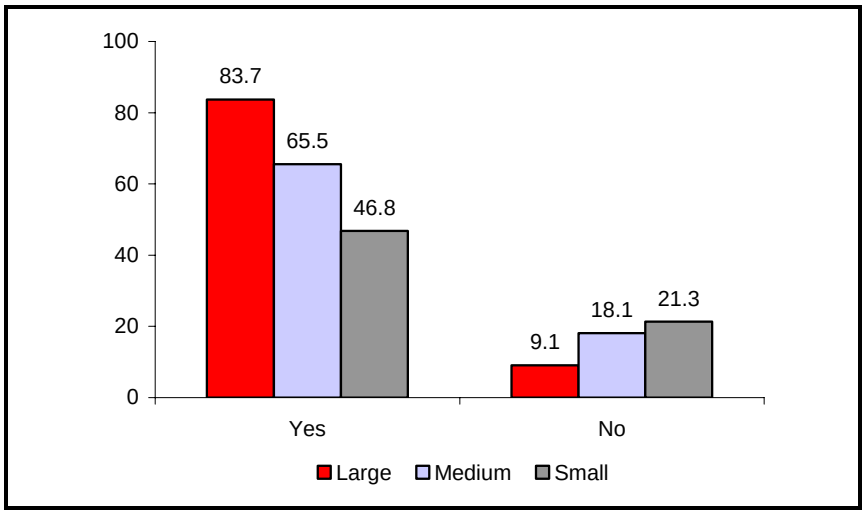


**Exhibit 4-19. Have You Read Part or All of a NIOSH Firefighter Fatality Investigation Report in the Last 12 Months? (Question 45), by Type of Department (Percent)**

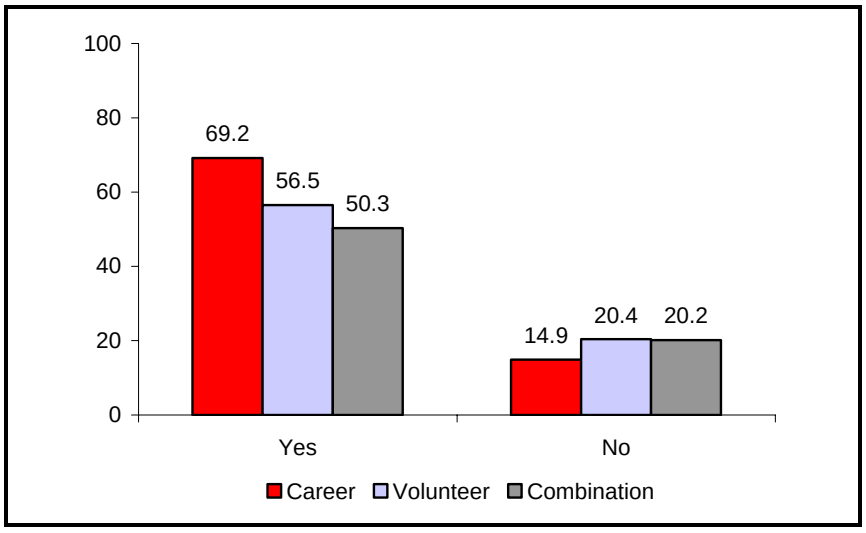
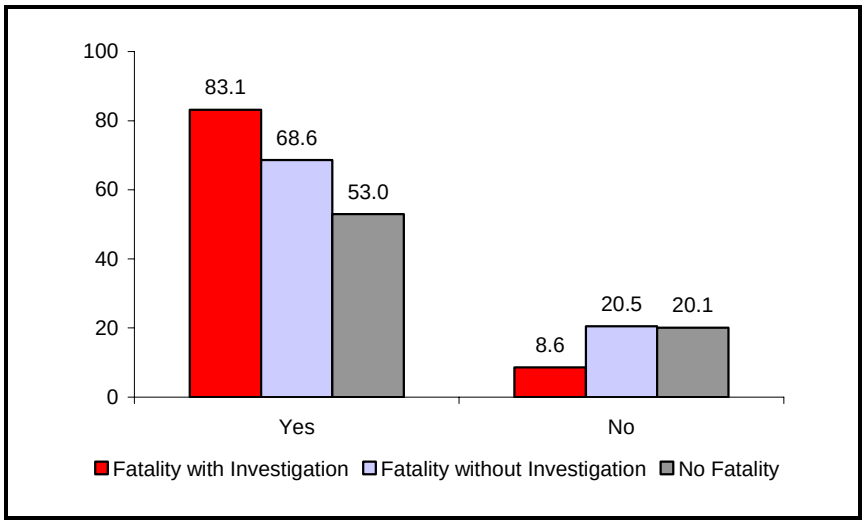



**Exhibit 4-20. Have You Read Part or All of a NIOSH Firefighter Fatality Investigation Report in the Last 12 Months? (Question 45), by Fatality and FFFIPP Investigation (Percent)**




### 4.2.5 Other FFFIPP Reports Received (Q53)

The majority of fire department officers (57.4%) report that they have seen NIOSH's Pocket Guide to Chemical Hazards. However, less than a third (31.7%) have seen an Alert, and relatively few have seen a FFFIPP CD-ROM (28.0%), Hazard IDs (16.6%), Respirator Maintenance Program Guide (13.8%), or Workplace Solutions (12.5%). A quarter of fire department officers (25.2%) report they have not seen any NIOSH materials.

Fire department officers who are more likely to have seen these additional NIOSH materials are those in jurisdictions that are urban or large, as well as those in career fire departments.

**Region.** Fire department officers in the Northeast are more likely than those in the South or Midwest to have seen NIOSH's

- Pocket Guide to Chemical Hazards (66.8%, 52.3%, 54.7%, and 61.0% for Northeast, South, Midwest, and West jurisdictions, respectively) and
- Alerts (38.8%, 29.8%, 27.3%, and 34.9%).

They are also more likely than fire department officers in the West to have seen the Respirator Maintenance Program Guide (17.0%, 13.1%, 13.9%, and 9.8%).

**Jurisdiction Type.** Fire department officers in urban jurisdictions are more likely than those in rural jurisdictions to have seen NIOSH's

- Pocket Guide to Chemical Hazards (73.7% and 55.0% for urban and rural departments, respectively),
- Respirator Maintenance Program Guide (20.3% and 13.9%),
- FFFIPP CD-ROM (34.0% and 27.8%), or
- Alerts (47.3% and 30.9%).

*Fire department officers are more likely to have seen additional NIOSH materials if they are in jurisdictions that are urban or large, as well as those in career fire departments.*

Officers in urban fire departments are also less likely than those in rural departments to report they have not seen any NIOSH materials (14.1% and 25.4%, respectively). See ***Exhibit 4-21***.

**Size of Jurisdiction.** The larger the jurisdiction of the fire department, the more likely the officers report that they have seen other NIOSH materials, particularly NIOSH's

- Pocket Guide to Chemical Hazards (85.2%, 64.8%, and 52.9% for large, medium, and small jurisdictions, respectively),
- Respirator Maintenance Program Guide (26.3%, 18.0%, and 11.3%),
- FFFIPP CD-ROM (41.2%, 30.1%, and 26.5%), and
- Alerts (62.9%, 41.3%, and 26.0%).

Almost a third of the fire department officers in small jurisdictions (30.3%) do not recall seeing any other NIOSH materials. See ***Exhibit 4-22.***

**Type of Department.** Officers in career fire departments are more likely to have seen other NIOSH materials than officers in volunteer or combination career-volunteer fire departments. The differences are significant for NIOSH's

- Pocket Guide to Chemical Hazards (77.1%, 59.0%, and 54.9% for career, volunteer, and combination departments, respectively) and
- Alerts (49.4%, 32.1%, and 30.0%).

Similarly, officers in career fire departments are less likely than those in volunteer or combination career-volunteer fire departments to say they have not seen any other NIOSH materials (14.1%, 25.0%, and 26.2%). See ***Exhibit 4-23.***

**Experience with On-Duty Fatality and FFFIPP Investigation.** Officers in fire departments with a prior FFFIPP investigation are significantly more likely than those in other fire departments to have seen the FFFIPP CD-ROM (47.9%, 32.8%, and 27.8% for fatality with investigation, fatality without investigation, and no-fatality departments, respectively).

Officers in fire departments with a prior firefighter fatality are more likely than those in departments without a prior fatality to have seen NIOSH's

- Pocket Guide to Chemical Hazards (68.3%, 67.4%, and 57.2%, respectively) or
- Alerts (48.4%, 41.7%, and 31.5%).

See ***Exhibit 4-24***.

**Exhibit 4-21. What Other NIOSH Materials Have You Seen? (Question 53), by Jurisdiction Type (Percent)**

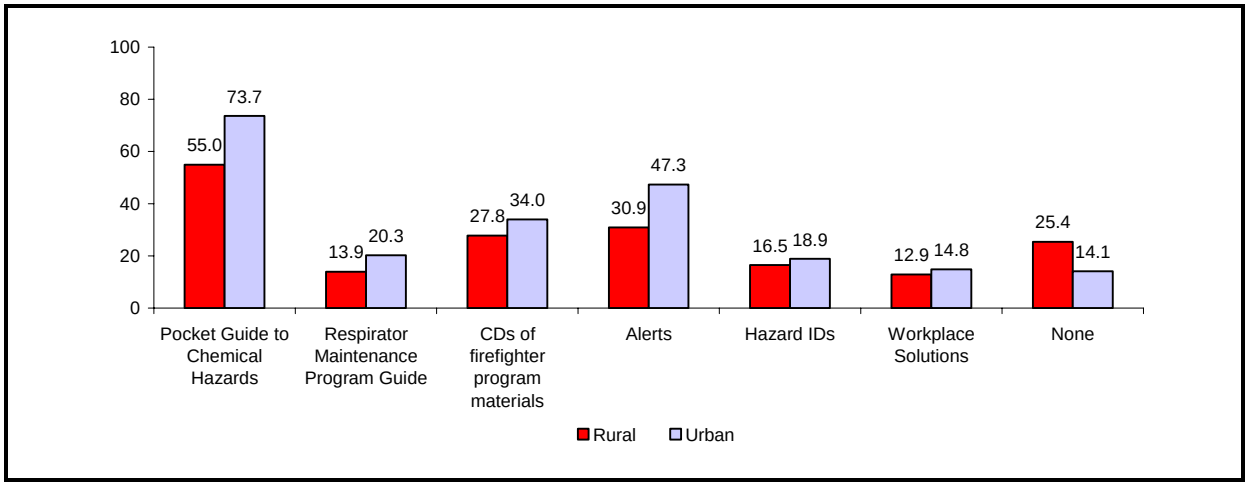


**Exhibit 4-22. What Other NIOSH Materials Have You Seen? (Question 53), by Size of Jurisdiction (Percent)**

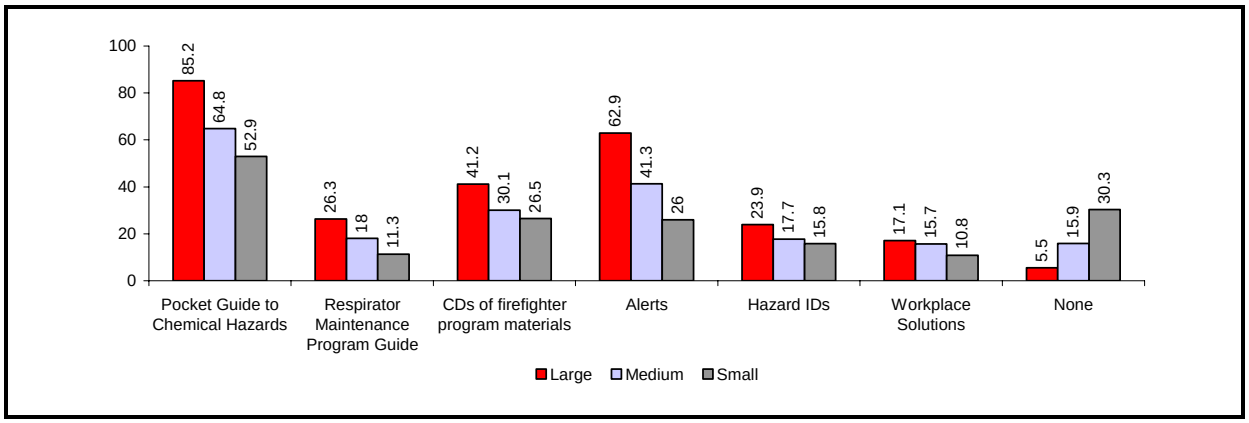



**Exhibit 4-23. What Other NIOSH Materials Have You Seen? (Question 53), by Type of Department (Percent)**

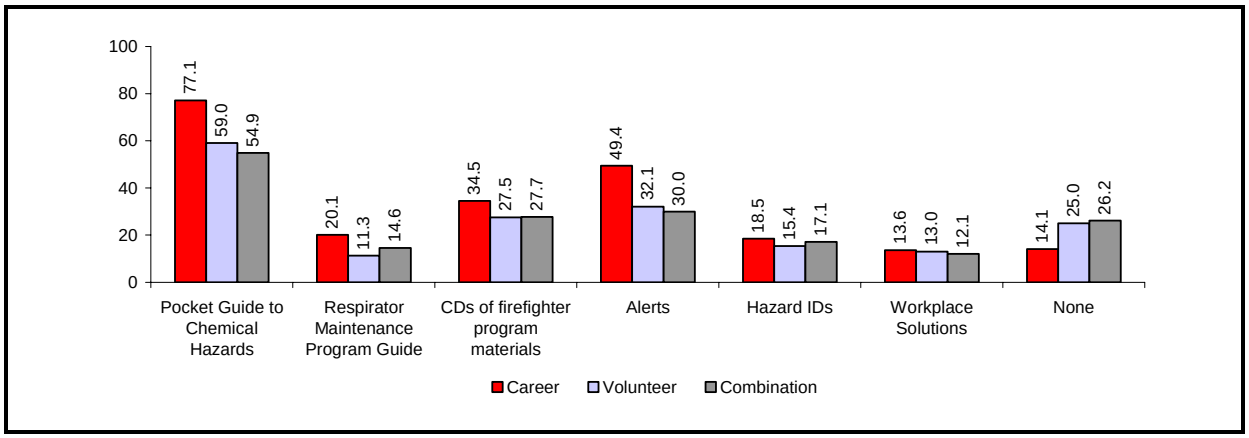
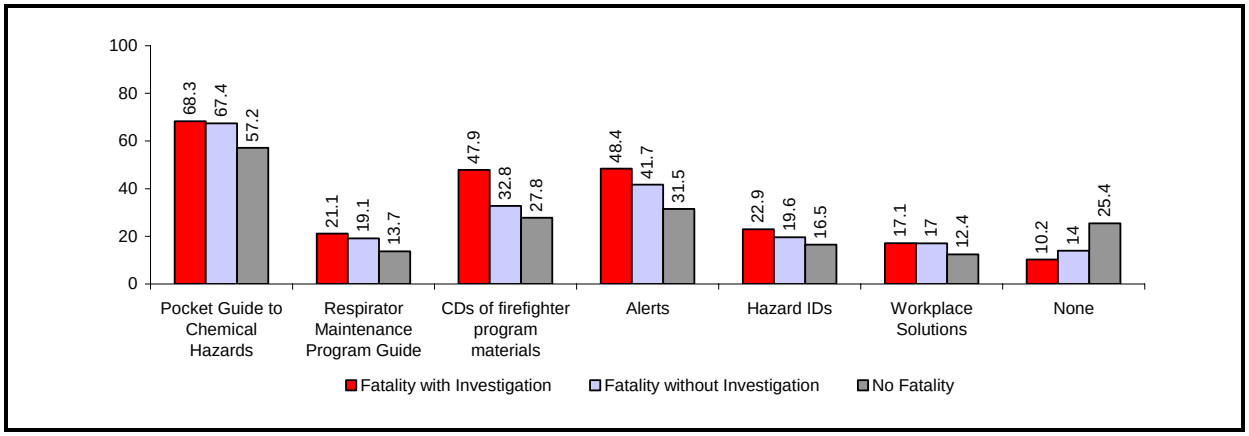



**Exhibit 4-24. What Other NIOSH Materials Have You Seen? (Question 53), by Fatality and FFFIPP Investigation (Percent)**



## 4.3 ARE FFFIPP RECOMMENDATIONS DISSEMINATED TO FIREFIGHTERS? (Q50, 50A, 11, 11A, 11B)

### 4.3.1 Do Fire Departments Disseminate FFFIPP Recommendations to Firefighters? (Q50)

*The majority of fire departments disseminate information from NIOSH to their firefighters.*

The majority of officers (60.7%) report that their fire department disseminates information from NIOSH to their firefighters. Fire departments that do not disseminate are most often in small jurisdictions, combination career-volunteer fire departments, fire departments in the South and Midwest, and those in rural jurisdictions.[24]

**Jurisdiction Type.** Fire departments in urban jurisdictions are more likely to disseminate information about NIOSH recommendations to their frontline firefighters (70.5% and 61.0%, respectively).

**Size of Jurisdiction.** The larger the size of the jurisdiction, the more likely the fire departments will disseminate information about NIOSH recommendations to their frontline firefighters; 79.8% of fire department officers in large jurisdictions say they disseminate the information, compared with 71.1% in medium jurisdictions and 55.2% in small jurisdictions. See ***Exhibit 4-25.***

**Type of Department.** Career fire departments are more likely than volunteer or combination career-volunteer fire departments to disseminate information about NIOSH recommendations to their frontline firefighters. The percentages are

- career, 72.0%,
- volunteer, 63.2%, and
- combination, 58.4%.

**Experience with On-Duty Fatality and FFFIPP Investigation.** Fire departments with a prior firefighter fatality are more likely than fire departments without a prior fatality to disseminate information about NIOSH recommendations to their frontline firefighters. The percentages are

[24]The nonresponse analysis suggests there may be nonresponse bias related to the response option “no” (the fire department does not disseminate the information). See Exhibit B-8a in Appendix B for details.

- fatality with investigation, 82.4%,
- fatality without investigation, 79.8%, and
- no fatality, 60.3%.

See ***Exhibit 4-26.***

There are no significant differences by region.

**Exhibit 4-25. Does the Fire Department Disseminate the Information It Receives from NIOSH to the Firefighters? (Question 50), by Size of Jurisdiction (Percent)**

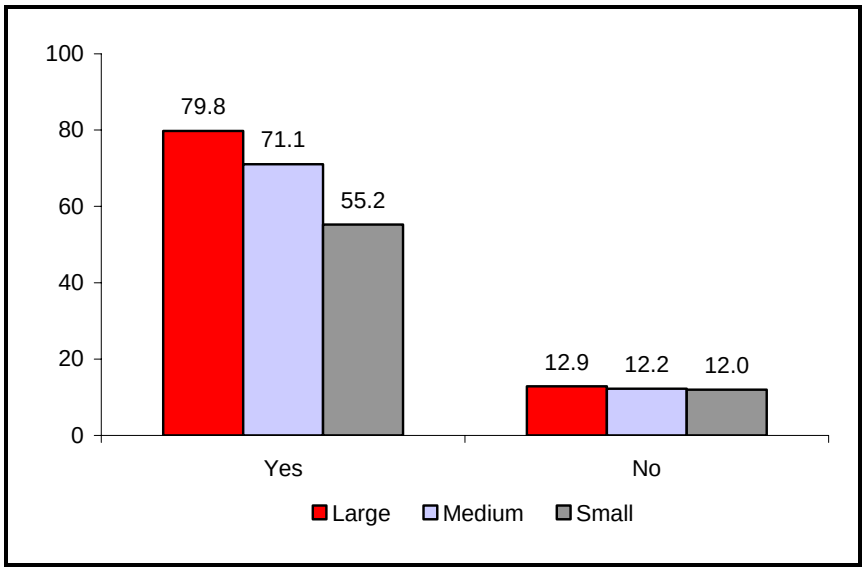
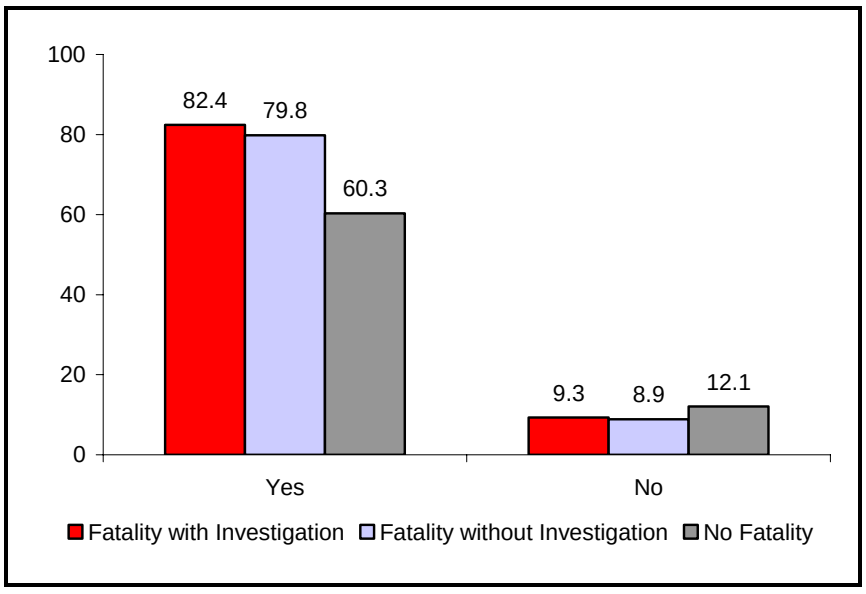



**Exhibit 4-26. Does the Fire Department Disseminate the Information It Receives from NIOSH to the Firefighters? (Question 50), by Fatality and FFFIPP Investigation (Percent)**



### 4.3.2 How Is the Information Disseminated within the Department? (Q50a)

*Information is disseminated to the firefighters primarily through training, posting the FFFIPP report on the station bulletin board, and briefings during regular staff meetings.*

Information is disseminated to the firefighters primarily through training (44.2% of all departments), posting the FFFIPP report on the station bulletin board (38.5%), and briefings during regular staff meetings (23.5%). Other approaches fire departments use include providing copies to firefighters (16.2%), providing firefighters with NIOSH's summaries of reports (6.2%), sending e-mail messages to firefighters (5.3%), providing summaries of reports prepared by the fire department (1.8%), and posting the FFFIPP report on the fire department's website (1.3%).

Fire departments are most likely to disseminate NIOSH recommendations through the following various approaches:

- **Training** (fire departments in large jurisdictions or those that have experienced a fatality)
- **Briefings during regular staff meetings** (fire departments in the West)
- **Posting the FFFIPP report on the station bulletin board** (jurisdictions that are medium sized, urban, or in the Northeast)
- **Providing copies to firefighters** (departments in jurisdictions that are large or urban; departments that are career, or that have a prior fatality and FFFIPP investigation)
- **Providing firefighters with NIOSH's summaries of reports** (departments in jurisdictions that are medium sized)
- **Sending e-mail messages to firefighters** (departments in jurisdictions that are large, urban, or in the West; departments that are career or have experienced a firefighter fatality)
- **Providing summaries of reports prepared by the fire department** (departments in jurisdictions that are large; career departments)
- **Posting the FFFIPP report on the fire department's website** (departments in jurisdictions that are large)

*All of these can be effective approaches for communicating safety messages.*

In the focus group discussions, frontline firefighters suggested all of these can be effective approaches for communicating safety messages. Following are some examples provided by the focus group participants:

> *Firefighters must sign a form indicating they have read announcements about safety procedures posted on the Safety Board.*
>
> *The Battalion Chief calls meetings to review safety information and specify action items (e.g., "practice this three times this coming week").*
>
> *We've run more drills lately to change habits and practices. People get checked off on it. Officers drill two times a day, though the messages aren't always about safety.*
>
> *Everyone is likely to follow the rules the Chief sends out by e-mail; he repeats them during the Monday meetings.*
>
> *We have excellent training at this fire department. The Chief maintains a chart that is hung on the wall in the main meeting room, showing all firefighters and all training offered. Firefighters are required to wear blue helmets until they are fully trained.*

Two Training Officers explained how they use FFFIPP Line of Duty Death (LODD) reports for training:

*"I look over the history of firefighter death and use PowerPoint slides to tell the class about lessons learned."—focus group participant*

> *We use the information from NIOSH all the time for training. I hand out different LODDs and then require the trainees to answer six questions about the incident and to make a presentation to the full class. It's a valuable tool for training.*
>
> *I look over the history of firefighter deaths, based on the LODDs, and use PowerPoint slides to tell the class about lessons learned.*

Details about the significant differences across the five fire department categories follow.

**Region.** Fire departments in the Northeast are significantly more likely to post information on the bulletin board. The percentages are

- Northeast, 52.2%,
- South, 32.2%,
- Midwest, 37.4%, and
- West, 33.9%.

Fire departments in the West are more likely to disseminate information about NIOSH recommendations via

- e-mail to their firefighters (3.0%, 4.9%, 3.5%, and 15.3%) and
- briefings during regular staff meetings (24.1%, 24.1%, 25.7%, and 15.5%).

**Jurisdiction Type.** Fire departments in urban jurisdictions are more likely than those in rural jurisdictions to

- distribute copies of NIOSH reports (28.9% and 14.3%, respectively),
- post copies on bulletin boards (46.7% and 38.6%), and
- send e-mail to firefighters about the recommendations (13.1% and 4.3%).

**Size of Jurisdiction.** In general, the larger the jurisdiction served, the more likely the fire department uses each of the methods for disseminating information about NIOSH recommendations to firefighters. Fire departments in large jurisdictions are significantly more likely than those in medium and small jurisdictions to disseminate information on NIOSH recommendations to firefighters through

- training (57.7%, 48.7%, and 41.7%, for large, medium, and small jurisdictions, respectively),
- e-mail (34.7%, 9.2% and 2.4%),
- copies of the NIOSH reports (32.6%, 24.9%, and 11.6%),
- summaries prepared by the department (8.5%, 2.2%, and 1.4%), and
- posting the report on the department's website (7.0%, 1.8%, and 0.6%).

However, fire departments in medium-sized jurisdictions are more likely to disseminate information by providing their firefighters with

- copies of NIOSH summaries (8.8%, 10.2%, and 4.3%, for large, medium, and small jurisdictions, respectively) or
- posting the full reports on fire station bulletin boards (37.7%, 48.1%, and 34.2%).

See ***Exhibit 4-27***.

**Type of Department.** Career fire departments are more likely than volunteer or combination fire departments to

- provide copies of FFFIPP reports to their firefighters (31.8%, 20.8%, and 12.4% for career, volunteer, and combination departments, respectively),
- send e-mail to their firefighters (23.5%, 8.0%, and 2.4%), and
- provide firefighters with summaries prepared by the department (4.4%, 1.5%, and 1.8%).

**Experience with On-Duty Fatality and FFFIPP Investigation.** Fire departments with a prior firefighter fatality are more likely than those without a prior fatality to disseminate information about FFFIPP recommendations via

- training (56.1%, 58.4%, and 44.0% for fatality with investigation, fatality without investigation, and no-fatality departments, respectively) and
- e-mail to firefighters (14.6%, 11.9%, and 5.2%).

Among fire departments with a prior firefighter fatality, those with a FFFIPP investigation are more likely than those without investigation to have distributed information about FFFIPP recommendations by providing copies of FFFIPP reports to the firefighters (33.8%, as opposed to 21.0%).

See ***Exhibit 4-28***.

**Exhibit 4-27. How Is This Information Disseminated to Firefighters? (Question 50a), by Size of Jurisdiction (Percent)**

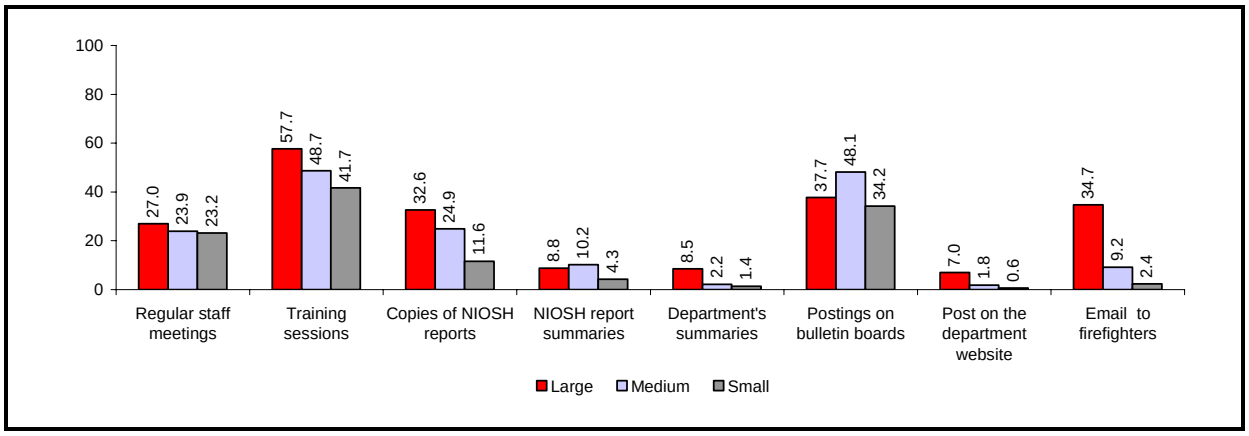
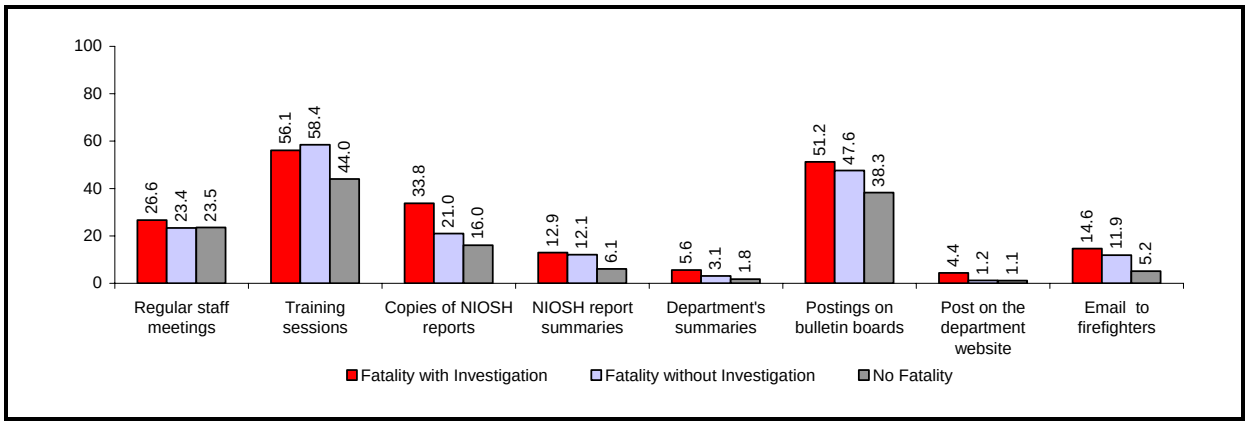


**Exhibit 4-28. How Is This Information Disseminated to Firefighters? (Question 50a), by Fatality and FFFIPP Investigation (Percent)**




### 4.3.3 To What Extent Are Firefighters Trained on FFFIPP Recommendations? (Q11, 11a, 11b)

*About 40% of all fire departments have changed their training program as a result of the NIOSH recommendations, particularly training on PPE and SCBA.*

The most common use of NIOSH recommendations is to modify the content of the firefighter training program. About 40% of all fire departments have changed their training program as a result of the NIOSH recommendations. The most common topics of NIOSH recommendations that are used for training programs are PPE and clothing, SCBA, PASS systems, the Incident Command System, traffic hazards, and radio communications.

The greatest use of NIOSH recommendations for training is among fire departments in large jurisdictions, particularly training on PPE and SCBA. The patterns of responses for these issues are described below.

**Region.** Fire departments in the Northeast are more likely than those in the South or Midwest to use NIOSH recommendations to make changes to their training program. The percentages are

- Northeast, 46.5%,
- South, 37.5%,
- Midwest, 36.2%, and
- West, 45.7%.

Northeastern fire departments are also more likely than all other fire departments to have used NIOSH recommendations to train firefighters on PPE. The percentages are

- Northeast, 51.1%,

- South, 37.3%,
- Midwest, 40.6%, and
- West, 39.0%.

**Jurisdiction Type.** Urban fire departments are more likely than rural fire departments to use NIOSH recommendations to make changes to their training program (53.3% versus 40.5%). They are also more likely to use NIOSH recommendations to train firefighters on

- PPE (52.6% and 41.0% for urban and rural departments, respectively),
- SCBA (54.4% and 40.0%),
- PASS systems (45.3% and 31.1%),
- the Incident Command System (44.5% and 30.8%),
- radio communications (32.1% and 22.3%), and
- physical fitness and cardiovascular disease (CVD;16.2% and 7.5%).

**Size of Jurisdiction.** The larger the fire department's jurisdiction, the more likely that NIOSH recommendations have been used to make changes to the department's training program (64.9%, 50.1%, and 34.5%, for large, medium, and small jurisdictions, respectively). The size of the jurisdiction also affects the extent to which NIOSH recommendations are used for specific kinds of training. The larger the jurisdiction, the more likely that NIOSH recommendations are used for training on

- traffic hazards (42.1%, 34.0%, and 26.6% for large, medium, and small jurisdictions, respectively),
- PPE (61.8%, 51.1%, and 36.3%),
- SCBA (63.4%, 52.2%, and 33.4%),
- PASS systems (44.5%, 42.9%, and 27.3%),
- the Incident Command System (48.1%, 41.1%, and 27.2%),
- radio communications (37.7%, 29.8%, and 19.3%),
- physical fitness and CVD (27.5%, 14.4%, and 5.0%), and
- building code compliance (13.1%, 8.4%, and 6.0%).

See ***Exhibit 4-29***.

**Type of Department.** Career fire departments are significantly more likely than volunteer or combination career and volunteer departments to use NIOSH recommendations to make changes to their training program (54.1%, 38.4%, and 40.0%, for career, volunteer, and combination departments, respectively). They are also more likely to use NIOSH recommendations to train firefighters on

- PPE (51.7%, 39.8%, and 41.8%),
- SCBA (51.6%, 38.5%, and 39.9%),
- physical fitness and cardiovascular disease (23.1%, 7.8%, and 7.7%), and
- building code compliance (15.2%, 6.5%, and 6.5%).

**Experience with On-Duty Fatality and FFFIPP Investigation.** Fire departments that have experienced an on-duty firefighter fatality (regardless of whether it was investigated by the FFFIPP) are more likely than those that have not to have used NIOSH recommendations to make changes in their training program. The percentages are

- fatality with investigation, 68.0%,
- fatality without investigation, 56.3%, and
- no fatality, 39.8%.

Among fire departments that have experienced a fatality, there are no significant differences based on whether a FFFIPP investigation took place. Fire departments that have experienced a fatality are also more likely to have used the recommendations for training purposes regarding

- traffic hazards (49.9%, 45.8%, and 29.0%),
- the Incident Command System (46.1%, 50.0%, and 31.8%),
- radio communications (40.3%, 38.9%, and 22.8%), and
- physical fitness and CVD (28.8%, 16.3%, and 8.3%).

The only significant difference based on prior FFFIPP investigation is training on physical fitness and CVD. Fire departments with a prior FFFIPP investigation were significantly more likely to provide this training to their firefighters. See ***Exhibits 4-30*** and ***4-31***.

**Exhibit 4-29. In What Ways Has Your Department Used NIOSH Recommendations? (Question 11), by Size of Jurisdiction (Percent)**

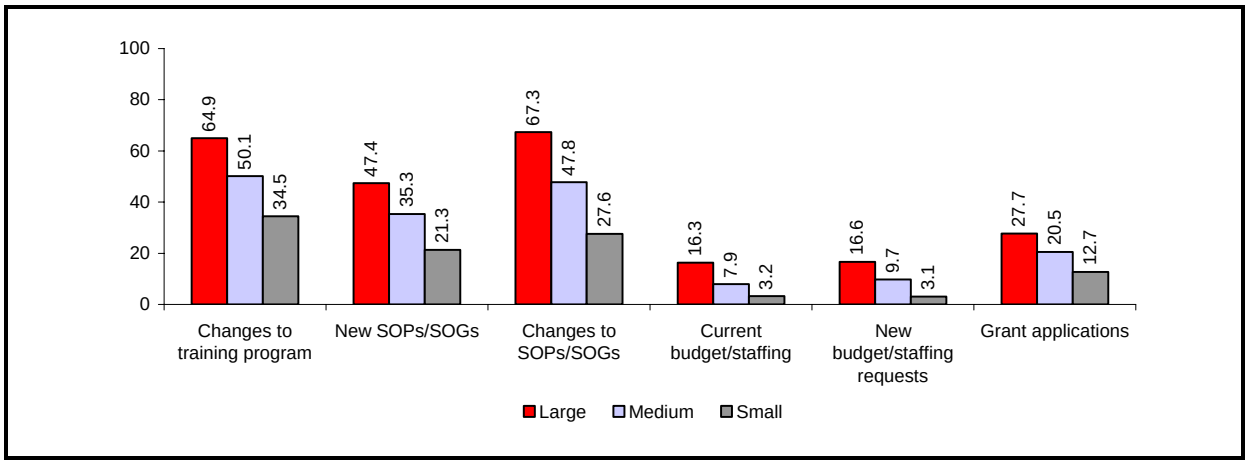



**Exhibit 4-30. In What Ways Has Your Department Used NIOSH Recommendations? (Question 11), by Fatality and FFFIPP Investigation (Percent)**

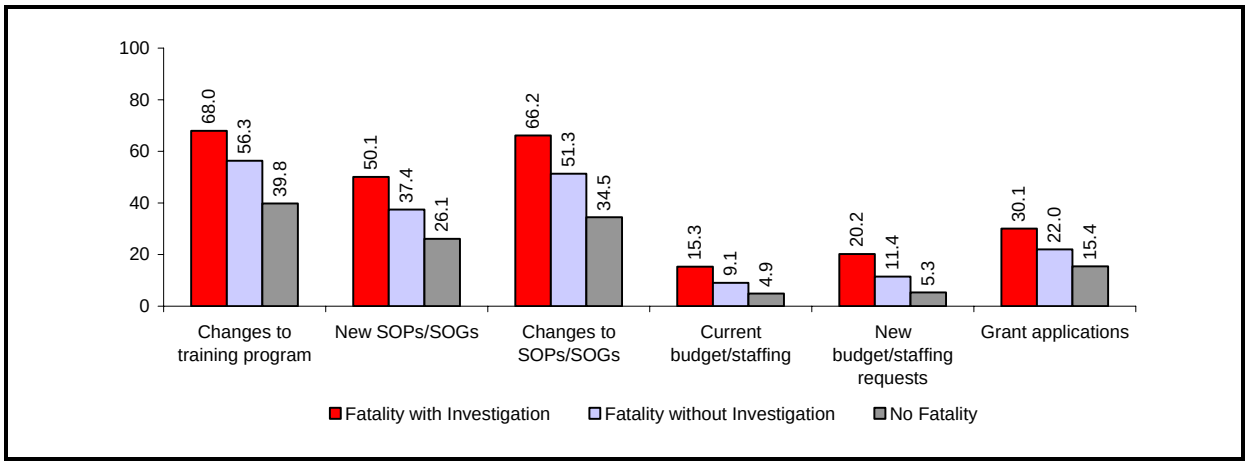
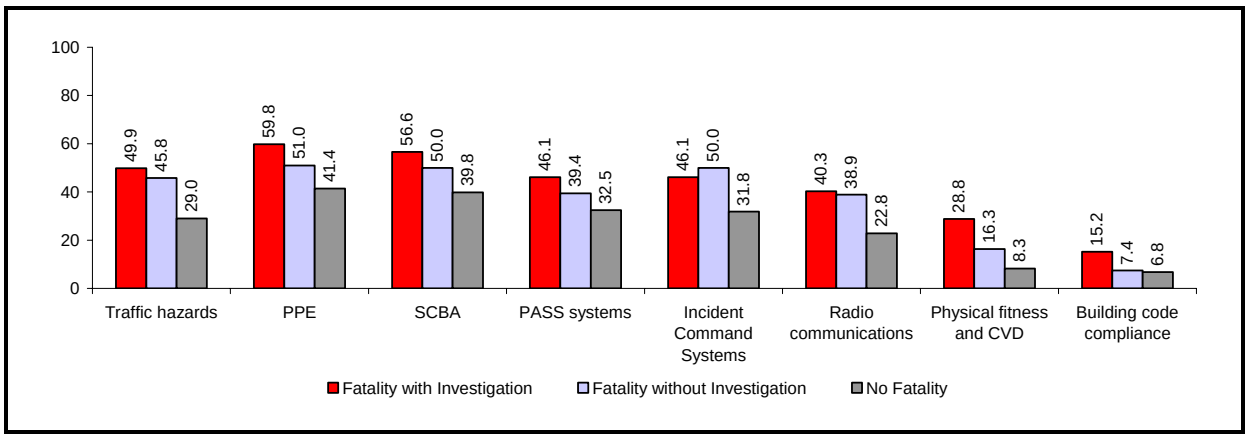



**Exhibit 4-31. Can You Identify Topics of NIOSH Recommendations That You Have Used for Training Purposes? (Question 11b), by Fatality and FFFIPP Investigation (Percent)**



## 4.4 FIREFIGHTER-LEVEL ESTIMATES

The findings reported in the preceding paragraphs are at the fire department level of analysis. ***Exhibit 4-32*** provides a summary of the findings on these same topics at the firefighter level of analysis. The exhibits on which the firefighter level of analysis is based are provided in Appendix C.[25]

**Exhibit 4-32. Dissemination of FFFIPP Recommendations, by Proportions of Fire Departments and Firefighters**

| Questionnaire Item | | Overall Percent of Fire Departments | Overall Percent of Firefighters |
|---|---|---|---|
| 8. | Familiar with NIOSH | 67.4 | 78.1 |
| 9. | Familiar with the FFFIPP | 45.7 | 58.2 |
| 10. | Receive NIOSH recommendations in a variety of ways | 3.6–67.8 | 9.3–71.5 |
| 11. | Train firefighters based on NIOSH recommendations | 40.2 | 48.5 |
| 43. | Have seen NIOSH reports frequently | 38.9 | 50.4 |
| 44. | Receive NIOSH reports via the Internet | 24.7 | 39.8 |
| 45. | Read Line of Duty Death reports | 53.3 | 64.8 |
| 50. | Disseminate information to firefighters | 60.7 | 67.6 |
| 50a. | Use a variety of methods to disseminate information to firefighters | 1.1–44.2 | 3.8–51.5 |
| 53. | Familiar with other NIOSH materials | 12.5–57.4 | 14.3–63.7 |

These data show, for example, that almost four fifths (78.1%) of firefighters work in fire departments where the officers are familiar with NIOSH. About two thirds of all firefighters (67.6%) work in departments where FFFIPP information is disseminated to firefighters. Almost half (48.5%) of all firefighters work in departments that train firefighters in accordance with the NIOSH recommendations. For all indicators of dissemination, in fact, the proportions at the firefighter level are higher than those at the fire department level. The characteristics of fire departments where FFFIPP recommendations are most widely disseminated are similar at the fire department and firefighter

[25]The tables in Appendix C correspond to the first tables in the fire department–level analysis (described in Section 3.1.9). Two additional sets of tables related to the firefighter-level analysis are provided in electronic format under separate cover. These correspond to the second and third tables in the fire department–level analysis and provide confidence intervals and sample sizes.

levels. Firefighters who work in large, urban, career departments, particularly those in the Northeast and those that have experienced a FFFIPP investigation, are more likely than others to be exposed to information from the FFFIPP.

## 4.5 MULTIVARIATE MODELS

The preceding discussion was based on bivariate cross tabulations of survey responses with fire department characteristics. A consistent theme throughout these bivariate analyses is the significant role that region, jurisdiction type, size of jurisdiction, and type of department appear to play in whether FFFIPP recommendations are disseminated to fire departments and firefighters. FFFIPP recommendations appear to be better disseminated in departments in the Northeast, departments in large and urban jurisdictions, and departments staffed by career firefighters.

In this section, through multivariate analysis we explore the relative importance of these fire department characteristics in the dissemination process. We also explore whether the type of respondent (Fire Chief, Safety Officer, Training Officer, or other) can explain any differences in the findings.[26] Of the 10 questionnaire items examined in this chapter, we selected 6 for further analysis (Questions 8, 9, 11, 43, 45, and 53). Complete details of the resulting 12 models are provided in the tables in the second part of Appendix C.[27] An overview of the key findings is provided in ***Exhibit 4-33***.

In comparison with the corresponding bivariate results (Exhibit 4-1), this table makes clear that the size of the jurisdiction is the most consistent predictor of dissemination activities. When all other factors in the model are controlled, size of jurisdiction remains a significant explanatory factor: The larger the jurisdiction, the more likely it is that FFFIPP recommendations

[26] Although the survey was designed for Fire Chiefs, the results suggest that the Chiefs delegated responsibility to others in the department. See note 18 for details.

[27] Question 53 consists of seven subquestions, so the total number of multivariate models examined is 12. Those discussed in this section are Models 33–35, 72, 73, and 77–83. For each model, the data reported in Appendix C include the original prevalence estimates, the beta coefficients, the predicted marginals, and the adjusted odds ratios. They also include confidence intervals, tests of significance, and the overall p-value for each independent variable.

**Exhibit 4-33. Fire Department Characteristics Where FFFIPP Recommendations Are Most Widely Disseminated, Based on Multivariate Models**

| Questionnaire Item | Fire Department Characteristics | | | | |
|---|---|---|---|---|---|
| | Region | Jurisdiction Type | Size of Jurisdiction | Type of Department | Fatality/ Investigation |
| 8. Familiar with NIOSH | NE* | — | L* | — | — |
| 9. Familiar with the FFFIPP | — | U* | L* | — | F* |
| 11. Train firefighters based on NIOSH recommendations | — | — | L* | — | F* |
| 43. Have seen NIOSH reports frequently | — | U* | L* | — | F* |
| 45. Read Line of Duty Death reports | — | U* | L* | — | I* |
| 53. Familiar with other NIOSH materials | | | | | |
| a. Pocket Guide to Chemical Hazards | NE* | U* | L* | — | — |
| b. Respirator Maintenance Program Guide | — | — | L, M* | — | — |
| c. CDs of firefighter program materials | — | — | — | — | —* |
| d. Alerts | — | — | L, M* | — | — |
| e. Hazard IDs | — | — | — | — | — |
| f. Workplace Solutions | — | — | L, M* | — | — |
| g. None | — | — | L, M* | — | F* |

Note: NE = Northeast; W = West; U = urban; L = large; C = career; F = prior fatality; I = prior FFFIPP investigation; — = does not apply (no significant pattern).

Source: Fire Department Survey.

*The p-value for this fire department characteristic is significant at the .05 level. See note “a” in the models in Appendix C.

are disseminated throughout the fire department. These patterns are revealed by both the predicted marginals and the adjusted odds ratios (see Appendix C).

These findings also indicate that the type of department (career, volunteer, or combination) and region of the country are seldom or never significant factors in the dissemination process. Thus, their significance in the bivariate analyses is likely attributable to the correlation between size of jurisdictions and these two characteristics.

However, jurisdiction type remains a significant factor for determining whether the Fire Chief is familiar with NIOSH reports (Question 43), has read the LODD reports (Question 45), or has read the Pocket Guide (Question 53), and whether

firefighters are trained on NIOSH recommendations (Question 11).

Whether the department has experienced a FFFIPP investigation also diminishes in significance in the multivariate analyses. After controlling for other factors, it is a significant predictor only for whether the Fire Chief has read the LODD reports.

The type of respondent is not a significant factor in any of the models.

# 5 Findings: Impact of the FFFIPP Recommendations

This section examines the impact of Fire Fighter Fatality Investigation and Prevention Program (FFFIPP) recommendations on the knowledge, attitudes, behavior, and safety practices of firefighters and the policies and practices of fire departments:

- How are the FFFIPP recommendations being implemented?
- To what extent are FFFIPP recommendations being implemented in the nation's fire departments?

To assess how FFFIPP recommendations are being implemented, we collected information from the fire departments on

- the existence of personnel responsible for safety and training in the department (i.e., a Training Officer and Safety Officer),
- the standard operating procedures (SOPs) that fire departments have established to reinforce safe practices,
- the nature of the training fire departments provide their firefighters, and
- other ways departments have implemented FFFIPP recommendations.

We found that most fire departments have both a Training Officer and a Safety Officer and that most have SOPs on five of the six types of recommendations addressed in this evaluation: personal protective equipment (PPE) and clothing, radio communications, Incident Command Systems, motor vehicle safety, Personal Alert Safety System (PASS) devices, and

maintenance of Self-contained Breathing Apparatus (SCBA).[28] Few fire departments have SOPs on fitness and wellness.

The majority of fire departments in the country also require firefighters to be trained on five of the six types of recommendations addressed in this evaluation: use of PPE, fighting structure fires, driving safety, use of radio communication devices, the Incident Command System, and maintenance of SCBA. Training is most often provided by the department's Training Officer, other officers in the department, or the state fire training academy. Only 7% of the fire departments have a required physical fitness training program. Most fire departments do not require firefighters to be screened for cardiovascular disease (CVD) risk factors and CVD.

In addition to training and SOPs, fire departments have used FFFIPP recommendations to justify grant applications.

To assess the extent to which FFFIPP recommendations are being implemented, we asked questions about

- driver training and seat belt use,
- the availability, use, and maintenance of equipment, including PASS devices, SCBA, SCBA facepieces, Chemical/Biological/Radiological/Nuclear (CBRN) SCBA, Automated External Defribrillators (AEDs), and two-way communication devices, and
- the use of procedures on the fire ground, such as Incident Command, Incident Safety Officers (ISOs), and Rapid Intervention Teams (RITs).

Most fire departments ensure that firefighters responsible for driving emergency vehicles receive driver training before being allowed to operate the vehicles, though frontline firefighters say there is room for improvement on the breadth of training provided. Firefighters need to be trained to the class of the vehicle, and home responders (from the volunteer fire service)

[28]The six categories of Sentinel Recommendations are Incident Command, motor vehicle safety, equipment, radio communication, safety on the fireground, and fitness/wellness. Several discrete recommendations are included under each of these categories. The list of all 17 FFFIPP recommendations is provided in Section 3, Exhibit 3-2. Questions in the Fire Department Survey regarding SOPs and training asked about Incident Command but did not ask whether the SOPs and training addressed specific recommendations. Information about the specific recommendations is captured in subsequent parts of this section, specifically regarding the extent to which the recommendations have been implemented by the fire departments.

need additional training. Firefighters in most fire departments also receive refresher driver training once or more per year. Most fire departments require their firefighters to wear seat belts while in emergency vehicles, though frontline firefighters say many still are not using them.

The survey results suggest that most fire departments

- have enough PASS devices for all of their firefighters to use when fighting structure fires. Almost all fire departments report that their firefighters use their PASS devices at least "most of the time."
- have SCBA for their firefighters and perform SCBA maintenance "after every time they are used" (though few have CBRN SCBA). Firefighters in almost all fire departments reportedly use their SCBA at least "most of the time" while fighting structure fires. Many fire departments, however, say that their firefighters have to share facepieces.
- have AEDs and perform routine maintenance on the AEDs. The AEDs are usually kept on the emergency vehicles, at the fire station, or in both locations.
- have radios or other two-way communication devices while responding to structure fires at least "most of the time."

According to the Fire Department Survey, Incident Command is established by most fire departments on a routine basis. The tasks that fire departments most often say are part of an Incident Commander's responsibilities include all three of the tasks identified in NIOSH recommendations: conducting an initial assessment, monitoring location of all firefighters at the scene, and developing and initiating a risk management plan. Incident Commanders in about half of all fire departments also usually assign an ISO. However, focus group participants identified the failure to implement Incident Command as one of their most common safety concerns.

About a third of all fire departments say they are sometimes unable to establish RITs because there are not enough firefighters at the scene of the fire. This was reinforced in the focus group discussions: firefighters said that among their main safety concerns was the failure to routinely use RITs. With not enough personnel on the scene, they sometimes need to go into structures without the RITs in place.

The kinds of fire departments that most likely follow the National Institute for Occupational Safety and Health's

(NIOSH's) safety guidelines are career fire departments in large, urban jurisdictions in the Northeast. Fire departments that have experienced a firefighter fatality are also more likely than others to implement many of the NIOSH recommendations. A summary of the departmental characteristics associated with greatest adherence to safety guidelines is provided in ***Exhibit 5-1***.

## 5.1 SAFETY OFFICERS (Q1)

Over two thirds of fire departments have a Safety Officer. Those that are less likely to have Safety Officers are in the Midwest or in small jurisdictions, and are those that have no prior firefighter fatality or FFFIPP investigation. Details about the statistically significant patterns follow.

**Region.** Fire departments in the Midwest are significantly less likely than those in other regions to have a Safety Officer. The percentages are

- Northeast, 72.9%,
- South, 73.3%,
- Midwest, 63.6%, and
- West, 73.5%.

**Size of Jurisdiction.** The larger the jurisdiction of the fire department, the more likely it has a Safety Officer. The percentages are

- large, 86.8%,
- medium, 72.0%, and
- small, 68.8%.

**Experience with On-Duty Fatality and FFFIPP Investigation.** Fire departments that have experienced both a firefighter fatality and a FFFIPP investigation are significantly more likely to have a Safety Officer than those departments that have experienced neither. The percentages are

- fatality with investigation, 78.6%, and
- fatality without investigation, 73.3%, and
- no fatality, 70.2%.

There are no significant patterns based on jurisdiction type or type of department.

**Exhibit 5-1. Impact of the FFFIPP Recommendations, by Department Characteristics**

| | | Fire Department Characteristics | | | | |
|---|---|---|---|---|---|---|
| Questionnaire Item | Overall Percent | Region | Jurisdiction Type | Size of Jurisdiction | Type of Department | Fatality / Investigation |
| 1. Has a Safety Officer | 70.3 | NE, SO, W | — | L | — | — |
| 2. Has a Training Officer | 88.5 | SO | — | L | — | — |
| 3. Has SOPs | 11.0–89.1[a] | — | U | L | C | F, I |
| 4. Requires training for firefighters | 35.5–88.9 | — | U | L | C | I |
| 5. Training provider | 20.9–84.9 | NE | U | L | C | F |
| 11. NIOSH recommendations are used | 5.0–34.9 | NE | U | L | C | F |
| 12. Has a fitness training program | 21.5[b] | W | U | L | C | — |
| 13. Firefighters receive CVD screenings at least annually | 17.4 | NE | U | L | C | — |
| 14. Drivers receive training before being allowed to operate vehicles | 13.8–84.0 | NE | U | L, M | C, V | — |
| 15. Drivers receive refresher training | 14.2–40.3 | — | U | — | — | — |
| 16. Department requires use of seat belts | 84.2 | NE, SO, W | U | L | C | — |
| 18. Firefighters use their seat belts regularly[c] | 54.9 | W | U | L | C | — |
| 21. Incident Command is routinely[c] established | 84.2 | NE, W | U | L | C | F |
| 23. Knows Incident Commanders' responsibilities | 38.8–93.1 | — | U | L | C | — |
| 24. Incident Commanders regularly[c] assign an Incident Safety Officer | 52.1 | NE | U | — | — | — |
| 26. RIT is routinely[c] available at structure fires | 42.4 | NE | U | L | C | F |
| 27. RIT is used | 9.3–32.3 | NE | U | L | — | — |
| 29. PASS devices are available | 78.8 | NE, W | U | L | C | I |
| 30. PASS devices are used regularly[c] | 88.0 | NE | U | L | C | I |
| 32. SCBA are available | 99.2 | — | — | — | — | — |
| 33. Firefighters have their own facepieces | 49.7 | NE, W | U | L | C | I |
| 34. SCBA are used regularly[c] | 90.6 | NE | U | L, MD | C | — |
| 36. Routine maintenance is performed on SCBA | 16.4–43.0 | — | — | — | — | — |
| 37. CBRN SCBA are available | 17.5 | — | U | L | C | — |
| 38. AEDs are available | 77.4 | — | U | L | C | F |

(continued)

**Exhibit 5-1. Impact of the FFFIPP Recommendations, by Department Characteristics (continued)**

| Questionnaire Item | Overall Percent | Fire Department Characteristics | | | | |
|---|---|---|---|---|---|---|
| | | Region | Jurisdiction Type | Size of Jurisdiction | Type of Department | Fatality / Investigation |
| 39. Routine maintenance is performed on AEDs | 13.9–25.4 | — | U | L | C | — |
| 40. Radios are used regularly[c] | 91.0 | SO, W | U | L | C | — |
| 41. Radios do not bleed over | 18.0 | — | U | L | — | — |

Note: NE = Northeast; SO = South; W = West; U = urban; L = large; MD = medium; C = career; V = volunteer; F = prior fatality; I = prior FFFIPP investigation; — = does not apply (no significant pattern).

Source: Fire Department Survey.

[a]The percentages range between these two values, depending on the specific type.

[b]Some figures in this column are the sums of two response categories.

[c] "Most of the time" or "always."

## 5.2 TRAINING OFFICER (Q2)

Almost all fire departments have a Training Officer. Among departments in large jurisdictions, for example, 99.0% have a Training Officer. The lowest percentage of Training Officers is among fire departments in the West (82.9%).

**Region.** Fire departments in the South are significantly more likely than those in other regions of the country to have a Training Officer. The percentages are

- Northeast, 87.0%,
- South, 92.4%,
- Midwest, 87.6%, and
- West, 82.9%.

**Size of Jurisdiction.** The larger the jurisdiction of the fire department, the more likely it has a Training Officer. The percentages are

- large, 99.0%,
- medium, 91.5%, and
- small, 86.7%.

**Experience with On-Duty Fatality and FFFIPP Investigation.** Fire departments with prior experience of both a firefighter fatality and a FFFIPP investigation are significantly more likely to have a Training Officer than departments that have experienced neither. The percentages are

- fatality with investigation, 93.8%,
- fatality without investigation, 90.4%, and
- no fatality, 88.4%.

There are no significant patterns based on jurisdiction type or type of department.

## 5.3 STANDARD OPERATING PROCEDURES (Q3)

During the focus group discussions, firefighters offered several examples of situations where a tragedy was averted by recently enacted safety precautions. In response to the question, "What is the best example of a safety success that you have experienced in your career?" firefighters told about the value of SOPs. One firefighter described a call from an assisted living facility, where 10 new units were being built in a three-story building. Workers had put the fire out with dry chemical extinguisher, but there was still smoke. The firefighter decided to put on his air pack, following the department's SOPs. He believes his life may have been saved by doing so, because "20 seconds later the whole room flashed."

SOPs, or standard operating guidelines (SOGs), are common management tools for fire departments. NIOSH recommends that fire departments "develop and implement a policy requiring the use of Personal Protective Equipment and protective clothing" and "implement an Incident Command System with written standard operating procedures for all firefighters."[29] Of the nine safety issues we asked about in this question, those most frequently addressed by SOPs are

- use of PPE and clothing (89.1% of all departments),
- use of radio communications (84.8%),
- use of Incident Command Systems (83.7%),
- motor vehicle safety (78.8%),
- use of PASS devices (75.4%),
- maintenance of SCBA (69.7%), and
- Rapid Intervention Teams (RITs; 40.4%).[30]

[29]This is Sentinel Recommendation 1-1. See Exhibit 2-3 for further details.

[30]RITs are also known as Rapid Intervention Crews (RICs) or Firefighter Assist and Search Teams (FAST).

Only 16.8% of fire departments, however, have an SOP for participating in regular CVD screenings, and only 11.0% have an SOP for participating in a personal physical fitness program. Fire departments that are least likely to have SOPs on these two health programs are those in the southern, rural, or small jurisdictions; those in combination career-volunteer departments; and those in departments with no prior firefighter fatality.

**Region.** Fire departments in the Northeast are significantly more likely than fire departments in other regions to have SOPs on

- maintenance of SCBA (77.9%, 66.3%, 68.7%, and 66.7% for departments in the Northeast, South, Midwest, and West jurisdictions, respectively) and
- use of PPE and clothing (94.7%, 89.5%, 85.2%, and 87.8%).

Fire departments in the West are the most likely to have an SOP on participation in a physical fitness program (9.8%, 10.9%, 7.5%, and 21.9%).

Fire departments in the Northeast and West were also more likely than those in the South and Midwest to have an SOP on RITs (48.3%, 35.6%, 33.9%, and 55.0%).

Fire departments in the South are less likely than other fire departments to have an SOP on CVD screenings (27.5%, 9.3%, 15.5%, and 21.0%).

Fire departments in the Midwest are the least likely to have an SOP on

- motor vehicle safety (84.8%, 80.2%, 70.9%, and 83.4%) and
- use of radio communications (91.8%, 85.5%, 78.1%, and 86.6%).

See ***Exhibits 5-2a*** and ***5-2b***.

**Jurisdiction Type.** Fire departments in urban jurisdictions are significantly more likely than those in rural fire departments to have SOPs in place for seven of the nine safety areas. The exceptions are SOPs for use of PPE and use of radio communications, which had high rates for both rural and urban fire departments. See ***Exhibits 5-3a*** and ***5-3b***.

**Size of Jurisdiction.** The larger the jurisdiction, the more likely the fire department will have an SOP or SOG on each of the topics noted above. Over 90% of fire departments in large jurisdictions have SOPs on

- Incident Command Systems,
- use of PPE and clothing,
- use of radio communications,
- motor vehicle safety, and
- use of PASS devices.

The difference between large and small jurisdictions was greatest for SOPs on

- RITs (89.4%, 60.8%, and 29.4% for large, medium, and small fire departments, respectively),
- physical fitness programs (54.0%, 19.7%, and 5.5%), and
- regular CVD screenings (50.1%, 26.8%, and 11.0%).

See ***Exhibits 5-4a*** and ***5-4b***.

**Type of Department.** Career fire departments are significantly more likely than volunteer or combination fire departments to have SOPs on most topics, including

- use of PPE (94.1%, 89.1%, and 88.7% for career, volunteer, and combination departments, respectively),
- Incident Command Systems (91.5%, 84.8%, and 82.5%),
- use of PASS devices (83.0%, 74.6%, and 75.1%),
- maintenance of SCBA (81.4%, 72.6%, and 67.1%),
- RITs (70.4%, 45.6%, and 35.1%),
- physical fitness programs (47.8%, 14.1%, and 6.4%), and
- regular CVD screenings (42.9%, 17.7%, and 14.2%).

The difference between career fire departments and combination departments was greatest for SOPs on PPE, RITs, and regular CVD screenings. See ***Exhibits 5-5a*** and ***5-5b***.

**Experience with On-Duty Fatality and FFFIPP Investigation.** Fire departments that have experienced a firefighter fatality are more likely than fire departments that have not to have SOPs on

- Incident Command Systems (92.0%, 92.7%, and 83.6% for fatality with investigation, fatality without investigation, and no-fatality departments, respectively) and
- RITs (64.0%, 55.5%, and 40.1%).

Fire departments with a prior fatality and investigation are significantly more likely than fire departments without a prior fatality to have SOPs on each of the topics, as shown in ***Exhibits 5-6a*** and ***5-6b***.

**Exhibit 5-2a. For Which of the Following Does Your Department Have SOPs/SOGs in Place? (Question 3, Part 1), by Region (Percent)**

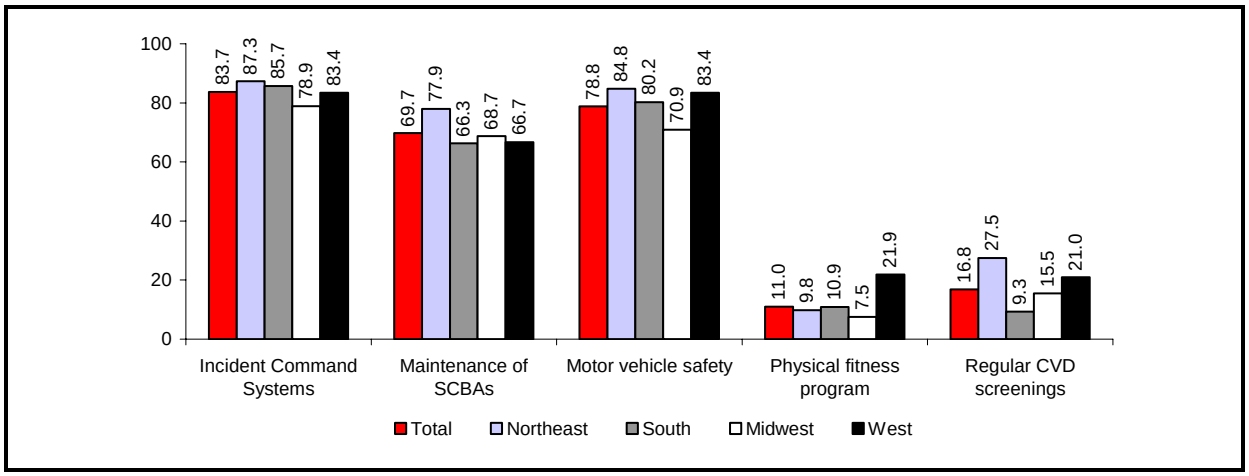



**Exhibit 5-2b. For Which of the Following Does Your Department Have SOPs/SOGs in Place? (Question 3, Part 2), by Region (Percent)**

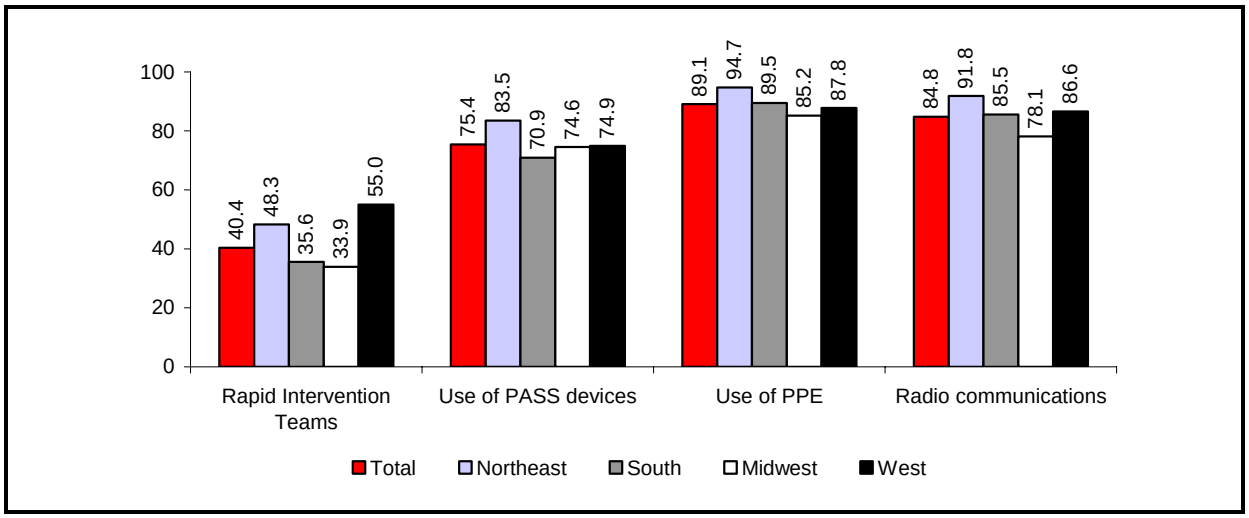


**Exhibit 5-3a. For Which of the Following Does Your Department Have SOPs/SOGs in Place? (Question 3, Part 1), by Jurisdiction Type (Percent)**

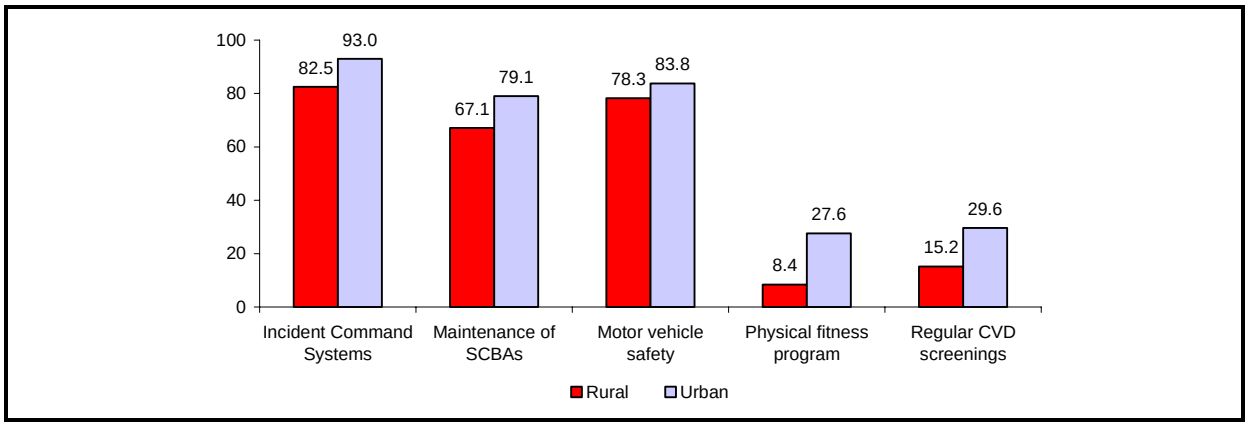



**Exhibit 5-3b. For Which of the Following Does Your Department Have SOPs/SOGs in Place? (Question 3, Part 2), by Jurisdiction Type (Percent)**

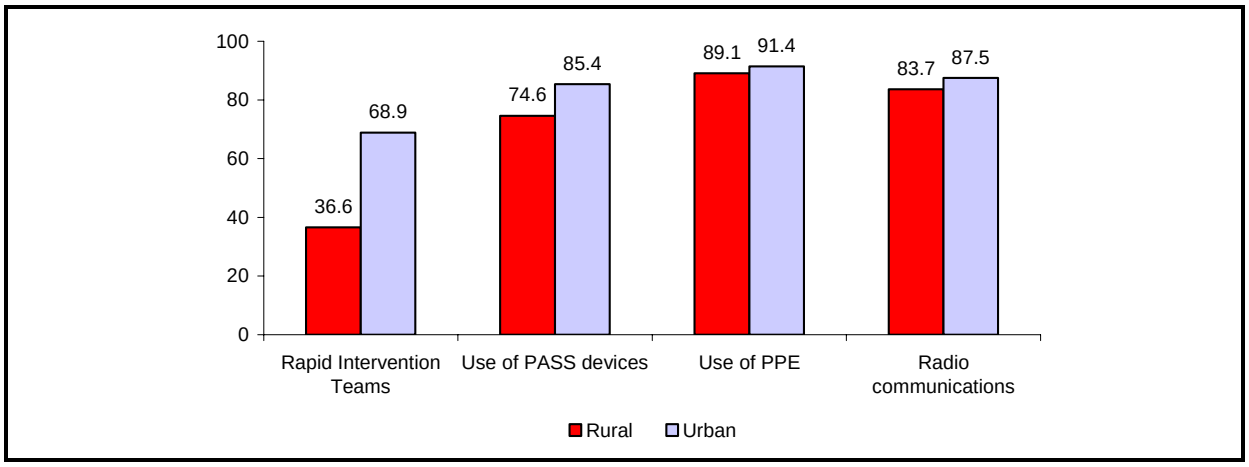



**Exhibit 5-4a. For Which of the Following Does Your Department Have SOPs/SOGs in Place? (Question 3, Part 1), by Size of Jurisdiction (Percent)**

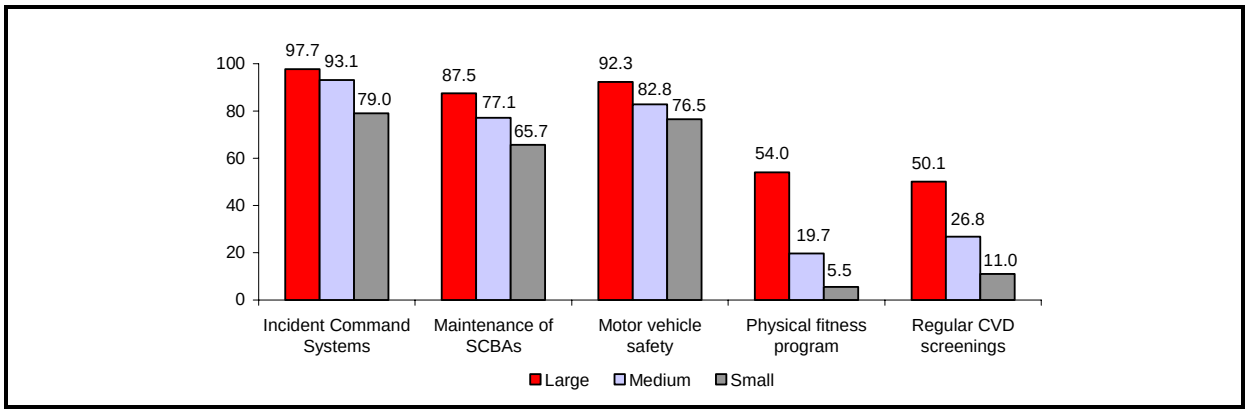


**Exhibit 5-4b. For Which of the Following Does Your Department Have SOPs/SOGs in Place? (Question 3, Part 2), by Size of Jurisdiction (Percent)**

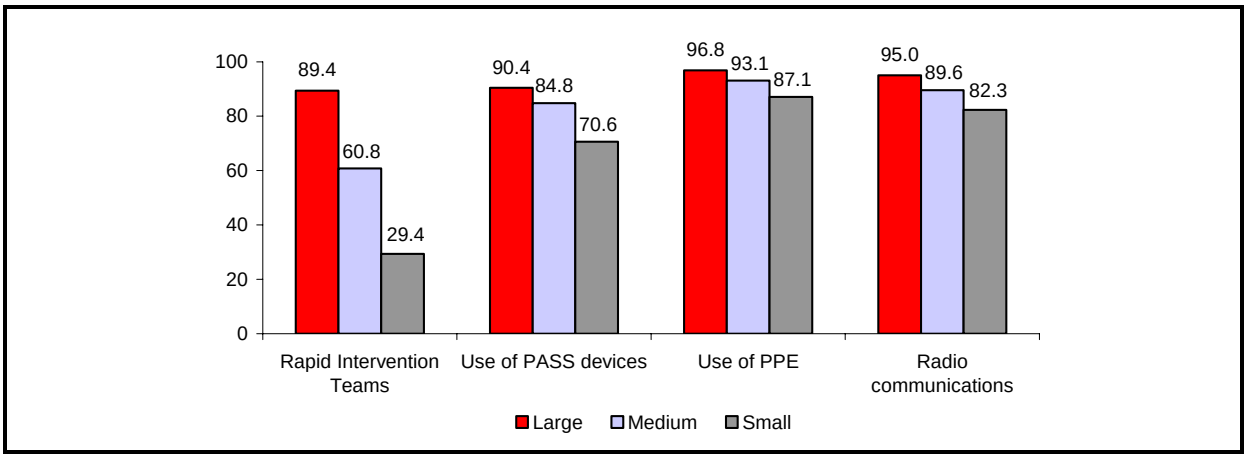



**Exhibit 5-5a. For Which of the Following Does Your Department Have SOPs/SOGs in Place? (Question 3, Part 1), by Type of Department (Percent)**

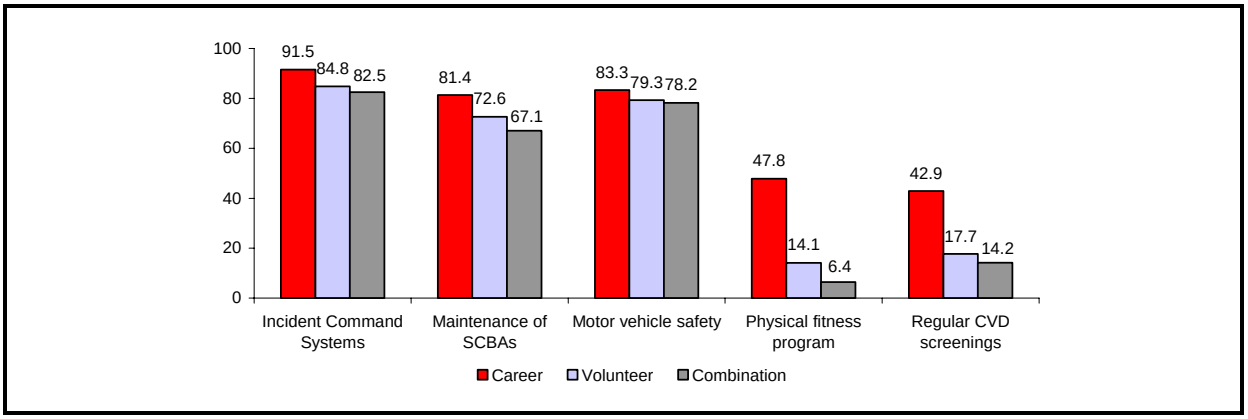



**Exhibit 5-5b. For Which of the Following Does Your Department Have SOPs/SOGs in Place? (Question 3, Part 2), by Type of Department (Percent)**

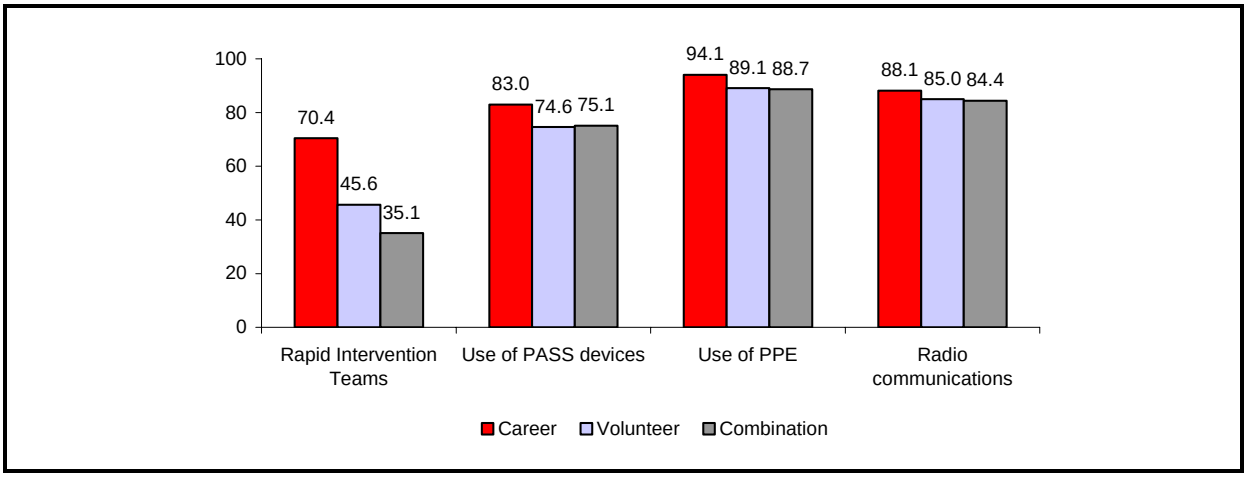


**Exhibit 5-6a. For Which of the Following Does Your Department Have SOPs/SOGs in Place? (Question 3, Part 1), by Fatality and FFFIPP Investigation (Percent)**

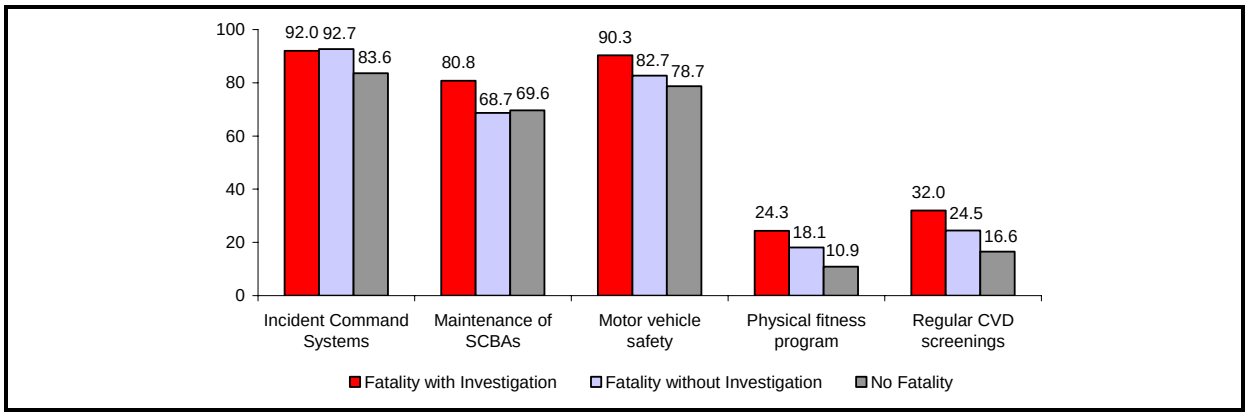
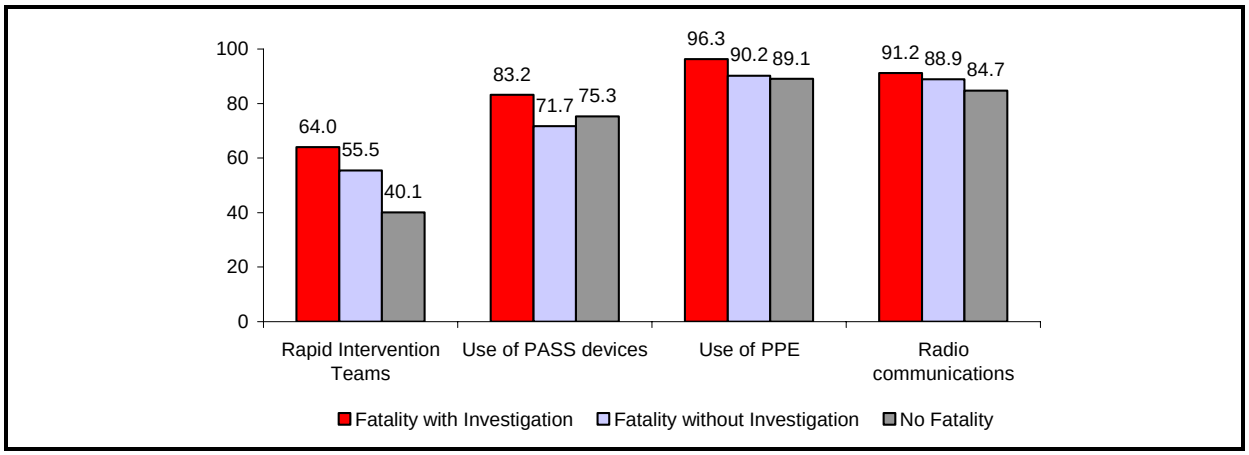



**Exhibit 5-6b. For Which of the Following Does Your Department Have SOPs/SOGs in Place? (Question 3, Part 2), by Fatality and FFFIPP Investigation (Percent)**




## 5.4 TRAINING (Q4)

The great majority of fire departments in the United States require firefighters to be trained on the use of PPE, fighting structure fires, driving safety, radio communication devices, the Incident Command System, and maintenance of SCBA. Details on the patterns of response regarding this issue follow.

**Region.** The topics with lowest rates of required training are RITs (in all four geographical regions) and maintenance of SCBA (in the Midwest). A third of the fire departments in the South and Midwest do not have any training for firefighters on RITs.

One firefighter told about a fire that got out of hand in the downstairs part of a house. The firefighter followed the protocol he was trained to follow and used the Z-line, bringing the safety line in: "The nozzle man did what he was supposed to do," and the fire was quickly extinguished. The firefighter noted, "Our training paid off."

Fire departments in the Midwest are also significantly less likely than those in other regions to have required training on

- fighting structure fires (84.9%, 85.9%, 76.9%, and 85.3% for departments in the Northeast, South, Midwest, and West jurisdictions, respectively) and
- driving safety (79.4%, 81.7%, 70.0%, and 82.3%).

Fire departments in the West are more likely than those in other regions to have training for firefighters on

- RITs (26.9%, 36.8%, 30.6%, and 58.9%) and
- use of radio communication devices (77.1%, 76.7%, 70.4%, and 87.1%).

See ***Exhibit 5-7***.

**Jurisdiction Type.** Firefighters in urban jurisdictions are significantly more likely than those in rural jurisdictions to be trained on each of the seven issues addressed in this question. The greatest discrepancies in the percentages involve training on

- RITs (60.6% and 31.0% for urban and rural jurisdictions, respectively) and
- the Incident Command System (90.2% and 68.8%).

See ***Exhibit 5-8***.

"Most deaths occur because the fundamentals were ignored. A lot of times the firefighter was trained incorrectly. You need to train as you work and work as you train"—focus group participant.

**Size of Jurisdiction.** The larger the jurisdiction, the greater the likelihood that the fire department requires firefighters to be trained on each of the seven issues. The greatest discrepancies in the percentages are between large and small jurisdictions regarding training on RITs, the Incident Command System, and maintenance of SCBA. See ***Exhibit 5-9.***

**Type of Department.** Firefighters in career fire departments are more likely than those in volunteer or combination fire departments to receive required training on six of the seven issues. The differences are significant for all except use of PPE. The bar chart below provides the details about this pattern of responses. The largest differences are between career fire departments and other departments regarding training on RITs and Incident Command Systems. See ***Exhibit 5-10.***

**Experience with On-Duty Fatality and FFFIPP Investigation.** Firefighters in fire departments that had a prior FFFIPP investigation are more likely than those in the fatality

without investigation and the no-fatality departments to have required training on

- fighting structure fires (90.4%, 76.3%, and 82.8% for fatality with investigation, fatality without investigation, and no-fatality departments, respectively),
- driving safety (92.0%, 80.3%, and 77.6%),
- the Incident Command System (86.3%, 73.6%, and 69.7%), and
- RITs (60.5%, 36.1%, and 35.4%).

See ***Exhibit 5-11***.

**Exhibit 5-7. Required Training (Questions 4a–c), by Region (Percent)**

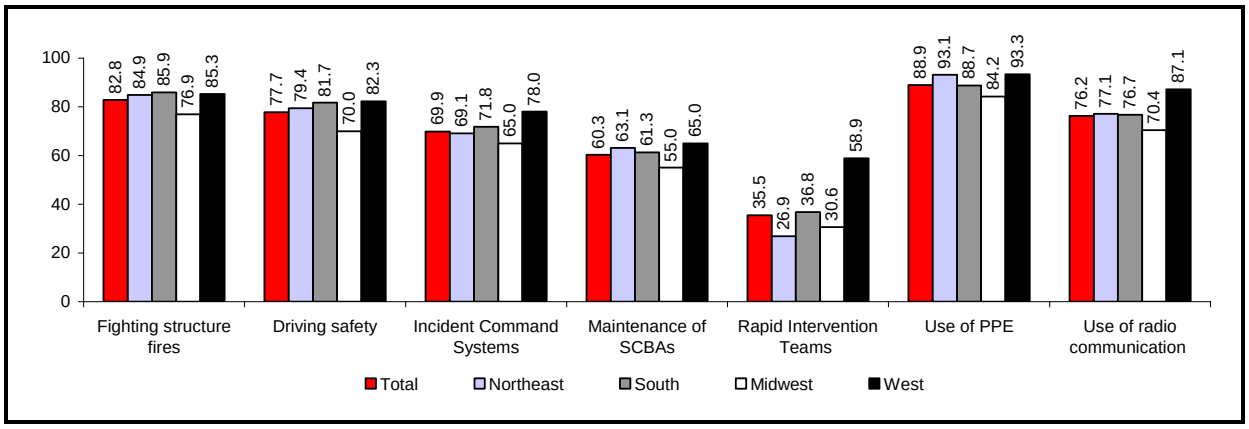



**Exhibit 5-8. Required Training (Questions 4a–c), by Jurisdiction Type (Percent)**

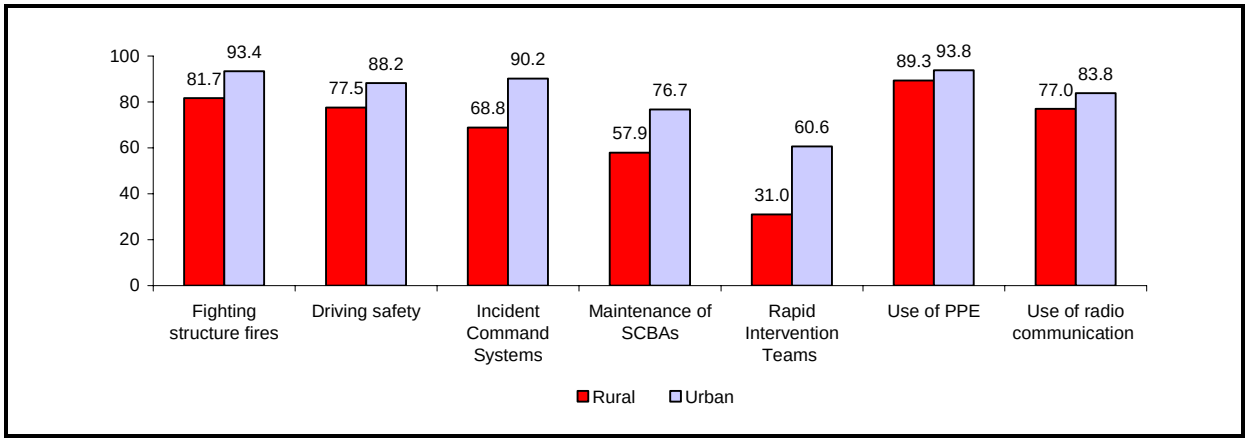


**Exhibit 5-9. Required Training (Questions 4a–c), by Size of Jurisdiction (Percent)**

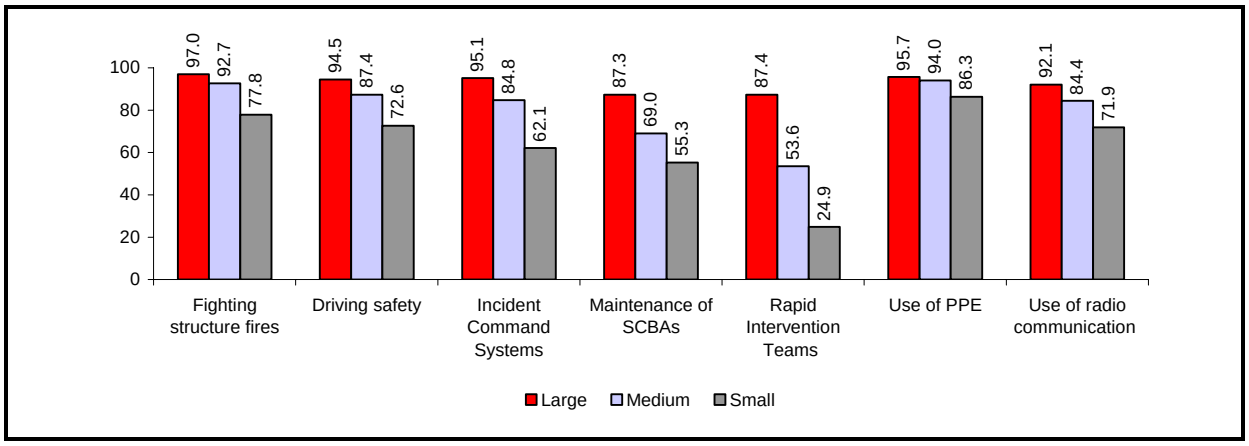



**Exhibit 5-10. Required Training (Questions 4a–c), by Type of Department (Percent)**

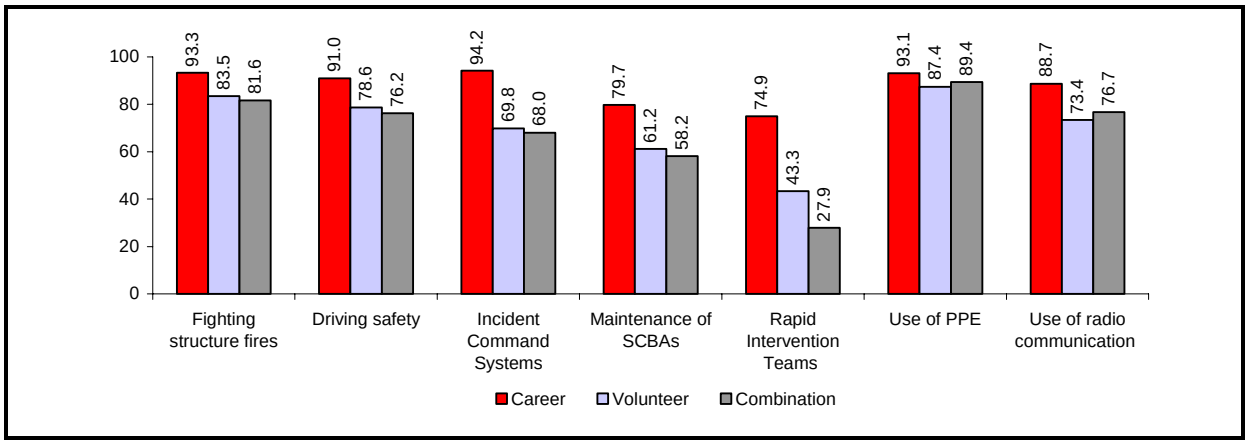
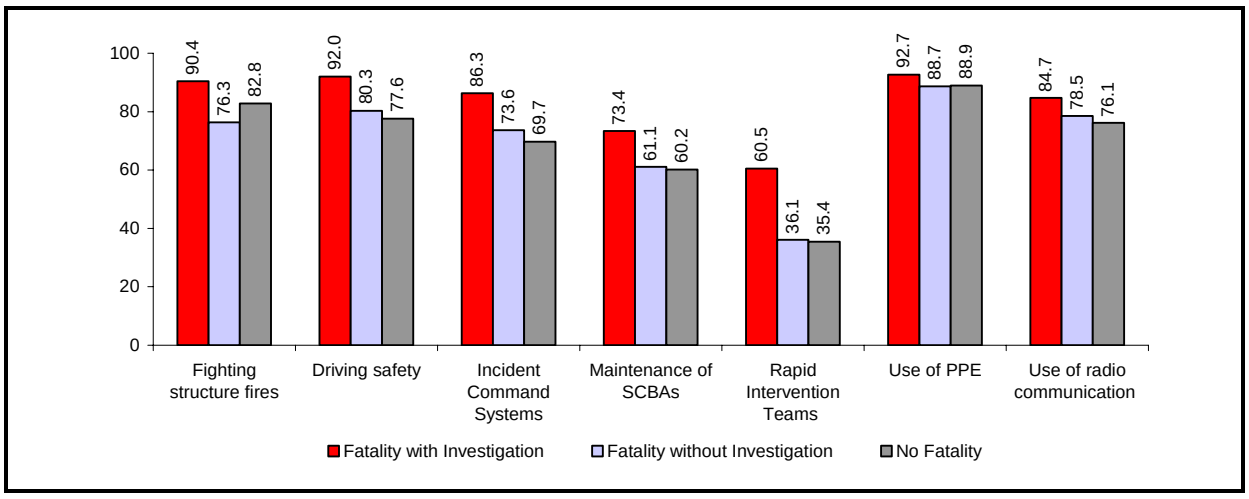



**Exhibit 5-11. Required Training (Questions 4a–c), by Fatality and FFFIPP Investigation (Percent)**



## 5.5 TRAINING PROVIDERS (Q5)

Firefighter training is provided by a variety of people. Over three quarters of the fire departments provide training through their Training Officer, other officers in the department, and the state fire training academy.

**Region.** Fire departments in the Northeast are significantly more likely than those in other regions to use the state fire training academy. The percentages are

- Northeast, 89.6%,
- South, 76.5%,
- Midwest, 75.2%, and
- West, 63.8%.

Departments in the South are less likely to use

- other officers (88.5%, 75.4%, 84.3%, and 88.9%) and
- conferences (55.2%, 43.4%, 55.3%, and 59.3%).

Fire departments in the Midwest are significantly less likely to use the United States Fire Administration's (USFA's) National Fire Academy (26.2%, 22.3%, 14.0%, and 24.7%).

There are no significant regional differences on use of the Training Officer. See ***Exhibit 5-12.***

**Jurisdiction Type.** Fire departments in urban jurisdictions are more likely than those in rural jurisdictions to provide firefighter training through

- officers in the department (91.0% and 82.8%, respectively),
- the USFA's National Fire Academy (40.8% and 19.3%), and
- conferences (67.9% and 50.7%).

There are no significant differences on use of the department's Training Officer or the state fire training academy. See ***Exhibit 5-13.***

**Size of Jurisdiction.** The larger the jurisdiction, the more likely the fire department uses each of the approaches to providing firefighter training. Only 12.1% of fire departments in small jurisdictions sent firefighters to the USFA National Fire Academy, compared with 67.8% of departments in large jurisdictions. See ***Exhibit 5-14.***

**Exhibit 5-12. Who Provides Training to Your Firefighters? (Question 5), by Region (Percent)**

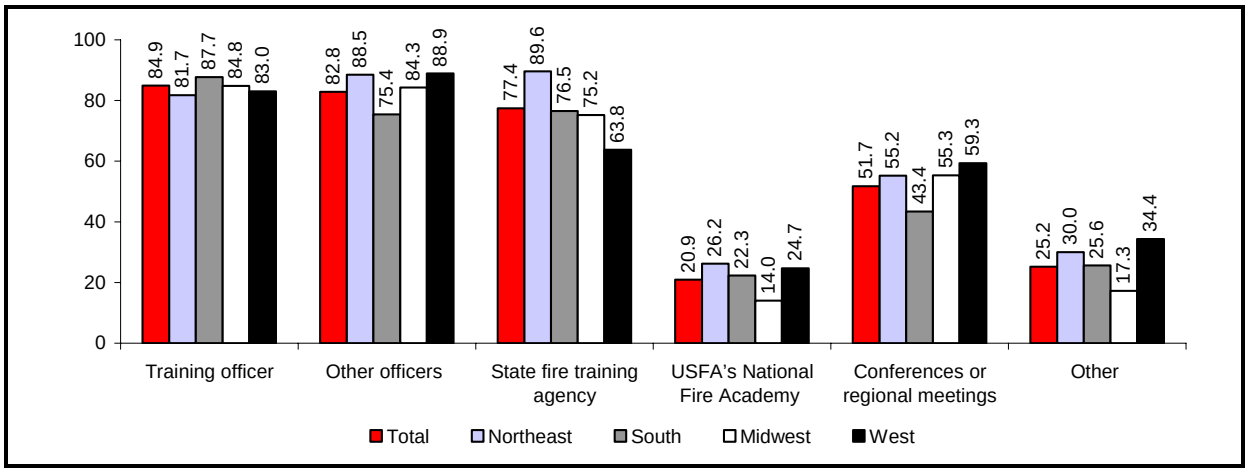



**Exhibit 5-13. Who Provides Training to Your Firefighters? (Question 5), by Jurisdiction Type (Percent)**

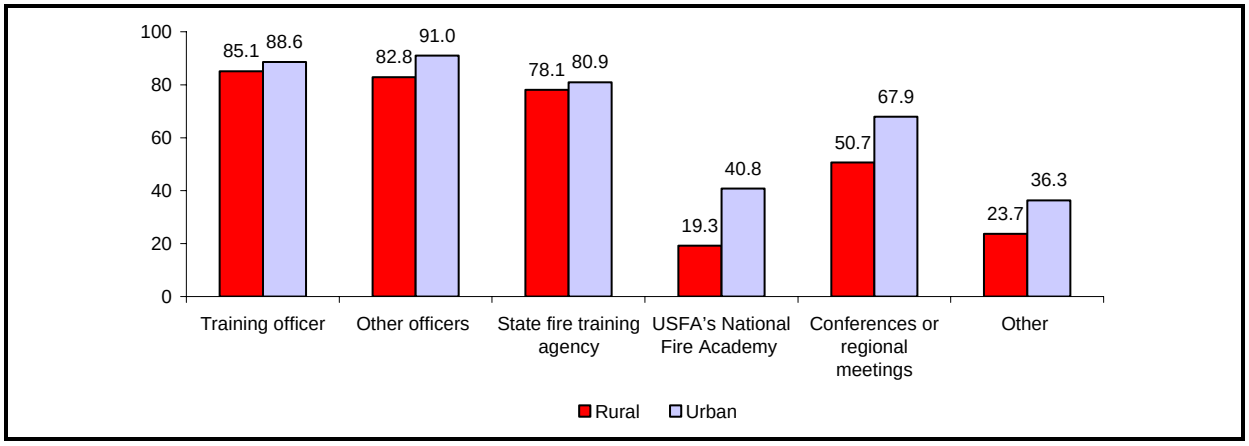
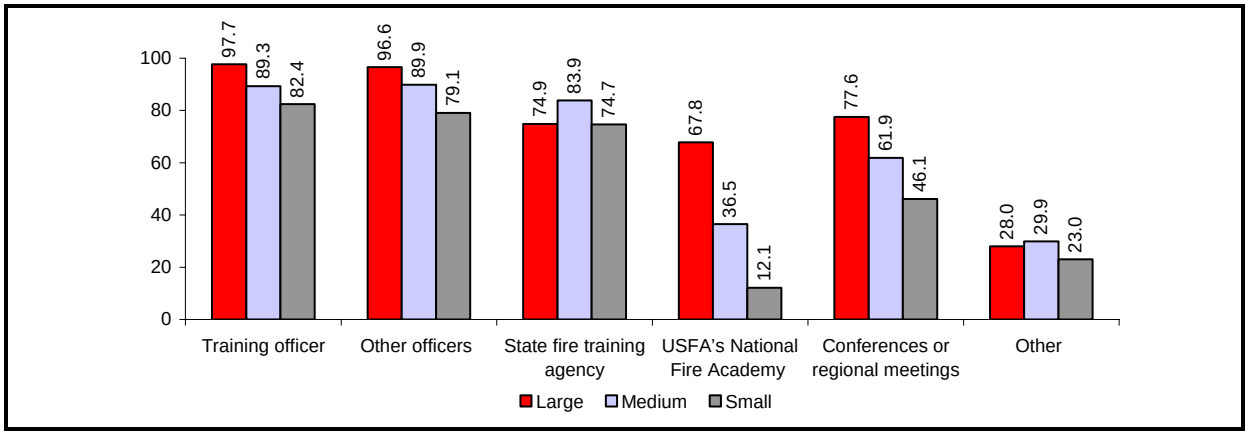



**Exhibit 5-14. Who Provides Training to Your Firefighters? (Question 5), by Size of Jurisdiction (Percent)**



**Type of Department.** To provide firefighter training, career fire departments are more likely than volunteer and combination fire departments to use

- officers in the department (94.6%, 80.6%, and 83.1%, respectively),
- the USFA National Fire Academy (58.2%, 25.5%, and 15.4%), and
- conferences (70.6%, 54.2%, and 48.8%).

Only a quarter (25.5%) of volunteer fire departments and 15.4% of combination career-volunteer fire departments send their firefighters to the USFA National Fire Academy for training. There are no significant differences for use of Training Officers and a state fire training academy. See ***Exhibit 5-15.***

**Experience with On-Duty Fatality and FFFIPP Investigation.** Firefighters in fire departments that have experienced a fatality are more likely than those that have no prior fatality to be trained by

- officers in the department,
- the USFA National Fire Academy, and
- conferences.

Whether fire departments have a FFFIPP investigation or not does not affect the source of training for firefighters. See ***Exhibit 5-16.***

**Exhibit 5-15. Who Provides Training to Your Firefighters? (Question 5), by Type of Department (Percent)**

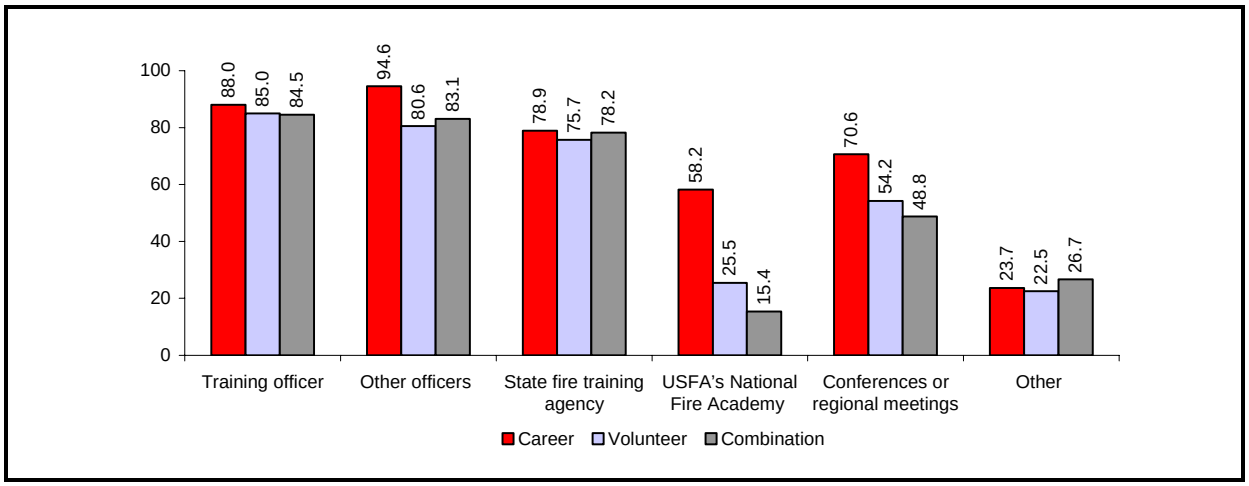
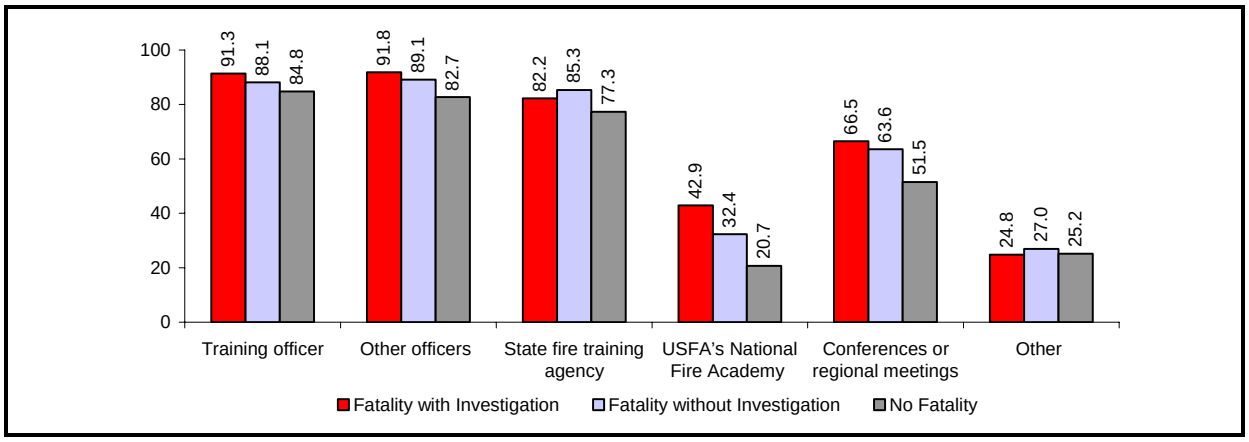


**Exhibit 5-16. Who Provides Training to Your Firefighters? (Question 5), by Fatality and FFIPP Investigation (Percent)**




## 5.6 USE OF NIOSH RECOMMENDATIONS (Q11, 11A, 11B)

The most common use of NIOSH recommendations is to modify the content of the firefighter training program and to change departmental SOPs. Over a third of all fire departments have made these changes as a result of the NIOSH recommendations.[31] Other common applications of NIOSH recommendations are new SOPs and grant applications. The most common topics of NIOSH recommendations that are used for training programs are PPE and clothing, SCBA, PASS systems, Incident Command Systems, traffic hazards, and radio communications.

*The greatest use of NIOSH recommendations for training is among fire departments in large jurisdictions, particularly training on PPE and SCBA.*

The greatest use of NIOSH recommendations for training is among fire departments in large jurisdictions, particularly training on PPE and SCBA. The patterns of responses for these issues are described below.

**Region.** Fire departments in the Northeast are more likely than those in the South or Midwest to use NIOSH recommendations to

- make changes to their training program (46.5%, 37.5%, 36.2%, and 45.7% for departments in the Northeast, South, Midwest, and West, respectively),

[31]The nonresponse analysis suggests there is nonresponse bias related to the response options "made new budget/staffing requests" and "justified grant applications." Respondents in the nonresponse survey were more likely to have listed these uses than respondents in the main survey. See Exhibit B-8a in Appendix B for details.

- develop new SOPs (31.3%, 23.4%, 23.4%, and 32.1%),
- make changes to existing SOPs (42.7%, 30.5%, 33.1%, and 37.3%), and
- justify grant applications (21.1%, 13.9%, 13.5%, and 15.0%).

Northeastern fire departments are also more likely than all other fire departments to have used NIOSH recommendations to train firefighters on PPE (the percentages are 51.1%, 37.3%, 40.6%, and 39.0% for fire departments in the Northeast, South, Midwest, and West, respectively).

See ***Exhibit 5-17***.

**Jurisdiction Type.** Urban fire departments are more likely than rural fire departments to use NIOSH recommendations to

- make changes to their training program (53.3% and 40.5%, respectively),
- develop new SOPs (38.1% and 25.1%),
- make changes to existing SOPs (48.3% and 34.8%),
- justify current budget or staffing (12.1% and 3.6%), and
- make new budget or staffing requests (11.8% and 4.8%).

Urban fire departments are also more likely to use NIOSH recommendations to train firefighters on

- PPE (52.6% and 41.0%),
- SCBA (54.4% and 40.0%),
- PASS systems (45.3% and 31.1%),
- Incident Command Systems (44.5% and 30.8%),
- radio communications (32.1% and 22.3%), and
- physical fitness and CVD (16.2% and 7.5%).

See ***Exhibit 5-18***.

**Size of Jurisdiction.** The larger the fire department's jurisdiction, the more likely that NIOSH recommendations have been used to

- make changes to the department's training program (64.9%, 50.1%, and 34.5% for large, medium, and small jurisdictions, respectively),
- develop new SOPs (47.4%, 35.3%, and 21.3%),
- change existing SOPs (67.3%, 47.8%, and 27.6%),

**Exhibit 5-17. In What Ways Has Your Department Used NIOSH Recommendations? (Question 11), by Region (Percent)**

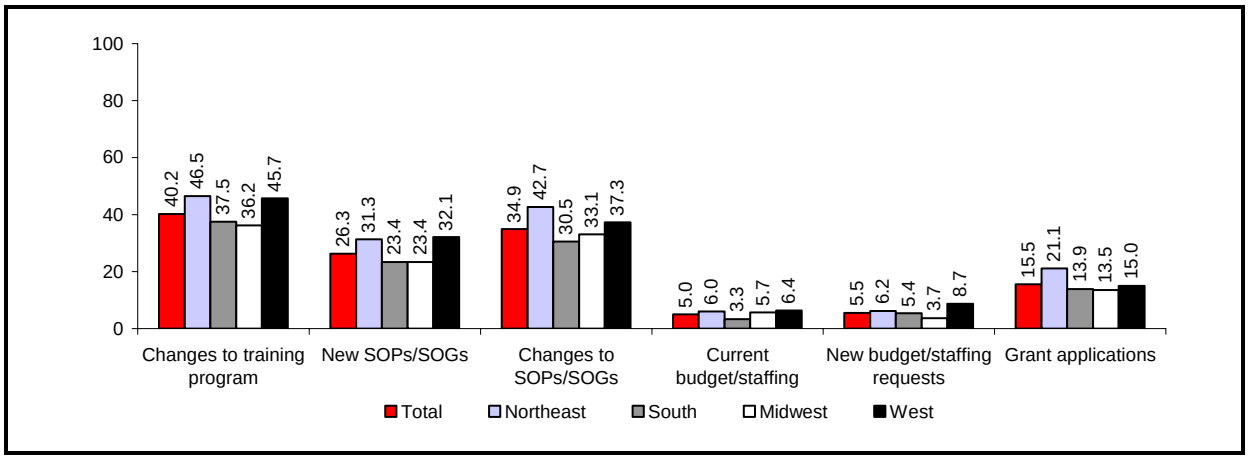
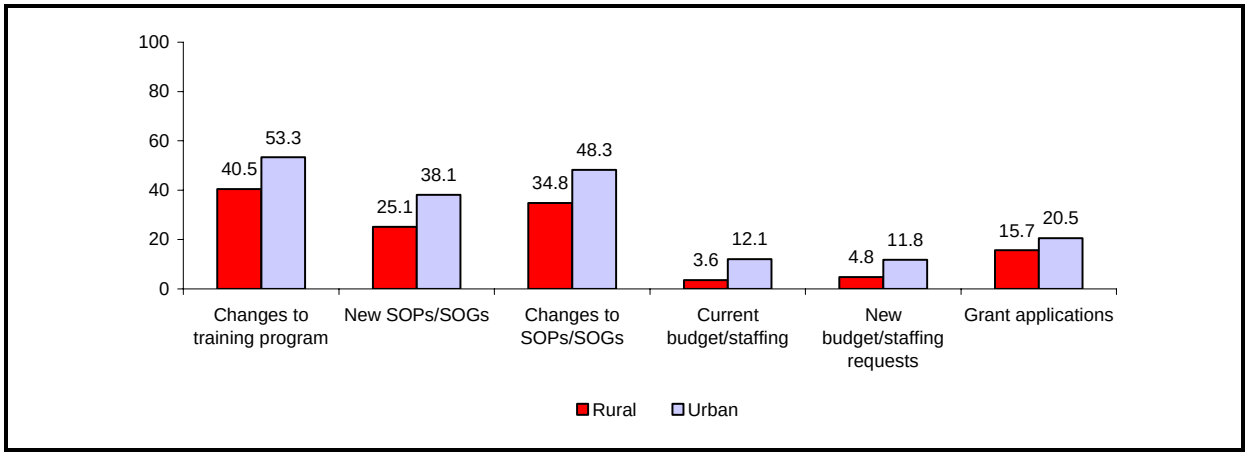



**Exhibit 5-18. In What Ways Has Your Department Used NIOSH Recommendations? (Question 11), by Jurisdiction Type (Percent)**




- justify current budget or staffing (16.3%, 7.9%, and 3.2%), and
- make new budget or staffing requests (16.6%, 9.7%, and 3.1%).

*A third of fire departments in small jurisdictions report that they do not use NIOSH recommendations.*

A third of fire departments in small jurisdictions report that they do not use NIOSH recommendations.

The size of the jurisdiction also affects the extent to which NIOSH recommendations are used for specific kinds of training. The larger the jurisdiction, the more likely that NIOSH recommendations are used for training on

- traffic hazards (42.1%, 34.0%, and 26.6%),
- PPE (61.8%, 51.1%, and 36.3%),

- SCBA (63.4%, 52.2%, and 33.4%),
- PASS systems (44.5%, 42.9%, and 27.3%),
- Incident Command Systems (48.1%, 41.1%, and 27.2%),
- radio communications (37.7%, 29.8%, and 19.3%),
- physical fitness and CVD (27.5%, 14.4%, and 5.0%), and
- building code compliance (13.1%, 8.4%, and 6.0%).

See ***Exhibit 5-19***.

**Type of Department.** Career fire departments are significantly more likely than volunteer or combination career-volunteer departments to use NIOSH recommendations to

- make changes to their training program (54.1%, 38.4%, and 40.0% for career, volunteer, and combination departments, respectively),
- develop new SOPs (38.2%, 28.2%, and 24.3%),
- make changes to existing SOPs (51.4%, 33.7%, and 34.2%),
- justify current budget or staffing (14.8%, 6.2%, and 3.6%),
- make new budget or staffing requests (14.8%, 5.4%, and 4.7%), and
- justify grant applications (22.8%, 13.1%, and 16.3%).

They are also more likely to use NIOSH recommendations to train firefighters on

- PPE (51.7%, 39.8%, and 41.8%),
- SCBA (51.6%, 38.5%, and 39.9%),
- physical fitness and CVD (23.1%, 7.8%, and 7.7%), and
- building code compliance (15.2%, 6.5%, and 6.5%).

See ***Exhibit 5-20***.

**Experience with On-Duty Fatality and FFFIPP Investigation.** Fire departments that have experienced an on-duty firefighter fatality (regardless of whether it was investigated by the FFFIPP) are more likely than those that have not to have used NIOSH recommendations to

- make changes in their training program (68.0%, 56.3%, and 39.8% for fatality with investigation, fatality without investigation, and no-fatality departments, respectively),

**Exhibit 5-19. In What Ways Has Your Department Used NIOSH Recommendations? (Question 11), by Size of Jurisdiction (Percent)**

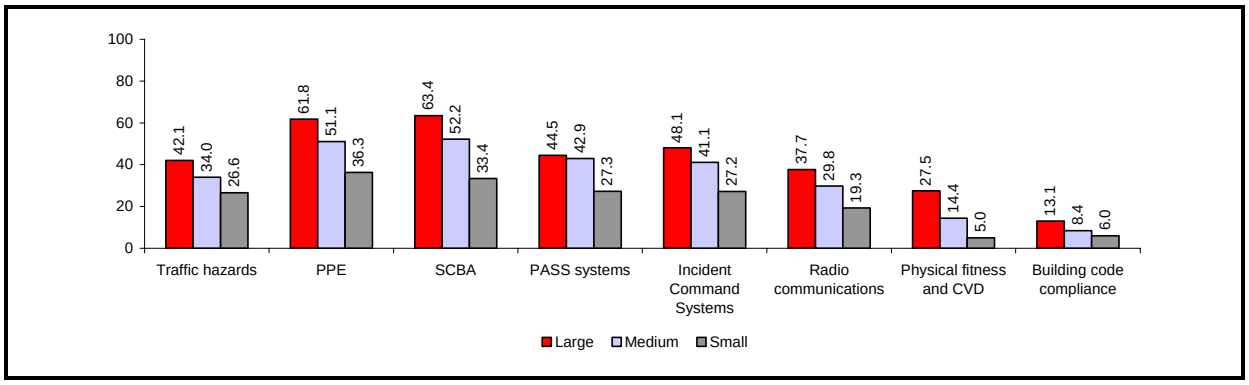
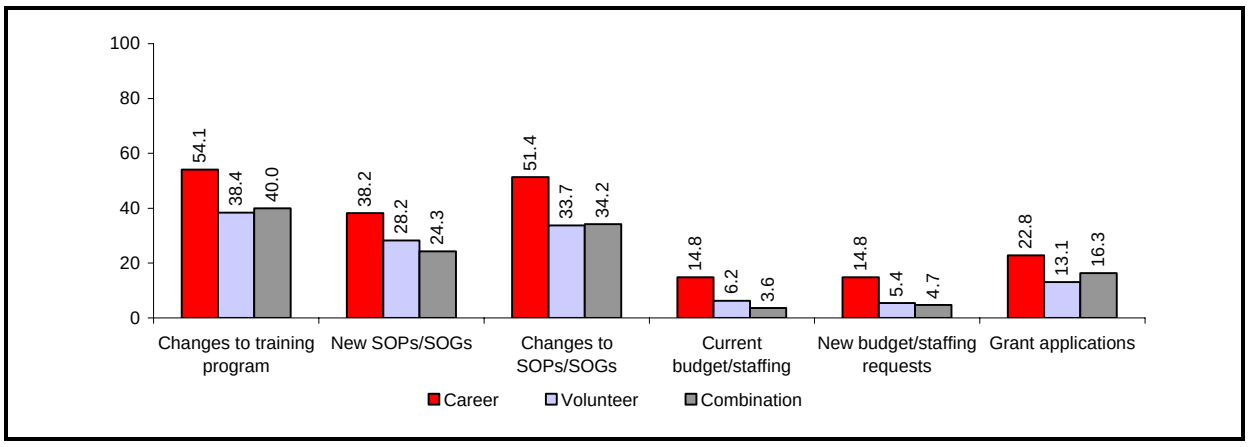



**Exhibit 5-20. In What Ways Has Your Department Used NIOSH Recommendations? (Question 11), by Type of Department (Percent)**




- developed new SOPs (50.1%, 37.4%, and 26.1%), and
- make changes to SOPs (66.2%, 51.3%, and 34.5%).

Among fire departments that have experienced a fatality, there are no significant differences based on whether a FFFIPP investigation took place.

*Fire departments with a prior FFFIPP investigation were significantly more likely to provide training on physical fitness and CVD to their firefighters.*

Fire departments that have experienced a fatality are also more likely to have used the recommendations for training purposes regarding

- traffic hazards (49.9%, 45.8%, and 29.0%),
- Incident Command Systems (46.1%, 50.0%, and 31.8%),
- radio communications (40.3%, 38.9%, and 22.8%), and
- physical fitness and CVD (28.8%, 16.3%, and 8.3%).

The only significant difference based on prior FFFIPP investigation is training on physical fitness and CVD. Fire departments with a prior investigation were significantly more likely to provide this training to their firefighters. See Exhibits 4-30 and 4-31.

## 5.7 DEPARTMENT FITNESS TRAINING PROGRAM (Q12)

*The vast majority of fire departments in the United States do not have a fitness training program for their firefighters.*

NIOSH recommends that fire departments make fitness/ wellness programs mandatory for their firefighters.[32] The vast majority of fire departments (78.5%) in the United States do not have a fitness training program for their firefighters, however.

The pattern of responses across fire department characteristics is as follows.

**Region.** Fire departments in the West are significantly more likely to have a required fitness program than those in the Northeast, South, or Midwest. The percentages are

- Northeast, 1.5%,
- South, 8.5%,
- Midwest, 4.1%, and
- West, 19.7%.

Western fire departments are also more likely than other departments to have any program, optional or required. The percentages are

- Northeast, 18.4%,
- South, 21.2%,
- Midwest, 16.4%, and
- West, 40.7%.

See ***Exhibit 5-21.***

**Jurisdiction Type.** Fire departments in urban jurisdictions are more likely than those in rural jurisdictions to have

[32]This is Sentinel Recommendation 6-1. See Exhibit 2-3 for further details. A program to maintain basic firefighter fitness and health is also required in *NFPA 1500, Standard on Fire Department Occupational Safety and Health Program*.

- a required program (18.4% and 4.7% among urban and rural departments, respectively) or
- an optional program (34.8% and 11.7%).

*Most rural fire departments (83.6%) have no fitness program for their firefighters.*

Most rural fire departments (83.6%) have no fitness program for their firefighters. See ***Exhibit 5-22.***

**Size of Jurisdiction.** The larger the jurisdiction, the more likely the department will have a fitness training program and the more likely it will be a required program. Fire departments in large jurisdictions are significantly more likely than those in medium or small jurisdictions to have

- a required program (36.4%, 12.8%, and 3.2% among large, medium, and small jurisdictions, respectively) or
- an optional program (39.1%, 29.0%, and 7.1%).

Almost 90% of fire departments in small jurisdictions do not have a program.[33] About 75% of fire departments in large jurisdictions have a fitness program, although only half of them are required programs. See ***Exhibit 5-23.***

**Type of Department.** Career fire departments are more likely than volunteer or combination departments to have

- a required program (36.6%, 11.1%, and 2.4% among career, volunteer, and combination departments, respectively) or
- an optional program (35.8%, 19.0%, and 10.4%).

*Fire departments with a prior FFFIPP investigation are more likely to have a required fitness program.*

Almost 70% of volunteer fire departments and over 87% of combination career-volunteer fire departments have no fitness program at all. See ***Exhibit 5-24.***

**Experience with On-Duty Fatality and FFFIPP Investigation.** Fire departments with experience of a FFFIPP investigation are more likely to have a required program than fire departments that do not. The percentages are

- fatality with investigation, 18.5%,
- fatality without investigation, 11.9%, and
- no fatality, 6.9%.

[33] This is consistent with NFPA's 2001 needs assessment, which found 88% of firefighters in communities with populations of less than 2,500 worked in fire departments that did not have a fitness program (Fahy, 2005).

Among fire departments with a prior fire fighter fatality, there is no significant difference with respect to whether the fatality was investigated by the FFFIPP. See ***Exhibit 5-25.***

**Exhibit 5-21. Does Your Department Have a Fitness Training That Involves Physical Exercise and/or Other Health Promotion Activities? (Question 12), by Region (Percent)**

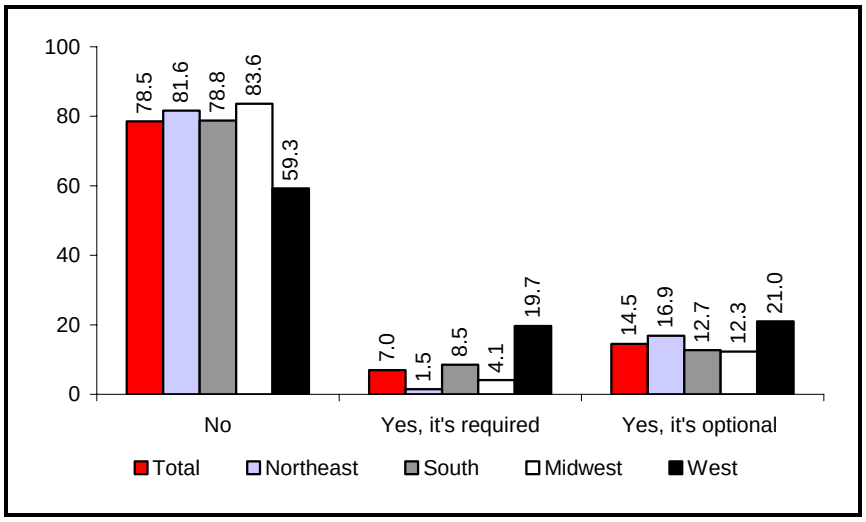



**Exhibit 5-22. Does Your Department Have a Fitness Training That Involves Physical Exercise and/or Other Health Promotion Activities? (Question 12), by Jurisdiction Type (Percent)**

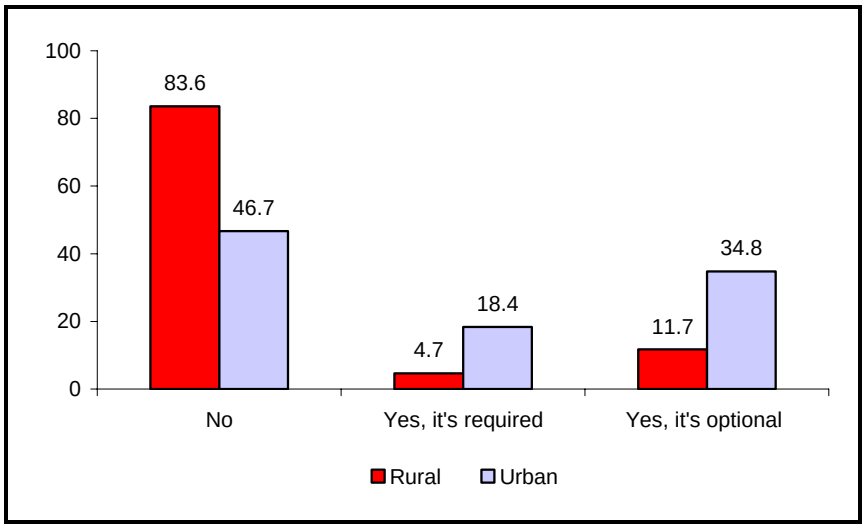


**Exhibit 5-23. Does Your Department Have a Fitness Training That Involves Physical Exercise and/or Other Health Promotion Activities? (Question 12), by Size of Jurisdiction (Percent)**

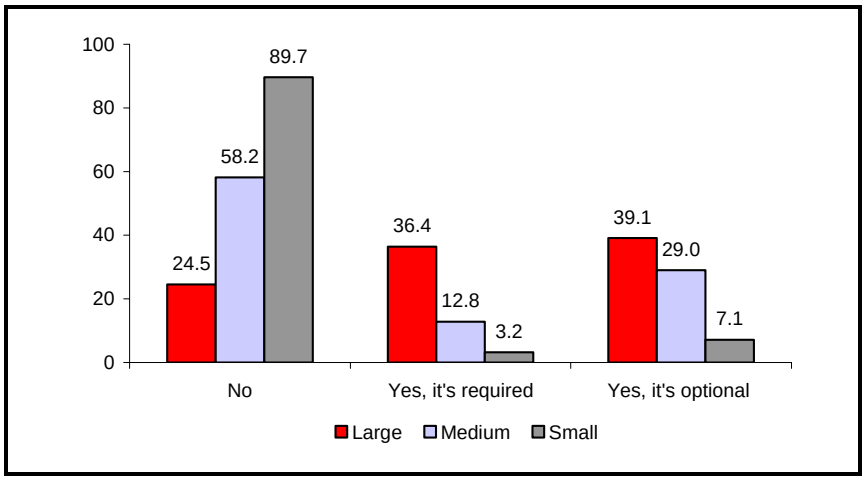



**Exhibit 5-24. Does Your Department Have a Fitness Training That Involves Physical Exercise and/or Other Health Promotion Activities? (Question 12), by Type of Department (Percent)**

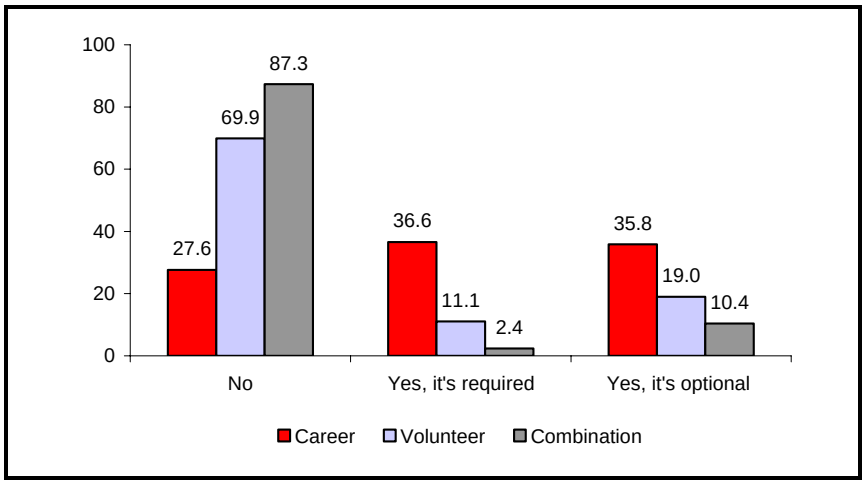
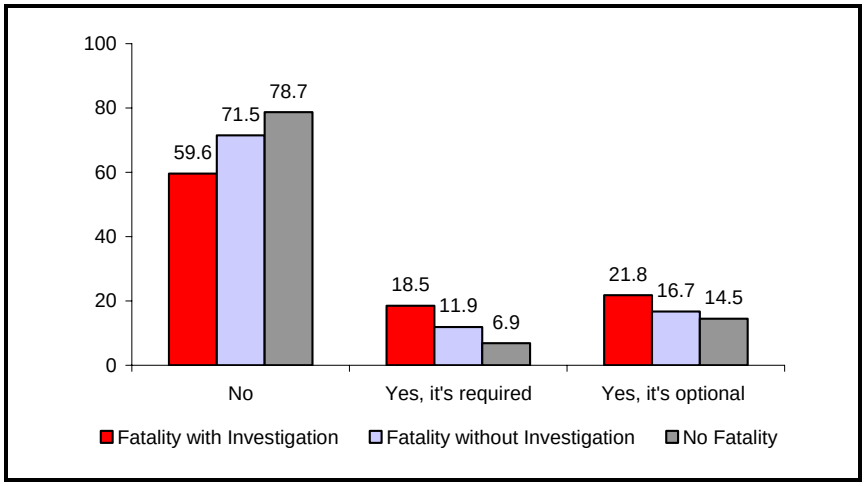



**Exhibit 5-25. Does Your Department Have a Fitness Training That Involves Physical Exercise and/or Other Health Promotion Activities? (Question 12), by Fatality and FFFIPP Investigation (Percent)**



## 5.8 CARDIOVASCULAR DISEASE SCREENINGS (Q13)

*Over half of all fire departments do not require CVD screenings. Only 17.1% require annual screenings. Three quarters of fire departments in the South never screen their firefighters for CVD.*

NIOSH recommends that fire departments conduct medical evaluations to screen firefighters for CVD risk factors and CVD.[34] Well over half (60.9%) of all fire departments, however, still do not require these screenings. Only 17.1% require annual screenings; 14.5% screen only at the time of employment.[35]

**Region.** Three quarters of fire departments in the South never screen their firefighters for CVD. Only 23.9% of departments in the South screen firefighters at least once, as opposed to 55.4%, 42.1%, and 43.6% in the Northeast, Midwest, and West, respectively. Fire departments in the Northeast are more likely to screen their firefighters for CVD once or more a year than fire departments in other regions of the country. The percentages are

- Northeast, 30.9%,
- South, 11.5%,
- Midwest, 13.5%, and
- West, 18.9%.

See ***Exhibit 5-26.***

**Jurisdiction Type.** Fire departments in urban jurisdictions are significantly more likely than those in rural jurisdictions to require CVD screenings once a year or more (33.9% and 14.9%, respectively).

Less than a third of fire departments in urban jurisdictions have no CVD screening requirements, compared with almost two thirds (64.7%) of fire departments in rural jurisdictions. See ***Exhibit 5-27.***

[34]This is Sentinel Recommendation 6-2. See Exhibit 2-3 for further details.

[35]The nonresponse analysis suggests there may be nonresponse bias related to two of the response options for this question. Respondents in the nonresponse survey were more likely to have said "less frequently than once a year" and less likely to have said "firefighters are not required to receive CVD screenings" than respondents in the main survey. See Exhibit B-8a in Appendix B for details.

*Two fifths of departments in medium-sized jurisdictions and almost three quarters of those in small jurisdictions do not require CVD screenings.*

**Size of Jurisdiction.** The larger the department, the more frequently firefighters are likely to receive screening for CVD once a year or more. The percentages are

- large, 53.0%,
- medium, 25.8%, and
- small, 12.3%.

Two fifths of departments in medium-sized jurisdictions and almost three quarters of those in small jurisdictions do not require CVD screenings at all. See ***Exhibit 5-28.***

**Type of Department.** Career fire departments are more likely than volunteer or combination fire departments to require CVD screenings for firefighters once or more a year. The percentages are

- career, 51.2%,
- volunteer, 17.8%, and
- combination, 14.5%.

The proportions of fire departments that do not require any screening are

- career, 13.9%,
- volunteer, 56.7%, and
- combination, 67.0%.

See ***Exhibit 5-29.***

**Experience with On-Duty Fatality and FFFIPP Investigation.** Fire departments that have no prior firefighter fatality are less likely than those with a fatality and a FFFIPP investigation to require CVD screenings. The percentages are

- fatality with investigation, 43.6%,
- fatality without investigation, 51.4%, and
- no fatality, 61.2%.

There is no statistically significant pattern of responses regarding how often firefighters are required to receive CVD screenings. See ***Exhibit 5-30.***

**Exhibit 5-26. How Often Do Your Firefighters Receive Screenings for Cardiovascular Disease (CVD) and Its Risk Factors? (Question 13), by Region (Percent)**

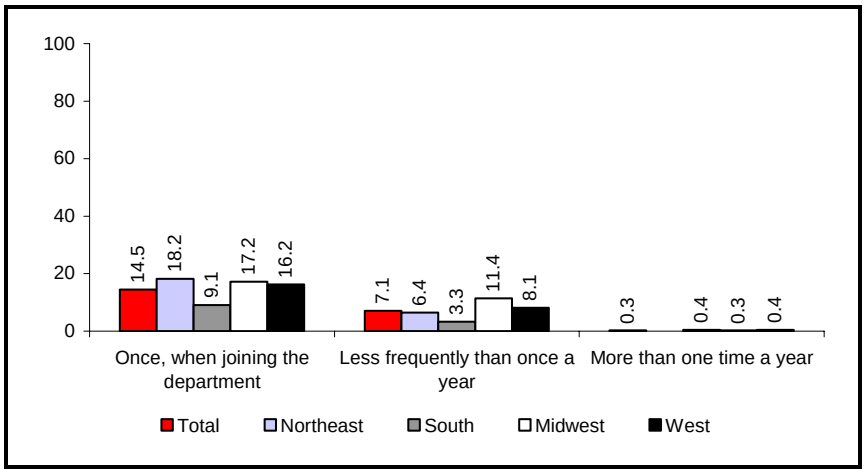



**Exhibit 5-27. How Often Do Your Firefighters Receive Screenings for Cardiovascular Disease (CVD) and Its Risk Factors? (Question 13), by Jurisdiction Type (Percent)**

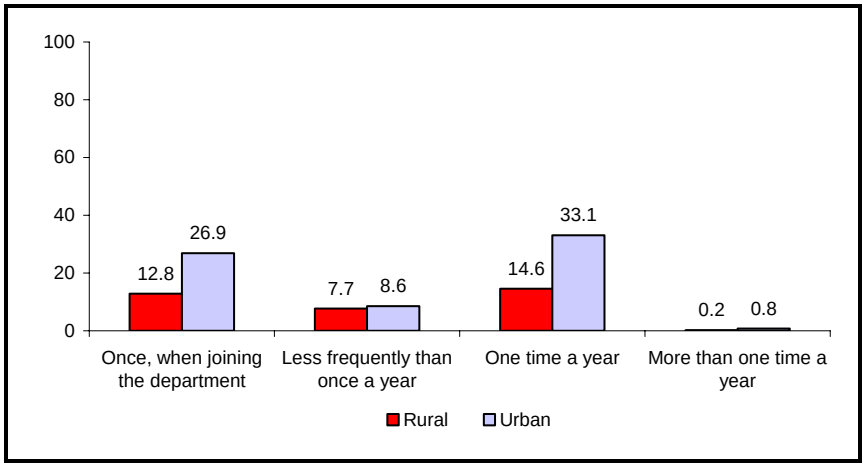



**Exhibit 5-28. How Often Do Your Firefighters Receive Screenings for Cardiovascular Disease (CVD) and Its Risk Factors? (Question 13), by Size of Jurisdiction (Percent)**

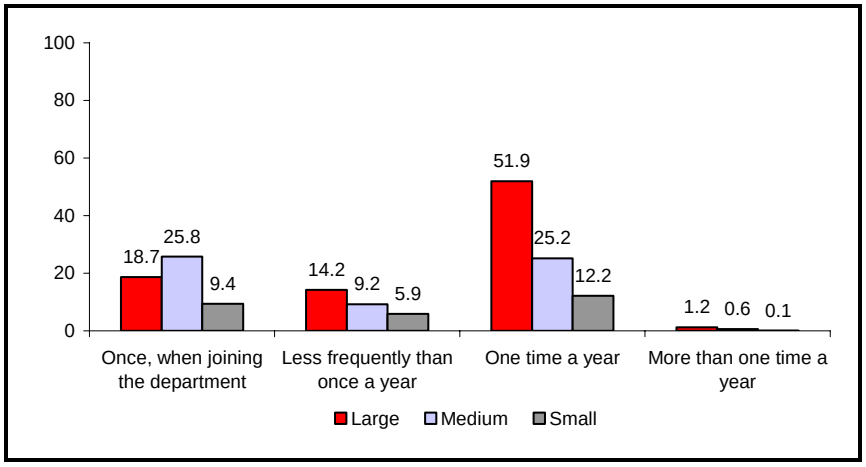


**Exhibit 5-29. How Often Do Your Firefighters Receive Screenings for Cardiovascular Disease (CVD) and Its Risk Factors? (Question 13), by Type of Department (Percent)**

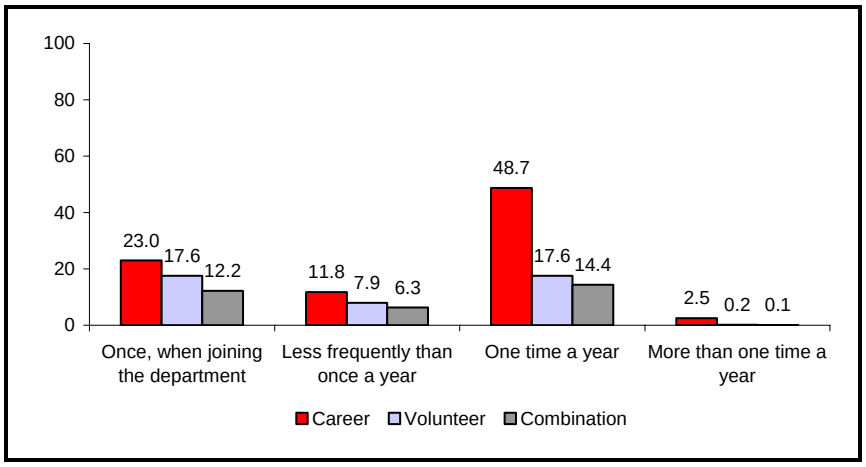
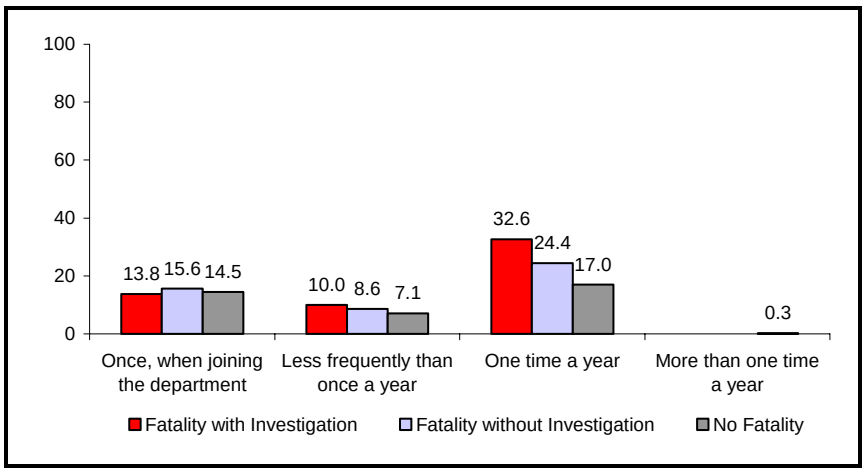



**Exhibit 5-30. How Often Do Your Firefighters Receive Screenings for Cardiovascular Disease (CVD) and Its Risk Factors? (Question 13), by Fatality and FFFIPP Investigation (Percent)**




## 5.9 DRIVER TRAINING (Q14, 15)

NIOSH recommends that fire departments "ensure all drivers of fire department vehicles receive driver training at least twice a year and document the training."[36] Firefighters said during the focus group discussions, however, that there is a need for better driver training. They said that firefighters need to be trained to the class of the vehicle, especially drivers of water tankers. Volunteer firefighters—the home responders—should also be trained.

According to the Fire Department Survey, most firefighters responsible for driving emergency vehicles receive driver training before being allowed to operate the vehicles.

[36]This is Sentinel Recommendation 2-3. See Exhibit 2-3 for further details.

Firefighters in about half (54.5%) of all fire departments also receive refresher driver training once or more a year.

**Region.** Drivers of vehicles responding to emergency calls in the Northeast are more likely than those in other regions to receive driver training required by the department (the percentages are 93.1%, 86.5%, 75.8%, and 81.3% for departments in the Northeast, South, Midwest, and West, respectively).

In fire departments in the South and West, drivers are more likely to receive driver training required by the state (18.3%, 30.1%, 22.7%, and 34.3%).

Regarding refresher training for drivers, there is no general pattern across regions. See ***Exhibit 5-31.***

**Jurisdiction Type.** Drivers of vehicles that respond to emergency calls are more likely in urban jurisdictions than in rural jurisdictions to receive driver training. The proportions of departments where firefighters do not receive training are 3.2% and 6.9%, respectively. See ***Exhibit 5-32.***

Urban fire departments are also more likely than those in rural jurisdictions to provide refresher training to drivers of emergency vehicles (15.9% of urban fire departments and 21.8% of rural fire departments provide no refresher training).

*Over 90% of departments in large and medium jurisdictions require driver training.*

**Size of Jurisdiction.** Drivers of vehicles responding to emergency calls from small jurisdictions are less likely than other drivers to receive driver training before being allowed to operate the vehicles (8.1% of those in small jurisdictions receive no training, compared with only 2.4% of those in large jurisdictions and 2.9% in medium jurisdictions). Over 90% of departments in large and medium jurisdictions require driver training. See ***Exhibit 5-33.***

Regarding the provision of refresher driver training, there is no significant pattern of responses based on size of jurisdiction. Firefighters in about a quarter of the fire departments in small jurisdictions do not receive any refresher driver training.

**Type of Department.** Drivers of vehicles responding to emergency calls from combination career-volunteer fire departments are less likely than those in other types of

departments to receive training required by the department. The percentages are

- career, 88.6%,
- volunteer, 86.9%, and
- combination, 82.0%.

See ***Exhibit 5-34.***

Regarding the provision of refresher driver training to drivers of emergency vehicles, there is no significant pattern of responses based on type of department.

**Experience with On-Duty Fatality and FFFIPP Investigation.** Fire departments that have no prior firefighter fatality are less likely than fire departments that have a prior FFFIPP investigation to require training. The proportions that require no training are

- fatality with investigation, 2.2%,
- fatality without investigation, 5.2%, and
- no fatality, 6.4%

There is no significant pattern of responses based on prior fatality or prior FFFIPP investigation.

Neither a prior fatality nor a prior FFFIPP investigation significantly affects the likelihood that firefighters receive refresher training to continue to drive emergency vehicles.

**Exhibit 5-31. Do All Drivers of Vehicles Responding to Emergency Calls Receive Driver Training before Being Allowed to Operate the Vehicles? (Question 14), by Region (Percent)**

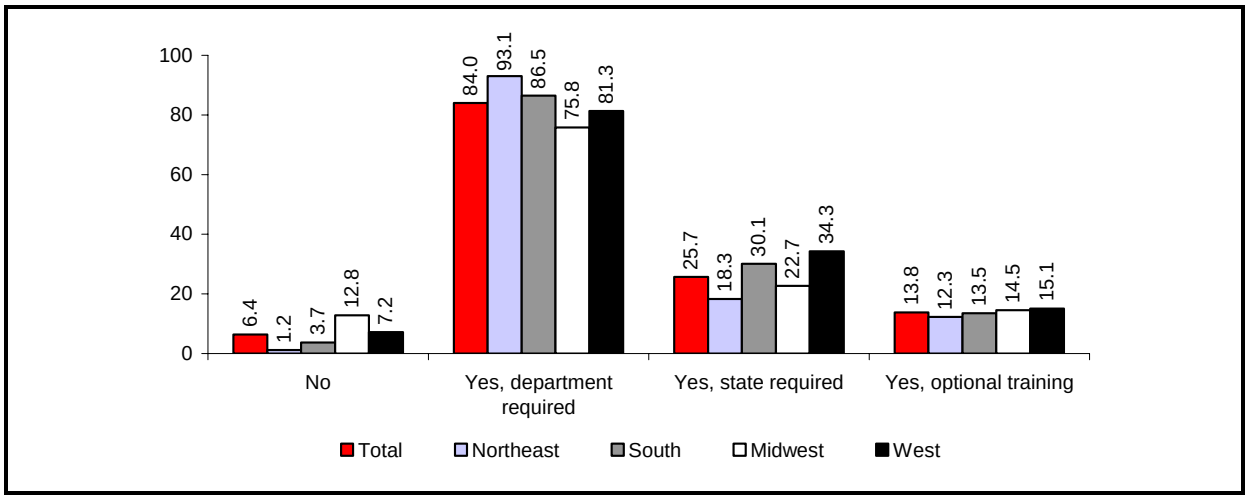


**Exhibit 5-32. Do All Drivers of Vehicles Responding to Emergency Calls Receive Driver Training before Being Allowed to Operate the Vehicles? (Question 14), by Jurisdiction Type (Percent)**

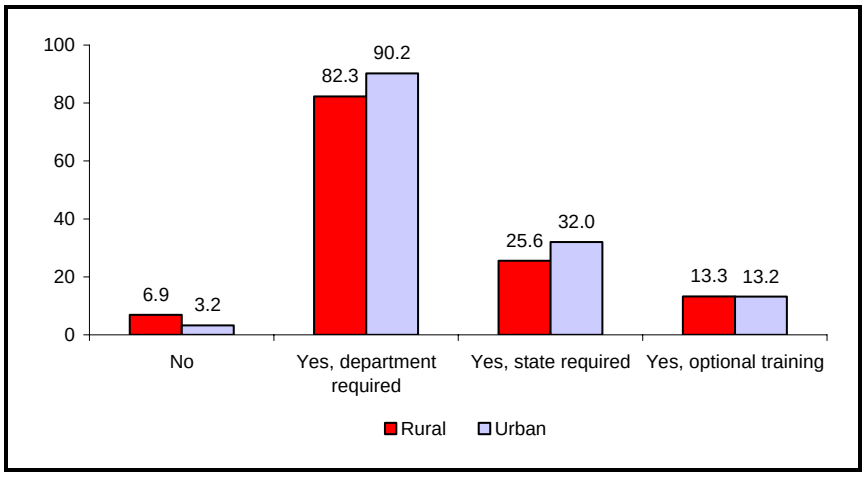



**Exhibit 5-33. Do All Drivers of Vehicles Responding to Emergency Calls Receive Driver Training before Being Allowed to Operate the Vehicles? (Question 14), by Size of Jurisdiction (Percent)**

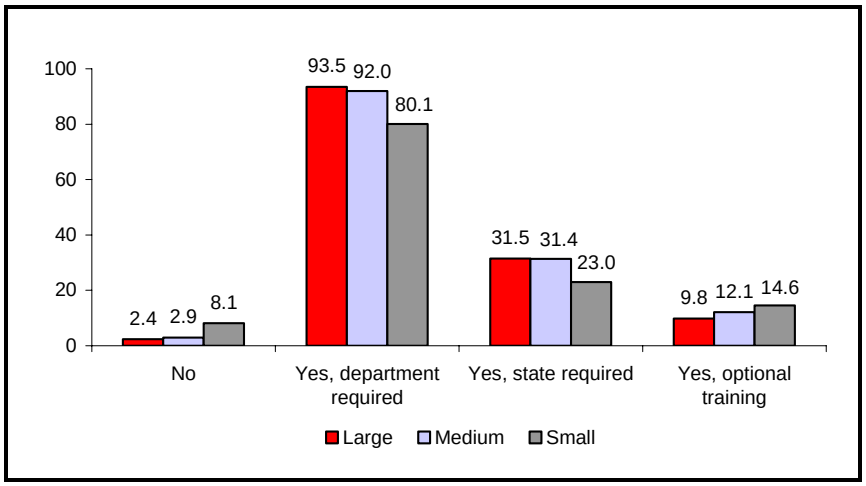
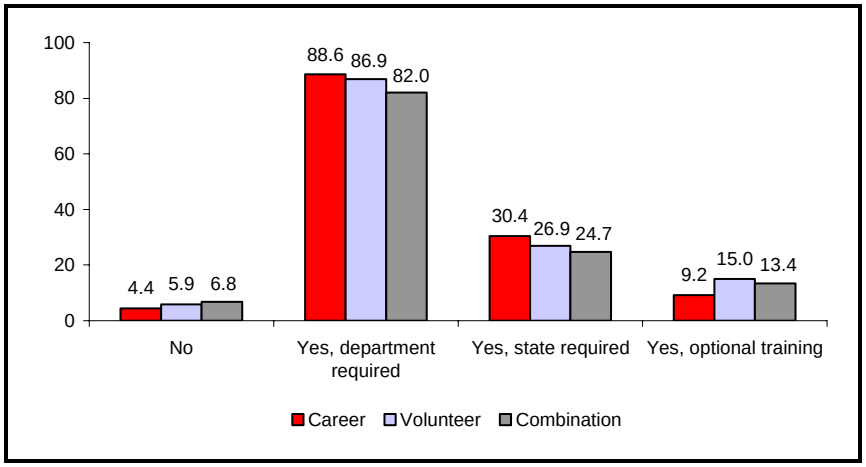



**Exhibit 5-34. Do All Drivers of Vehicles Responding to Emergency Calls Receive Driver Training before Being Allowed to Operate the Vehicles? (Question 14), by Type of Department (Percent)**



## 5.10 SEAT BELT REQUIREMENT (Q16)

NIOSH recommends that fire departments "ensure that all firefighters riding in emergency fire apparatus are wearing and are properly belted and secured by seat belts."[37] Among the issues firefighters raised during the focus group discussions was the failure of firefighters to use their seat belts. Some firefighters felt the officer in charge should enforce seat belt usage more.

The findings from the Fire Department Survey indicate that the vast majority (84.2%) of fire departments require their firefighters to wear seat belts while they are in emergency vehicles. The highest percentages are among departments in the West; in urban, career, and large departments; and in fire departments with a prior FFFIPP investigation.

*A quarter of all fire departments in the Midwest do not require seat belt use in emergency vehicles.*

**Region.** A quarter of all fire departments in the Midwest do not require seat belt use in emergency vehicles. Midwestern fire departments are significantly less likely than those in other regions to require seat belt use. The percentages of departments that require seat belts are

- Northeast, 85.6%,
- South, 87.3%,
- Midwest, 76.7%, and
- West, 92.0%.

See ***Exhibit 5-35.***

**Jurisdiction Type.** Fire departments in urban jurisdictions are more likely than those in rural jurisdictions to require seat belts (89.8% and 83.0%, respectively). See ***Exhibit 5-36.***

**Size of Jurisdiction.** Almost all fire departments that serve large jurisdictions require the use of seat belts on emergency vehicles. The larger the jurisdiction served, the more likely the fire department requires the use of seat belts. The percentages are

- large, 97.6%,
- medium, 90.1%, and
- small, 81.1%.

[37] This is Sentinel Recommendation 2-1. See Exhibit 2-3 for further details.

Almost a fifth (18.9%) of fire departments in small jurisdictions do not have a seat belt requirement, whereas virtually all departments in large jurisdictions have a seat belt requirement. See ***Exhibit 5-37.***

**Type of Department.** Career fire departments are more likely than volunteer and combination fire departments to require the use of seat belts (94.3%, 86.9%, and 82.0%, respectively). See ***Exhibit 5-38.***

**Experience with On-Duty Fatality and FFFIPP Investigation.** Neither a prior fatality nor a prior FFFIPP investigation significantly affects the likelihood that the fire department requires firefighters to wear seat belts on emergency vehicles. The percentages are

- fatality with investigation, 92.1%,
- fatality without investigation, 88.0%, and
- no fatality, 84.1%.

**Exhibit 5-35. Does Your Fire Department Have a Requirement Regarding Seat Belt Use in Emergency Vehicles? (Question 16), by Region (Percent)**

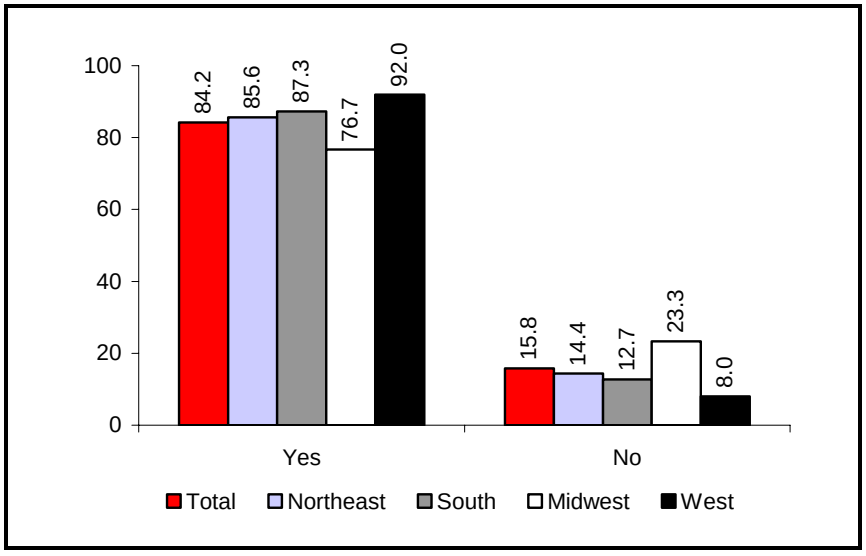


**Exhibit 5-36. Does Your Fire Department Have a Requirement Regarding Seat Belt Use in Emergency Vehicles? (Question 16), by Jurisdiction Type (Percent)**

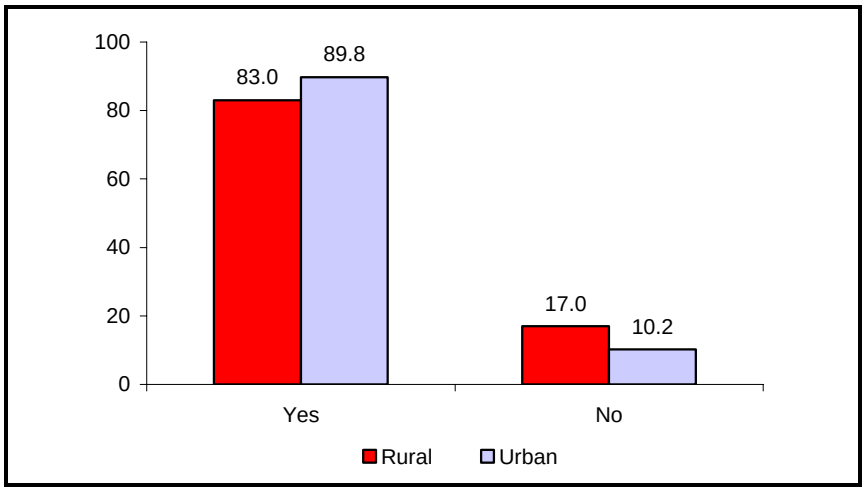



**Exhibit 5-37. Does Your Fire Department Have a Requirement Regarding Seat Belt Use in Emergency Vehicles? (Question 16), by Size of Jurisdiction (Percent)**

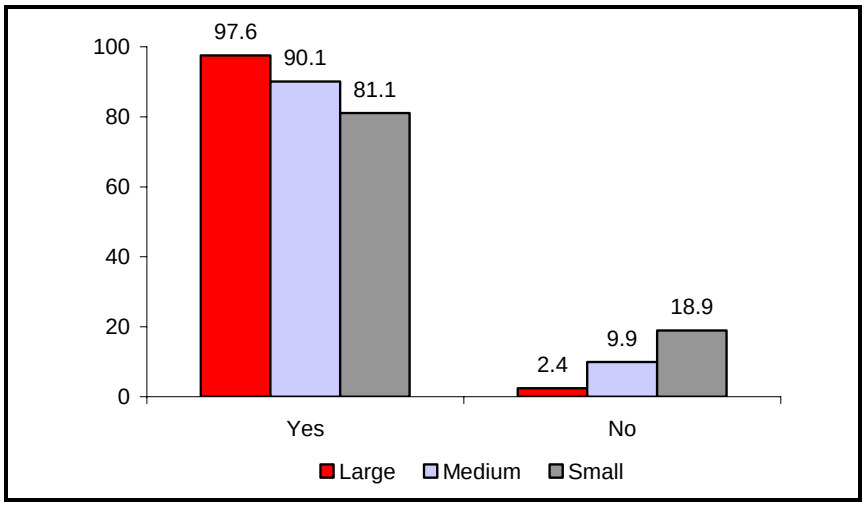
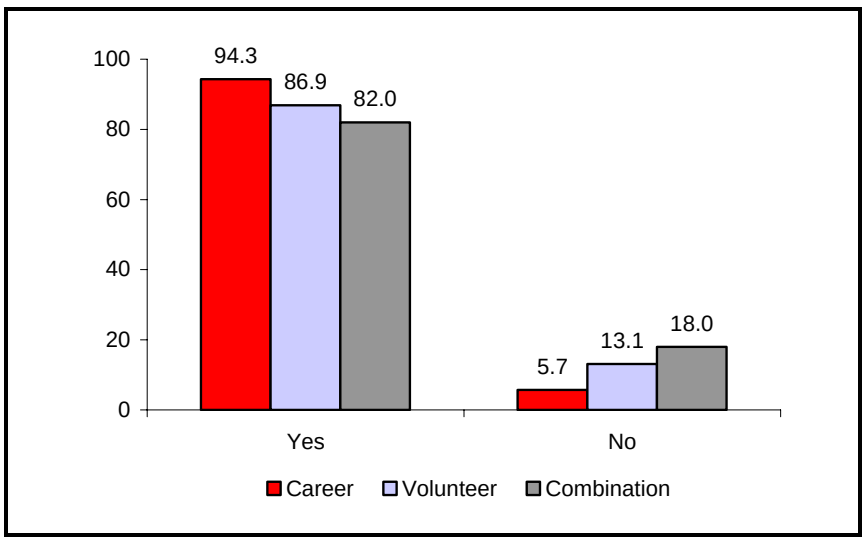



**Exhibit 5-38. Does Your Fire Department Have a Requirement Regarding Seat Belt Use in Emergency Vehicles? (Question 16), by Type of Department (Percent)**



## 5.11 FIREFIGHTERS' USE OF SEAT BELTS (Q18)

*Firefighters in only about half of the nation's fire departments are thought to use their seat belts "most of the time" or "always."*

Firefighters in only about half of the nation's fire departments are thought to use their seat belts "most of the time" or "always." The significant patterns are as follows.[38]

**Region.** Firefighters in departments in the West are more likely than those in other regions to use their seat belts "most of the time" or "always" when riding in emergency vehicles. The proportions of departments where firefighters use seat belts "most of the time" or "always" are

- Northeast, 48.6%,
- South, 58.5%,
- Midwest, 45.3%, and
- West, 79.2%.

See ***Exhibit 5-39.***

**Jurisdiction Type.** Firefighters in urban fire departments are more likely than those in rural jurisdictions to "always" wear their seat belts (22.8% and 16.3%, respectively); 6.3% of fire departments in rural jurisdictions say their firefighters "never" wear seat belts. See ***Exhibit 5-40.***

**Size of Jurisdiction.** The larger the jurisdiction served, the more frequently firefighters are said to wear their seat belts when riding in the emergency vehicles. The proportions that responded "most of the time" or "always" are

- large, 79.5%,
- medium, 60.6%, and
- small, 51.4%.

See ***Exhibit 5-41.***

**Type of Department.** Firefighters in career fire departments are more likely than those in volunteer and combination fire departments to "always" use their seat belts when riding in emergency vehicles (the percentages are 32.8%, 20.9%, and 12.8%, respectively). See ***Exhibit 5-42.***

[38]The nonresponse analysis suggests there may be some nonresponse bias related to this question. Respondents in the nonresponse survey were more likely to have responded "most of the time" or "always" than respondents in the main survey. See Exhibit B-8a in Appendix B for details.

**Experience with On-Duty Fatality and FFFIPP Investigation.** Neither a prior fatality nor a prior FFFIPP investigation significantly affects the likelihood that firefighters use their seat belts. The portion of fire departments that say firefighters use them "most of the time" or "always" is

- fatality with investigation, 64.0%,
- fatality without investigation, 52.0%, and
- no fatality, 54.9%.

**Exhibit 5-39. About How Often Do You Think Your Firefighters Use Their Seat Belts When Riding in the Emergency Vehicles? (Question 18), by Region (Percent)**

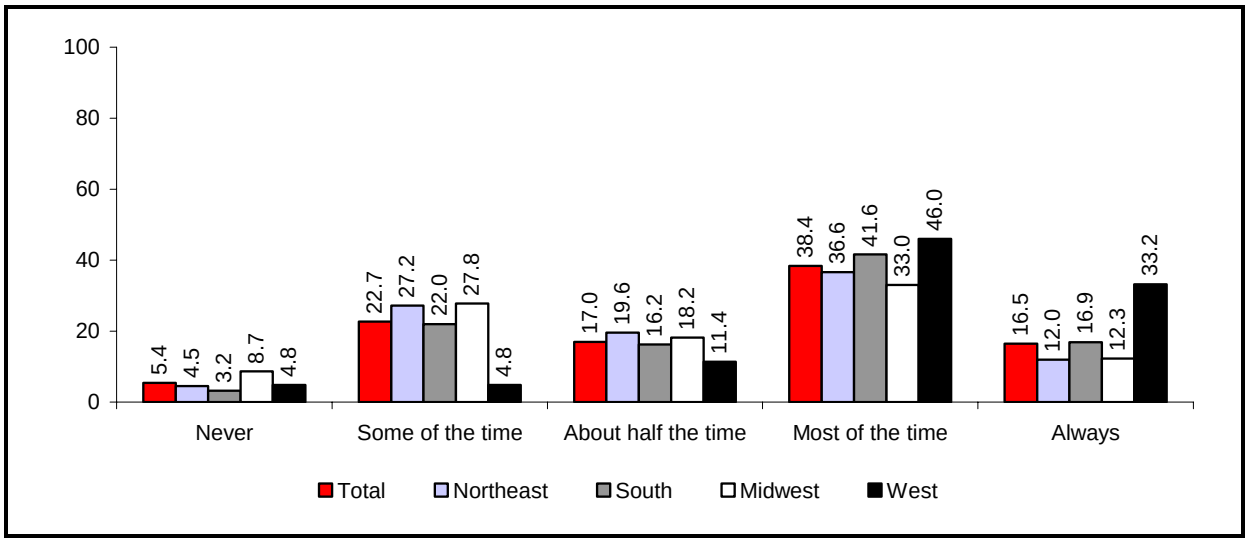



**Exhibit 5-40. About How Often Do You Think Your Firefighters Use Their Seat Belts When Riding in the Emergency Vehicles? (Question 18), by Jurisdiction Type (Percent)**

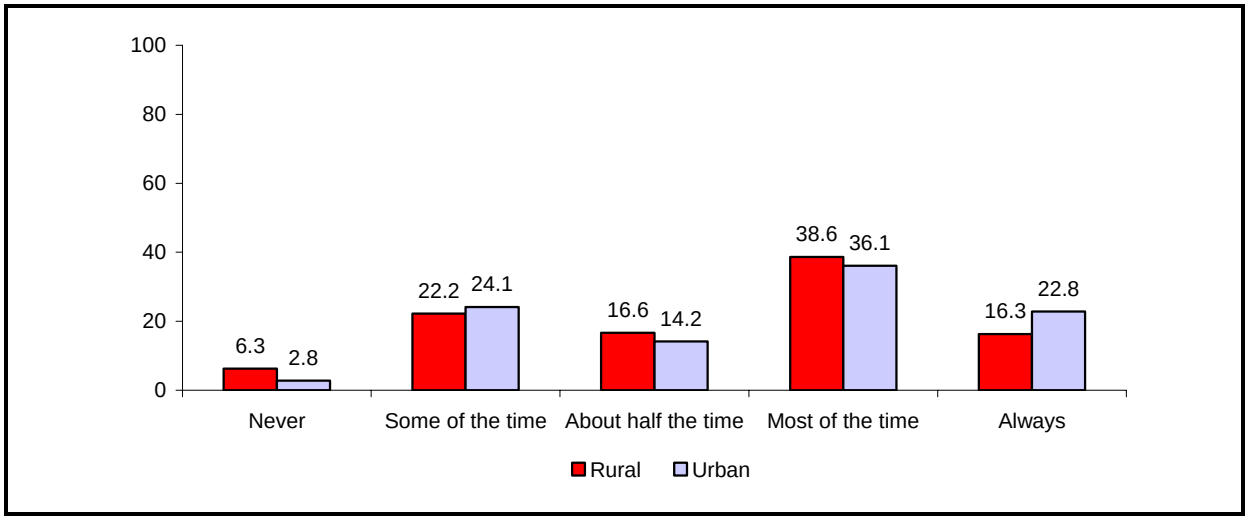


**Exhibit 5-41. About How Often Do You Think Your Firefighters Use Their Seat Belts When Riding in the Emergency Vehicles? (Question 18), by Size of Jurisdiction (Percent)**

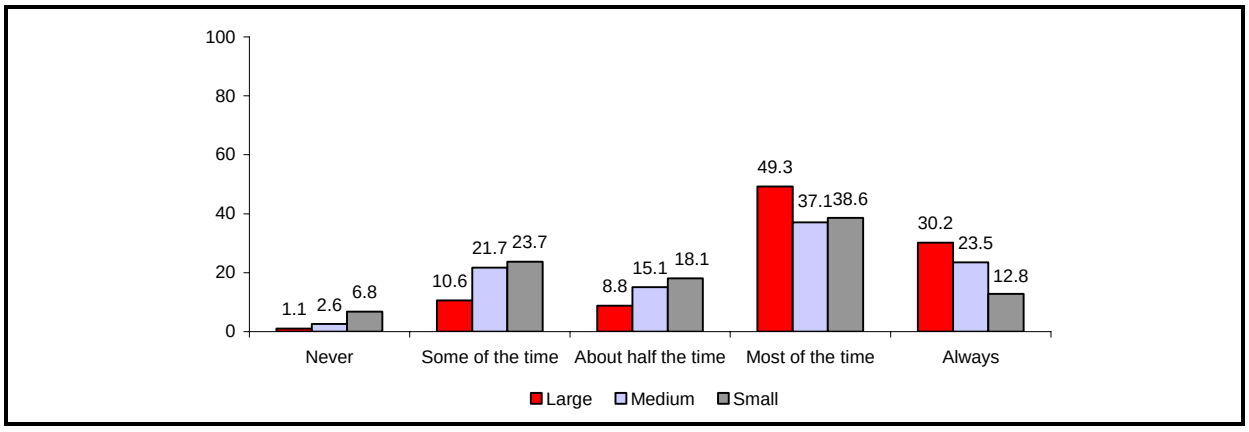
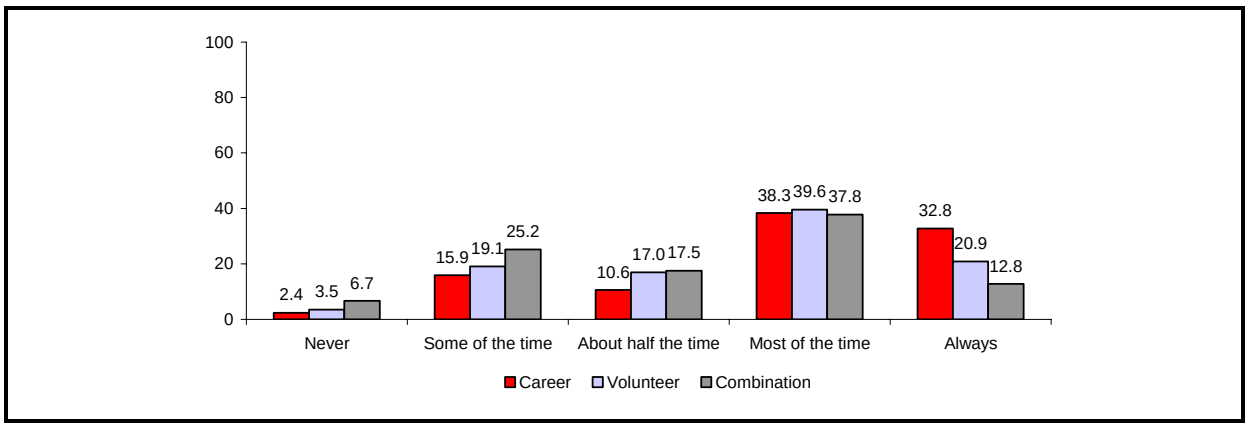



**Exhibit 5-42. About How Often Do You Think Your Firefighters Use Their Seat Belts When Riding in the Emergency Vehicles? (Question 18), by Type of Department (Percent)**




## 5.12 ESTABLISHING INCIDENT COMMAND (Q21)

*Focus group participants identified a variety of safety problems. Among the most common was failure to implement Incident Command.*

NIOSH recommends that fire departments "establish and implement an Incident Command System with written standard operating procedures for all firefighters."[39] In response to the question, "What is the worst safety incident that you have experienced in your career?" focus group participants identified a variety of safety problems. Among the most common was failure to implement Incident Command. Firefighters in four of the focus groups said there is "a lot of freelancing" rather than Incident Command.

According to the Fire Department Survey, however, Incident Command is established by most fire departments on a routine

[39]This is Sentinel Recommendation 1-1. See Exhibit 2-3 for further details.

basis. It is established most routinely by fire departments in the Northeast, in urban and large jurisdictions, by career departments, and by those that have experienced a firefighter fatality.[40]

**Region.** Fire departments in the Northeast are more likely than those in the South, Midwest, or West to establish Incident Command when responding to structure fires. The proportions that use it "most of the time" or "always" are

- Northeast, 91.1%,
- South, 84.1%,
- Midwest, 79.9%, and
- West, 83.0%.

See ***Exhibit 5-43.***

**Jurisdiction Type.** Fire departments in urban jurisdictions are more likely than those in rural jurisdictions to establish Incident Command "most of the time" or "always" (the combined proportions are 96.1% and 81.9%, respectively); 10% of rural fire departments "rarely" or "never" establish Incident Command. See ***Exhibit 5-44.***

**Size of Jurisdiction.** The larger the jurisdiction, the more likely that Incident Command is established by the fire department when responding to a structure fire. The proportions that "always" establish Incident Command are

- large, 87.5%,
- medium, 72.1%, and
- small, 48.5%.

12% of fire departments in small jurisdictions "rarely" or "never" establish Incident Command. See ***Exhibit 5-45.***

**Type of Department.** Career fire departments are more likely than volunteer and combination fire departments to "always" establish Incident Command when they respond to structure fires (the percentages are 79.0%, 58.9%, and 53.5% for career, volunteer, and combination departments, respectively). See ***Exhibit 5-46.***

[40]The nonresponse analysis suggests there may be some nonresponse bias related to this question. Respondents in the nonresponse survey were more likely to have responded "most of the time" and less likely to have responded "always" than respondents in the main survey. See Exhibit B-8a in Appendix B for details.

**Exhibit 5-43. How Often Is Incident Command Established When Responding to Structure Fires? (Question 21), by Region (Percent)**

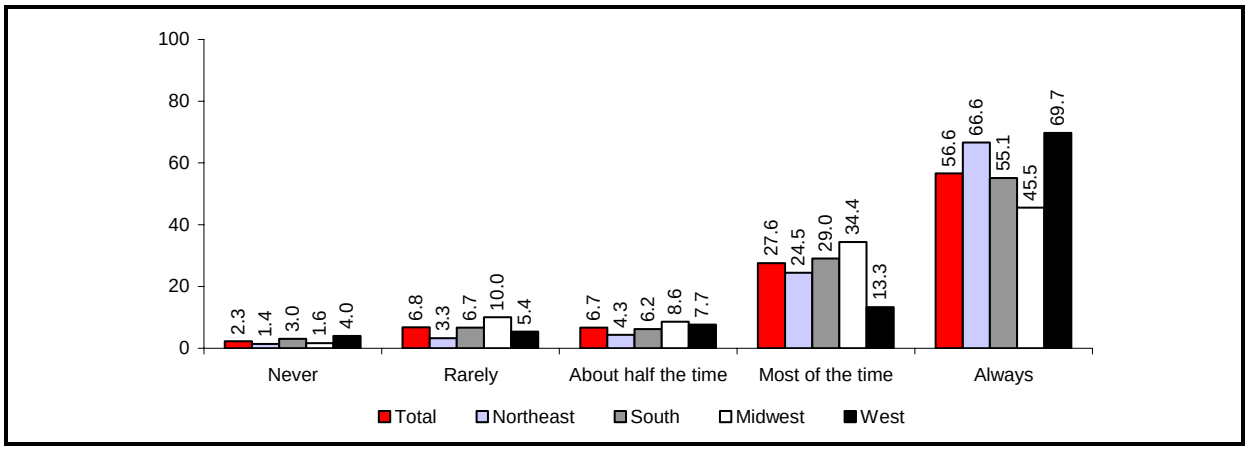



**Exhibit 5-44. How Often Is Incident Command Established When Responding to Structure Fires? (Question 21), by Jurisdiction Type (Percent)**

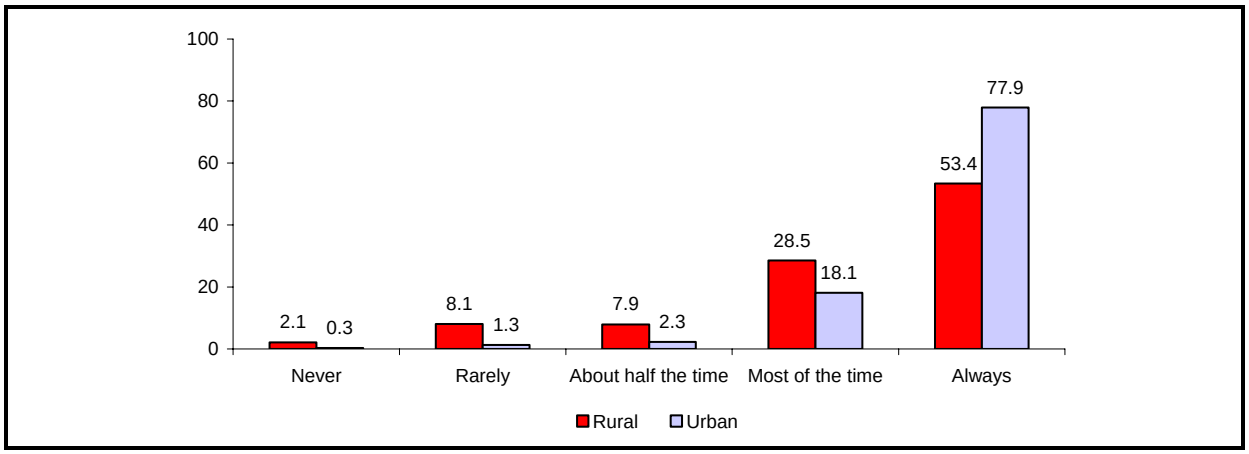
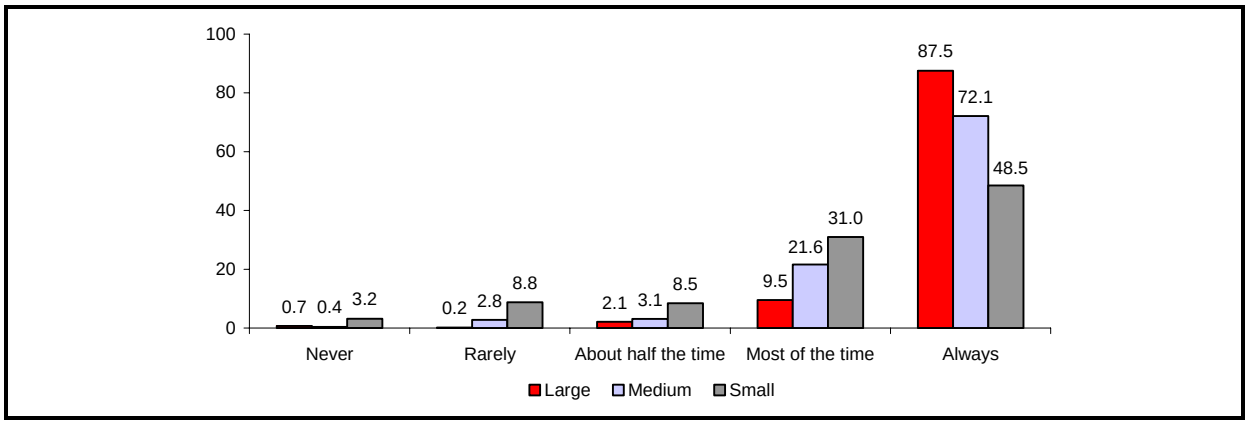



**Exhibit 5-45. How Often Is Incident Command Established When Responding to Structure Fires? (Question 21), by Size of Jurisdiction (Percent)**



*Fire departments that have a prior fatality are more likely to establish Incident Command.*

**Experience with On-Duty Fatality and FFFIPP Investigation.** Fire departments that have a prior fatality (whether investigated or not) are more likely than those that do not to establish Incident Command "most of the time" or "always." The total proportions of fire departments that gave one of these two responses are

- fatality with investigation, 93.8%,
- fatality without investigation, 93.4%, and
- no fatality, 84.1%.

See ***Exhibit 5-47.***

**Exhibit 5-46. How Often Is Incident Command Established When Responding to Structure Fires? (Question 21), by Type of Department (Percent)**

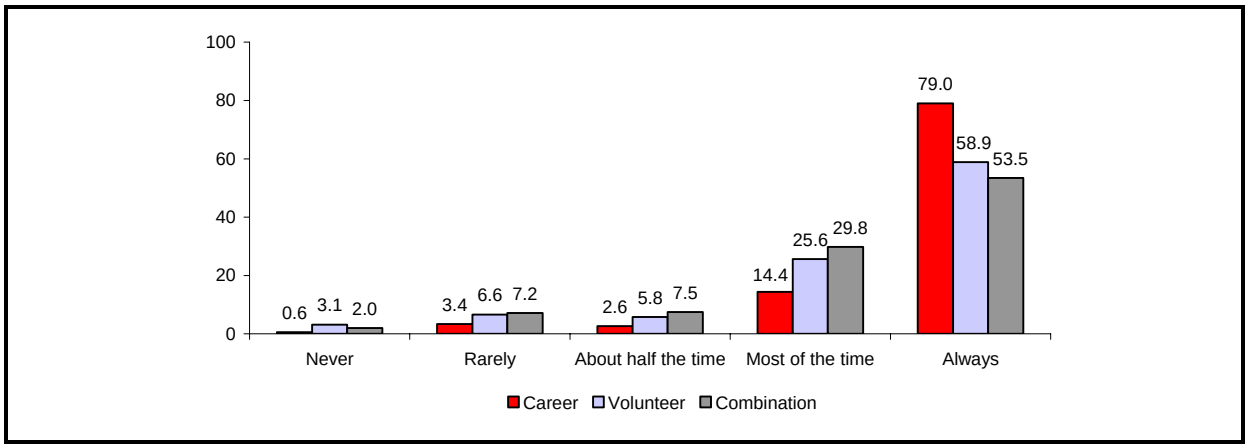
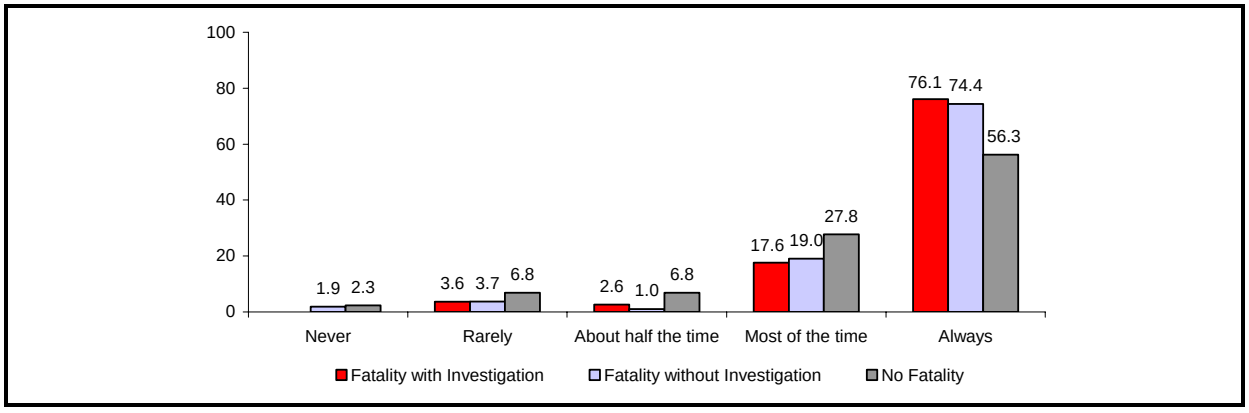



**Exhibit 5-47. How Often Is Incident Command Established When Responding to Structure Fires? (Question 21), by Fatality and FFFIPP Investigation (Percent)**



## 5.13 INCIDENT COMMANDER'S RESPONSIBILITIES (Q23)

NIOSH recommends that fire departments ensure that the Incident Commander (1) "always maintains close accountability for all personnel at the fire scene," (2) "conducts an initial size-up of the incident before initiating firefighting efforts," and (3) "continually evaluates the risk versus gain during operations at an incident."[41] The tasks that fire departments say are part of an Incident Commander's responsibilities are (in order of mention) to

- develop and coordinate the fire attack strategy (93.1% of all departments),
- conduct an initial assessment (Item 2 above; 91.0%),
- monitor location of all firefighters at the scene (Item 1 above; 76.2%),
- ensure that at least four firefighters are on the scene before entering the building (68.6%),
- identify and implement a communication strategy (64.7%),
- develop and initiate a risk management plan (Item 3 above; 52.3%),
- establish a collapse zone around the building (49.1%),
- establish a RIT (48.5%), and
- document all assessments, plans, and events related to the fire (38.8%).

The significant patterns of responses follow.

**Region.** Fire departments in the Northeast and West are more likely than those in the South and Midwest to identify as one of the Incident Commander's responsibilities the establishment of a RIT. The percentages are

- Northeast, 62.8%,
- South, 41.3%,
- Midwest, 40.8%, and
- West, 60.6%.

Fire departments in the Northeast are less likely than those in other regions to identify "monitor location of all firefighters" at

[41]These are Sentinel Recommendations 1-2 and 1-3, respectively. See Exhibit 2-3 for further details.

the scene as one of the Incident Commander's responsibilities. The percentages are

- Northeast, 63.0%,
- South, 82.8%,
- Midwest, 78.3%, and
- West, 77.4%.

See ***Exhibit 5-48***.

**Jurisdiction Type.** Fire departments in urban jurisdictions are more likely than those in rural jurisdictions to include as one of the Incident Commander's responsibilities to

- develop and coordinate the fire attack strategy (95.8% and 92.2%, respectively),
- develop and implement a risk management plan (64.0% and 50.4%),
- establish a collapse zone around the building (58.3% and 48.4%), and
- establish RIT (77.7% and 43.6%).

See ***Exhibit 5-49***.

**Size of Jurisdiction.** The larger the jurisdiction served, the more likely the Incident Commander's responsibilities include

- developing and coordinating the fire attack strategy (99.2%, 94.7%, and 92.1% for large, medium, and small jurisdictions, respectively),
- developing and implementing a risk management plan (77.8%, 61.4%, and 47.2%), and
- establishing RIT (92.2%, 67.3%, and 38.3%).

See ***Exhibit 5-50***.

**Type of Department.** Incident Commanders in career fire departments are reported to be more likely than those in volunteer and combination fire departments to

- develop and initiate a risk management plan (65.4%, 54.4%, and 50.1%, respectively),
- ensure that at least four firefighters are on the scene before entering the building (78.3%, 70.7%, and 66.6%), and
- establish RIT (79.9%, 51.8%, and 44.2%).

See ***Exhibit 5-51***.

**Exhibit 5-48. When Incident Command Is Established for a Structure Fire, What Are the Incident Commander's Responsibilities? (Question 23), by Region (Percent)**

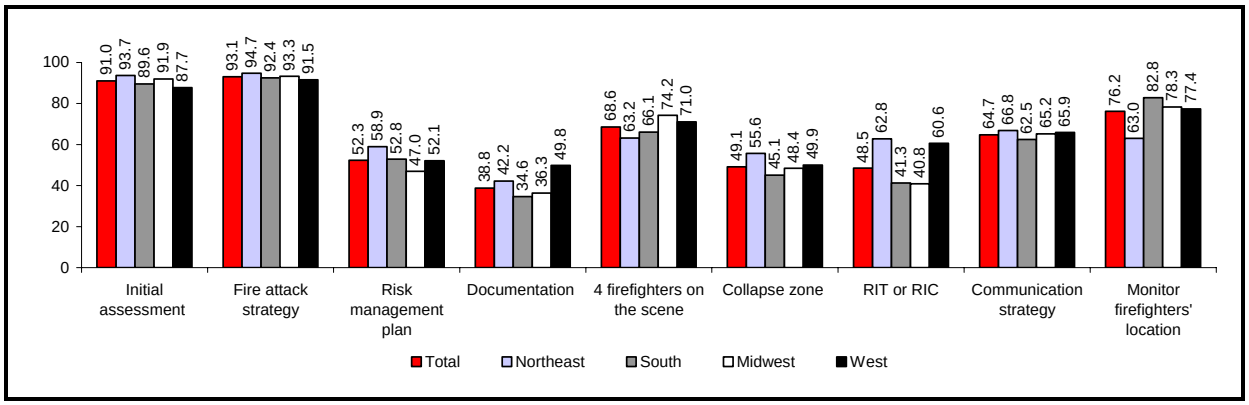



**Exhibit 5-49. When Incident Command is Established for a Structure Fire, What Are the Incident Commander's Responsibilities? (Question 23), by Jurisdiction Type (Percent)**

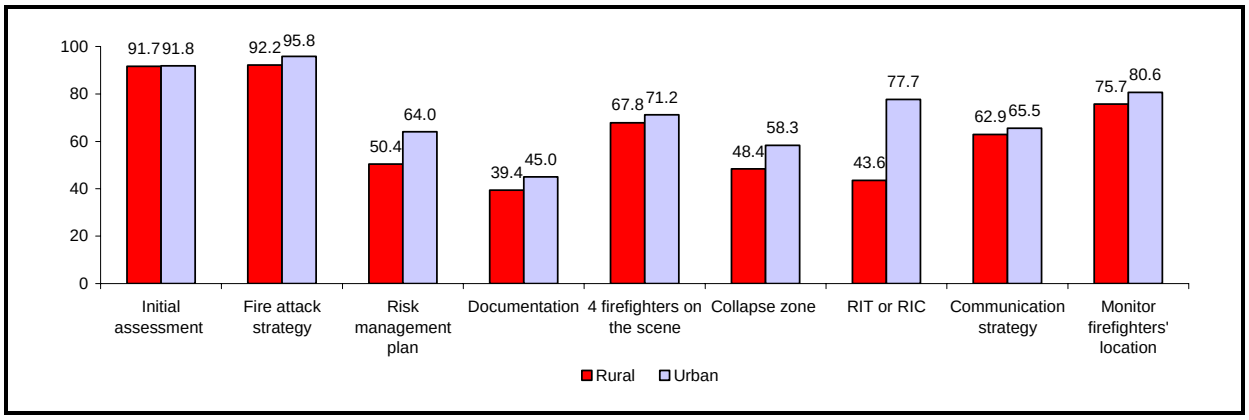



**Exhibit 5-50. When Incident Command is Established for a Structure Fire, What Are the Incident Commander's Responsibilities? (Question 23) by Size of Jurisdiction (Percent)**

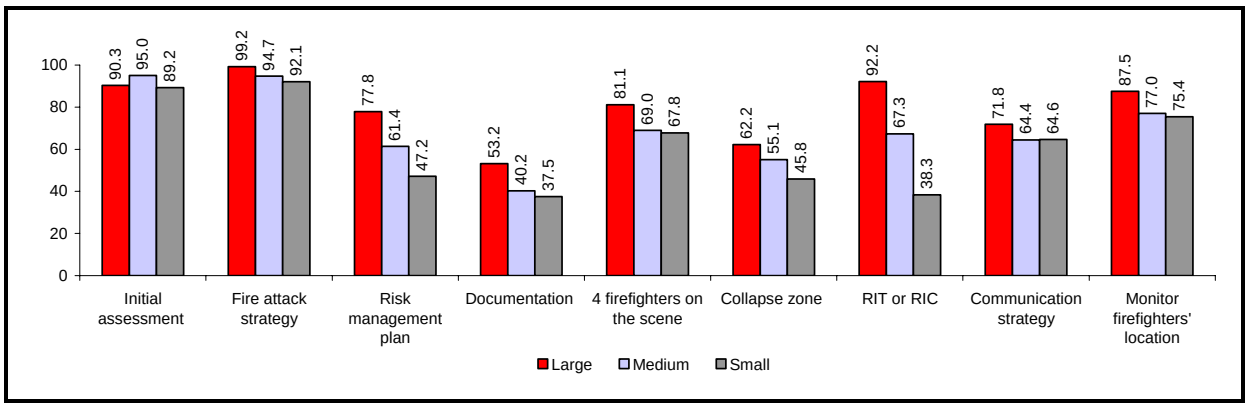
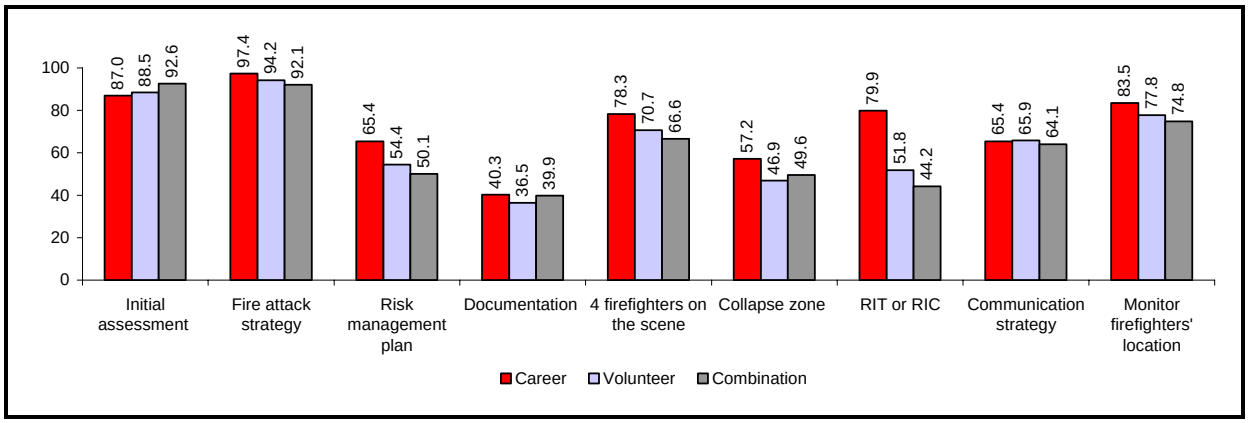


**Exhibit 5-51. When Incident Command is Established for a Structure Fire, What Are the Incident Commander's Responsibilities? (Question 23), by Type of Department (Percent)**




**Experience with On-Duty Fatality and FFFIPP Investigation.** Regarding the Incident Commander's responsibilities, there is no statistically significant pattern of responses based on prior experience with a firefighter fatality or FFFIPP investigation.

## 5.14 ASSIGNING ISO (Q24)

NIOSH recommends that fire departments ensure that the Incident Commander appoints "a separate Incident Safety Officer, independent from the Incident Commander."[42]

Incident Commanders in about half of all fire departments assign an ISO at least most of the time.[43] The significant patterns of responses follow.

*Almost a fifth of the fire departments in the Midwest never assign ISOs.*

**Region.** Incident Commanders in fire departments in the Northeast are more likely than those in the other regions to "always" assign an ISO. The percentages are

- Northeast, 31.9%,
- South, 21.1%,
- Midwest, 17.0%, and
- West, 21.4%.

[42]This is Sentinel Recommendation 1-4. See Exhibit 2-3 for further details.

[43]The nonresponse analysis suggests there may be some nonresponse bias related to this question. Respondents in the nonresponse survey were more likely to have responded "always" and less likely to have responded "some of the time" and "about half the time" than respondents in the main survey. See Exhibit B-8a in Appendix B for details.

Almost a fifth of the fire departments in the Midwest never assign ISOs. See ***Exhibit 5-52.***

**Jurisdiction Type.** Incident Commanders in urban fire departments are more likely than those in rural jurisdictions to assign an ISO when they respond to structure fires: 62.9% of urban fire departments assign an ISO "most of the time" or "always," compared with only 49.7% of rural departments; 14.2% of rural fire departments never assign an ISO. See ***Exhibit 5-53.***

**Size of Jurisdiction.** There is some association between the size of the jurisdiction served and the likelihood that an ISO is assigned when responding to a structure fire, but the association is not uniform across all response categories. However, the larger the jurisdiction served, the less likely it is that an ISO is "never" assigned. The percentages are

- large, 3.3%,
- medium, 7.8%, and
- small, 16.2%.

Also, the larger the jurisdiction served, the more likely it is that an ISO is "always" assigned. The percentages are

- large, 29.8%,
- medium, 24.1%, and
- small, 21.2%.

A third of the departments in large jurisdictions (33.1%) assign ISOs only "some of the time." See ***Exhibit 5-54.***

**Experience with On-Duty Fatality and FFFIPP Investigation.** Regarding how often an ISO is assigned, there is no statistically significant pattern of responses based on prior experience with a firefighter fatality or FFFIPP investigation.

There is no significant pattern of responses based on type of department.

**Exhibit 5-52. About How Often Does an Incident Commander Assign an Incident Safety Officer When Responding to Structure Fires? (Question 24), by Region (Percent)**

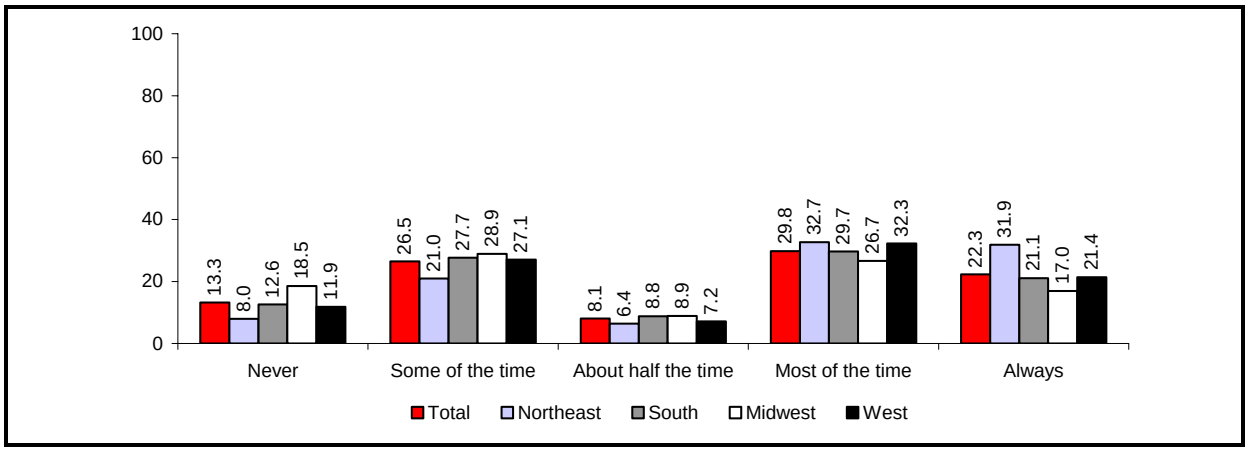



**Exhibit 5-53. About How Often Does an Incident Commander Assign an Incident Safety Officer When Responding to Structure Fires? (Question 24), by Jurisdiction Type (Percent)**

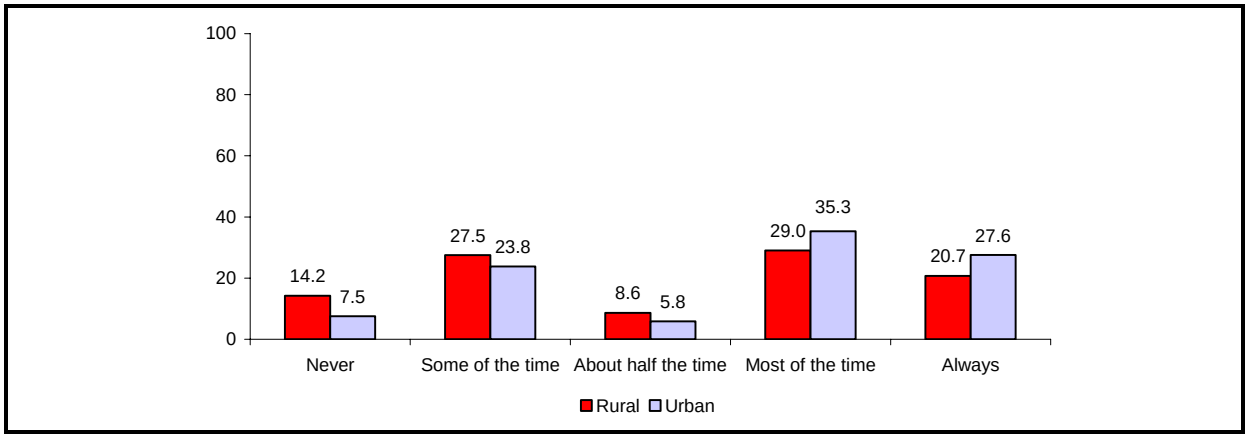
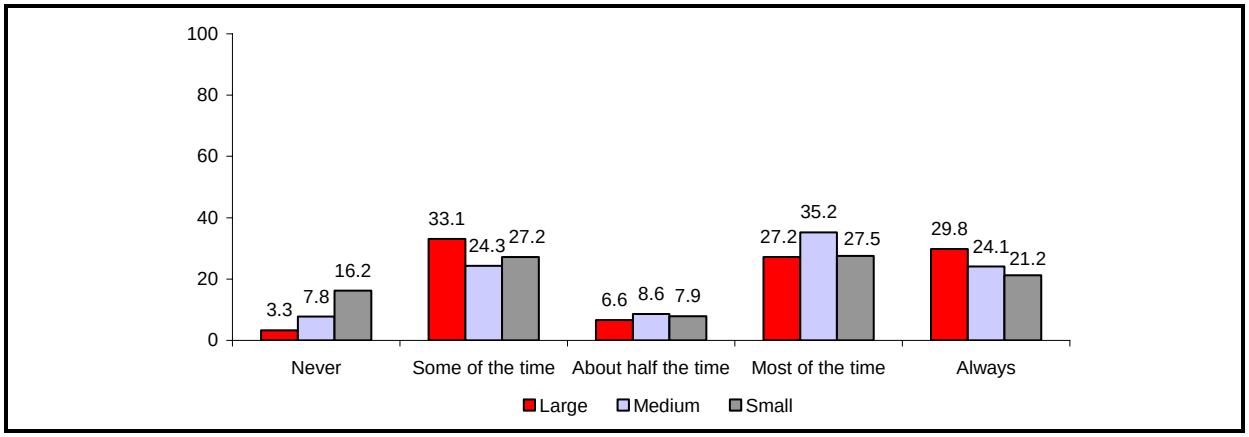



**Exhibit 5-54. About How Often Does an Incident Commander Assign an Incident Safety Officer When Responding to Structure Fires? (Question 24), by Size of Jurisdiction (Percent)**



## 5.15 USE OF RITS (Q26)

NIOSH recommends that fire departments "ensure that a Rapid Intervention Team is established and in position immediately upon arrival" at a fire scene."[44] Firefighters in focus groups said that among their main safety concern was the failure to routinely use RITs. Firefighters explained that, with not enough personnel on the scene, they sometimes need to enter structures without the RITs in place.

The use of RITs is common in large jurisdictions but much less so in small jurisdictions. Across all fire departments, about half say they have RITs available at least most of the time.

The significant patterns of responses follow.

*Two fifths of fire departments in the Midwest (39.1%) never have RITs available at structure fires.*

**Region.** Fire departments in the Northeast and West are more likely to have RIT available than other departments. The proportions of departments that have RITs available "most of the time" or "always" are

- Northeast, 61.5%,
- South, 36.8%,
- Midwest, 29.8%, and
- West, 53.7%.

Two fifths of fire departments in the Midwest (39.1%) never have RITs available at structure fires. See ***Exhibit 5-55.***

**Jurisdiction Type.** RITs are available more often for fire departments in urban jurisdictions than for fire departments in rural jurisdictions; 71.1% of urban fire departments have RITs available "most of the time" or "always," compared with only 37.6% of rural fire departments. See ***Exhibit 5-56.***

**Size of Jurisdiction.** The larger the jurisdiction served, the more likely the fire department will have RITs available at structure fires. The combined proportions of fire departments that have RITs available "most of the time" or "always" are

- large, 88.3%,
- medium, 59.0%, and
- small, 33.1%.

See ***Exhibit 5-57.***

[44]This is Sentinel Recommendation 5-1. See Exhibit 2-3 for further details.

**Type of Department.** Career fire departments are more likely than volunteer and combination fire departments to "always" have RITs available at structure fires (45.3%, 21.0% and 17.2%, respectively). See ***Exhibit 5-58.***

*Fire departments that have a prior fatality establish RIT more often.*

**Experience with On-Duty Fatality and FFFIPP Investigation.** Fire departments that have a prior fatality establish RIT more often than departments that have not experienced a firefighter fatality. The proportions of departments that said "most of the time" or "always" are

- fatality with investigation, 64.4%,
- fatality without investigation, 59.0%, and
- no fatality, 42.1%.

See ***Exhibit 5-59.***

**Exhibit 5-55. How Often Are RITs Available at Structure Fires? (Question 26), by Region (Percent)**

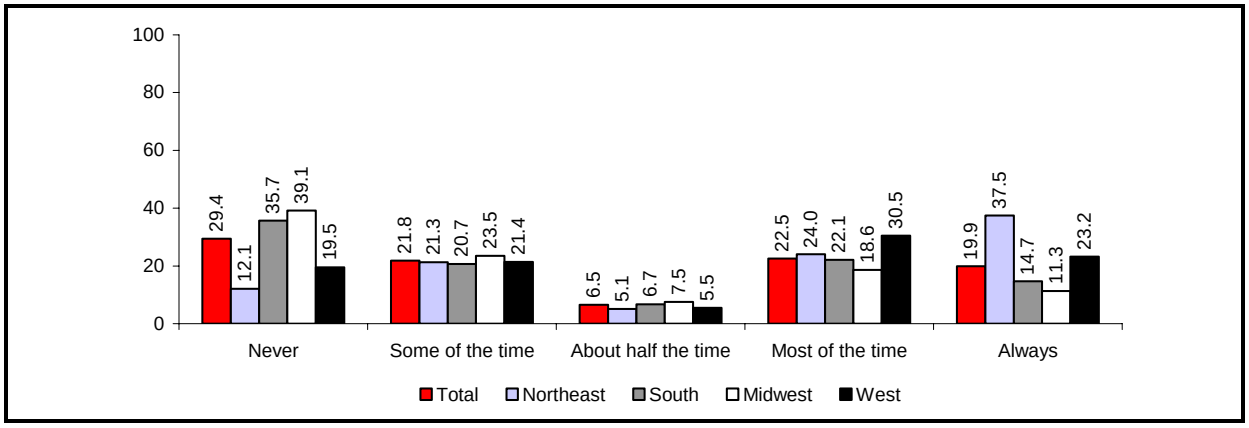



**Exhibit 5-56. How Often Are RITs Available at Structure Fires? (Question 26), by Jurisdiction Type (Percent)**

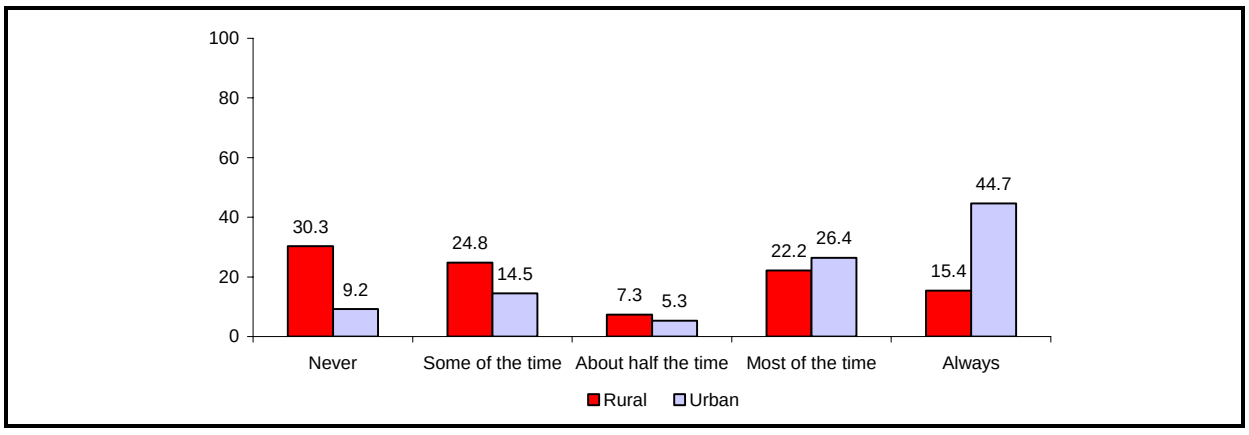


**Exhibit 5-57. How Often Are RITs Available at Structure Fires? (Question 26), by Size of Jurisdiction (Percent)**

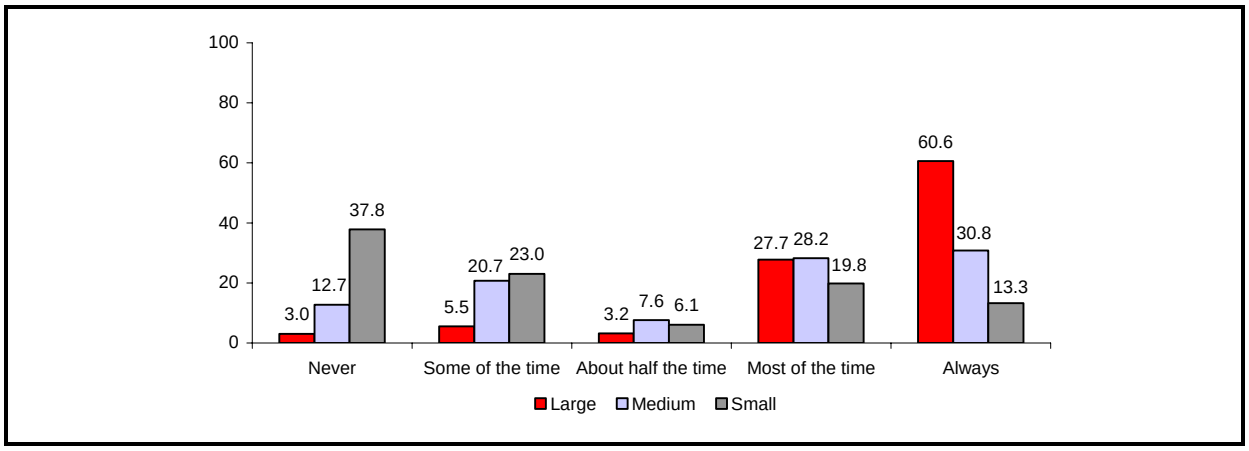



**Exhibit 5-58. How Often are RITs Available at Structure Fires? (Question 26), by Type of Department (Percent)**

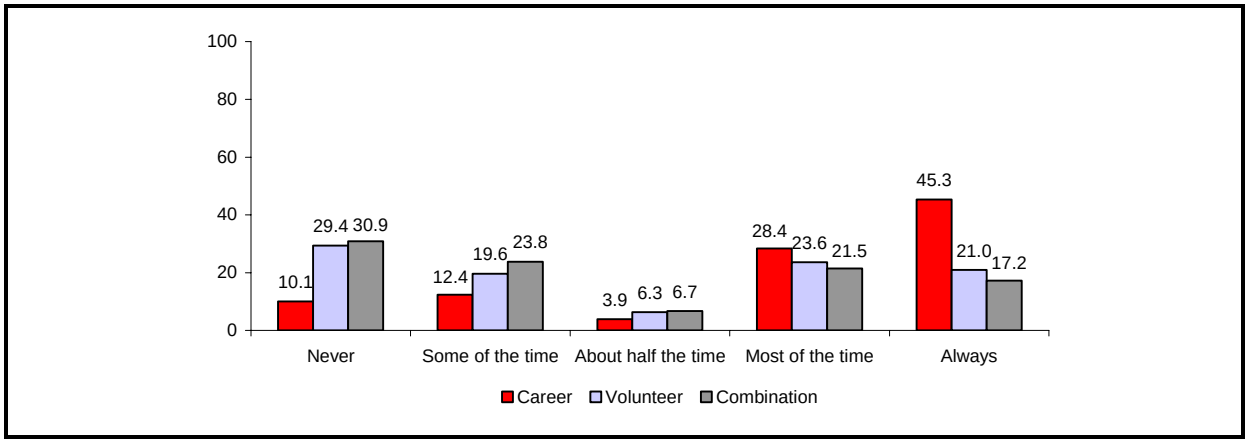
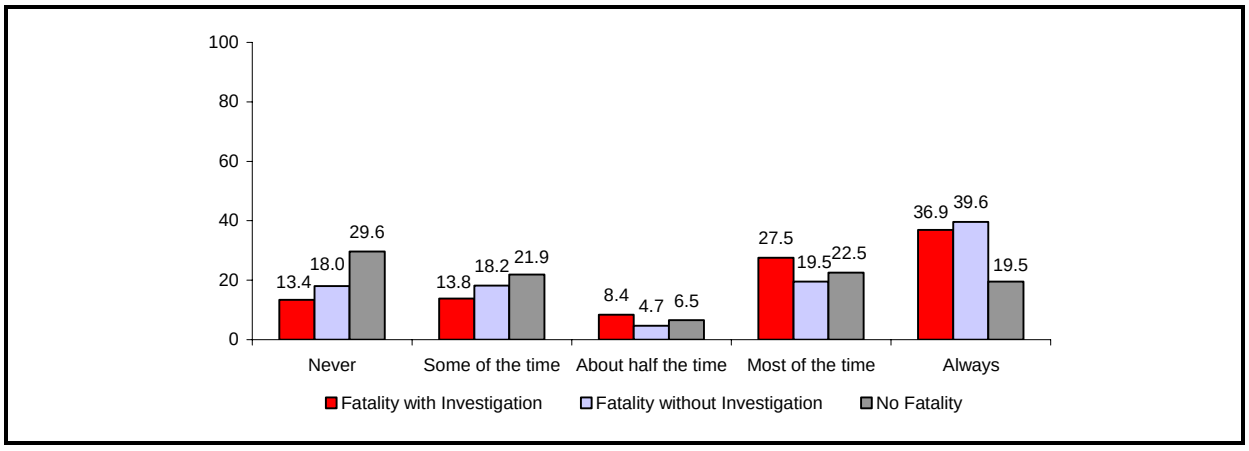



**Exhibit 5-59. How Often Are RITs Available at Structure Fires? (Question 26), by Fatality and FFFIPP Investigation (Percent)**



## 5.16 RIT SITUATIONS (Q27)

About a third of all fire departments appear to be sometimes unable to establish RITs because there are not enough firefighters at the scene of the fire. About a quarter establish RITs whenever firefighters enter a burning building.

The significant patterns of responses follow.

**Region.** Fire departments in the Northeast are less likely than those in other regions to say they establish RITs "when there are enough firefighters on and at the scene of the fire." The percentages are

- Northeast, 23.4%,
- South, 36.0%,
- Midwest, 32.8%, and
- West, 36.7%.

See ***Exhibit 5-60.***

**Jurisdiction Type.** Fire departments in urban jurisdictions are less likely than those in rural jurisdictions to say RITs are established "when there are enough firefighters at the scene of the fire" (28.0% and 34.9%, respectively). See ***Exhibit 5-61.***

**Size of Jurisdiction.** The larger the jurisdiction served, the less likely it is the department will say it establishes RITs "when there are enough firefighters at the scene of the fire." The percentages are

- large, 20.0%,
- medium, 35.6%, and
- small, 31.3%.

See ***Exhibit 5-62.***

There is no significant pattern of responses based on type of department or prior experience with a firefighter fatality or FFFIPP investigation.

**Exhibit 5-60. In What Situations Are RITs Established? (Question 27), by Region (Percent)**

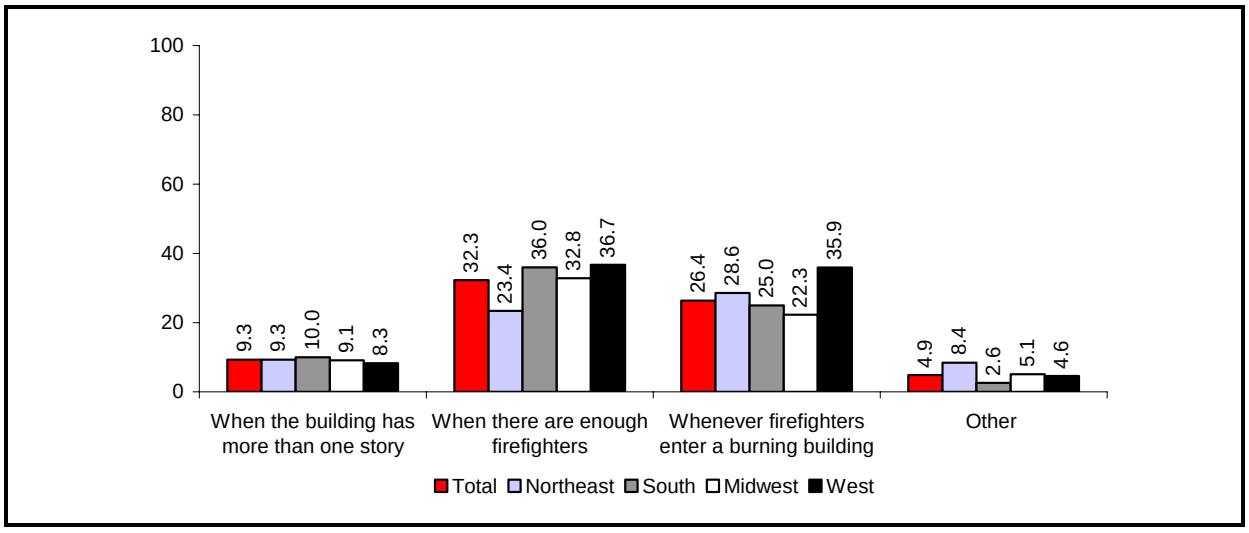



**Exhibit 5-61. In What Situations Are RITs Established? (Question 27), by Jurisdiction Type (Percent)**

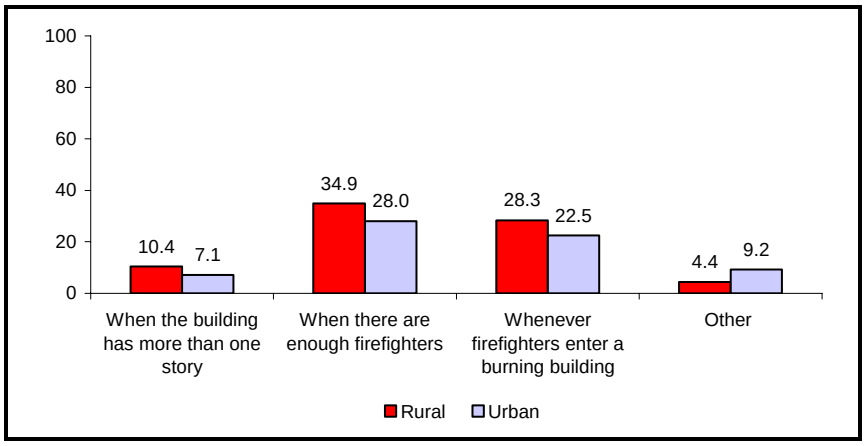
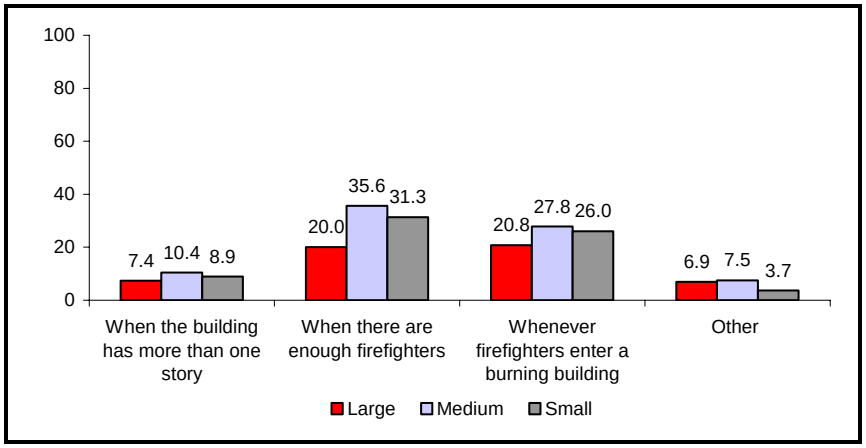



**Exhibit 5-62. In What Situations Are RITs Established? (Question 27), by Size of Jurisdiction (Percent)**



## 5.17 AVAILABILITY OF PASS DEVICES FOR ALL FIREFIGHTERS (Q29)

Only about three quarters of all fire departments say they have enough PASS devices for all of their firefighters to use when fighting structure fires. The shortage of PASS devices is largest among fire departments in small and rural jurisdictions, as well as those in the South.

The significant patterns of responses follow.

**Region.** Fire departments in the Northeast and West are more likely than those in the South and Midwest to have PASS devices for all of their firefighters. The proportions are

- Northeast, 86.7%,
- South, 72.7%,
- Midwest, 78.1%, and
- West, 82.8%.

See ***Exhibit 5-63.***

*A fifth of rural fire departments say they do not have enough PASS devices on hand for their firefighters.*

**Jurisdiction Type.** Fire departments in urban jurisdictions are more likely than those in rural jurisdictions to have enough PASS devices for all firefighters to use when fighting structure fires (98.3% and 78.7%, respectively). A fifth of rural fire departments say they do not have enough PASS devices on hand for their firefighters. See ***Exhibit 5-64.***

**Size of Jurisdiction.** The larger the size of the jurisdiction served, the more likely it is the fire department will have enough PASS devices for all their firefighters to use when they fight structure fires. The percentages are

- large, 98.6%,
- medium, 92.2%, and
- small, 72.0%.

See ***Exhibit 5-65.***

**Type of Department.** Career fire departments are more likely than volunteer and combination fire departments to have PASS devices for all firefighters to use when they fight structure fires (97.5%, as opposed to 77.0% and 78.2%, respectively). See ***Exhibit 5-66.***

*Fire departments that have had a FFFIPP investigation are more likely to have enough PASS devices for all their firefighters.*

**Experience with On-Duty Fatality and FFFIPP Investigation.** Fire departments that have had a FFFIPP investigation are more likely than other departments to have enough PASS devices for all their firefighters to use in fighting structure fires. The percentages are

- fatality with investigation, 93.4%,
- fatality without investigation, 81.3%, and
- no fatality, 78.6%.

See ***Exhibit 5-67.***

**Exhibit 5-63. Does Your Fire Department Have Enough PASS Devices for All Firefighters for Use When Fighting Structure Fires? (Question 29), by Region (Percent)**

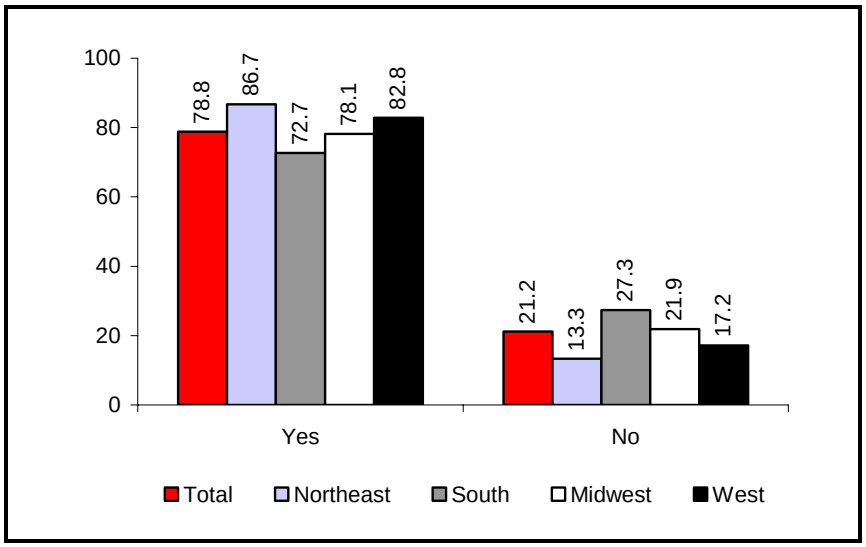



**Exhibit 5-64. Does Your Fire Department Have Enough PASS Devices for All Firefighters for Use When Fighting Structure Fires? (Question 29), by Jurisdiction Type (Percent)**

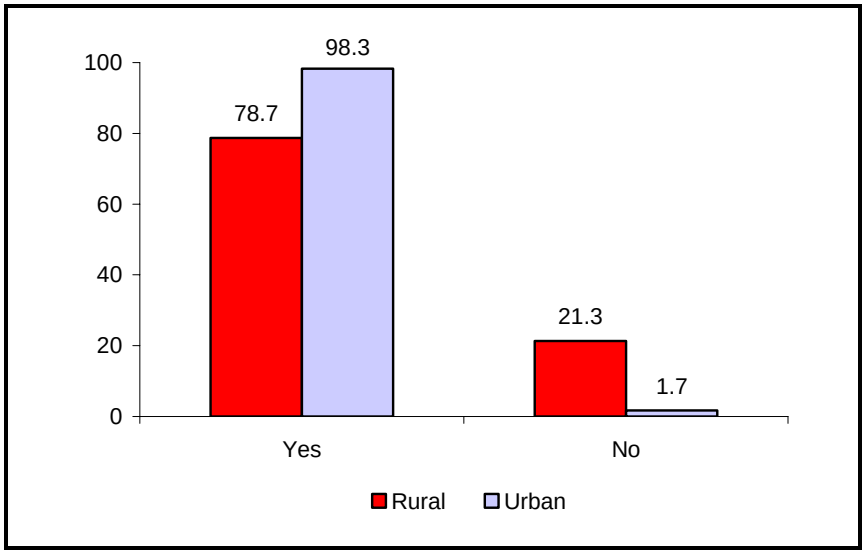


**Exhibit 5-65. Does Your Fire Department Have Enough PASS Devices for All Firefighters for Use When Fighting Structure Fires? (Question 29), by Size of Jurisdiction (Percent)**

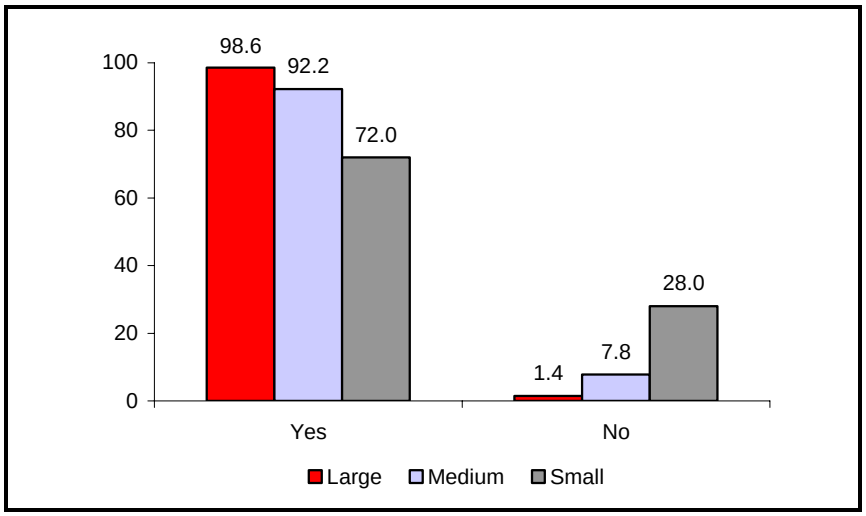



**Exhibit 5-66. Does Your Fire Department Have Enough PASS Devices for All Firefighters for Use When Fighting Structure Fires? (Question 29), by Type of Department (Percent)**

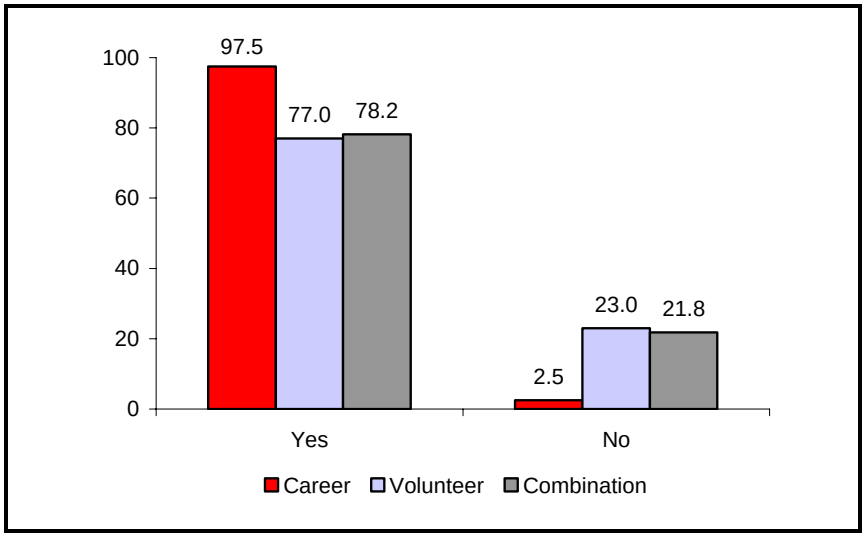
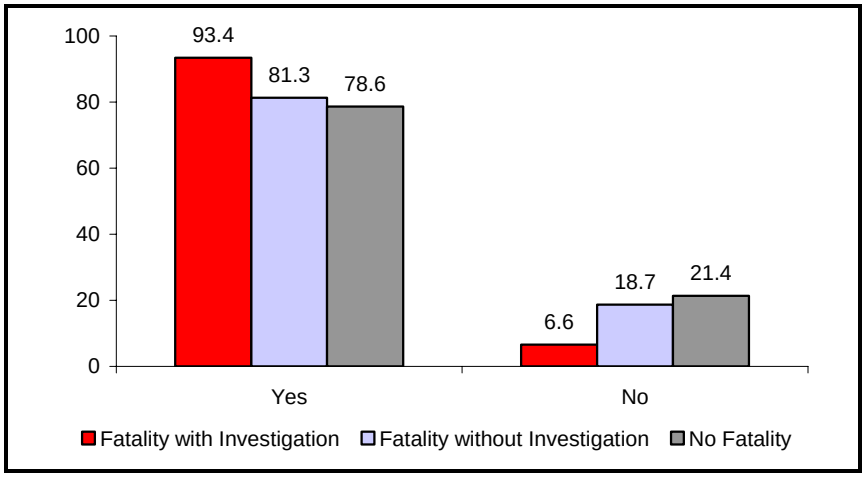



**Exhibit 5-67. Does Your Fire Department Have Enough PASS Devices for All Firefighters for Use When Fighting Structure Fires? (Question 29), by Fatality and FFFIPP Investigation (Percent)**



## 5.18 USE OF PASS DEVICES (Q30)

NIOSH recommends that fire departments "strictly enforce the wearing and use of PASS devices when firefighters are involved in fire fighting, rescue, and other hazardous duties."[45] Almost all fire departments report that their firefighters use their PASS devices at least most of the time. The significant patterns of responses follow.

**Region.** Fire departments in the Northeast are more likely than those in other regions to say their firefighters "always" wear their PASS devices when fighting structure fires. The percentages are

- Northeast, 89.6%,
- South, 70.8%,
- Midwest, 68.0%, and
- West, 78.7%.

Firefighters in about 10% of fire departments in the South and Midwest never use PASS devices. See ***Exhibit 5-68.***

*Firefighters in urban departments are more likely to "always" wear their PASS devices.*

**Jurisdiction Type.** Firefighters in urban fire departments are more likely than those in rural jurisdictions to "always" wear their PASS devices (96.0% and 73.2%, respectively). See ***Exhibit 5-69.***

**Size of Jurisdiction.** The larger the size of the jurisdiction served, the more likely firefighters will "always" wear their PASS devices when fighting structure fires. The percentages are

- large, 97.8%,
- medium, 87.0%, and
- small, 68.9%.

See ***Exhibit 5-70.***

**Type of Department.** Firefighters in career fire departments are more likely than those in volunteer and combination fire departments to "always" wear their PASS devices when fighting structure fires (91.8%, 75.9%, and 73.4%, respectively). See ***Exhibit 5-71.***

[45]This is Sentinel Recommendation 5-2. See Exhibit 2-3 for further details.

*Firefighters in departments that have had a FFFIPP investigation use their PASS devices more frequently.*

**Experience with On-Duty Fatality and FFFIPP Investigation.** Firefighters in fire departments that have had a FFFIPP investigation use their PASS devices more frequently than other departments. The proportions of departments that responded "most of the time" or "always" are

- fatality with investigation, 95.6%,
- fatality without investigation, 87.0%, and
- no fatality, 87.9%.

See ***Exhibit 5-72.***

**Exhibit 5-68. About How Often Do You Think Your Firefighters Wear Their PASS Devices When Fighting Structure Fires? (Question 30), by Region (Percent)**

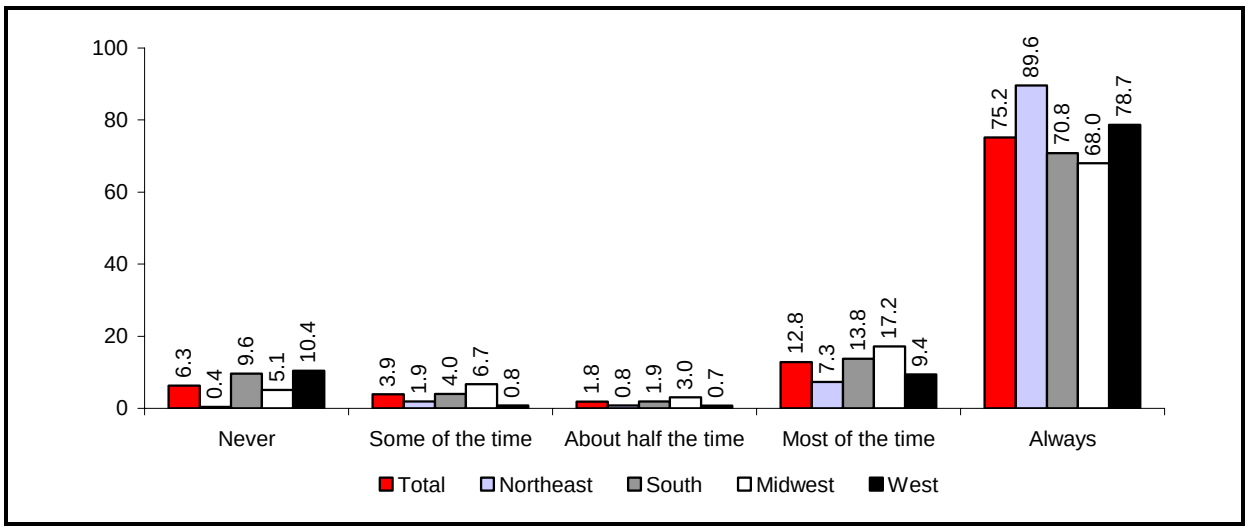



**Exhibit 5-69. About How Often Do You Think Your Firefighters Wear Their PASS Devices When Fighting Structure Fires? (Question 30), by Jurisdiction Type (Percent)**

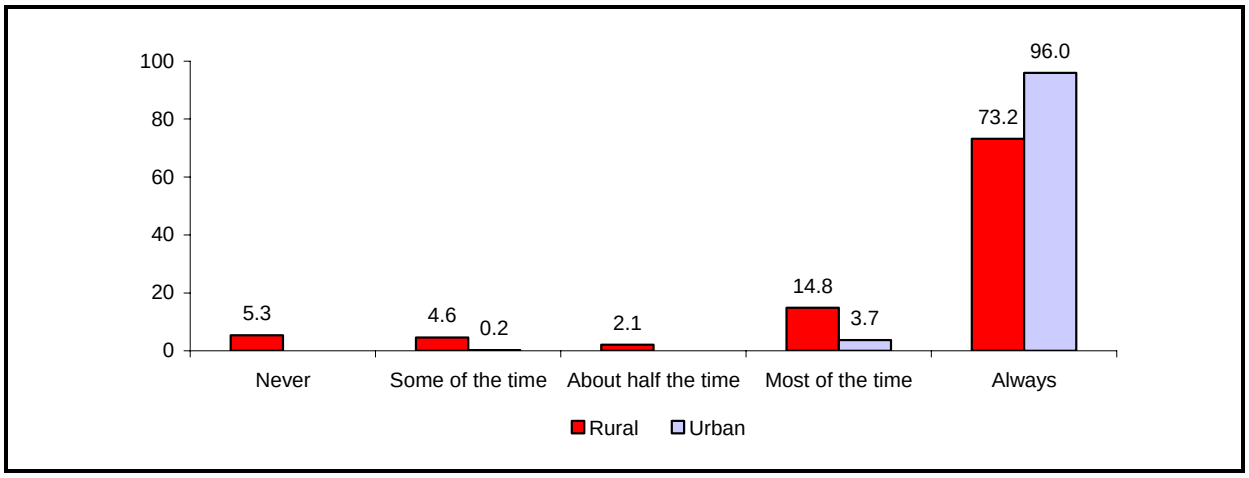


**Exhibit 5-70. About How Often Do You Think Your Firefighters Wear Their PASS Devices When Fighting Structure Fires? (Question 30), by Size of Jurisdiction (Percent)**

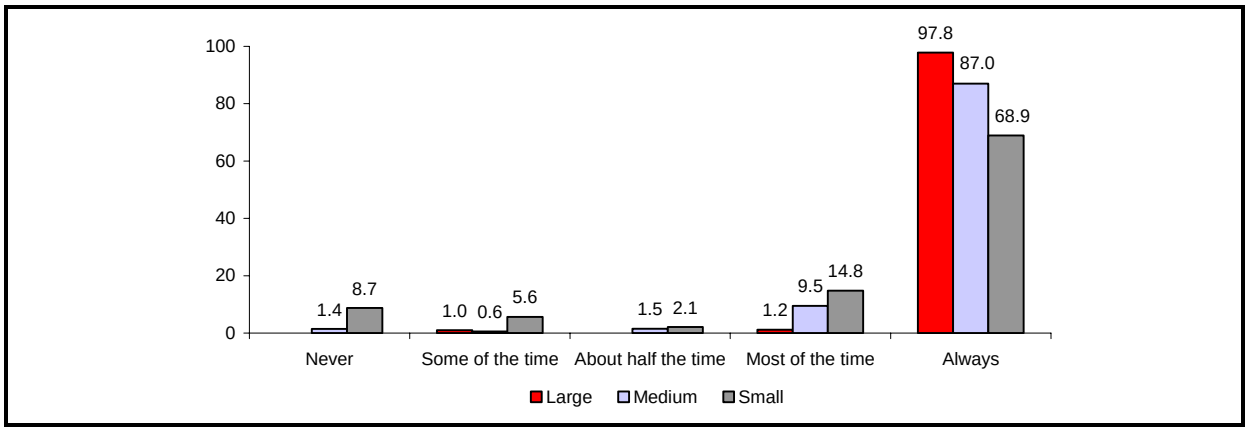



**Exhibit 5-71. About How Often Do You Think Your Firefighters Wear Their PASS Devices When Fighting Structure Fires? (Question 30), by Type of Department (Percent)**

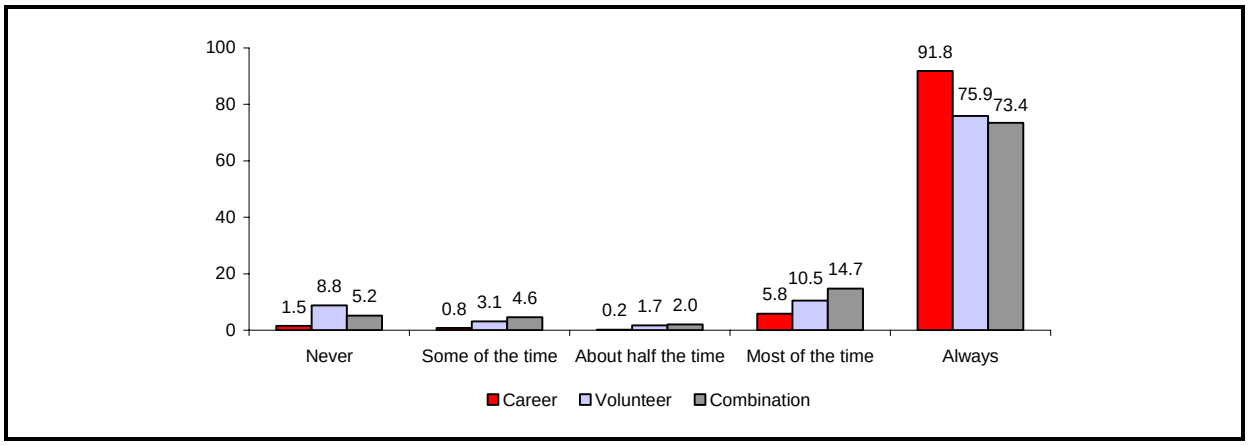
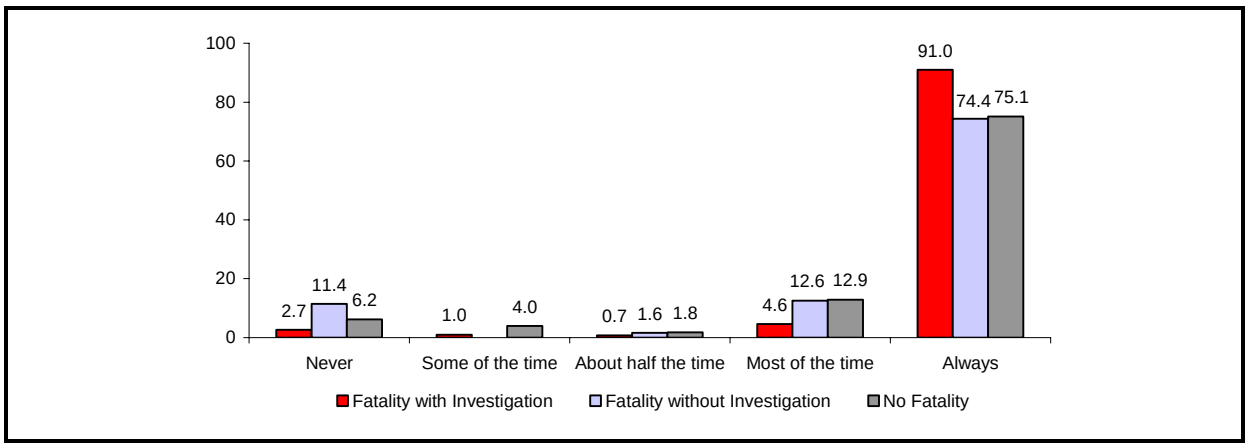



**Exhibit 5-72. About How Often Do You Think Your Firefighters Wear Their PASS Devices When Fighting Structure Fires? (Question 30), by Fatality and FFFIPP Investigation (Percent)**



## 5.19 AVAILABILITY OF SCBA, PERSONALIZED FACEPIECES, AND CBRN SCBA (Q32, 33, 37)

Almost all fire departments report that they have SCBA for their firefighters to use when they combat structure fires. About half of all fire departments, however, say that their firefighters have to share facepieces for SCBA. Firefighters who are least likely to have to share facepieces are in jurisdictions that are large, urban, or located in the West or Northeast, and are those employed in career fire departments.

Most fire departments do not yet have CBRN SCBA available or on order. Departments that are more likely to have CBRNs are from larger and urban jurisdictions.

The significant patterns of responses are as follows.

**Region.** Regarding whether departments have SCBA for their firefighters to use when they combat structure fires, there is no significant pattern of responses based on region.

Firefighters in fire departments in the Northeast and West are less likely than those in the South and Midwest to have to share facepieces for SCBA. The percentages are

- Northeast, 43.9%,
- South, 56.8%,
- Midwest, 51.3%, and
- West, 36.5%.

Regarding whether departments have CBRN SCBA for their firefighters, there is no significant pattern of responses based on region. See ***Exhibit 5-73.***

**Jurisdiction Type.** Regarding the availability of SCBA for firefighters, there is no significant pattern of responses based on type of jurisdiction.

Firefighters in urban fire departments are less likely than those in rural jurisdictions to have to share facepieces for their SCBA (27.4% and 52.5%, respectively, report having to share facepieces). Over half of rural fire departments say their firefighters have to share facepieces.

*Urban fire departments are more likely to have CBRN SCBA.*

Urban fire departments are also more likely than those in rural jurisdictions to have CBRN SCBA available for their firefighters (34.5% and 15.0%, respectively). See ***Exhibit 5-74.***

**Size of Jurisdiction.** Regarding the availability of SCBA for firefighters, there is no significant pattern of responses based on size of jurisdiction.

The larger the size of the jurisdiction served, the less likely it is that firefighters have to share facepieces for SCBA. The percentages are

- large, 10.4%,
- medium, 37.4%, and
- small, 56.5%.

Although few firefighters in large jurisdictions have to share, most firefighters in small jurisdictions still do share facepieces.

The size of jurisdiction is also associated with the availability of CBRN SCBA. The larger the size of the jurisdiction served, the more likely the fire department will have CBRN SCBA available for their firefighters to use. The percentages are

- large, 47.1%,
- medium, 27.1%, and
- small, 12.2.

See ***Exhibit 5-75.***

**Type of Department.** Regarding whether departments have SCBA for their firefighters to use when they combat structure fires, there is no significant pattern of responses based on type of department.

Firefighters in career fire departments are much less likely than those in volunteer or combination fire departments to have to share facepieces for their SCBA (the percentages are 8.4%, 50.6%, and 52.4%, respectively).

Career fire departments are also more likely to have CBRN SCBA than volunteer or combination fire departments (43.7%, 20.1%, and 14.0%, respectively). See ***Exhibit 5-76.***

**Experience with On-Duty Fatality and FFFIPP Investigation.** Regarding the availability of SCBA for firefighters, there is no statistically significant pattern of

responses based on prior experience with a firefighter fatality or FFFIPP investigation.

*Firefighters in departments that have had a FFFIPP investigation are less likely to have to share facepieces.*

Firefighters in fire departments that have had a FFFIPP investigation are significantly less likely than those in other fire departments to have to share facepieces for their SCBA. The proportions are

- fatality with investigation, 34.5%,
- fatality without investigation, 52.8%, and
- no fatality, 49.8%.

Firefighters in fire departments that have both a prior fatality and a FFFIPP investigation are more likely than those without a prior fatality to have CBRN SCBA. The proportions of fire departments that have at least one CBRN are

- fatality with investigation, 35.9%,
- fatality without investigation, 24.4%, and
- no fatality, 17.3%

See ***Exhibit 5-77.***

**Exhibit 5-73. Do Your Firefighters Ever Have to Share Facepieces for SCBA? (Question 33), by Region (Percent)**

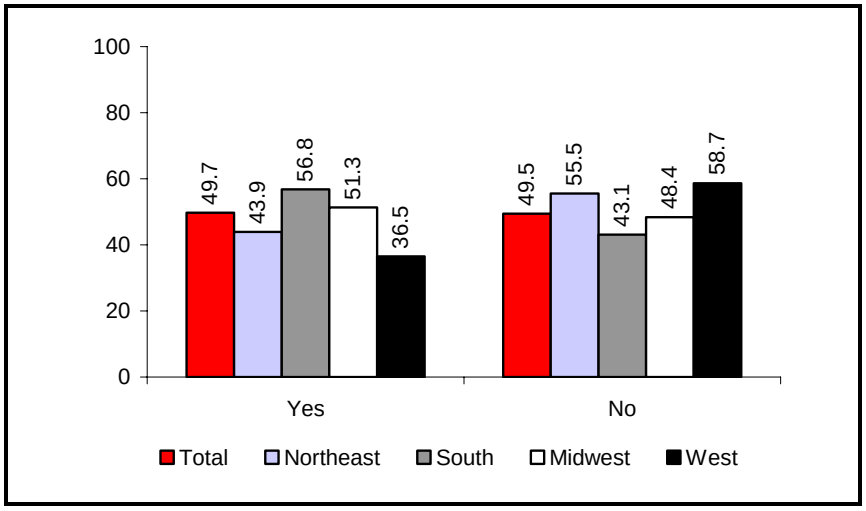


**Exhibit 5-74. Do Your Firefighters Ever Have to Share Facepieces for SCBAs? (Question 33), by Jurisdiction Type (Percent)**

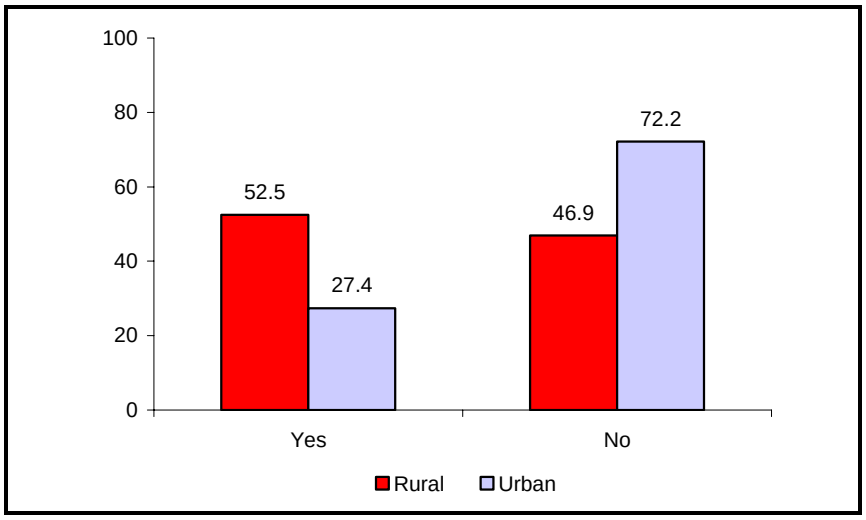



**Exhibit 5-75. Do Your Firefighters Ever Have to Share Facepieces for SCBAs? (Question 33), by Size of Jurisdiction (Percent)**

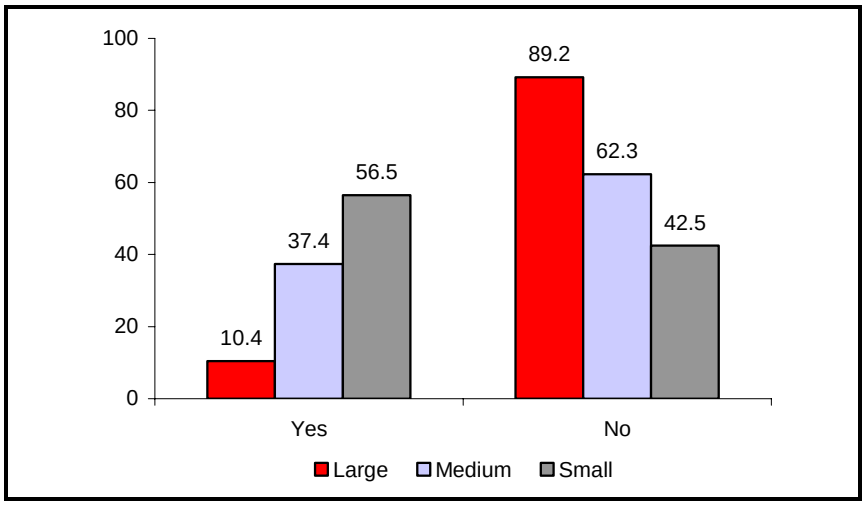



**Exhibit 5-76. Do Your Firefighters Ever Have to Share Facepieces for SCBAs? (Question 33), by Type of Department (Percent)**

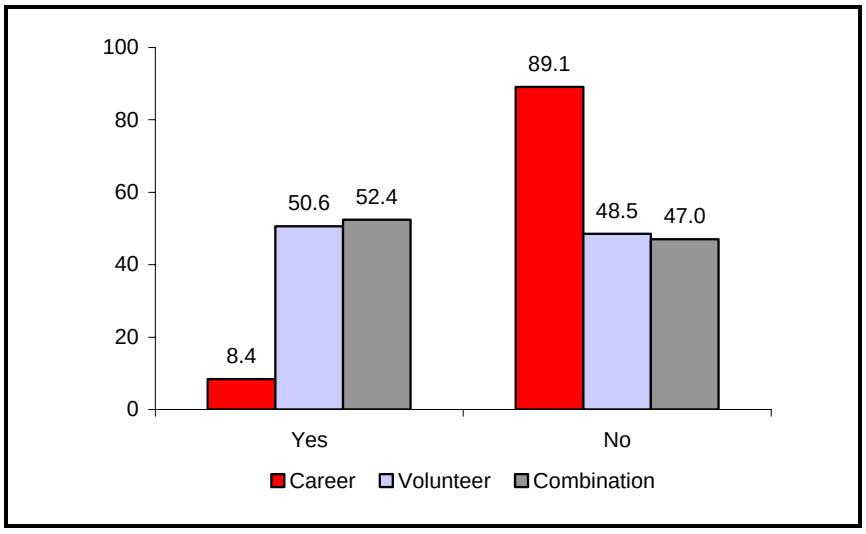
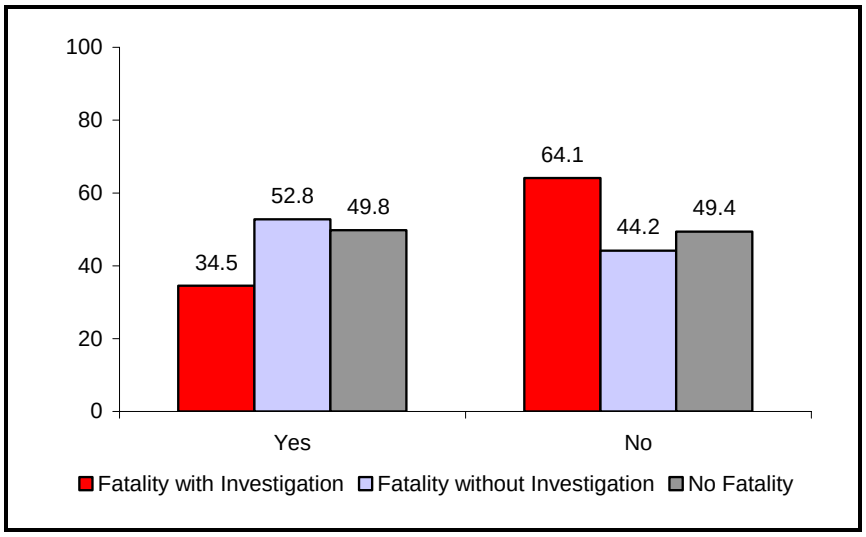


**Exhibit 5-77. Do Your Firefighters Ever Have to Share Facepieces for SCBAs? (Question 33), by Fatality and FFFIPP Investigation (Percent)**




## 5.20 USE OF SCBA (Q34)

NIOSH recommends that fire departments "ensure that officers enforce and firefighters wear their SCBA whenever there is a chance they might be exposed to a toxic or oxygen-deficient atmosphere, including initial assessment."[46] Firefighters in almost all fire departments reportedly use their SCBA at least most of the time while fighting structure fires. The significant patterns of responses follow.

**Region.** Fire departments in the Northeast are more likely than those in the South and Midwest to say firefighters "most of the time" or "always" use SCBA while fighting structure fires. The proportions of fire departments that said firefighters use SCBA "most of the time" or "always" are

- Northeast, 98.6%,
- South, 89.7%,
- Midwest, 87.2%, and
- West, 87.9%.

See ***Exhibit 5-78.***

**Jurisdiction Type.** Firefighters in urban jurisdictions are more likely than those in rural jurisdictions to "always" use SCBA**.** The proportions of departments that say firefighters use SCBA

[46]This is Sentinel Recommendation 5-3. See Exhibit 2-3 for further details.

"most of the time" or "always" are 99.6% and 90.1%, respectively. See ***Exhibit 5-79.***

**Size of Jurisdiction.** Firefighters in small jurisdictions are less likely than those in other jurisdictions to use SCBA while fighting structure fires. The proportions that say firefighters use them "most of the time" or "always" are

- large, 98.9%,
- medium, 97.4%, and
- small, 87.4%.

See ***Exhibit 5-80.***

**Type of Department.** Firefighters in career fire departments are more likely than those in volunteer and combination fire departments to use SCBA "most of the time" or "always." The proportions of departments that gave one of these two response options are

- career, 96.0%,
- volunteer, 91.5%, and
- combination, 89.8%.

See ***Exhibit 5-81.***

**Exhibit 5-78. About How Often Do You Think Your Firefighters Use SCBAs While Fighting Structure Fires? (Question 34), by Region (Percent)**

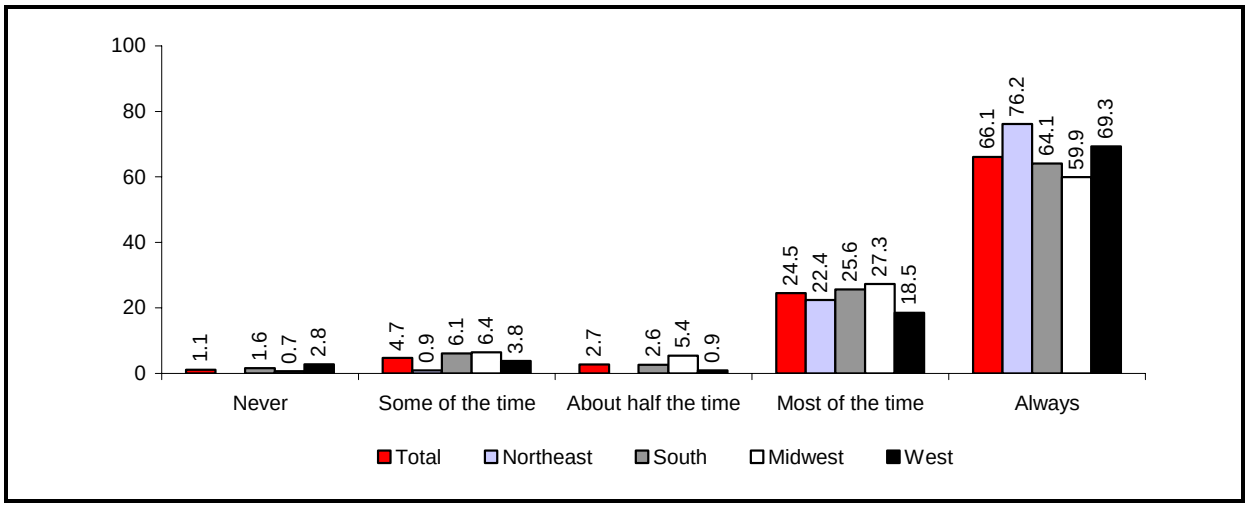


**Exhibit 5-79. About How Often Do You Think Your Firefighters Use SCBAs While Fighting Structure Fires? (Question 34), by Jurisdiction Type (Percent)**

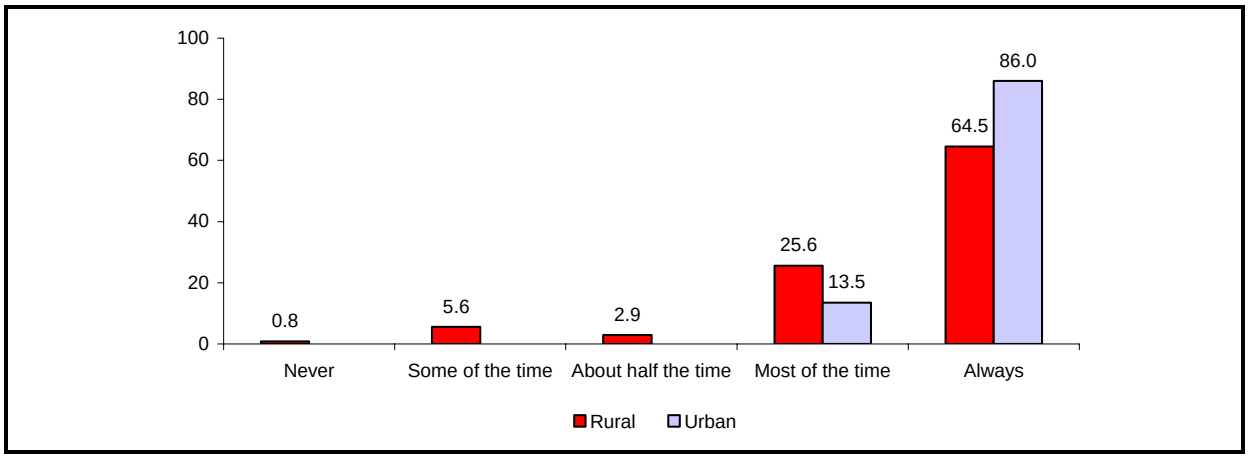



**Exhibit 5-80. About How Often Do You Think Your Firefighters Use SCBAs While Fighting Structure Fires? (Question 34), by Size of Jurisdiction (Percent)**

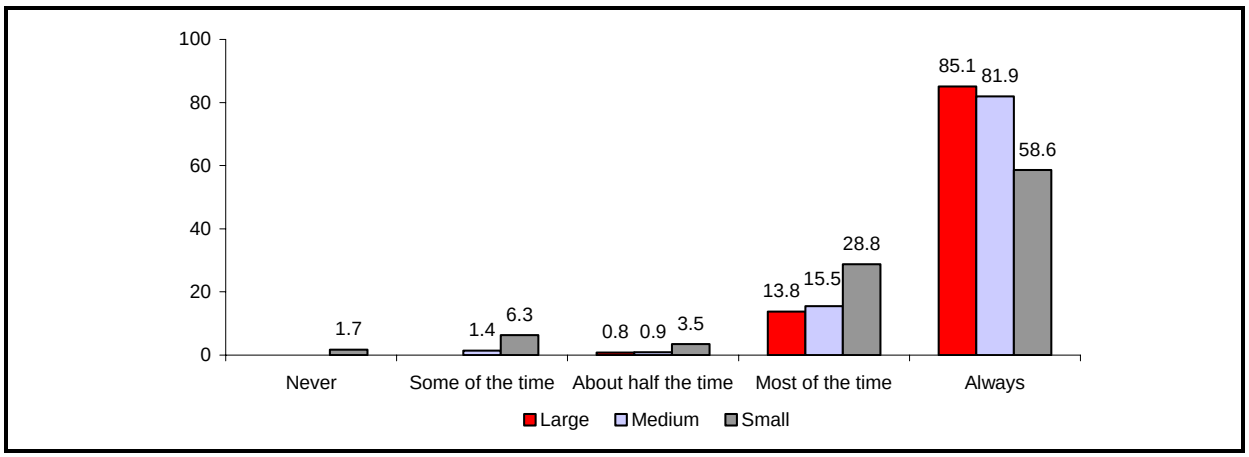
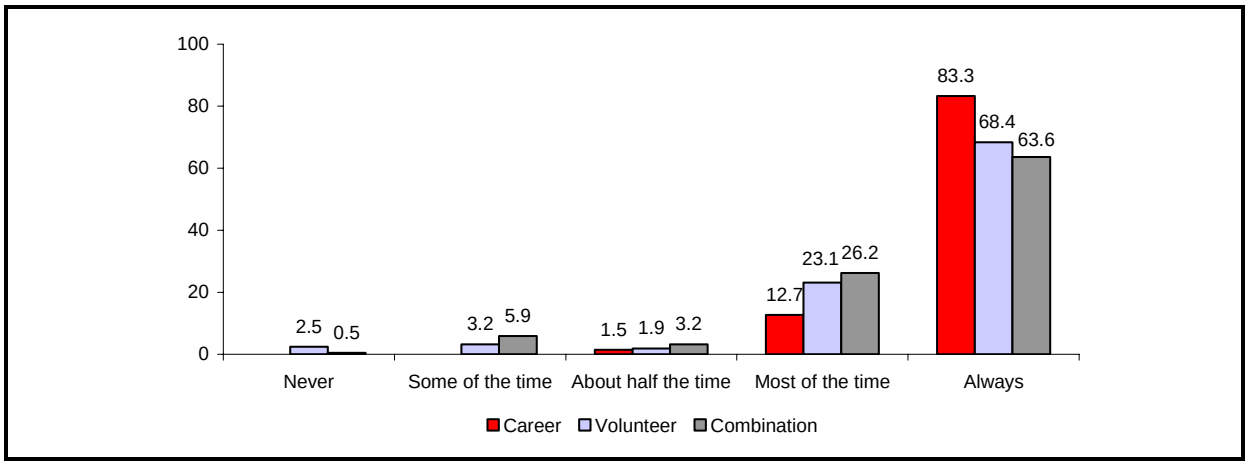



**Exhibit 5-81. About How Often Do You Think Your Firefighters Use SCBAs While Fighting Structure Fires? (Question 34), by Type of Department (Percent)**



**Experience with On-Duty Fatality and FFFIPP Investigation.** Firefighters in fire departments that have both a prior fatality and a FFFIPP investigation reportedly use SCBA more frequently than those without a prior firefighter fatality. The proportions of departments that responded "most of the time" or "always" to this question are

- fatality with investigation, 95.6%,
- fatality without investigation, 91.9%, and
- no fatality, 84.6%

## 5.21 MAINTENANCE OF SCBA (Q36)

NIOSH recommends that fire departments "develop and implement a preventive maintenance program to ensure that all Self-Contained Breathing Apparatus are adequately maintained.[47] About two fifths of fire departments perform SCBA maintenance "after every time they are used." Less than 6% perform maintenance "less than once a year" or "never."

There are no significant patterns of responses based on the five department characteristics (region, jurisdiction type, size of jurisdiction, type of department, or experience with on-duty fatality and FFFIPP investigation).

## 5.22 AVAILABILITY OF AEDS (Q38, 38A)

About three quarters (77.4%) of all fire departments have AEDs. Most fire departments keep their AEDs on the emergency vehicles, at the fire station, or in both locations. The significant patterns of responses are as follows.

**Jurisdiction Type.** Fire departments in urban jurisdictions are more likely than those in rural jurisdictions to have AEDs (87.8% and 77.6%, respectively). Fire departments in urban jurisdictions are also more likely than those in rural jurisdictions to have AEDs on the emergency vehicles (72.4% and 61.6%). See ***Exhibit 5-82.***

**Size of Jurisdiction.** The larger the size of the jurisdiction served, the more likely the fire department will have AEDs. The percentages are

[47] This is Sentinel Recommendation 3-1. See Exhibit 2-3 of this report for details.

- large, 95.2%,
- medium, 85.1%, and
- small, 73.3%.

Fire departments in small jurisdictions are less likely than other departments to keep their AEDs on the emergency vehicles or both at the fire station and on the emergency vehicles. The combined proportions for these two responses are

- large, 93.5%,
- medium, 82.2%, and
- small, 67.5%.

See ***Exhibit 5-83.***

**Type of Department.** Career fire departments are more likely than volunteer and combination fire departments to have AEDs (92.2%, 76.9%, and 76.6%, respectively) and to store them on the emergency vehicles (77.0%, 60.5%, and 61.7%). See ***Exhibit 5-84.***

**Experience with On-Duty Fatality and FFFIPP Investigation.** Firefighters in fire departments that have a prior firefighter fatality are significantly more likely to have AEDs than those that do not. The percentages are

- fatality with investigation, 88.8%,
- fatality without investigation, 85.9%, and
- no fatality, 77.3%.

There is no statistically significant difference based on prior experience with a FFFIPP investigation. There are also no statistically significant differences regarding where the AEDs are placed. See ***Exhibit 5-85.***

There is no significant pattern of responses based on region.

**Exhibit 5-82. Does Your Fire Department Have AEDs? (Question 38), by Jurisdiction Type (Percent)**

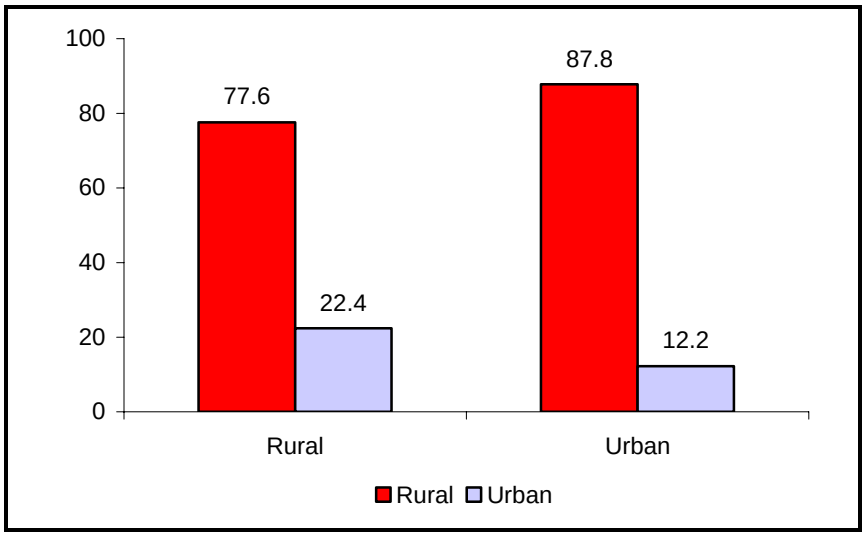



**Exhibit 5-83. Does Your Fire Department Have AEDs? (Question 38), by Size of Jurisdiction (Percent)**

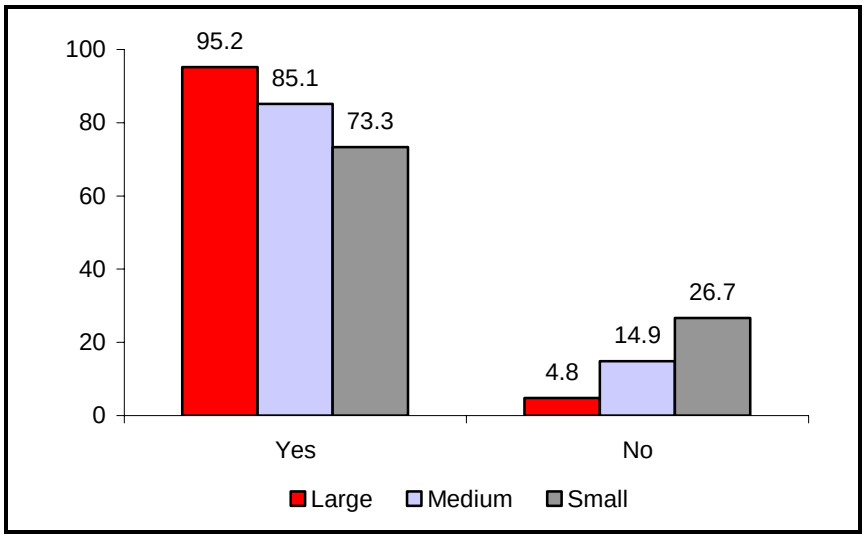



**Exhibit 5-84. Does Your Fire Department Have AEDs? (Question 38), by Type of Department (Percent)**

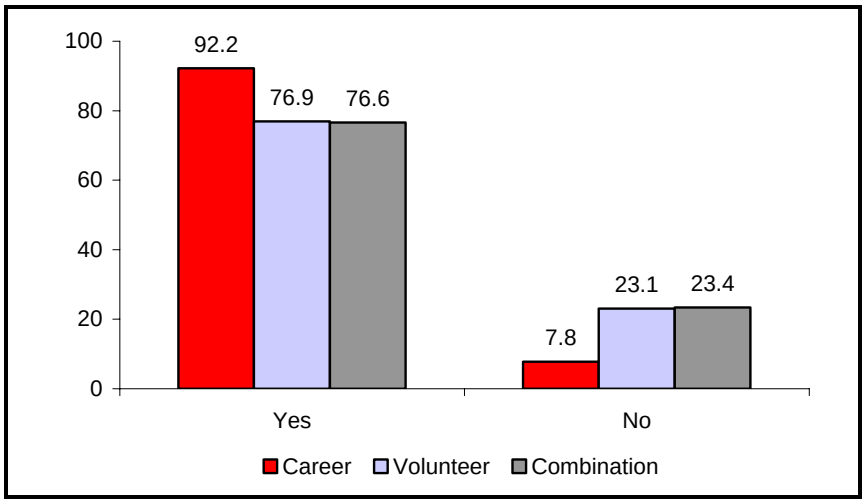
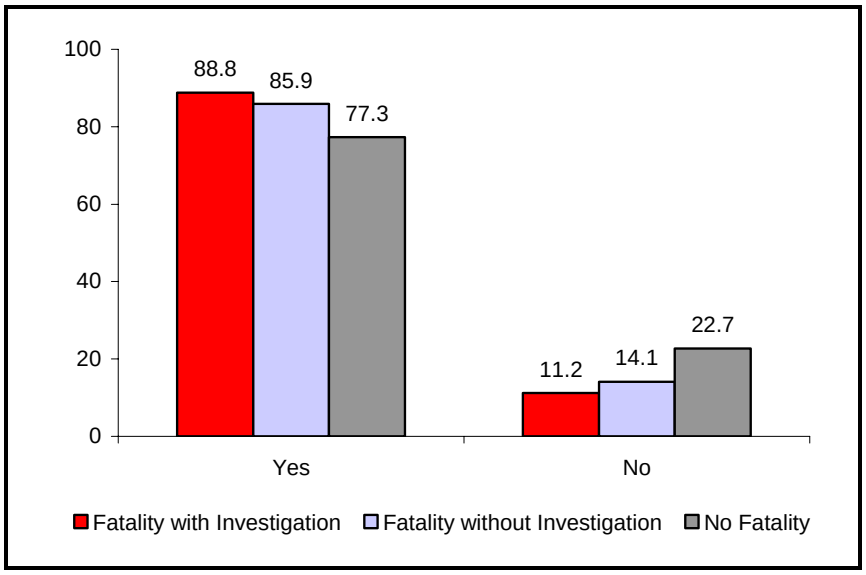


**Exhibit 5-85. Does Your Fire Department Have AEDs? (Question 38), by Fatality and FFFIPP Investigation (Percent)**




## 5.23 MAINTENANCE OF AEDS (Q39)

NIOSH recommends that fire departments perform routine maintenance on their AEDs by following "manufacturers' instructions to replace battery packs immediately when the unit indicates a low battery or replace battery message."[48] Most fire departments report that they perform routine maintenance on AEDs between once a year and once a month or more, or "after every time they are used."

The significant patterns of responses follow.

**Jurisdiction Type.** Urban fire departments are more likely than rural fire departments to perform maintenance on their AEDs "after every time they are used" (19.1% and 12.3%, respectively). See ***Exhibit 5-86.***

**Size of Jurisdiction.** The larger the size of the jurisdiction served, the more likely it is the fire department conducts routine maintenance on AEDs "after every time they are used." The percentages are

- large, 33.4%,
- medium, 15.1%, and
- small, 12.4%.

See ***Exhibit 5-87.***

[48]This is Sentinel Recommendation 3-2. See Exhibit 2-3 of this report for further details.

**Type of Department.** Career fire departments are less likely than volunteer and combination fire departments to never maintain their AEDs (the percentages are 2.7%, 10.3%, and 11.1%, respectively). See ***Exhibit 5-88.***

There are no significant patterns of responses based on region or prior experience with a firefighter fatality or FFFIPP investigation.

**Exhibit 5-86. How Often Has Routine Maintenance, Including Replacement of Battery Packs, Been Performed on Your AEDs? (Question 39), by Jurisdiction Type (Percent)**

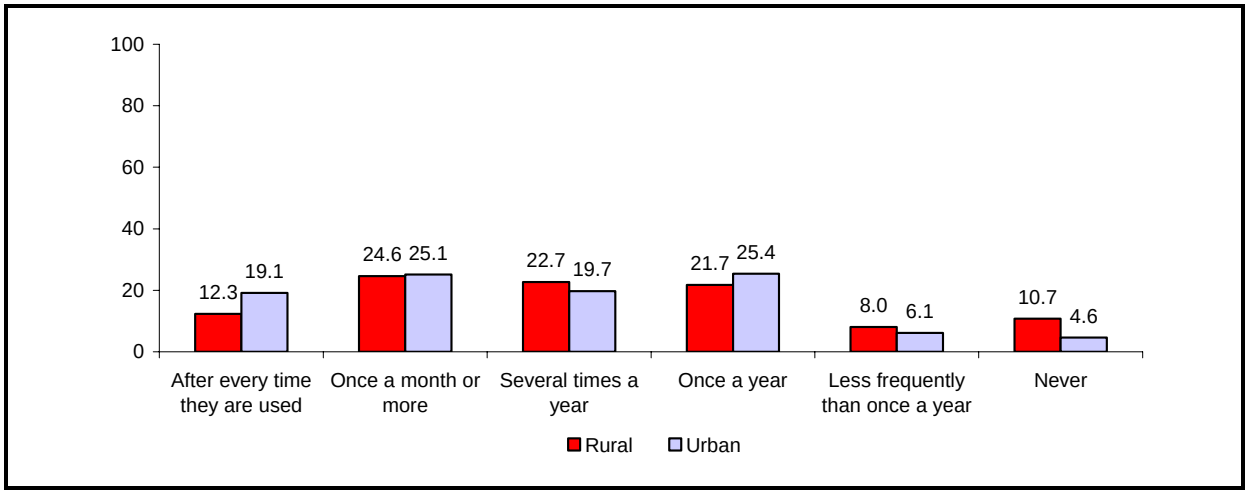



**Exhibit 5-87. How Often Has Routine Maintenance, Including Replacement of Battery Packs, Been Performed on Your AEDs? (Question 39), by Size of Jurisdiction (Percent)**

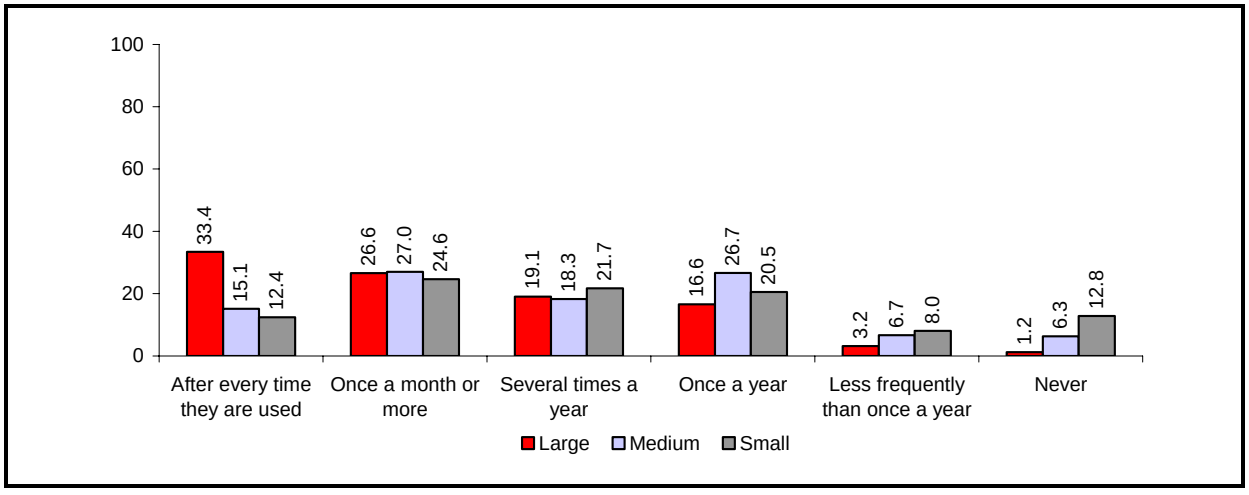
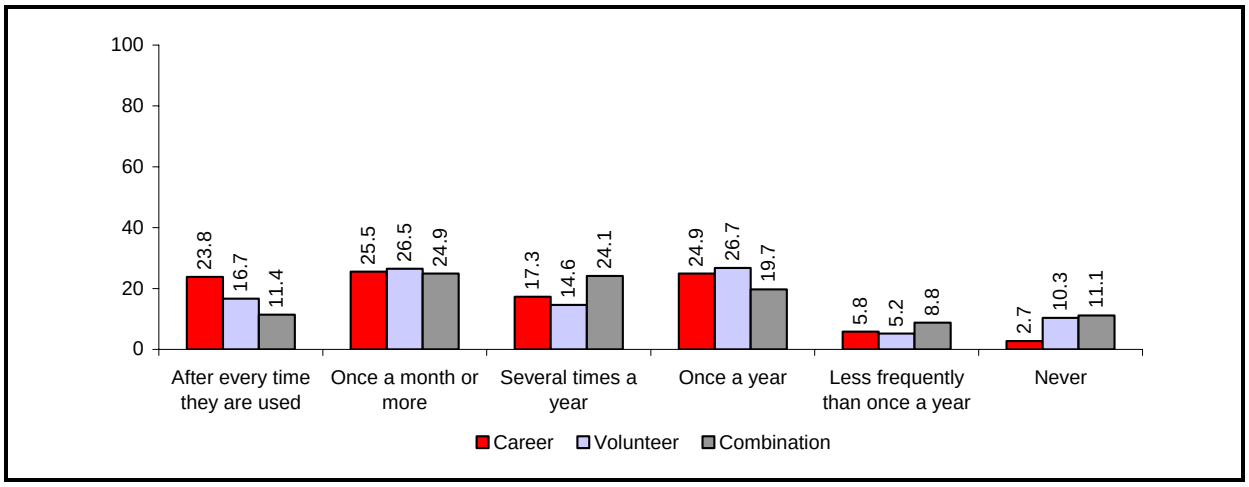


**Exhibit 5-88. How Often Has Routine Maintenance, Including Replacement of Battery Packs, Been Performed on Your AEDs? (Question 39), by Type of Department (Percent)**




## 5.24 TWO-WAY COMMUNICATION DEVICES (Q40, 41)

NIOSH recommends that fire departments "ensure that firefighters who enter hazardous areas are equipped with two-way communications with incident command" and that the radio "does not bleed over, cause interference, or lose communication under field conditions."[49] Firefighters in almost all (91.0%) fire departments have radios or other two-way communication devices while they are responding to structure fires at least "most of the time."

The significant patterns of responses follow.

**Region.** Firefighters in fire departments in the South and West are more likely than those in the Northeast and Midwest to "always" carry radios or other two-way communication devices while they are responding to structure fires, though the difference between the West and Northeast is not statistically significant. The percentages are

- Northeast, 66.2%,
- South, 76.9%,
- Midwest, 64.6%, and
- West, 74.6%.

[49]These are Sentinel Recommendations 4-1 and 4-2, respectively.

Regarding problems with communication devices, there is no pattern of responses (Question 41) based on region. See ***Exhibit 5-89.***

**Jurisdiction Type.** While responding to structure fires, firefighters in urban jurisdictions "always" carry radios or other two-way communication devices more often than those in rural jurisdictions (85.6% and 65.4%, respectively). They are also less likely to have problems with their communication devices (8.4% urban fire departments say they have problems "about half the time" or more, compared with 19.3% of rural departments). See ***Exhibit 5-90.***

**Exhibit 5-89. About How Often Do Your Firefighters Carry Radios or Other Two-Way Communication Devices While Responding to Structure Fires? (Question 40), by Region (Percent)**

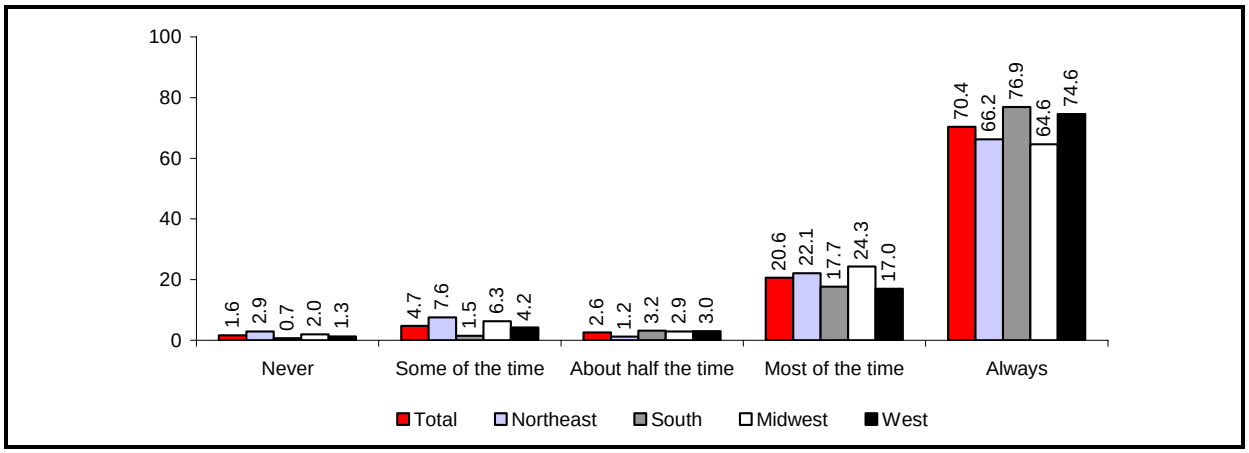
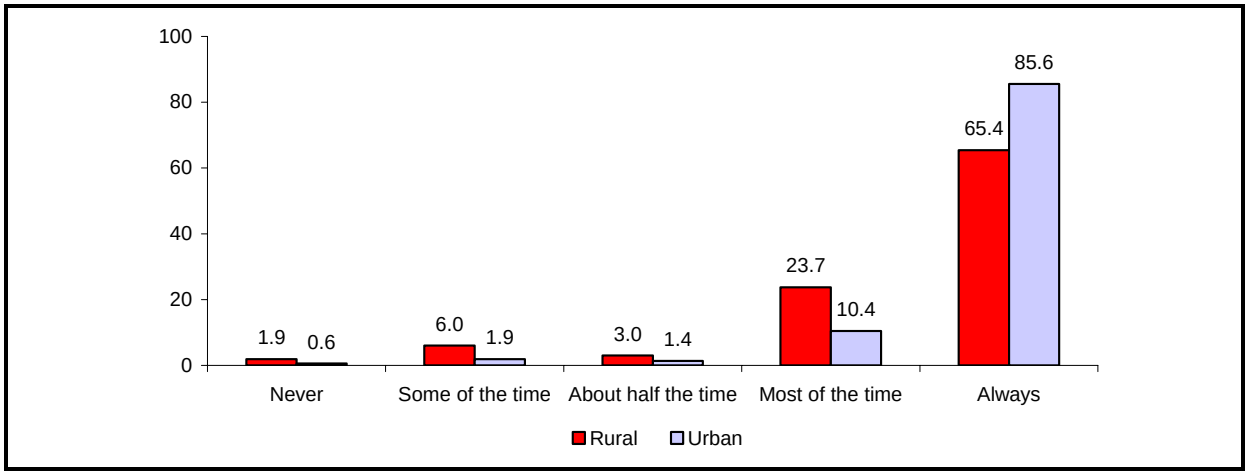



**Exhibit 5-90. About How Often Do Your Firefighters Carry Radios or Other Two-Way Communication Devices While Responding to Structure Fires? (Question 40), by Jurisdiction Type (Percent)**



**Size of Jurisdiction.** The larger the jurisdiction served, the more frequently the firefighters "always" carry radios or other two-way communication devices while responding to structure fires. The percentages are

- large, 94.8%,
- medium, 78.6%, and
- small, 65.8%.

Firefighters in large jurisdictions are less likely than those in other jurisdictions to experience problems with their communication devices. The percentages that experience problems "never" or "some of the time" are

- large, 90.8%,
- medium, 86.4%, and
- small, 80.5%.

See ***Exhibit 5-91.***

**Type of Department.** Firefighters in career fire departments are more likely than those in volunteer or combination fire departments to carry radios or other two-way communication devices while responding to structure fires. The proportions who responded "always" or "most of the time" are

- career, 98.1%,
- volunteer, 94.9%, and
- combination, 88.3%.

Regarding experience of problems with the communication devices, there is no clear pattern of responses based on department type. See ***Exhibit 5-92.***

**Experience with On-Duty Fatality and FFFIPP Investigation.** Firefighters in fire departments that have both a prior fatality and a FFFIPP investigation carry radios or other two-way communication devices more frequently than other firefighters when they respond to structure fires. The proportions who responded "always" are

- fatality with investigation, 82.5%,
- fatality without investigation, 66.6%, and
- no fatality, 70.4%.

Regarding frequency of problems with use of these devices, there is no pattern based on prior fatality or FFFIPP investigation.

**Exhibit 5-91. About How Often Do Your Firefighters Carry Radios or Other Two-Way Communication Devices While Responding to Structure Fires? (Question 40), by Size of Jurisdiction (Percent)**

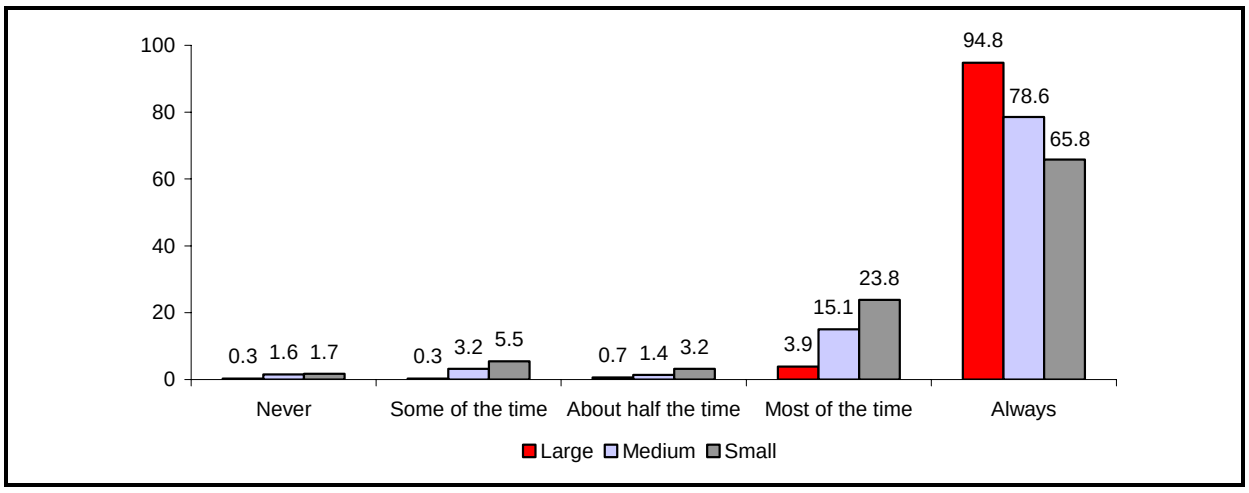
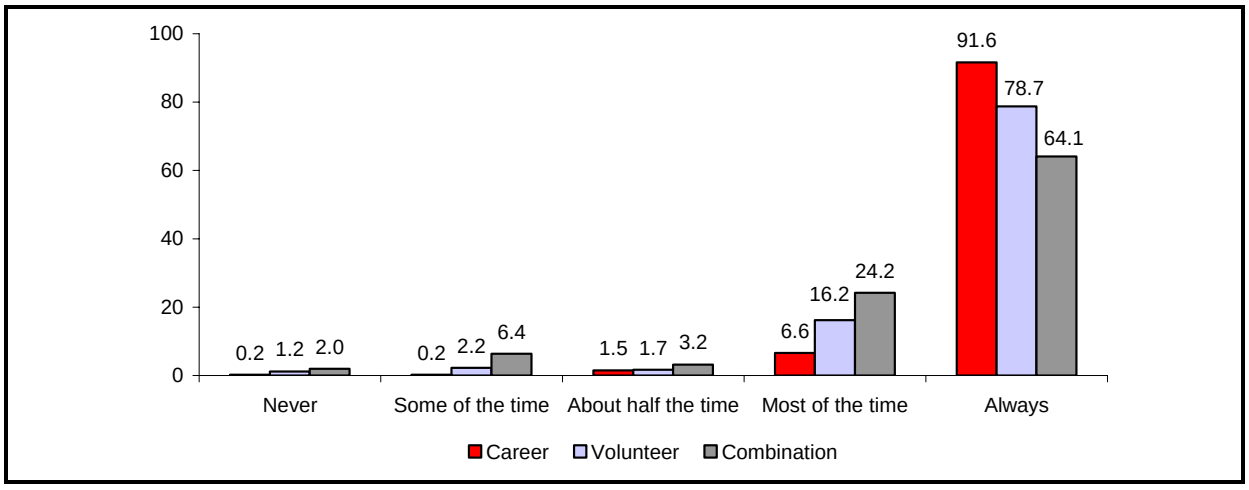



**Exhibit 5-92. About How Often Do Your Firefighters Carry Radios or Other Two-Way Communication Devices While Responding to Structure Fires? (Question 40), by Type of Department (Percent)**




## 5.25 FIREFIGHTER-LEVEL ESTIMATES

The findings reported in the preceding paragraphs are at the fire department level of analysis. ***Exhibit 5-93*** provides a summary of the findings on these topics at the firefighter level of analysis. The tables on which the firefighter level of analysis is based are provided in Appendix C.

**Exhibit 5-93. Impact of the FFFIPP Recommendations, by Proportions of Fire Departments and Firefighters**

| Questionnaire Item | Overall Percent of Fire Departments | Overall Percent of Firefighters |
|---|---|---|
| 1. Has a Safety Officer | 70.3 | 79.0 |
| 2. Has a Training Officer | 88.5 | 93.3 |
| 3. Has SOPs | 11.0–89.1[a] | 24.3-93.1 |
| 4. Requires training for firefighters | 35.5–88.9 | 50.3-92.2 |
| 5. Training provided | 20.9–84.9 | 34.4-90.4 |
| 11. NIOSH recommendations are used | 5.0–34.9 | 10.6-48.5 |
| 12. Has a fitness training program | 21.5[b] | 41.2 |
| 13. Firefighters receive CVD screenings at least annually | 17.4 | 33.2 |
| 14. Drivers receive training before being allowed to operate vehicles | 13.8–84.0 | 13.6-88.9 |
| 15. Drivers receive refresher training | 14.2–40.3 | 12.1-43.6 |
| 16. Department requires use of seat belts | 84.2 | 89.2 |
| 18. Firefighters use their seat belts regularly[c] | 54.9 | 57.6 |
| 21. Incident Command is routinely[c] established | 84.2 | 91.2 |
| 23. Knows Incident Commanders' responsibilities | 38.8–93.1 | 42.2-94.2 |
| 24. Incident Commanders regularly[c] assign an Incident Safety Officer | 52.1 | 58.7 |
| 26. Rapid Intervention Teams are routinely[c] available at structure fires | 42.4 | 60.6 |
| 27. RITs are used | 9.3–32.3 | 8.6-28.7 |
| 29. PASS devices are available | 78.8 | 86.4 |
| 30. PASS devices are used regularly[c] | 88.0 | 92.6 |
| 32. SCBA are available | 99.2 | 98.8 |
| 33. Firefighters have their own facepieces | 49.7 | 40.2 |
| 34. SCBAs are used regularly[c] | 90.6 | 94.5 |
| 36. Routine maintenance is performed on SCBAs | 16.4–43.0 | 17.6-46.6 |
| 37. CBRN SCBAs are available | 17.5 | 29.7 |
| 38. AEDs are available | 77.4 | 85.3 |

Source: Fire Department Survey.

[a]The percentages range between these two values, depending on the specific type.

[b]Some figures in this column are the sums of two response categories.

[c]"Most of the time" or "always."

These data show, for example, that two fifths (41.2%) of firefighters work in fire departments that have a fitness training program (either optional or required). About one third of all firefighters (33.2%) work in departments where CVD

screenings are provided at least annually. Two thirds of all firefighters (60.6%) are in departments that routinely have RIT available at structure fires. About 85% of firefighters are in departments that have AEDs available. Almost all the indicators of FFFIPP impact are higher at the firefighter level than at the fire department level. The notable exceptions are Question 27 (RITs are used) and Question 33 (Firefighters have their own facepieces). In these cases, the proportions are smaller at the firefighter level than at the fire department level.

The characteristics of fire departments where FFFIPP recommendations have the greatest impact are somewhat similar at the fire department and firefighter levels. The FFFIPP is more likely to have had an impact on firefighters at departments that are large, urban, and staffed by career firefighters.

## 5.26 MULTIVARIATE MODELS

A consistent theme throughout the bivariate analyses presented in this section is the significant role that region, jurisdiction type, size of jurisdiction, and type of department appear to play in the impact of FFFIPP recommendations on fire departments. FFFIPP recommendations appear to have greatest impact in departments in the Northeast, departments in large and urban jurisdictions, and departments staffed by career firefighters.

In this section, we explore the relative importance of these fire department characteristics through multivariate modeling. Seventeen questions from the survey were selected for this analysis.[50] Complete details of the resulting 41 models are provided in the tables in the second part of Appendix C.[51] An overview of the key findings is provided in ***Exhibit 5-94***.

In comparison with the corresponding bivariate results (Exhibit 5-1), this table makes clear that the size of the jurisdiction is the most consistent predictor of dissemination activities. When all other factors in the model are controlled, size of jurisdiction remains a significant explanatory factor: The larger the

[50]These are Questions 3, 4, 11–13, 15, 16, 18, 21, 26, 29, 30, 33, 34, and 38–41.

[51]Question 3 consists of 11 subquestions; Question 4, of 7 subquestions; and Question 11, of 7 subquestions. The total number of multivariate models examined, therefore, is 41. Those discussed in this section are Models 1–11, 14, 17, 20, 23, 26, 29, 32, 35–41, 52–61, and 67–71.

**Exhibit 5-94. Impact of the FFFIPP Recommendations, by Department Characteristics, Based on Multivariate Models**

| Questionnaire Item | Fire Department Characteristics | | | | |
|---|---|---|---|---|---|
| | Region | Jurisdiction Type | Size of Jurisdiction | Type of Department | Fatality / Investigation |
| 3. Has SOPs for the following: | | | | | |
| a. Incident Command Systems | — | — | L, MD* | — | — |
| b. Maintenance of SCBA | NE* | — | L, MD* | — | — |
| c. Motor vehicle safety | NE, SO, W* | — | L, MD* | — | — |
| d. Physical fitness program | W* | U* | L, MD* | C* | — |
| e. CVD screenings | NE* | — | L, MD* | C* | — |
| f. RIT | NE, W* | U* | L, MD* | — | — |
| g. PASS devices | — | — | L, MD* | — | — |
| h. PPE | NE* | — | L, MD* | — | — |
| i. Radio communication | NE, SO, W* | — | L, MD* | — | — |
| j. Other | — | — | L* | — | — |
| k. None | NE* | — | L, MD* | — | F* |
| 4. Requires following training for firefighters: | | | | | |
| a. Fighting structure fires | — | — | L, MD* | — | I |
| b. Driving safety | NE, SO, W* | — | L, MD* | — | I |
| c. Incident Command Systems | — | U* | L, MD* | C | — |
| d. SCBA | — | U* | L, MD* | — | — |
| e. RIT | W* | U* | L, MD* | — | — |
| f. PPE | N, SO,W* | — | L, MD* | — | — |
| g. Radio communication | W* | — | L, MD* | — | — |
| 11. NIOSH recommendations used as follows: | | | | | |
| a. Change training program | — | — | L, MD* | — | F* |
| b. Develop new SOPs | — | — | L, MD* | — | I* |
| c. Change SOPs | — | — | L, MD* | — | F* |
| d. Justify budget/staffing | — | U* | — | — | — |
| e. Made new budget staffing requests | — | — | — | — | — |
| f. Justified grant applications | — | — | L, MD* | — | I* |
| g. Does not apply; not used. | — | — | L, MD* | — | F* |
| 12. Has a fitness training program | W* | U* | L, MD* | C* | — |
| 13. Firefighters receive CVD screenings at least annually | NE* | — | L, MD* | C* | — |
| 15. Drivers receive refresher training | — | — | — | — | — |
| 16. Department requires use of seat belts | NE,S,W* | — | L, MD* | — | — |
| 18. Firefighters use their seat belts regularly[a] | W* | — | L, MD* | — | — |
| 21. Incident Command is routinely[a] established | — | U* | L, MD* | — | — |
| 26. RIT is routinely[a] available at structure fires | NE,W* | U* | L, MD* | — | — |
| 29. PASS devices are available | — | U* | L, MD* | — | I |
| 30. PASS devices are used regularly[a] | NE* | U* | L, MD* | — | — |

(continued)

**Exhibit 5-94. Impact of the FFFIPP Recommendations, by Department Characteristics, Based on Multivariate Models (continued)**

| Questionnaire Item | Fire Department Characteristics | | | | |
|---|---|---|---|---|---|
| | Region | Jurisdiction Type | Size of Jurisdiction | Type of Department | Fatality / Investigation |
| 33. Firefighters have their own facepieces | W* | U* | L, MD* | C* | — |
| 34. SCBA are used regularly[a] | NE* | — | L, MD* | — | — |
| 38. AEDs are available | — | — | L, MD* | — | — |
| 39. Routine maintenance is performed on AEDs | — | — | L* | — | — |
| 40. Radios are used regularly[a] | —* | — | — | —* | — |
| 41. Radios do not bleed over | — | U | — | — | — |

Note: NE = Northeast; SO = South; W = West; U = urban; L = large; MD = medium; C = career; V = volunteer; F = prior fatality; I = prior FFFIPP investigation; — = does not apply (no significant pattern).

Source: Fire Department Survey.

[a]"Most of the time" or "always."

*The p-value for this fire department characteristic is significant at the .05 level. See note "a" in the models in Appendix C.

jurisdiction, the more likely it is that the FFFIPP has had an impact on fire departments and firefighters.

These multivariate models also indicate that the type of department (career, volunteer, or combination) and jurisdiction type (urban or rural) are seldom significant factors in the impact of the FFFIPP. A notable exception is the provision of a physical fitness program. Even controlling for other factors in the model, type of department and jurisdiction type are significant predictors: Urban and career fire departments are more likely than other departments to have either optional or required programs.

Region of the country remains a significant predictor of FFFIPP impact in most of these models. The analysis indicates that fire departments in the Northeast and West are more likely than those in other departments to have been affected by the FFFIPP.

Whether the department has experienced a fatality has an impact on the department's use of NIOSH recommendations for training and changing existing SOPs. Experience with a FFFIPP investigation has an impact on the department's development of new SOPs and the use of NIOSH recommendations for justifying grant applications.

The type of respondent is not a significant factor in the majority of the models. The statistically significant exceptions are as follows:

- Question 3: Safety Officers are significantly more likely than others to report there is an SOG in place for RIT.
- Question 4: Safety Officers are more likely than others to report that firefighters receive training in RIT, and much less likely to say they receive no training in Incident Command.
- Question 11: Safety Officers are more likely than Fire Chiefs to report that the department made changes to the training program, made changes to SOPs, based on FFFIPP recommendations. Fire Chiefs are more likely to report having justified grant applications.
- Question 13: Training Officers are less likely than Fire Chiefs to report that firefighters receive CVD screening at least once a year.
- Question 38: Training Officers are more likely than Fire Chiefs to report that the department has AEDs.

# 6 Findings: Factors Influencing the FFFIPP's Impact

The purpose of this section is to describe the factors that may influence the ability of fire departments to implement Fire Fighter Fatality Investigation and Prevention Program (FFFIPP) recommendations. It addresses the following questions:

- What factors, if any, hinder fire departments' ability to implement the FFFIPP recommendations?
- What characteristics of fire departments facilitate their adherence to FFFIPP recommendations?

The Fire Department Survey included a number of questions in which respondents could select from a list of possible reasons for not being able to implement a FFFIPP-recommended safety practice. The FFFIPP recommendations that are addressed in these questions concern the use of equipment—Self-Contained Breathing Apparatus (SCBA) and Chemical/Biological/ Radiological/Nuclear (CBRN) SCBA, personally fitted SCBA facepieces, Personal Alert Safety System (PASS) devices, seat belts, and turnout gear generally—and procedures on the fireground, such as Incident Command, Incident Safety Officers (ISOs), and Rapid Intervention Teams (RITs). The response options included a number of factors that potentially make it difficult to follow safety guidelines, including funding, equipment, personnel, fire department practices, situation on the fireground, and firefighter resistance. The Fire Department Survey also included questions about the extent to which funding is generally adequate for various purposes. These

general questions about the adequacy of funding focused on equipment, training, and personnel.

The presentation of findings is organized by type of barrier. Individual sections address specific questions such as the following:

- To what extent do limited financial resources affect fire departments' ability to implement FFFIPP recommendations?
- To what extent do fire departments have enough (or adequate) personal protective gear for their firefighters?
- What other factors (such as not enough personnel, firefighter resistance, and situation on the fireground) limit fire departments' ability to follow recommended safety practices?
- What enforcement mechanisms or incentives help promote safety practices?

Among the barriers that many fire departments face in implementing FFFIPP recommendations is insufficient funding for equipment, personnel, and training:

- Almost half of all departments say they do not have enough funding for equipment.
- A third do not have enough funding for personally fitted SCBA facepieces for all of their firefighters.
- Almost two thirds do not have enough funding to purchase CBRN SCBA.
- About 40% do not have enough funds for training.
- Over half do not have enough funding for the personnel they need.

The lack of equipment also hinders some departments from implementing FFFIPP-recommended safety practices:

- A quarter of all fire departments do not have enough SCBA.
- A quarter say their firefighters are not able to sit comfortably in their seat belts while wearing turnout gear in emergency vehicles.

Other barriers identified are as follows:

- Not enough personnel available at the scene. This prevents over half of all fire departments from assigning an ISO and establishing RITs, and 20% from establishing Incident Command.

- The situation on the fireground (e.g., the fire is not large enough). This is the reason cited by a third of the departments for not always assigning an ISO.

Very few fire departments cite firefighter resistance as a reason a FFFIPP-recommended safety practice is not followed.

Among the factors that can encourage safe practices are experience with an on-duty firefighter fatality, experience with a FFFIPP investigation, financial and legal penalties, an officer's attention to specific safety issues, and union representation. Examples are as follows:

- Departments that have a prior fatality are less likely than other departments to identify personnel, equipment, or situational barriers to implementing FFFIPP-recommended safety practices.
- FFFIPP investigations have had an impact on the perceived barriers to using PASS devices and individual SCBA facepieces.
- Insurance Services Office ratings, potential lawsuits and liability claims, state Occupational Safety and Health Administration (OSHA) fines, and lost pay can encourage fire departments and firefighters to work safely.

## 6.1 TO WHAT EXTENT DO LIMITED FINANCIAL RESOURCES AFFECT FIRE DEPARTMENTS' ABILITY TO IMPLEMENT FFFIPP RECOMMENDATIONS?

The results of the Fire Department Survey suggest that a substantial portion of the nation's fire departments do not have enough funding to purchase the equipment, training, and personnel needed to implement FFFIPP-recommended safety practices.

The departments that identify a lack of financial resources as a barrier to adequate equipment are departments in rural and small jurisdictions and those with all-volunteer or combination career-volunteer personnel. With one exception, there is a similar pattern for funding for training and personnel. The exception to the pattern regards departments in large jurisdictions. Departments in large jurisdictions are significantly more likely than other departments (not less) to cite inadequate funding as a problem.

Details about each of these potential barriers follow.

### 6.1.1 Funding for Equipment (Q42a)

Almost half of all departments (48.6%) say they do not have enough funding for equipment.

**Region.** Fire departments in the Midwest, West, and South are significantly more likely than those in the Northeast to say that their funding for equipment is inadequate. The percentages of departments that responded "not adequate" are

- Northeast, 40.3%,
- South, 49.0%,
- Midwest, 53.3%, and
- West, 50.8%.

**Jurisdiction Type.** Fire departments in rural jurisdictions are significantly more likely than those in urban jurisdictions to indicate that their funding for equipment is not adequate. The proportion of rural departments that answered "not adequate" is 50.8%, compared with 35.6% of urban departments. See ***Exhibit 6-1***.

*The smaller the jurisdiction, the more likely it is the fire department will report that funding for equipment is not adequate.*

**Size of Jurisdiction.** The smaller the jurisdiction, the more likely it is the fire department will report that funding for equipment is not adequate. The proportions of departments that indicate funding for equipment is "not adequate" are

- large, 31.7%,
- medium, 40.3%, and
- small, 53.0%.

See ***Exhibit 6-2***.

"A lot of the volunteer fire departments don't have the money to keep up with the physical fitness stuff. So there are a lot more overweight firefighters in the volunteer departments."—focus group participant

**Type of Department.** Volunteer and combination fire departments are significantly more likely than career departments to indicate that their funding for equipment is not adequate. The proportions that indicate their funding is "not adequate" for equipment are

- career, 35.3%,
- volunteer, 46.4%, and
- combination, 50.9%.

See ***Exhibit 6-3***.

**Experience with On-Duty Fatality and FFFIPP Investigation.** There are no significant differences based on whether the department has a prior firefighter fatality or FFFIPP investigation.

**Exhibit 6-1. How Would You Rate Your Department's Budget in the Following Areas? Not Adequate (Questions 42a–c), by Jurisdiction Type (Percent)**

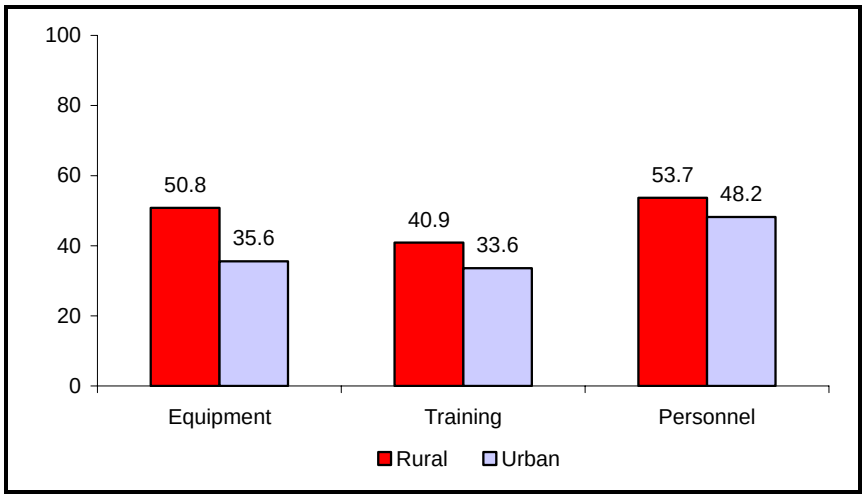



**Exhibit 6-2. How Would You Rate Your Department's Budget in the Following Areas? Not Adequate (Questions 42a–c), by Size of Jurisdiction (Percent)**

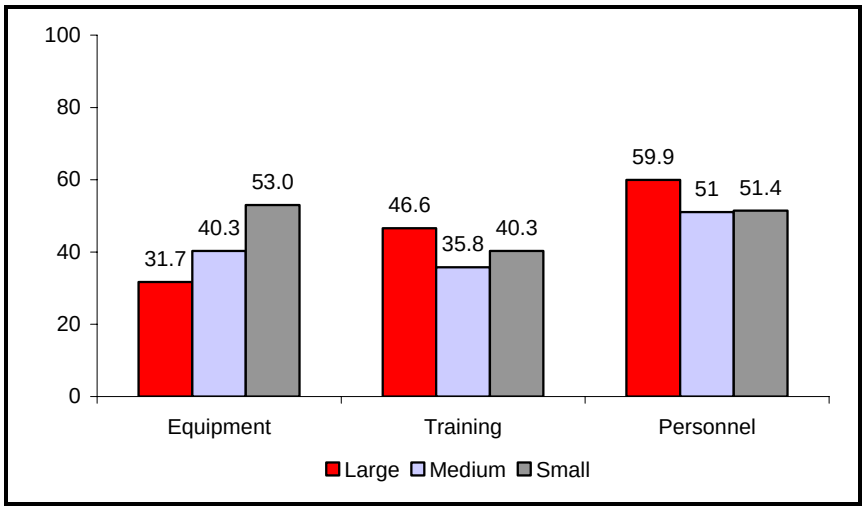
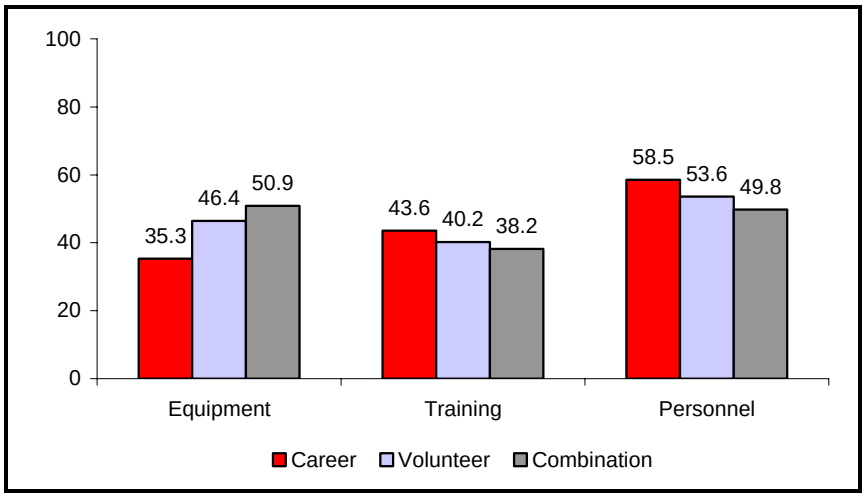



**Exhibit 6-3. How Would You Rate Your Department's Budget in the Following Areas? Not Adequate (Questions 42a–c), Type of Department (Percent)**



### 6.1.2 Funding for SCBA (Q33a)

A third of the fire departments (31.8%) indicate that their funding for personally fitted SCBA facepieces for all of their firefighters is not adequate. In general, fire departments that are smaller, are in rural jurisdictions, are volunteer, or are combination career-volunteer are the most likely to indicate they do not have adequate resources to purchase personally fitted SCBA facepieces for their firefighters.

**Region.** Fire departments in the South are significantly more likely than those in the Northeast and West to indicate they do not have personally fitted SCBA facepieces because they "cost too much." The proportions of departments in the Northeast, South, Midwest, and West that indicated they do not have personally fitted SCBA facepieces because they "cost too much" are

- Northeast, 25.4%,
- South, 37.8%,
- Midwest, 32.6%, and
- West, 24.4%.

**Jurisdiction Type.** Fire departments in rural jurisdictions are significantly more likely to indicate they do not have personally fitted SCBA facepieces because they "cost too much" than departments found in urban jurisdictions (15.6% and 33.7% for urban and rural departments, respectively).

**Size of Jurisdiction.** The smaller the jurisdiction, the more likely it is the fire department will indicate that they do not have personally fitted SCBA facepieces because they "cost too much." The proportions of departments that say they "cost too much" are

- large, 5.7%,
- medium, 23.0%, and
- small, 36.5%.

**Type of Department.** Volunteer and combination fire departments are significantly more likely than career departments to indicate that they do not have personally fitted SCBA facepieces because they "cost too much." The proportions that say they cost too much are

- career, 5.7%,
- volunteer, 31.8%, and
- combination, 33.7%.

**Experience with On-Duty Fatality and FFFIPP Investigation.** There are no significant differences based on whether the department has a prior firefighter fatality or FFFIPP investigation. However, no-fatality departments are significantly more likely than other departments to indicate that they do not have personally fitted SCBA facepieces because they cost too much. The proportions are

- fatality with investigation, 20.4%,
- fatality without investigation, 30.1%, and
- no fatality, 31.9%.

### 6.1.3 Funding for CBRN SCBA (Q37a)

Almost two thirds of the fire departments (60.3%) do not have enough funding to purchase CBRN SCBA. In general, fire departments that are in small and rural jurisdictions and those that are all volunteer or combination career-volunteer are the most likely to cite inadequate resources as the reason for not having CBRN SCBA for their firefighters. The significant patterns follow.

**Jurisdiction Type.** Fire departments in rural jurisdictions are significantly more likely to indicate that they do not have enough funding to purchase CBRN SCBA than urban jurisdictions (44.6% and 63.6% for urban and rural jurisdictions, respectively).

**Size of Jurisdiction.** The smaller the jurisdiction, the more likely it is the fire department will indicate that it does not have enough funding to purchase CBRN SCBA. The proportions that do not have adequate funding are

- large, 33.4%,
- medium, 55.1%, and
- small, 63.6%.

**Type of Department.** Volunteer and combination fire departments are significantly more likely than career departments to indicate that they do not have enough funding to purchase CBRN SCBA. The proportions that say they do not have enough funding are

- career, 37.0%,
- volunteer, 58.0%, and
- combination, 63.5.

**Experience with On-Duty Fatality and FFFIPP Investigation.** There is no significant pattern of difference based on prior fatality or FFFIPP investigation. However, fire departments with no previous fatality are more likely than fatality-with-investigation departments to report that they do not have enough funding to purchase CBRN SCBA. The proportions are

- fatality with investigation, 46.5%,
- fatality without investigation, 54.0%, and
- no fatality, 60.4%.

There are no significant regional patterns with respect to fire departments' not having enough funding to purchase CBRN SCBA.

### 6.1.4 Funding for Training (Q42b)

About 40% of all fire departments say they do not have enough funds for training. In general, fire departments that are located outside the Northeast region and in large and rural jurisdictions are the most likely to indicate that they do not have adequate resources for training.

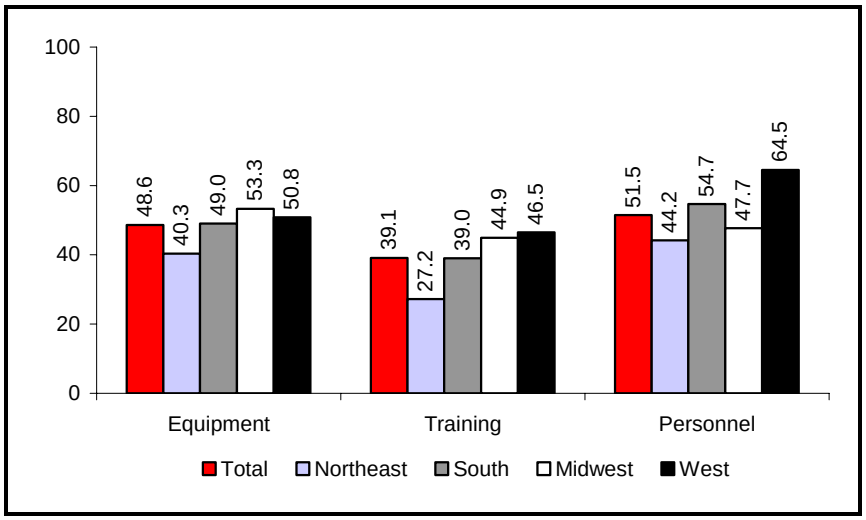
**Region.** Fire departments in the South, Midwest, and West are significantly more likely to indicate that their funding for training is "not adequate" and less likely to say it is "adequate," compared with departments in the Northeast. The proportions that do not have adequate funding for training are

- Northeast, 27.2%,
- South, 39.0%,
- Midwest, 44.9%, and
- West, 46.5%.

See ***Exhibit 6-4***.

**Jurisdiction Type.** Fire departments in rural jurisdictions are significantly more likely than urban departments to indicate that their funding for training is not adequate. The proportion of rural departments that indicated funding was "not adequate" is 40.9%, compared with 33.6% of urban departments. See Exhibit 6-1 above.

**Exhibit 6-4. How Would You Rate Your Department's Budget in the Following Areas? Not Adequate (Questions 42a–c), by Region (Percent)**




*Fire departments in large jurisdictions are less likely to indicate that the funding for training is adequate.*

**Size of Jurisdiction.** In sharp contrast to other patterns related to financial resources, fire departments in large jurisdictions are *less* likely than those in small and medium jurisdictions to indicate that the funding for training is adequate. The proportions of departments that indicate they have "adequate" funding for training are

- large, 47.6%,
- medium, 56.3%, and
- small, 55.7%.

See Exhibit 6-2 above.

There are no significant patterns of difference based on type of department, or on prior fatality or FFFIPP investigation.

### 6.1.5 Funding for Personnel (Q42c)

Over half of responding fire departments (51.5%) do not have enough funding for the personnel they need. In general, fire departments that are located in the West or in large jurisdictions, and those with combination career-volunteer personnel, are the most likely to cite inadequate resources for personnel.

**Region.** Fire departments in the West are significantly more likely than other departments to indicate that their funding for personnel is "not adequate." The proportions of departments that indicated they do not have adequate funding for personnel are

- Northeast, 44.2%,
- South, 54.7%,
- Midwest, 47.7%, and
- West, 64.5%.

See Exhibit 6-4 above.

**Jurisdiction Type.** Among departments that say funding for personnel is not adequate, there is no significant difference based on jurisdiction type. Fire departments in urban jurisdictions, however, are significantly more likely to indicate that their funding for personnel is more than adequate. The proportion of urban departments that indicated funding was "adequate" or "more than adequate" is 51.8%, compared with 46.3% of rural departments. See Exhibit 6-1 above.

*Fire departments in large jurisdictions are more likely to say that funding for personnel is "not adequate."*

**Size of Jurisdiction.** Fire departments in large jurisdictions are *less* likely to indicate that the funding for personnel is adequate and more likely to say it is "not adequate," compared with small and medium jurisdictions. The proportions of departments that indicate they have "adequate" funding for personnel are

- large, 35.3%,
- medium, 44.2%, and
- small, 44.7%.

See Exhibit 6-2 above.

**Type of Department.** Combination career-volunteer fire departments are significantly more likely than career departments to indicate that their funding for personnel is not adequate. The proportions that indicate their funding for personnel is "not adequate" are

- career, 58.5%,
- volunteer, 53.6%, and
- combination, 49.8%.

See Exhibit 6-3 above.

**Experience with On-Duty Fatality and FFFIPP Investigation.** There is no significant pattern of difference based on prior fatality or FFFIPP investigation.

## 6.2 TO WHAT EXTENT DO FIRE DEPARTMENTS HAVE ENOUGH (OR ADEQUATE) PERSONAL PROTECTIVE GEAR FOR THEIR FIREFIGHTERS?

The results of the Fire Department Survey suggest that a lack of equipment hinders some departments from implementing FFFIPP-recommended safety practices. Fire departments also report that problems with existing equipment can keep firefighters from following safety practices:

- A quarter of all fire departments (24.5%) do not have enough SCBA for all of their firefighters to use.
- A fifth (21.2%) do not have enough PASS devices for their firefighters.
- A quarter of the fire departments (24.9%) say their firefighters are not able to sit comfortably in their seat belts while wearing turnout gear in the emergency vehicles.

The departments that identify a lack of adequate equipment as a barrier to implementing FFFIPP-recommended safety practices tend to be those in rural and small jurisdictions and those with all-volunteer or combination career-volunteer personnel. Departments that have not had a prior FFFIPP investigation are also more likely to identify this as a barrier.

Details about each of these potential barriers follow.

### 6.2.1 Not Enough Equipment

Fire departments were asked a number of questions about whether inadequate equipment serves as a barrier to implementing FFFIPP-recommended safety practices. Questions 28, 29, 31, 33a, and 35 include response options that capture this type of barrier for the use of SCBA, turnout gear, and PASS devices. A summary of the findings is provided in ***Exhibit 6-5***. Fire departments that most likely face "not enough equipment" as a barrier are those serving rural and smaller jurisdictions and departments with combination career-volunteer or all-volunteer staffs. Details about the pattern of responses follow.[52]

[52]Since the data for this discussion come from individual response options across a number of questions in the survey, bar charts are not provided for significant findings. Some subsequent sections of this report also omit bar charts for this reason.

**Exhibit 6-5. Not Enough Equipment, by Fire Department Characteristics**

| Questionnaire Item | Overall Percentage | Fire Department | | | | |
|---|---|---|---|---|---|---|
| | | Region | Jurisdiction Type | Size of Jurisdiction | Type of Department | Fatality/ Investigation |
| 28. We don't have enough equipment, SCBAs, or turnout gear to establish an RIT/RIC | 8.8 | — | R | S | V, CO | NF |
| 29. Does your fire department have enough Personal Alert Safety System (PASS) devices for all firefighters for use when fighting structure fires? ("No") | 21.2 | — | R | S | V, CO | FN, NF |
| 31. They don't have a PASS device to use | 13.1 | — | R | S | V, CO | FN, NF |
| 33a. We don't have enough equipment [SCBAs] for all of our firefighters to use | 24.6 | — | R | S | V, CO | — |
| 35. Firefighters don't have SCBAs to use | 3.9 | — | — | S | — | — |

Note: S = small; CO = combination; V = volunteer; NF = no prior fatality; FN = prior fatality and no FFFIPP investigation; — = does not apply (no significant pattern).

Source: Fire Department Survey.

**Region.** Region is not a significant factor in the likelihood that the fire department has enough personal protective equipment and clothing for its firefighters to use. In general, departments in the South and Midwest are more likely to have a shortage of equipment, although the differences from departments in the North and West are not uniformly significant. Specific patterns by region among departments that report not having enough equipment are as follows:

- There is no overall pattern among departments that say, "We don't have enough equipment, SCBA, or turnout gear to establish an RIT/Rapid Intervention Crew (RIC)" (Q28—Reasons RITs/RICs are not always used; 4.8%, 10.0%, 11.6%, and 6.3% for departments in the Northeast, South, Midwest, and West, respectively). However, departments in the Northeast are less likely than those in the South and Midwest to say this is a reason for not establishing RIT/RIC.

- There is no overall pattern among departments that cite not having "a PASS device for all firefighters" to use as a reason for not establishing RIT/RIC. However, departments in the Northeast are more likely than those in the South and Midwest to have a PASS device for all firefighters to use (Q29—PASS devices; 86.7%, 72.7%, 78.1%, and 82.8%, respectively, have enough PASS devices).
- There is no overall pattern by region among departments that say they "don't have a PASS device to use" (Q31—Reasons PASS devices not used more often; 6.2%, 17.3%, 13.9%, and 12.2%). However, departments in the Northeast are less likely than those in the South and Midwest to say this is a reason for not establishing RIT/RIC.
- There is no overall pattern by region among departments that say, "We don't have enough equipment for all of our firefighters to use" (Q33a—Reasons personally fitted SCBA facepieces are not available; 15.7%, 26.2%, 30.0%, and 22.1% for departments in the Northeast, South, Midwest, and West, respectively). However, departments in the Northeast are less likely than those in the South and Midwest to say this is a reason for not establishing RIT/RIC.
- There is no significant pattern by region among departments that say, "Firefighters don't have SCBAs to use" (Q35—Reasons SCBAs not used more often).

**Jurisdiction Type.** Rural fire departments are significantly more likely than urban fire departments to say they do not have enough equipment. Rural fire departments are much more likely than urban departments to report the following:

- "We don't have enough equipment, SCBAs, or turnout gear to establish RIT/RIC" (Q28—Reasons RITs/RICs are not always used; 0.9% and 10.0% for urban and rural, respectively).
- They do not "have enough PASS devices" (Q29—PASS devices; 78.7% and 98.3%).
- "They don't have a PASS device to use" (Q31—Reasons PASS devices not used more often; 0.7% and 12.4%).
- "We don't have enough equipment for all of our firefighters to use" (Q33a—Reasons personally fitted SCBA facepieces are not available; 9.9% and 26.4%).

The cell sizes are too small to make reliable estimates for Question 35 (reasons SCBAs not used more often).

**Size of Jurisdiction.** The smaller the jurisdiction, the more likely the fire department is to cite shortages of equipment as a

reason that it does not implement a FFFIPP-recommended practice. Specifically, the smaller the jurisdiction, the more likely the fire department is to say the following:

- "We don't have enough equipment, SCBAs, or turnout gear to establish an RIT/RIC" (Q28—Reasons RITs/RICs are not always used; 4.3% and 11.2% for medium and small departments, respectively).[53]
- They do not "have enough PASS devices" (Q29—PASS devices; 1.4%, 7.8%, and 28.0%).
- "They don't have a PASS device to use" (Q31—Reasons PASS devices not used more often; 1.0%, 3.3%, and 17.9%).
- "We don't have enough equipment for all of our firefighters to use" (Q33a—Reasons personally fitted SCBA facepieces are not available; 2.3%, 13.3%, and 30.2%).
- "Firefighters don't have SCBAs to use" (Q35—Reasons SCBAs not used more often; 0.8%, 1.7%, and 5.0%).

**Type of Department.** Fire departments with a volunteer or combination workforce are significantly more likely than career workforces to cite a shortage of equipment as a reason they do not implement a FFFIPP-recommended practice. Volunteer or combination departments are more likely to say the following:

- "We don't have enough equipment, SCBAs, or turnout gear to establish an RIT/RIC" (Q28—Reasons RITs/RICs are not always used; 0.1%, 8.2%, and 9.9% for career, volunteer, and combination, respectively).
- They do not "have enough PASS devices" (Q29—PASS devices; 2.5%, 23.0%, and 21.8%).
- "They don't have a PASS device to use" (Q31—Reasons PASS devices not used more often; 1.7%, 16.0%, and 12.5%).
- "We don't have enough equipment for all of our firefighters to use" (Q33a—Reasons personally fitted SCBA facepieces are not available; 1.8%, 24.8%, and 26.2%).

Cell sizes are too small to make reliable estimates for the indicator, "Firefighters don't have SCBAs to use" (Q35—Reasons SCBAs not used more often).

[53]The cell size was too small to calculate an estimate for large departments.

*Fire departments that have had a prior FFFIPP investigation are more likely to cite as a reason for not always using PASS devices that they do not "have enough PASS devices."*

**Experience with On-Duty Fatality and FFFIPP Investigation.** Fire departments that have experienced either a firefighter fatality or a FFFIPP investigation are somewhat more likely to cite a shortage of equipment as a reason they do not implement a FFFIPP-recommended practice. Fire departments that have had a prior FFFIPP investigation are more likely than those without to cite the following as a reason for not always using PASS devices:

- They do not "have enough PASS devices" (Q29; 6.6%, 18.7%, and 21.4% for fatality-with-investigation, fatality-without-investigation, and no-fatality departments, respectively).
- "They don't have a PASS device to use" (Q31; 3.4%, 16.1%, and 13.2%).

Fire departments with no prior firefighter fatality are more likely than those with a prior fatality (investigated or not) to cite the following as a reason for not using RITs more often: "We don't have enough equipment, SCBAs, or turnout gear to establish an RIT/RIC" (Q28). The proportions are

- fatality with investigation, 2.3%,
- fatality without investigation, 3.8%, and
- no fatality, 8.9%.

There are no significant patterns for other indicators related to the use of SCBA (Q33a—Reasons personally fitted SCBA facepieces are not available, and Q35—Reasons SCBAs not used more often).[54]

### 6.2.2 Equipment Does Not Function Well

Another issue related to the adequacy of firefighters' equipment is how well it is perceived to function. Questions 17, 31, and 35 include response options that capture this type of barrier to implementing FFFIPP-recommended safety practices. A summary of the findings is provided in ***Exhibit 6-6***.

Few patterns across fire department characteristics are statistically significant because of the small cell sizes, reflecting the lack of significance for this potential barrier to good safety practices. For example, no significant patterns were found for problems with SCBA functioning in any of the questions discussed in the following section. The two exceptions are

[54]The cell size is too small to make reliable estimates for Question 35.

**Exhibit 6-6. Problems with Equipment, by Fire Department Characteristics**

| Questionnaire Item | Overall Percentage | Fire Department | | | | |
|---|---|---|---|---|---|---|
| | | Region | Jurisdiction Type | Size of Jurisdiction | Type of Department | Fatality/ Investigation |
| 17. Firefighters not able to fit comfortably in their seat belts while wearing turnout gear in emergency vehicles? | 24.9 | W | R | S | CO | — |
| 31. Firefighters think the [PASS] devices do not always work reliably | 0.3 | — | — | — | — | — |
| 31. [PASS] devices go off while firefighters are resting | 3.7 | M, W | R | S, MD | CO | — |
| 35. Firefighters don't trust that SCBAs will work reliably | — | — | — | — | — | — |
| 35. Firefighters don't like sharing [SCBA] facepieces with others | 1.0 | — | — | — | — | — |
| 35. Firefighters are concerned that the SCBA may be or become contaminated | 0.0 | — | — | — | — | — |

Note: M = Midwest; R = rural; S = small; MD = medium; CO = combination; — = does not apply (no significant pattern).

Source: Fire Department Survey.

*A quarter of the fire departments report that their firefighters are not able to fit comfortably in their seat belts while wearing turnout gear.*

Questions 17 (on seat belts) and 31 (on PASS devices). A quarter of the fire departments (24.9%) report that their firefighters are not able to fit comfortably in their seat belts while wearing turnout gear in the emergency vehicles. About 4% say firefighters do not use their PASS devices, because they "go off" while the firefighter is resting.

Fire departments that most likely face inadequately functioning equipment as a barrier appear to be those serving rural and smaller jurisdictions, and departments with combination career-volunteer staffs.

**Region.** There is little evidence that the fire department's region affects the likelihood that problems with equipment quality are a reason for not implementing a FFFIPP-recommended practice. Of the six indicators of equipment quality, the only significant pattern regards Question 31 on the use of PASS devices. Sample sizes are too small to make reliable estimates for three of the other indicators. Fire

departments in the Midwest are more likely to indicate that "devices go off while firefighters are resting" as a reason for not using the PASS devices. The proportions that checked this response option are

- Northeast, 2.3%,
- South, 2.4%,
- Midwest, 6.8%, and
- West, 1.8%.

(Q31—Reasons PASS devices are not used.)

**Jurisdiction Type.** Rural fire departments are somewhat more likely to cite equipment problems as reasons for not implementing a FFFIPP-recommended practice. For four of the six indicators, however, the cell sizes are too small to make reliable estimates. The two significant patterns are as follows:

- Rural departments are more likely than urban departments to cite as a reason for not always using them that PASS "devices go off while firefighters are resting" (Q31—Reasons PASS devices are not used; 0.8% and 4.9% for urban and rural departments, respectively).
- Urban fire departments are more likely than rural departments to agree that firefighters could "fit comfortably in their seat belts while wearing turnout gear in the emergency vehicle." The percentages of fire departments reporting that they "agree" or "strongly agree" with the statement are 52.9% and 43.2% for urban and rural, respectively (Q17—Fitting comfortably in seat belts). See ***Exhibit 6-7***.

**Size of Jurisdiction.** There is some evidence that fire departments in small and medium-sized jurisdictions are more likely to cite problems with equipment functioning as a reason for not being able to implement a FFFIPP-recommended practice. Of the six indicators for this issue, however, cell sizes are too small for four to make reliable estimates on the significance of the differences across jurisdiction sizes. The two reliably significant patterns are as follows:

- The larger the jurisdiction, the more likely the department "strongly agrees" that firefighters could "fit comfortably in their seat belts while wearing turnout gear in the emergency vehicle." The percentages that "agree" or "strongly agree" with the statement are 63.2%, 50.4%, and 40.8% for departments in large, medium, and small

jurisdictions, respectively (Q17—Fitting comfortably in seat belts). However, there is no difference by jurisdiction size among fire departments that say they "disagree" or "strongly disagree" that firefighters could fit comfortably in their seat belts while wearing turnout gear in the emergency vehicle. See ***Exhibit 6-8***.

- Fire departments in small and medium jurisdictions are more likely than those in large jurisdictions to cite that PASS "devices go off while firefighters are resting" as a reason for not always using them (Q31—Reasons PASS devices are not used; 0.6%, 3.7, and 3.8% for large, medium, and small jurisdictions, respectively).

**Type of Department.** For two of the six indicators, combination career-volunteer fire departments are more likely than other departments to cite equipment problems as reasons for not implementing a FFFIPP-recommended practice. For the remaining four indicators, cell sizes are too small to make reliable estimates. Following are the statistically significant differences:

- Combination career-volunteer departments are more likely than other departments to "strongly disagree" that firefighters could fit comfortably in their seat belts while wearing turnout gear in the emergency vehicle (Q17—Fitting comfortably in seat belts; 4.0%, 4.9%, and 8.2% for career, volunteer, and combination departments, respectively). See ***Exhibit 6-9***.
- Combination career-volunteer departments are more likely than career and volunteer departments to cite that PASS "devices go off while firefighters are resting" (Q31—Reasons PASS devices are not used; 2.8%, 2.0%, and 4.6% respectively).

**Experience with On-Duty Fatality and FFFIPP Investigation.** There is no significant pattern of difference based on prior fatality or FFFIPP investigation.

**Exhibit 6-7. Reasons for Not Following FFFIPP Recommendation: Seat Belts Uncomfortable (Question 17), by Jurisdiction Type (Percent)**

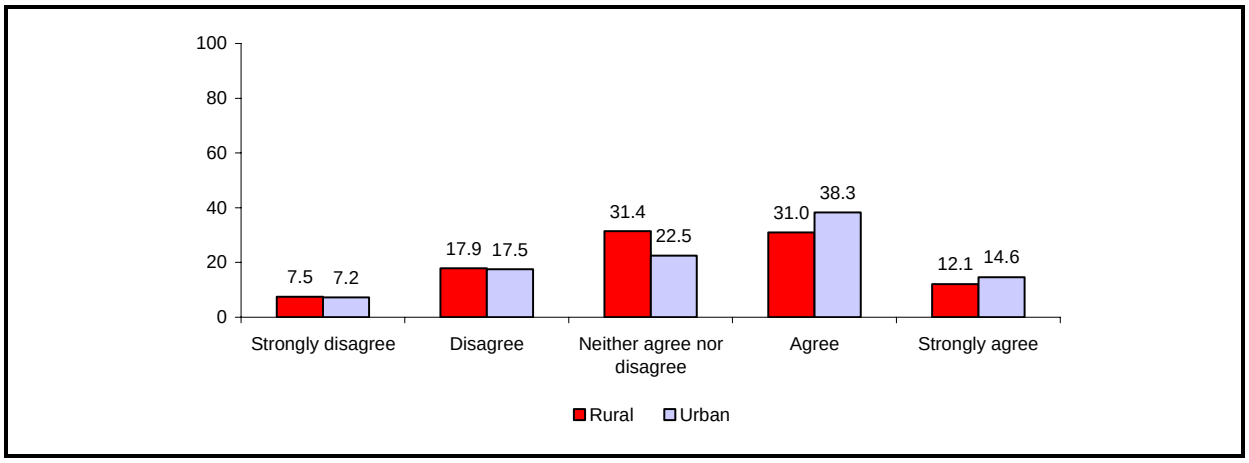



**Exhibit 6-8. Reasons for Not Following FFFIPP Recommendation: Seat Belts Uncomfortable (Question 17), by Size of Jurisdiction (Percent)**

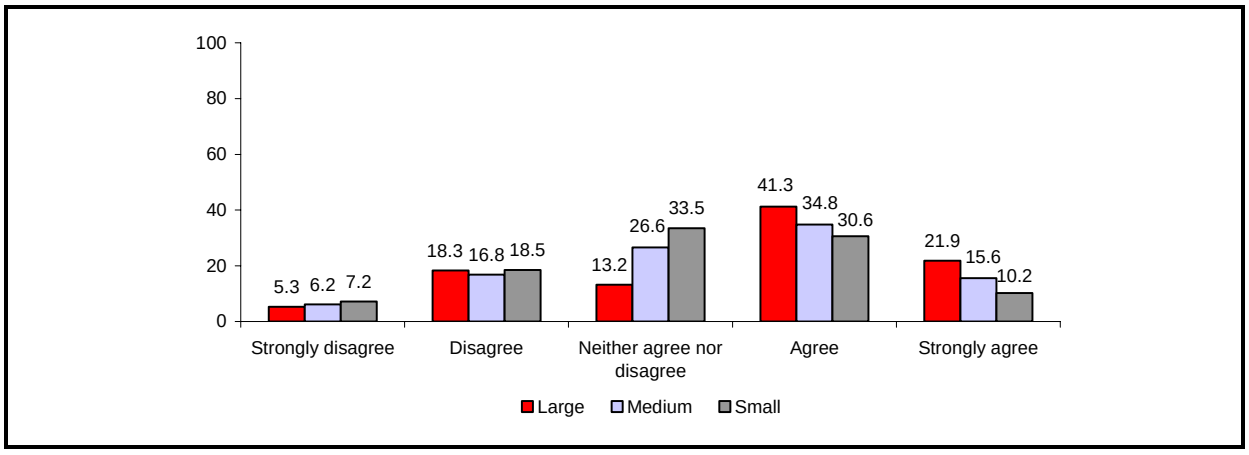
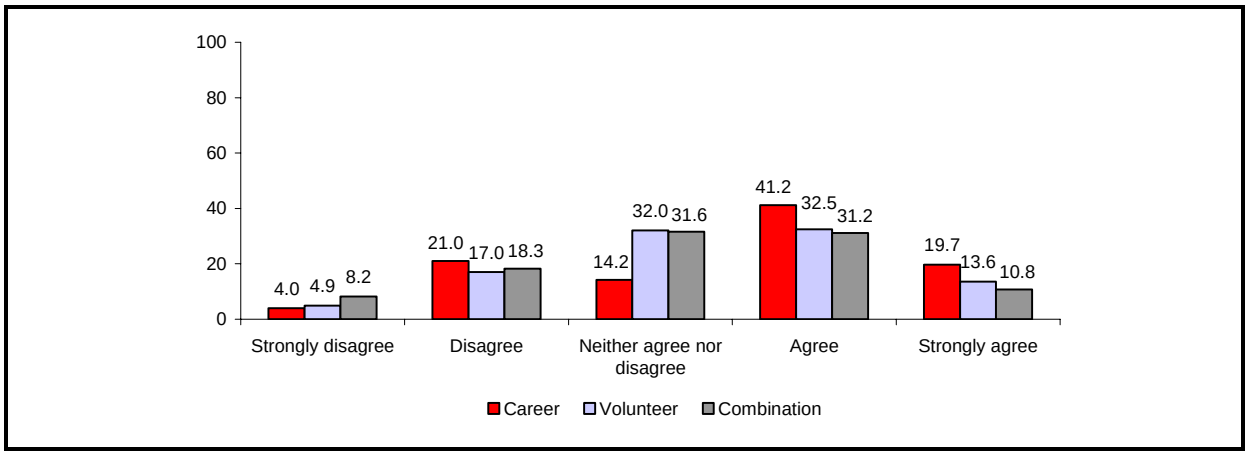



**Exhibit 6-9. Reasons for Not Following FFFIPP Recommendation: Seat Belts Uncomfortable (Question 17), by Type of Department (Percent)**



## 6.3 OTHER BARRIERS TO SAFETY PRACTICES

A number of additional barriers to implementing FFFIPP-recommended safety practices emerged from the Fire Department Survey. These fall under four categories:

- Not enough personnel are available.
- Implementation is not a practice of the fire department.
- Fire department determines that the situation does not warrant implementation.
- There is firefighter resistance.

The most commonly cited reason is insufficient personnel at the scene. Over half say this prevents them from assigning an ISO and establishing RITs. More than 20% say it prevents them from establishing Incident Command.

The second most common reason for not implementing a FFFIPP-recommended safety practice is the situation on the fireground:

- A third of the departments (32.3%) say they do not assign an ISO (e.g., because the fire is not large enough).
- A third of the departments (34.9%) do not establish RIT.
- A quarter of the departments (25.9%) say their firefighters sometimes do not use SCBA.
- A fifth (22.5%) do not establish Incident Command.
- A fifth (20.9%) do not have CBRN SCBA.
- About 9.5% say their firefighters sometimes do not use their PASS devices.

Being the “usual fire department practice” is cited as the reason that

- almost a quarter of fire departments (23.4%) say their firefighters do not use personally fitted facepieces for their SCBA (because “shared systems work fine for our needs”) and
- about a fifth (19.7%) do not have CBRN SCBA (“We do not have enough technical information to purchase CBRN SCBAs”).

Very few fire departments cite firefighter resistance as a reason a FFFIPP-recommended safety practice is not followed:

- Only 10.3% say firefighters do not think they need SCBA.

- Only 4.6% say firefighters do not think they need PASS devices.
- Fewer than 1% (0.3%) say firefighters do not like using the personally fitted SCBA facepieces.

Details about each of these potential barriers follow.

### 6.3.1 Not Enough Personnel Are Available

Fire departments were asked a number of questions about the availability of necessary personnel for implementing FFFIPP-recommended safety practices. Questions 22, 25, and 28 include response options that capture this type of barrier regarding the establishment of Incident Command, the assignment of an ISO, and the use of RITs or RICs. A summary of the findings is provided in ***Exhibit 6-10***.

**Exhibit 6-10. Not Enough Personnel, by Fire Department Characteristics**

| Questionnaire Item | Overall Percentage | Fire Department Characteristics | | | | |
|---|---|---|---|---|---|---|
| | | Region | Jurisdiction Type | Size of Jurisdiction | Type of Department | Fatality/ Investigation |
| 22. Not enough firefighters are available at the scene of the fire [to establish Incident Command] | 21.2 | M | R | S | V, CO | NF |
| 25. Not enough firefighters are available at the scene of the fire [to assign an Incident Safety Officer] | 51.7 | M | R | S, MD | V, CO | — |
| 28. We don't have enough firefighters available at the scene of a fire [to establish RIT/RIC] | 53.5 | SO, M, W | R | S, MD | V, CO | NF |
| 28. We don't have enough training or trained personnel at the scene to establish RIT/RIC | 20.7 | M | R | S | V, CO | — |

Note: SO = South; M = Midwest; W = West; R = rural; S = small; MD = medium; V = volunteer; CO = combination; NF = no prior fatality; — = does not apply (no significant pattern).

Source: Fire Department Survey.

Fire departments that are most likely to report this barrier are those that are located in the South or Midwest, are serving rural and small- to medium-sized jurisdictions, and are combination or volunteer departments. Also, departments with

no previous experience with a firefighter fatality are somewhat more likely to report problems with having adequate personnel.

**Region.** In general, fire departments in the Midwest are more likely than those in other regions to say that the reason they do not always engage in recommended safety practices is a lack of necessary personnel. Departments in the Northeast were the least likely to say that lack of personnel was a factor. Specific response patterns related to these indicators of a lack of personnel are as follows:

- Departments in the Midwest and South are significantly more likely than those in the Northeast to say they do not always use Incident Command, because there are "Not enough firefighters available at the scene of the fire" (Q22—Reasons Incident Command is not established; 13.6%, 21.7%, 27.1%, 18.9% for departments in the Northeast, South, Midwest, and West, respectively).
- Departments in the Midwest are significantly more likely than those in the Northeast and South to say they do not always assign an ISO, because there are "not enough firefighters available at the scene of the fire" (Q25—Reasons an Incident Safety Officer is not assigned; 42.7%, 50.9%, 58.8%, and 52.2%).
- Departments in the Midwest are significantly more likely than those in the Northeast and West to say they do not use RTIs/RICs in every structure fire, because, they say, "We don't have enough firefighters available at the scene of a fire" (Q28—Reasons RITs/RICs are not always used; 33.0%, 59.4%, 63.5%, and 50.9%). Departments in the Northeast are significantly less likely than those in other regions to provide this reason.
- Departments in the Midwest are significantly more likely than those in all other regions to say, "We don't have enough training or trained personnel at the scene to establish RIT/RIC" (Q28—Reasons RITs/RICs are not always used; 17.0%, 17.1%, 28.1%, and 19.3%).

*Rural fire departments are more likely than urban departments to cite a lack of necessary personnel as a reason for not implementing a FFFIPP-recommended practice.*

**Jurisdiction Type.** Rural fire departments are more likely than urban departments to cite a lack of necessary personnel as a reason for not implementing a FFFIPP-recommended practice. Rural fire departments are more likely than urban departments to report the following:

- "Not enough firefighters available at the scene of the fire" (Q22—Reasons Incident Command is not established; 23.5% and 8.1% for rural and urban, respectively).

- "Not enough firefighters are available at the scene of the fire" (Q25—Reasons an Incident Safety Officer is not assigned; 54.2% and 42.4%).
- "We don't have enough firefighters available at the scene of a fire" (Q28—Reasons RITs/RICs are not always used; 57.8% and 34.0%).
- "We don't have enough training or trained personnel at the scene to establish RIT/RIC" (Q28—Reasons RITs/RICs are not always used; 23.2% and 8.5%).

**Size of Jurisdiction.** The smaller the jurisdiction, the more likely it is the department will cite lack of personnel as a reason for not implementing a FFFIPP-recommended practice. Specifically, the smaller the jurisdiction, the more likely the department is to say the following:

- "Not enough firefighters available at the scene of the fire" (Q22—Reasons Incident Command is not established; 2.4%, 11.1%, and 26.4% for large, medium, and small, respectively).
- "Not enough firefighters are available at the scene of the fire" (Q25—Reasons an Incident Safety Officer is not assigned; 25.0%, 47.9%, and 54.5%).
- "We don't have enough firefighters available at the scene of a fire" (Q28—Reasons RITs/RICs are not always used; 18.2%, 45.7%, and 58.5%).
- "We don't have enough training or trained personnel at the scene to establish RIT/RIC" (Q28—Reasons RITs/RICs are not always used; 3.7%, 12.0%, and 25.3%).

**Type of Department.** Fire departments with a volunteer or combination workforce are more likely to say that the reason they do not always engage in recommended safety practices is a lack of necessary personnel. Volunteer and combination departments are more likely to cite the following:

- "Not enough firefighters available at the scene of the fire" (Q22—Reasons Incident Command is not established; 7.6%, 19.2%, and 23.3% for career, volunteer, and combination, respectively).
- "Not enough firefighters are available at the scene of the fire" (Q25—Reasons an Incident Safety Officer is not assigned; 35.3%, 54.2%, and 51.6%).
- "We don't have enough firefighters available at the scene of a fire" (Q28—Reasons RITs/RICs are not always used; 33.3%, 53.3%, and 55.3%).

- "We don't have enough training or trained personnel at the scene to establish RIT/RIC" (Q28—Reasons RITs/RICs are not always used; 8.3%, 18.1%, and 23.1%).

*Fire departments without a prior firefighter fatality are more likely to say, "Not enough firefighters are available at the scene of the fire."*

**Experience with On-Duty Fatality and FFFIPP Investigation.** Fire departments without a prior firefighter fatality are somewhat more likely than other departments to say that the reason they do not always engage in recommended safety practices is a lack of necessary personnel. These departments are more likely to cite the following:

- "Not enough firefighters available at the scene of the fire" (Q22—Reasons Incident Command is not established; 10.8%, 13.8%, and 21.3% for fatality-with-investigation, fatality-without-investigation, and no-fatality departments, respectively).
- "We don't have enough firefighters available at the scene of a fire" (Q28—Reasons RITs/RICs are not always used; 41.5%, 38.5%, and 53.8%).

They are also more likely than fatality-with-investigation departments to say, "We don't have enough training or trained personnel at the scene to establish an RIT/RIC" (Q28; 10.8%, 15.3%, and 20.8%). There is no significant pattern for the response, "Not enough firefighters are available at the scene of the fire," as a reason an Incident Safety Officer is not assigned (Q25).

### 6.3.2 Not a Practice of the Fire Department

Another factor sometimes cited as a barrier is simply lack of experience with a recommended safety practice. Questions 28, 33a, and 37a include response options that capture this type of barrier to implementing RITs or RICs, using personally fitted SCBA facepieces, and using CBRN SCBA. A summary of the findings is provided in ***Exhibit 6-11***. Fire departments that most likely regard this as a barrier to a FFFIPP-recommended safety practice are those serving rural and either small or medium jurisdictions, and serving combination or volunteer departments. Departments that had no prior firefighter fatality are also more likely to cite this as a barrier.

**Region.** There is no consistent and statistically significant regional pattern regarding the likelihood a fire department will cite "not their usual practice" as a barrier. Among the four indicators, the two significant patterns are as follows:

**Exhibit 6-11. Not a Usual Practice, by Fire Department Characteristics**

| Questionnaire Item | Overall Percentage | Fire Department Characteristics | | | | |
|---|---|---|---|---|---|---|
| | | Region | Jurisdiction Type | Size of Jurisdiction | Type of Department | Fatality/ Investigation |
| 28. We have never established an RIT/RIC | 17.7 | SO, M | R | S, MD | V, CO | — |
| 28. We use other safety practices and so we don't need them [RIT/RIC] | 4.2 | — | R | S | V | — |
| 33a. Didn't know it [personally fitted SCBA facepieces] was recommended | 4.8 | — | — | — | — | — |
| 33a. Shared systems [not personally fitted SCBA facepieces] work fine for our needs | 23.4 | — | R | S, MD | V, CO | FN, NF |
| 37a. We didn't know they [CBRN SCBA] were available | 15.1 | — | — | S, MD | CO | NF |
| 37a. We don't have adequate technical information to purchase them [CBRN SCBA] | 19.7 | M, W | R | S, MD | V, CO | NF |

Note: SO = South; M = Midwest; W = West; R = rural; S = small; MD = medium; V = volunteer; CO = combination; NF = no prior fatality; FN = prior fatality and no FFFIPP investigation; — = does not apply (no significant pattern).

Source: Fire Department Survey.

- Departments in the South and Midwest are more likely to say, "We have never established an RIT/RIC" (Q28—Reasons RITs/RICs are not always used; 11.2%, 18.8%, 25.7%, and 7.2% for Northeast, South, Midwest, and West, respectively).
- Departments in the Midwest and West are more likely than those in the South to say, "We don't have adequate technical information to purchase them" (Q37a—Reasons CBRN SCBA unavailable; 18.8%, 15.3%, 22.7%, and 25.6%).

There are no statistically significant patterns among departments for Questions 28 ("We use other safety practices [instead of RITs] and so don't need them"), 33a ("Shared systems [instead of personally fitted SCBA facepieces] work fine for our needs"), or 37a ("Didn't know it [CBRN SCBA] was recommended").

**Jurisdiction Type.** Rural fire departments are significantly more likely than urban fire departments to indicate that they do not engage in a recommended safety procedure because the procedure is not their usual practice. Specifically, rural departments are more likely than urban departments to say the following:

- "We have never established an RIT/RIC" (Q28—Reasons RITs/RICs are not always used; 19.0% and 5.9% for rural and urban, respectively).
- "We use other safety practices and so don't need them" (Q28—Reasons RITs/RICs are not always used; 3.5% and 0.9%).
- "Shared systems work fine for our needs" (Q33a—Reasons personally fitted SCBA facepieces are not available; 24.3% and 11.4%).
- "We don't have adequate technical information to purchase them" (Q37a—Reasons CBRN SCBAs are unavailable; 21.0% and 14.4%).

There are no statistically significant patterns among departments for Questions 33a and 37a ("Didn't know it was recommended").

*The smaller the jurisdiction, the more likely the department will say, "Shared systems work fine for our needs."*

**Size of Jurisdiction.** Fire departments in small and medium jurisdictions are more likely than those in large jurisdictions to say they do not engage in a recommended safety procedure because it is not their usual practice. The smaller the jurisdiction, the more likely the department is to say the following:

- "We have never established an RIT/RIC" (Q28—Reasons RITs/RICs are not always used; 1.5%, 8.3%, and 22.5% for large, medium, and small, respectively).
- "Shared systems work fine for our needs" (Q33a—Reasons personally fitted SCBA facepieces are not available; 5.0%, 18.2%, and 26.4%).
- "We didn't know they were available" (Q37a—Reasons CBRN SCBAs unavailable; 6.0%, 11.2%, and 17.1%).
- "We don't have adequate technical information to purchase them" (Q37a–Reasons CBRN SCBAs unavailable; 7.8%, 15.7%, and 21.9%).

In addition, departments in small jurisdictions are more likely than those in medium and large jurisdictions to say, "We use

other safety practices and so don't need them" (Q28—Reasons RITs/RICs are not always used; 2.4%, 1.3%, and 5.6%).

Cell sizes are too small to make reliable estimates for the indicator, "Didn't know it was recommended" (Q33a—Reasons personally fitted SCBA facepieces are not available).

"Safety officers in volunteer departments don't take the issue as seriously as they do in career departments." —focus group participant

**Type of Department.** Fire departments with a volunteer or combination workforce tend to indicate more often than career departments that they do not engage in a recommended safety procedure because it is not their usual practice. Volunteer and combination departments are more likely to say the following:

- "We have never established an RIT/RIC" (Q28—Reasons RITs/RICs are not always used; 4.6%, 14.8%, and 20.3% for career, volunteer, and combination, respectively).
- "Shared systems work fine for our needs" (Q33a—Reasons personally fitted SCBA facepieces are not available; 4.2%, 24.3%, and 24.5%).
- "We don't have adequate technical information to purchase them" (Q37a—Reasons CBRN SCBAs are unavailable; 7.8%, 20.1%, and 20.4%).

In addition were the following responses:

- Volunteer departments are more likely than career departments to cite, "We use other safety practices and so don't need them," as a reason for not using RITs (Q28—Reasons RITs/RICs are not always used; 1.8%, 5.9%, and 3.5%).
- Combination career-volunteer departments are more likely than career departments to say, "We didn't know they were available" (Q37a—Reasons CBRN SCBAs unavailable; 9.6%, 15.0%, and 15.5%).

The same pattern exists for the response, "Didn't know it was recommended," but the cell sizes are too small for a reliable estimate (Q33a—Reasons personally fitted SCBA facepieces are not available).

**Experience with On-Duty Fatality and FFFIPP Investigation.** Fire departments that do not have a prior firefighter fatality are more likely than those that do to cite lack of information as reason for not having CBRN SCBA:

- "We didn't know they were available" (Q37a—Reasons CBRN SCBAs unavailable; 7.1%, 7.9%, and 15.2% for

fatality-with-investigation, fatality-without-investigation, and no-fatality departments, respectively).

- "We don't have adequate technical information to purchase them" (Q37a—Reasons CBRN SCBAs are unavailable; 11.3%, 12.6%, and 19.8%).

Departments that have not experienced a FFFIPP investigation are more likely than departments that have a prior investigation to say they do not have individual facepieces because having them is not their usual practice:

- "Shared systems work fine for our needs" (Q33a—Reasons personally fitted SCBA facepieces are not available; 14.5%, 27.5%, and 23.5%).

In addition, departments that have no prior fatality are more likely than fatality-with-investigation departments to cite similar reasons for not using RITs:

- "We have never established an RIT/RIC" (Q28—Reasons RITs/RICs are not always used; 7.0%, 11.5%, and 17.8% for fatality-with-investigation, fatality-without-investigation, and no-fatality departments, respectively).

There are no significant differences for the remaining two indicators ("We use other safety practices and so don't need them" [Question 28—Reasons RITs/RICs are not always used], and "Didn't know it was recommended" [Q33a—Reasons personally fitted SCBA facepieces are not available]).

### 6.3.3 Fire Department Determines That the Situation Does Not Warrant It

Another reason fire departments may not implement FFFIPP-recommended safety procedures relates to whether the situation on the fireground warrants using those procedures. Questions 22, 25, 28, 31, 35, and 37a include response options that capture situational reasons for not using Incident Command, RITs, PASS devices, and SCBA. A summary of the findings is provided in ***Exhibit 6-12***. Fire departments that most likely cite situational reasons include departments that are located in the South or Midwest, those serving in rural and small jurisdictions, and those that are combination or all-volunteer. In most cases, not having any experience with a previous on-duty firefighter fatality is also associated with this potential barrier.

**Exhibit 6-12. Situational Reasons, by Fire Department Characteristics**

| Questionnaire Item | Overall Percentage | Fire Department | | | | |
|---|---|---|---|---|---|---|
| | | Region | Jurisdiction Type | Size of Jurisdiction | Type of Department | Fatality/ Investigation |
| 22. Fires are not usually big enough to require an Incident Commander | 22.5 | M | R | S, MD | V, CO | NF |
| 25. Fires are not usually big enough to require an Incident Safety Officer | 32.3 | SO, M, W | R | — | — | NF |
| 28. Structure fire may not be large enough to need an RIT/RIC | 34.9 | M | R | S | V | NF |
| 31. Situation doesn't require them [PASS devices] | 9.5 | M | R | S, MD | V, CO | FN, NF |
| 33a. Have never needed them [personally fitted SCBA facepieces] | 0.7 | — | — | — | — | — |
| 35. Situation doesn't require them [SCBA] | 25.9 | M | R | S | V, CO | NF |
| 37a. CBRN SCBA devices are not needed in our department | 20.9 | — | R | S | V, CO | — |

Note: SO = South; M = Midwest; W = West; R = rural; S = small; MD = medium; V = volunteer; CO = combination; NF = no prior fatality; FN = prior fatality and no FFFIPP investigation; — = does not apply (no significant pattern).

Source: Fire Department Survey.

**Region.** In general, fire departments in the Midwest are more likely than other departments to cite situational reasons, such as, "The fire is not big enough," for not complying with FFFIPP-recommended safety practices. Following are specific response patterns related to these indicators:

- Departments in the Midwest are significantly more likely than those in the Northeast and West to say, "Fires are not usually big enough to require an Incident Commander" (Q22—Reasons Incident Command is not established; 15.9%, 24.6%, 27.5%, and 16.6% for departments in the Northeast, South, Midwest, and West, respectively).
- Departments in the Northeast are less likely than those in other regions to say, "Fires are not big enough to require an Incident Safety Officer." There is no significant pattern by

region among departments that say this is a reason for not assigning an ISO (Q25—Reasons an Incident Safety Officer is not assigned; 23.7%, 33.7%, 33.7%, and 39.5%).

- Fire departments in the Midwest are significantly more likely than those in the Northeast and South to say, "Structure fire may not be large enough to need an RIT/RIC" (Q28—Reasons the department does not always use RITs/RICs; 27.5%, 34.1%, 41.5%, and 34.8%).
- Fire departments in the Midwest are significantly more likely than those in the Northeast and West to say, "Situation doesn't require them" (Q31—Reasons PASS devices are not used; 3.9%, 10.0%, 14.5%, and 6.2%).
- Fire departments in the Midwest are significantly more likely than those in the Northeast and West to say, "Situation doesn't require them" (Q35—Reasons SCBAs are not used more often; 17.9%, 27.9%, 31.8%, and 19.9%).

There is no statistically significant pattern among departments for Question 33a ("Have never needed them") or Question 37a ("CBRN SCBA devices are not needed in our department").

*Rural fire departments are significantly more likely than urban departments to cite situational reasons for not complying with FFFIPP-recommended safety practices.*

**Jurisdiction Type.** Rural fire departments are significantly more likely than urban departments to cite situational reasons for not complying with FFFIPP-recommended safety practices. Rural departments are more likely to say the following:

- "Fires are not usually big enough to require an Incident Commander" (Q22—Reasons Incident Command is not established; 24.9% and 7.8% for rural and urban, respectively).
- "Fires are not usually big enough to require an Incident Safety Officer" (Q25—Reasons an Incident Safety Officer is not assigned; 33.3% and 26.5%).
- "Structure fire may not be large enough to need an RIT/RIC" (Q28—Reasons RITs/RICs are not always used; 35.5% and 28.1%).
- "Situation doesn't require them" (Q31—Reasons PASS devices not used more often; 11.5% and 1.4%).
- "Situation doesn't require them" (Q35—Reasons SCBAs not used more often; 27.5% and 9.9%).
- "CBRN SCBA devices are not needed in our department" (Q37a—Reasons CBRN SCBAs unavailable; 21.1% and 13.6%).

**Size of Jurisdiction.** Fire departments in small jurisdictions are significantly more likely than other departments to cite

situational reasons for not complying with FFFIPP-recommended safety practices. The smaller the jurisdiction, the more likely the department is to report the following:

- "Fires are not usually big enough to require an Incident Commander" (Q22—Reasons Incident Command is not established; 6.3%, 12.8%, and 27.5% for large, medium, and small, respectively).
- "Situation doesn't require them" (Q31—Reasons PASS devices not used more often; 0.4%, 5.7%, and 11.6%).

In addition, departments in small jurisdictions are more likely than those in medium and large jurisdictions to cite the following as a reason:

- "Structure fire may not be large enough to need an RIT/RIC" (Q28—Reasons RITs/RICs are not always used; 24.5%, 31.2%, and 37.0%).
- "Situation doesn't require them" (Q35—Reasons SCBAs not used more often; 10.3%, 12.9%, and 32.1%).
- "CBRN SCBA devices are not needed in our department" (Q37a—Reasons CBRN SCBAs are unavailable; 10.4%, 13.1%, and 24.7%).

There is no significant pattern for Question 25, and cell sizes are too small for reliable estimates for Question 33a.

**Type of Department.** Volunteer and combination fire departments are more likely than career departments to cite situational reasons for not complying with FFFIPP-recommended safety practices. Volunteer and combination departments are more likely than career departments to say the following:

- "Fires are not usually big enough to require an Incident Commander" (Q22—Reasons Incident Command is not established; 10.2%, 23.6%, and 22.9% for career, volunteer, and combination, respectively).
- "Situation doesn't require them" (Q31—Reasons PASS devices are not used more often; 2.0%, 7.1%, and 11.4%).
- "Situation doesn't require them" (Q35—Reasons SCBAs are not used more often; 8.2%, 23.8%, and 28.4%).
- "CBRN SCBA devices are not needed in our department" (Q37a—Reasons CBRN SCBAs are unavailable; 10.5%, 18.1%, and 23.4%).

In addition, volunteer departments are more likely than career departments to cite the following as a reason:

- "Structure fire may not be large enough to need an RIT/RIC" (Q28—Reasons RITs/RICs are not always used; 29.3%, 38.0%, and 33.6%).

There is no significant pattern for Question 25, and cell sizes are too small for reliable estimates for Question 33a.

*Departments without a prior fatality are more likely to say, "Structure fire may not be large enough to need an RIT/RIC."*

**Experience with On-Duty Fatality and FFFIPP Investigation.** A prior firefighter fatality and a prior FFFIPP investigation can affect whether a fire department says it has situational reasons for not complying with FFFIPP-recommended safety practices. Departments without a prior fatality are more likely to say the following:

- "Fires are not usually big enough to require an Incident Commander" (Q22—Reasons Incident Command is not established; 8.0%, 10.4%, and 22.7% for fatality-with-investigation, fatality-without-investigation, and no-fatality departments, respectively).
- "Fires are not usually big enough to require an Incident Safety Officer" (Q25—Reasons an Incident Safety Officer is not assigned; 20.5%, 15.9%, and 32.5%).
- "Structure fire may not be large enough to need an RIT/RIC" (Q28—Reasons RITs/RICs are not always used; 25.4%, 23.4%, and 35.1%).
- "Situation doesn't require them" (Q35—Reasons SCBAs not used more often; 18.1%, 17.1%, and 26.0%).

*Departments that have not experienced a FFFIPP investigation are more likely to cite, "Situation doesn't require PASS devices."*

Departments that have not experienced a FFFIPP investigation are more likely than those that have to state, "Situation doesn't require them" (Q31—Reasons PASS devices not used more often; 3.0%, 9.9%, and 9.5%).

In addition, no-fatality departments are more likely than fatality-with-investigation departments to cite "CBRN SCBA devices are not needed in our department" as a reason these devices are not available at the department (Question 37a; 8.9%, 17.6%, and 21.1%).

Cell sizes are too small for reliable estimates for Question 33a.

### 6.3.4 Firefighter Resistance

Fire departments were asked a number of questions about issues related to firefighter resistance as a reason for not engaging in recommended safety practices. Questions 31, 33a, and 35 provide response options related to this barrier for use of PASS devices, SCBA, and personally fitted facepieces for

SCBA. A summary of the findings is provided in ***Exhibit 6-13***. Fire departments that are most likely to cite firefighter resistance as a barrier serve rural and small jurisdictions and those with combination career-volunteer staffs.

**Exhibit 6-13. Firefighter Resistance, by Fire Department Characteristics**

| Questionnaire Item | Overall Percentage | Fire Department | | | | |
|---|---|---|---|---|---|---|
| | | Region | Jurisdiction Type | Size of Jurisdiction | Type of Department | Fatality / Investigation |
| 31. Firefighters don't think they need them [PASS devices] | 4.6 | — | R | S | CO | — |
| 33a. Firefighters don't like using the equipment [personally fitted SCBA facepieces] | 0.3 | — | R | — | — | — |
| 35. Firefighters don't think they need them [SCBA] | 10.3 | — | R | S | CO | — |
| 35. Wearing SCBAs makes it more difficult to work | 5.9 | M | R | S | — | — |

Note: M = Midwest; R = rural; S = small; CO = combination; — = does not apply (no significant pattern).

Source: Fire Department Survey.

The focus group discussions provide additional evidence for this perception of firefighter resistance. Firefighters told us, for example, that some safety practices are considered impractical:

*"You don't always have the personnel in the early stages of the attack to follow the '2 in 2 out' rule."—focus group participant*

*There is an inherent risk to what we do.*

*The "2 in 2 out" rule—This is not a job where you can just wait for the rest of the guys to show up; you don't always have the personnel in the early stages of the attack to follow the "2 in 2 out" rule. "2 in 2 out" can limit our effectiveness.*

*There is pressure from the public. . . . Some of these departments, you've got so much politics going on, they really push you and there are always these threats that they will cut your budget.*

**Region.** Fire departments in the Midwest are somewhat more likely than those in other regions of the country to cite firefighter resistance as the reason SCBA are not used more often. Regarding firefighter resistance, there are no other

statistically significant patterns by region. The only specific pattern by region for this issue is that fire departments in the Midwest are significantly more likely than those in the Northeast and West to say, "Wearing SCBAs makes it more difficult to work" (Q35—Reasons SCBAs not used more often). The proportions are

- Northeast, 3.6%,
- South, 6.4%,
- Midwest, 8.0%, and
- West, 3.6%.

There is no statistically significant pattern across regions for Questions 31 ("Firefighters don't think they need them [PASS devices]"), 33a ("Firefighters don't like using the equipment [personally fitted SCBA facepieces]"), or 35 ("Firefighters don't think they need them [SCBA]").

**Jurisdiction Type.** Rural fire departments are significantly more likely than urban departments to cite firefighter resistance as a reason for not using PASS devices and SCBA equipment. Rural departments are more likely to say the following:

- "Firefighters don't think they need them" (Q31—Reasons PASS devices not used more often; 6.4% and 1.4% for rural and urban, respectively).
- "Firefighters don't think they need them" (Q35—Reasons SCBAs not used more often; 11.4% and 7.3%).
- "Wearing SCBAs makes it more difficult to work" (Q35—Reasons SCBAs not used more often; 7.3% and 2.0%).

The cell sizes are too small to make reliable estimates regarding Question 33a ("Firefighters don't like using the equipment [personally fitted SCBA facepieces]").

**Size of Jurisdiction.** Fire departments in small jurisdictions are more likely than those in medium and large jurisdictions to cite firefighter resistance as a reason for not using PASS devices and SCBA equipment. Fire departments in small jurisdictions are more likely to say the following:

- "Firefighters don't think they need them" (Q31—Reasons PASS devices not used more often; 1.0%, 2.7%, and 5.6%).
- "Firefighters don't think they need them" (Q35—Reasons SCBAs not used more often; 6.3%, 6.9%, and 12.0%).

- "Wearing SCBAs makes it more difficult to work" (Q35—Reasons SCBAs not used more often; 3.3%, 3.9%, and 6.9%).

Cell sizes are too small to make reliable estimates for the indicator, "Firefighters don't like using the equipment" (Q33a—Reasons the department does not have personally fitted SCBA facepieces for all firefighters).

**Type of Department.** Fire departments with a combination (career and volunteer) workforce are significantly more likely than career or volunteer departments to cite firefighter resistance as a reason for not using PASS devices and SCBA equipment. Combination departments are more likely to say the following:

- "Firefighters don't think they need them" (Q31—Reasons PASS devices not used more often; 1.4%, 2.3%, and 6.1% for career, volunteer, and combination, respectively).
- "Firefighters don't think they need them" (Q35—Reasons SCBAs not used more often; 7.6%, 7.4%, and 12.1%).

However, there is no statistically significant pattern among departments that responded, "Wearing SCBAs makes it more difficult to work" (Question 35). Cell sizes are too small for reliable estimates for the indicator, "Firefighters don't like using the equipment" (Question 33a).

**Experience with On-Duty Fatality and FFFIPP Investigation.** There is no significant pattern based on prior experience with either a firefighter fatality or investigation.

## 6.4 FACTORS THAT PROMOTE SAFE PRACTICES

### 6.4.1 Experience with an On-Duty Firefighter Fatality

The results of the Fire Department Survey indicate that an on-duty firefighter fatality can have a significant impact on fire department safety practices. Regardless of whether the department also experienced a FFFIPP investigation, departments that have a prior fatality are less likely than other departments to identify personnel, equipment, or situational barriers to implementing FFFIPP-recommended safety practices. Fire departments that have a prior firefighter fatality are less likely to say the following:

- "Fires are not big enough" to establish Incident Command, assign an Incident Safety Officer, establish RIT, and use SCBA.
- There are "not enough firefighters available on the scene" to establish Incident Command or RIT.
- There is "not enough equipment, SCBAs, or turnout gear" to establish RIT.

Data from the focus group discussions support these findings. We asked a series of questions during the focus group discussions to determine how safety guidelines generally are received by firefighters.[55] Frontline firefighters whose departments have experienced a line of duty death are aware of the FFFIPP and its impact on department policy:

> *If there is a specific incident and it gets a lot of media attention, the impact can be huge and immediate.*
>
> *A lot depends on the public outcry and the media attention.*

### 6.4.2 Experiencing a FFFIPP Investigation

*FFFIPP investigations have had an impact on the perceived barriers to using PASS devices and individual SCBA facepieces.*

FFFIPP investigations can also have a significant impact on departmental policies. Comparing fatality-with-investigation with fatality-without-investigation departments, the Fire Department Survey results suggest that FFFIPP investigations have had an impact on the perceived barriers to using PASS devices and individual SCBA facepieces. Departments that have experienced a FFFIPP investigation are less likely than those that have not to say the following:

- They "don't have enough PASS devices to use."
- "Shared systems [instead of personally fitted SCBA facepieces] work fine for our needs."
- The "situation doesn't require them [PASS devices]."

[55] Following are some of the questions: Does the safety information you and your department receive have an impact on what people do either in training or fighting fires? Do you change the way you do things after you have read or heard a presentation on new safety guidelines? Have there been events within your department that have had an impact on how your department follows safety guidelines?

*"We had a NIOSH investigation at my department, and it was really tough. But afterwards, it was like we made 25 years of progress in a few months."—focus group participant*

Data from the focus group discussions support these findings. Frontline firefighters whose departments have experienced a FFFIPP investigation told us the following, for example:

> *The LODD report affected a lot of our procedures. Both policies and practices were affected.*
>
> *We had a NIOSH investigation at my department, and it was really tough. They came in and they really reamed us. But afterwards, it was like we made 25 years of progress in a few months. We didn't have an accountability system. The gear was 10 years old and had never been cleaned. It really raised the Chief's consciousness. Until then, we just got away with it. Then a light bulb went off.*

Another focus group participant noted the following:

> *Having an independent agency conduct the investigation is important. Their brutal honesty when they come in is what helps. . . . It usually brings good change when it comes.*

### 6.4.3 Enforcement Mechanisms

Firefighters indicated that the most effective ways to encourage safety practices are enforcement mechanisms tied to financial and other penalties. The focus group data suggest that financial and legal penalties, as well as their officer's attention to specific safety issues, can have a significant impact on firefighter behavior.

Several firefighters described the financial and legal penalties on fire departments that can motivate greater safety practices. Firefighters are aware that their actions can result in citations, lawsuits, and fines against the fire department:

*"The department's ISO rate is determined in part by its rating on the level of safety training provided."—focus group participant*

> *The department's ISO [Insurance Services Office] rate is determined in part by its rating on the level of safety training provided. The ISO rate, in turn, affects insurance rates.*
>
> *The safety regulations, and especially the way they are enforced, are motivated primarily by a desire to minimize liability. The legal departments seem to dictate what needs to be done.*
>
> *If something goes wrong at the fire scene, there could be repercussions. If OSHA determines that it was the firefighter's fault, OSHA may fine the department, and there would be a big internal investigation and then someone sitting behind a desk would write 10 new regulations.*

*It is unusual for a fire department to be cited, but that's becoming more common. It really brings the issue home for the firefighter when that happens, so I use that information in training.*

*There is also the risk of a lawsuit if a civilian is injured.*

Firefighters acknowledge that they take safety precautions more seriously if there are tangible personal penalties for ignoring them. The penalties that can be imposed on firefighters include days off without pay, denied promotions, demotions or loss of job, and loss of death benefits in the event of a line of duty death:

*"Our Chief makes us take days off without pay if the firefighter does not use a seat belt."—focus group participant*

*Our Chief makes us take days off without pay if the firefighter does not use a seat belt. That gets people's attention. He's also said that if you lose an eye because you failed to have your gear on properly, you will be fired.*

*The department monitors compliance, and gets tough with noncompliers. Compliance affects promotions, demotions.*

*My department keeps a clipboard next to the information. You have to sign off on it showing that you read the material. If something happens, then you could be penalized for not following it.*

*We have officers who finally are "getting" the seat belt issue and are helping to drive that home. . . . And they threaten fines. That's how to get through to some of these folks.*

*"The insurance company won't cover you if you don't have all equipment on correctly."—focus group participant*

*The insurance company won't cover you if you don't have all equipment on correctly. In [our big city department], the legal department has told the union the family won't get death benefits if the firefighter was negligent. But firefighters also see the value of safety.*

As these comments suggest, fire department officers play a key role in promoting safety. However, firefighters can receive mixed messages from their officers, as the following comments show:

*"The firefighters don't mind wearing their vests and following the other regulations, but they get mixed messages from the administration."—focus group participant*

*Some officers are more aggressive than others about safety. There are some officers who could care less about the safety issue, but most of the officers are positive about safety.*

*It depends on the situation and the specific issue. Our Chief is strict about seat belts but not as strict about other things.*

*The firefighters don't mind wearing their vests and following the other regulations, but they get mixed messages from the administration.*

*When these guys make Lieutenant, they stop trying to learn more about safety, stop going to conferences like this.*

*Most of the awards for valor usually involve . . . doing things you aren't supposed to do. It's in our nature to want to save someone. If nothing goes wrong despite ignoring the rule, you'll be praised for saving someone.*

*It's also how the officers approach the physical fitness issue. Our officers make exercising a punishment instead of something that is fun. . . . Also, the officers preach it but then they don't do it themselves. They aren't physically fit either.*

*"Most of the awards for valor usually involve . . . doing things you aren't supposed to do." —focus group participant*

Firefighters also told us that union representation promotes safety:

*Having the union presence makes a lot of difference.*

*"Having the union presence makes a lot of difference."—focus group participant*

## 6.5 FIREFIGHTER-LEVEL ESTIMATES

The findings reported in the preceding paragraphs are at the fire department level of analysis. ***Exhibit 6-14*** provides a summary of the findings on these same topics at the firefighter level of analysis. The tables on which the firefighter level of analysis is based are provided in Appendix C.

The patterns revealed in these data are similar to those at the fire department level. Over a quarter of firefighters (26.3%) work in departments where firefighters are unable to fit comfortably in their seat belts while wearing turnout gear in emergency vehicles. Numerically, the greatest barrier is not having enough personnel on hand to follow FFFIPP recommendations regarding assigning an ISO and establishing RIT. Two fifths of the nation's firefighters work for departments where staffing prevents them from following these two FFFIPP guidelines.

Generally, the proportions of firefighters affected by the various barriers identified in this evaluation are lower than the corresponding proportions of fire departments. For example, 21.2% of fire departments say they do not have enough PASS devices for their firefighters, whereas this barrier affects only 13.6% of the nation's firefighters. This relationship holds for almost all barriers examined. One exception is firefighter

resistance. Although 10.3% of fire departments say firefighters sometimes do not use SCBA, because they "don't think they need them," the proportion at the firefighter level is 11.4%.

The characteristics of fire departments that have specific barriers that limit the FFFIPP's impact are similar at the fire department and firefighter levels. Firefighters who work in small, rural, and volunteer departments, particularly those that have not experienced a firefighter fatality, are more likely than others to perceive barriers to implementing FFFIPP recommendations.

**Exhibit 6-14. Factors Influencing the FFFIPP's Impact, by Proportions of Fire Departments and Firefighters**

| Barrier: Not Enough Equipment | Overall Percent of Fire Departments | Overall Percent of Firefighters |
|---|---|---|
| 28. We don't have enough equipment, SCBAs, or turnout gear to establish an RIT/RIC | 8.8 | 4.9 |
| 29. Does your fire department have enough Personal Alert Safety System (PASS) devices for all firefighters for use when fighting structure fires? ("No") | 21.2 | 13.6 |
| 31. They don't have a PASS device to use | 13.1 | 8.3 |
| 33a. We don't have enough equipment [SCBA] for all of our firefighters to use | 24.6 | 17.9 |
| 35. Firefighters don't have SCBAs to use | 3.9 | 2.7 |
| **Barrier: Problems With Equipment** | | |
| 17. Firefighters not able to fit comfortably in their seat belts while wearing turnout gear in emergency vehicles? | 24.9 | 26.3 |
| 31. Firefighters think the [PASS] devices do not always work reliably | 0.3 | 0.2 |
| 31. [PASS] devices go off while firefighters are resting | 3.7 | 2.6 |
| 35. Firefighters don't trust that SCBAs will work reliably | — | — |
| 35. Firefighters don't like sharing [SCBA] facepieces with others | 1.0 | 0.5 |
| 35. Firefighters are concerned that the SCBA may be or become contaminated | 0.0 | — |

(continued)

**Exhibit 6-14. Factors Influencing the FFFIPP's Impact, by Proportions of Fire Departments and Firefighters (continued)**

| Barrier: Not Enough Personnel | Overall Percent of Fire Departments | Overall Percent of Firefighters |
|---|---|---|
| 22. Not enough firefighters are available at the scene of the fire [to establish Incident Command] | 21.2 | 12.6 |
| 25. Not enough firefighters are available at the scene of the fire [to assign an Incident Safety Officer] | 51.7 | 42.4 |
| 28. We don't have enough firefighters available at the scene of a fire [to establish RIT/RIC] | 53.5 | 41.7 |
| 28. We don't have enough training or trained personnel at the scene to establish RIT/RIC | 20.7 | 13.6 |
| **Barrier: Not a Usual Practice** | | |
| 28. We have never established an RIT/RIC | 17.7 | 10.6 |
| 28. We use other safety practices and so we don't need them [RIT/RIC] | 4.2 | 2.6 |
| 33a. Didn't know it [personally fitted SCBA facepieces] was recommended | 4.8 | 3.1 |
| 33a. Shared systems [not personally fitted SCBA facepieces] work fine for our needs | 23.4 | 19.3 |
| 37a. We didn't know they [CBRN SCBA] were available | 15.1 | 11.2 |
| 37a. We don't have adequate technical information to purchase them [CBRN SCBA] | 19.7 | 15.4 |
| **Barrier: Situational Reasons** | | |
| 22. Fires are not usually big enough to require an Incident Commander | 22.5 | 15.1 |
| 25. Fires are not usually big enough to require an Incident Safety Officer | 32.3 | 28.0 |
| 28. Structure fire may not be large enough to need an RIT/RIC | 34.9 | 29.7 |
| 31. Situation doesn't require them [PASS devices] | 9.5 | 6.3 |
| 33a. Have never needed them [personally fitted SCBA facepieces] | 0.7 | 0.2 |
| 35. Situation doesn't require them [SCBA] | 25.9 | 20.1 |
| 37a. CBRN SCBA devices are not needed in our department | 20.9 | 16.6 |
| **Barrier: Firefighter Resistance** | | |
| 31. Firefighters don't think they need them [PASS devices] | 4.6 | 3.2 |
| 33a. Firefighters don't like using the equipment [personally fitted SCBA facepieces] | 0.3 | 0.1 |
| 35. Firefighters don't think they need them [SCBA] | 10.3 | 11.4 |
| 35. Wearing SCBAs makes it more difficult to work | 5.9 | 4.4 |

## 6.6 MULTIVARIATE MODELS

As in the prior sections of this report, the bivariate analyses reported in the preceding discussion suggest that fire departments in smaller, rural jurisdictions and those with volunteer staff are more likely to encounter barriers to implementing FFFIPP recommendations. To examine the relative importance of the five fire department characteristics on barriers to implementation, multivariate models were developed for the responses to Question 33a. Complete details are provided in the tables in the second part of Appendix C.

An overview of the key findings is provided in ***Exhibit 6-15***. These findings can be compared with the corresponding findings for the bivariate models reported in Exhibits 6-5 and 6-11. They show that only the size of the jurisdiction remains a significant factor with a distinct pattern, but for only one of the two models. In addition, region emerges as a significant characteristic for the first model. Although these models address only two items related to factors that influence implementation of the FFFIPP, they suggest that fire departments may encounter barriers, regardless of region, jurisdiction, type of department, or history with a firefighter fatality or FFFIPP investigation.

**Exhibit 6-15. Not Enough Equipment, by Fire Department Characteristics, Based on Multivariate Models**

| Questionnaire Item | Fire Department Characteristic | | | | |
|---|---|---|---|---|---|
| | Region | Jurisdiction Type | Size of Jurisdiction | Type of Department | Fatality / Investigation |
| 33a. We don't have enough equipment [SCBA] for all of our firefighters to use | M, W* | — | S* | — | — |
| 33a. Shared systems [not personally fitted SCBA facepieces] work fine for our needs | — | — | — | — | — |

Note: S = small; M = Midwest; W = West; — = does not apply (no significant pattern).

Source: Fire Department Survey.

*The p-value for this fire department characteristic is significant at the .05 level. See note "a" in the models in Appendix C.

# 7 Findings: Dissemination Methods

This section presents the results from the Fire Department Survey and firefighter focus groups on the National Institute for Occupational Safety and Health's (NIOSH's) methods for sharing the findings of the Fire Fighter Fatality Investigation and Prevention Program (FFFIPP) investigations with the fire service. Specifically, it addresses the following question:

- What changes are appropriate, if any, in the content or format of recommendations developed by NIOSH?

Only about half of officers agree that NIOSH reports are practical, easy to understand, specific, and concrete. These tend to be officers in large urban jurisdictions. Firefighters say that learning about specific incidents helps them develop safer work practices, and they appreciate that the Line of Duty Death (LODD) reports are unbiased. However, they also suggest that the recommendations be made stronger, more straightforward, and less generic, and that they take into consideration the size and resources of the department. Some also recommend outside expert review of the FFFIPP reports.

Focus group participants think the LODD reports are generally well designed, but recommend making it easier to skim through them by making more effective use of headings and headlines, adding more visual aids to clarify the fire scene (a timeline, a diagram of the fire scene, and more photos), and adding information about the victims. They also recommend that NIOSH prepare summary documents with statistics showing the number of deaths and injuries due to specific unsafe practices,

using communication techniques employed by the print media. Firefighters also want to receive the LODD reports as soon as possible after an incident.

Fire department officers want help translating FFFIPP recommendations into actionable items for their departments. There is particular interest in receiving ready-made training material (including PowerPoint presentations and lesson plans) based on the LODD reports. Other management tools that would be helpful include sample standard operating procedures (SOPs) based on the FFFIPP recommendations.

The most common recommendation from the fire department officers is for improvements in the ways FFFIPP materials are disseminated and marketed. For example, firefighters recommend that NIOSH update the FFFIPP mailing list and e-mail listserv, implement procedures for refreshing these lists, and better advertise the lists. Most firefighters have not visited the NIOSH website. One recommendation is that NIOSH create a banner with the NIOSH website address to post on fire station bulletin boards and redesign the website to make it more firefighter-friendly.

Finally, focus group participants suggest that NIOSH develop coordinated campaigns around specific issues, focusing on one issue at a time, to raise awareness throughout the fire service.[56]

## 7.1 DOES NIOSH PROVIDE USEFUL AND PRACTICAL RECOMMENDATIONS? (Q49, 52A–C)

Although over a quarter of the officers responding to the Fire Department Survey reported no experience with the NIOSH reports (28%), about half of all officers who are aware of the NIOSH reports indicate that they agree that NIOSH reports are practical (49.3%), easy to understand (50.0%), and specific and concrete (41.7%).[57] In general, officers who provided the

[56]Many of the data for this section come from the focus group discussions and thus should not be quantified. For this reason, we do not provide a summary table of findings similar to those provided in the previous sections on findings.

[57]The nonresponse analysis suggests there may be nonresponse bias related to the response option “agree” in Questions 52a (recommendations are practical), 52b (recommendations are easy

most positive ratings regarding the reports are from fire departments that serve larger populations, are career, or are located in urban jurisdictions. Also, officers in fire departments with a previous firefighter fatality are generally more positive about the reports than those in departments that have not had a fatality.

Firefighters also agree the reports are useful. Several focus group participants said learning about specific incidents helped them develop safer work practices. They especially like talking to "people who have done it" and reading news articles:

> *You can read between the lines about what things people could do better.*
>
> *Sharing information in the fire service is a common part of the culture, like handing down skills from father to son.*
>
> *The information is useful for learning from others' mistakes.*

Many focus group participants said they valued the detailed, factual information provided in NIOSH's LODD reports:

> *The FFFIPP reports are regarded as more detailed and accurate than those in the trade journals.*
>
> *I appreciate that the LODDs are unbiased. That's hard for the departments themselves to do. They might be too tight-knit, not able to look critically at themselves.*

*"I appreciate that the LODDs are unbiased. That's hard for the departments themselves to do."—focus group participant*

A training officer reported the following:

> *We have a safety presentation once a quarter that lasts 1 or 2 hours. They are good. They focus on one topic. Also, each month, an officer will pull up an LODD report and review it with the firefighters for about 20 minutes.*

We asked the respondents to the Fire Department Survey if they had any suggestions for how NIOSH reports could be improved (Question 49). Among the suggestions are some that relate to the nature of the recommendations, including the following:

- Make recommendations stronger, more straightforward.
- Make recommendations less generic.
- Tailor the lessons to the fire department constraints such as their size, budget, and rural location.

*Make recommendations stronger, more straightforward.*

to understand), and 52c (recommendations are specific and concrete). See Exhibit B-8a in Appendix B for details.

- Submit recommendations for an independent outside expert review:

  *Consider use of an expert review to clarify the recommendations. Key information is sometimes left out of the report that would be readily identified by an appropriate expert reviewer.*

*"Consider use of an expert review to clarify the recommendations." —focus group participant*

Following are some additional, specific suggestions from survey respondents:

*Ensure the use of more authoritative sources (for fire behavior, in particular). The current edition of the IFSTA Essentials manual [International Fire Service Training] is targeted for entry-level firefighters and does not provide substantive information on the topic. I would recommend Enclosure Fire Dynamics by Karlsson and Quintiere, or An Introduction to Fire Dynamics by Drysdale.*

*Most of the tactical references used in the reports have been written by East Coast (largely FDNY) authors. While these individuals bring a great deal of experience, there are other perspectives on the topics in question.*

*More clearly separate the recommendations that are unrelated to the causal or contributory factors involved. This has been done in some reports, but not in others.*

*Examine the recommendations regarding ventilation more closely. Almost all recommendations focus on vertical ventilation (while other options receive some attention in the body of the reports). This at times conflicts with recommendations regarding truss-roof hazards.*

With respect to whether NIOSH recommendations are practical, easy to understand, and specific and concrete, there are some patterns of responses from the Fire Department Survey, details of which follow.

**Jurisdiction Type.** Officers in urban fire departments are significantly more likely than those in rural fire departments to report that NIOSH recommendations are practical, easy to understand, and specific and concrete. The proportions that "agree" or "strongly agree" with these statements are

- 63.4% in urban jurisdictions versus 47.8% in rural jurisdictions (practical),
- 66.6% versus 47.9% (easy to understand), and
- 54.7% versus 40.7% (specific and concrete).

See ***Exhibit 7-1*** for details.

**Size of Jurisdiction.** The larger the size of the jurisdiction served by the department, the more likely it is the officers find NIOSH recommendations practical, easy to understand, and specific and concrete. Officers in large jurisdictions are more likely than those in medium or small jurisdictions to "strongly agree" that NIOSH's recommendations have these characteristics. Officers in medium-sized jurisdictions are significantly more likely than those in small jurisdictions to "agree" that NIOSH's recommendations are practical, easy to understand, and specific and concrete. The combined percentages of officers who "agree" or "strongly agree" with these three statements are

- 69.0%, 60.3%, and 43.6%, for large, medium-sized, and small jurisdictions, respectively (practical),
- 75.0, 61.2%, and 44.0% (easy to understand), and
- 61.7%, 48.8%, and 37.8% (specific and concrete).

See ***Exhibit 7-2***.

**Type of Department.** Officers in career fire departments are more likely than those in other types of departments to say that NIOSH recommendations are practical, easy to understand, and specific and concrete. The proportions of officers who "agree" or "strongly agree" with these statements are

- 65.4%, 53.9%, and 45.5% for career, volunteer, and combination fire departments, respectively (practical),
- 70.6%, 54.5%, and 45.9% (easy to understand), and
- 57.0%, 43.6%, and 39.5% (specific and concrete).

See ***Exhibit 7-3***.

**Experience with On-Duty Fatality and FFFIPP Investigation.** Officers in departments with a previous fatality (regardless of whether a FFFIPP investigation had occurred) are more likely than those in departments without a prior fatality to "agree" that NIOSH recommendations are easy to understand and specific and concrete. A prior fatality is not a significant factor for whether the recommendations are considered practical. The combined percentages that "agree" or "strongly agree" are

- 65.9%, 59.3%, and 49.1% for fatality-with-investigation, fatality-without-investigation, and no-fatality departments, respectively (practical),

- 71.1%, 66.7%, and 49.7% (easy to understand), and
- 60.4%, 55.4%, and 41.5% (specific and concrete).

There are no significant differences based on prior FFFIPP investigation about whether NIOSH recommendations are considered practical, easy to understand, or specific and concrete. ***Exhibit 7-4*** provides a summary of the percentages that "agree" or "strongly agree" with these three statements about the NIOSH recommendations.

There is no significant pattern by region.

**Exhibit 7-1. How Much Do You Agree or Disagree with the Following Statements about the NIOSH Recommendations: Agree or Strongly Agree (Questions 52a–c), by Jurisdiction Type (Percent)**

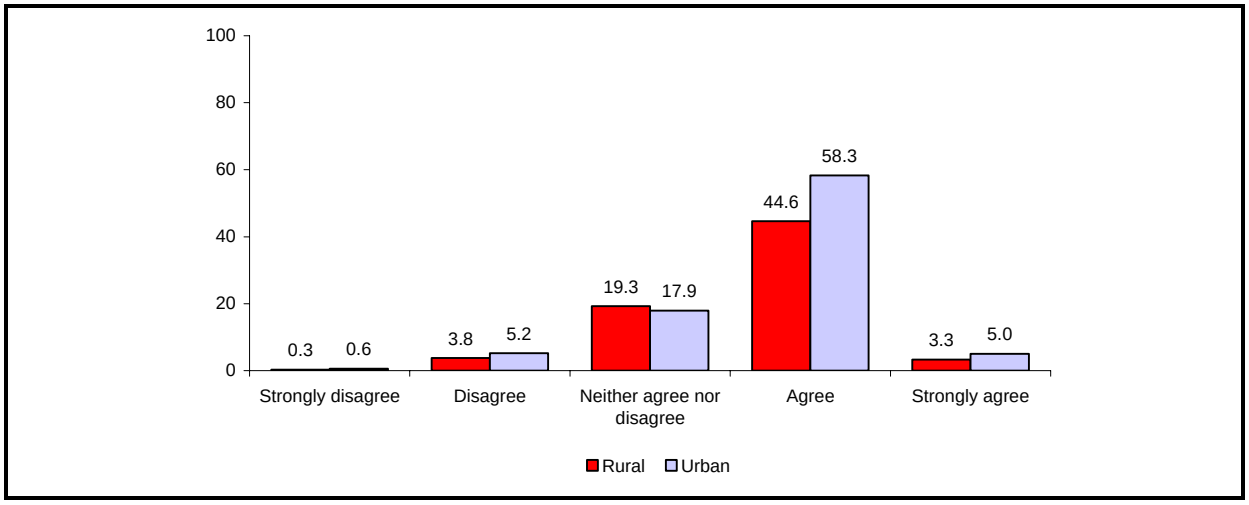



**Exhibit 7-2. How Much Do You Agree or Disagree with the Following Statements about the NIOSH Recommendations: Agree or Strongly Agree (Questions 52a–c), by Size of Jurisdiction (Percent)**

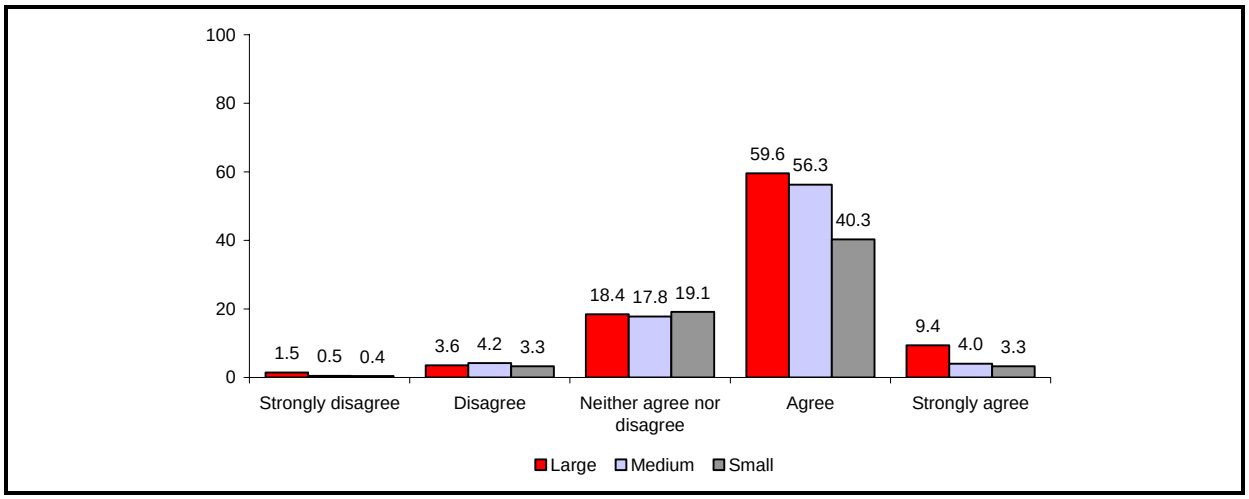


**Exhibit 7-3. How Much Do You Agree or Disagree with the Following Statements about the NIOSH Recommendations: Agree or Strongly Agree (Questions 52a–c), by Type of Department (Percent)**

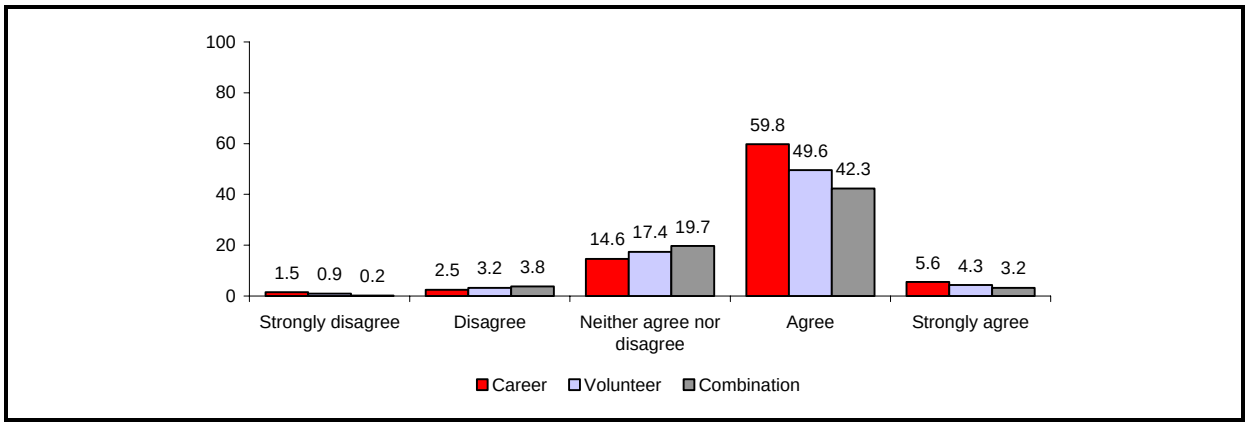
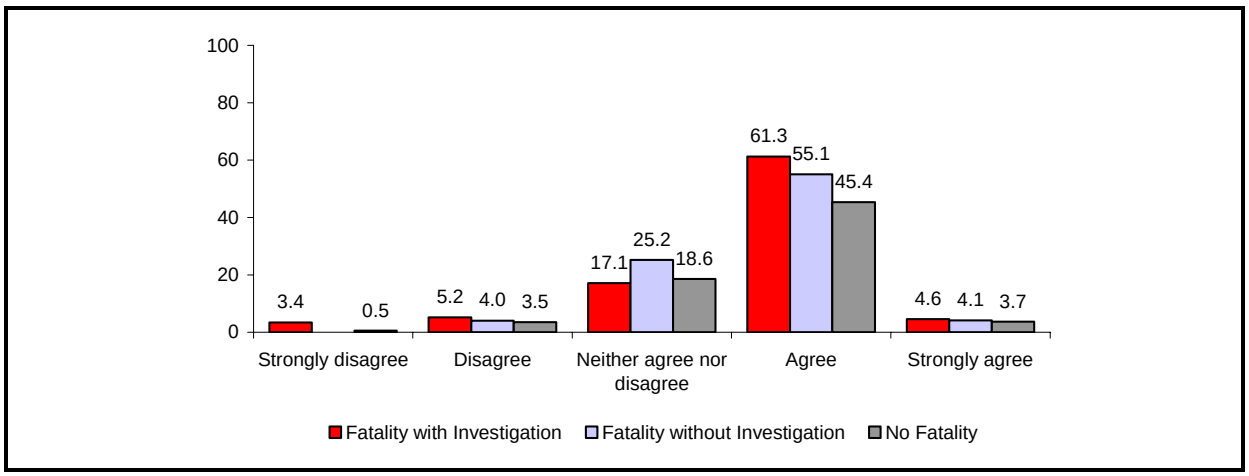



**Exhibit 7-4. How Much Do You Agree or Disagree with the Following Statements about the NIOSH Recommendations: Agree or Strongly Agree (Questions 52a–c), by Fatality and Investigation (Percent)**




## 7.2 DOES NIOSH PRESENT THE FINDINGS OF FFFIPP INVESTIGATIONS IN WAYS THAT ARE ACCESSIBLE TO FIRE DEPARTMENT STAFF? (Q47–49, 53A–54)

A number of questions were posed during the focus group discussions and in the Fire Department Survey about NIOSH's current materials for disseminating the findings of the FFFIPP investigations. Officers and firefighters are very appreciative of the unbiased, factual information provided in the LODD reports and offer a number of suggestions for enhancing the information provided in them, including ideas about both

formatting and content. A large proportion of officers and firefighters are not familiar with other NIOSH materials or with the NIOSH website. This section provides details about each of these topics.

### 7.2.1 Format of the LODD Reports

Focus group participants say the LODD reports are generally well designed:

> *It's structured well. Bullet format is very good. The text is to the point.*
>
> *Having the summaries first is very good, especially since so many of the incidents are basically repeats of something that has already happened elsewhere. . . . They're great.*

One firefighter recommended some formatting changes that would make the messages in the reports more powerful:

> *Make it easier to skim through. Use headings and headlines in a consistent way for all LODDs. There should be a clear indication of the category of the incident in the headline; there should be consistency in the way the headlines are created. People watch trends; it's easier to understand the trends if the headlines tell the story and in ways that make it easier to track across LODDs.*

*"People watch trends; it's easier to understand the trends if the headlines tell the story and in ways that make it easier to track across LODDs."*
*—focus group participant*

Making use of the headings in the reports to reinforce recurring messages can thus add value to the LODD reports.

### 7.2.2 Amount of Detail (Q47) and Length of Reports (Q48)

Two questions in the Fire Department Survey addressed the content of the LODD reports. Question 47 asks generally about the level of detail provided in the reports. Question 48 asks about the length of each of the four parts of the LODD reports: summary, investigation results, discussion, and recommendation. Among those officers who are familiar with the FFFIPP LODD reports, 88.2% rate the amount of detail in the reports as "about right," 2.8% say there is too little detail, 3.6% say there is too much detail, and 5.4% did not respond to this question.

Regarding the length of the four sections of the LODD reports, most officers (about 71%) think the results and recommendation sections should remain the same as they are (another 7% say these sections ought to be longer, while about 5% say these sections should be shorter). Similarly, two thirds (65.3%) of the officers think the length of the discussion

section should not be changed (only 12.3% think it should be shortened; 7.2% want it longer). Over three fourths (76.9%) of the officers say the length of the summary should not be changed.[58]

The firefighters who participated in the focus groups are similarly satisfied with the length of the LODD reports.

Both officers and frontline firefighters, however, suggest that more visual aids be added to the LODD reports to clarify the fire scene. The most common suggestions for enhancing the LODDs are

- a graphic showing a timeline of events,
- a diagram of the fire scene (e.g., the floor plan), and
- more photos.

*The most common suggestions for enhancing the LODDs are*

- *a graphic showing a timeline of events,*
- *a diagram of the fire scene (e.g., the floor plan), and*
- *more photos.*

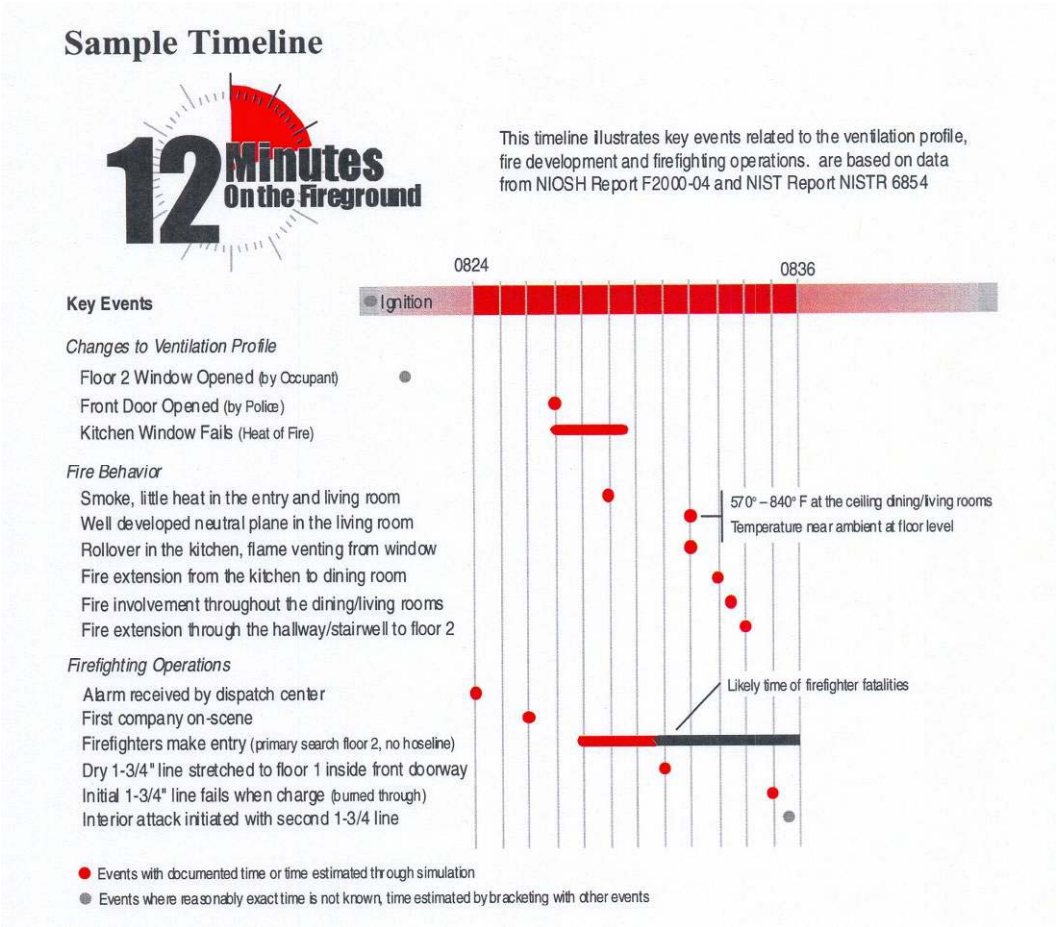
A sample of various firefighter comments about these issues follows:

> *I like the details and especially the ones with meaningful pictures and diagrams.*
>
> *The investigator's supporting photographs and documents ought to be included. When you show the guys a diagram showing where victim 1 was . . . here and here is where a firefighter died, that is a powerful message. There also need to be pictures of, for example, what the vehicle looked like after the crash. Diagrams are important, too.*
>
> *You need the visual more than the written report.*
>
> *Include a timeline of events as an exhibit . . . something I can refer to as I am reading the description of the incident.*

One Battalion Chief sent a sample timeline graphic to illustrate his suggestion. This is reproduced in ***Exhibit 7-5***.

[58] Approximately 16% of the respondents left these four questions blank.

**Exhibit 7-5. Sample Timeline**




Several officers and firefighters also want more information about the victim(s) to heighten the impact of the recommendations:

> *Tell more about the victim (e.g., "a married father of two"). The situation and lessons learned will have more impact if I can relate to the people involved. . . . Give the firefighters a generic name instead of calling them Firefighter 1, Firefighter 2, etc. The content of the report needs to be . . . less sanitized. It would be easier for me to follow the storyline.*

*"The content of the report needs to be . . . less sanitized. It would be easier for me to follow the storyline."—focus group participant*

As an example of the kind of material the firefighters say they want, one firefighter was especially appreciative of the "Great Lakes E-mail" that the International Association of Fire Chiefs began publishing recently:

> *It's a collection of fire war stories from local newspapers about firefighters killed or injured. It's a very interesting read. It's a clipping service, but a very valuable one.*

Other firefighters and officers want more technical detail about the scene and a broader scope of investigation:

> *More technical details. Need a better breakdown statistically. So many times we go with the final cause of death. For example, asphyxiation. There's an issue about when the alarms should go off. So I want to know, did he get lost first or did he run out of air first?*
>
> *I think the reports should be broader. There are a lot of other issues that make a difference in addition to the specific things that happened on the scene. For example, when someone has a heart attack, there is always the issue of whether there was a physical fitness program with regular checkups and whether he was overweight, etc.*

### 7.2.3 Satisfaction with Other NIOSH Materials (Q53a)

Two questions in the Fire Department Survey ask about FFFIPP materials other than the LODD reports. Question 53 asks which other NIOSH materials from the FFFIPP the respondent has seen. Question 53a asks about the general level of satisfaction with these additional materials.

Besides the LODD reports, the only FFFIPP item that most officers are aware of is the Pocket Guide to Chemical Hazards. A quarter of the officers (25.2%) say they have not seen any FFFIPP materials other than LODD reports. In order of frequency, the overall proportion of officers who have seen additional FFFIPP materials are

- Pocket Guide to Chemical Hazards, 57.4%,
- CDs of firefighter program materials, 28.0%,
- Hazard IDs, 16.6%,
- Respirator Maintenance Program Guide, 13.8%,
- Workplace Solutions,12.5%, and
- Alerts, 1.7%.

Firefighters who participated in the focus group discussions are less familiar with these materials than those who answered the survey. After being shown samples of these documents, however, several said they looked helpful:

*Modernize the format, add statistics showing the number of deaths and injuries due to specific unsafe practices, and make use of communication techniques employed by the media.*

*"We need material that combines information on a single topic. Use the USA Today approach." —focus group participant*

*The "Your Safety First" document is excellent. Good reminders.*

One focus group thought a different format would be more compelling for conveying lessons learned across a number of FFFIPP investigations. Their suggestion is to modernize the format, add statistics showing the number of deaths and injuries due to specific unsafe practices, and make use of communication techniques employed by the media:

*If you look at the NIOSH reports, there are obviously recurring issues. I'd like to see someone take a more proactive role. Study the recurring events and put out statistics on the incidents. . . . LODDs are about a single incident. We need material that combines information on a single topic. Use the USA Today approach. Report on how many deaths due to a specific issue have occurred. Include a citation to make it easier to find the full report posted on the Web.*

Officers in about half of all fire departments (52.3%) report that they are satisfied with the additional NIOSH materials. In general, officers from fire departments that are large, career, or located in urban jurisdictions are the most satisfied with the NIOSH materials. Also, officers in fire departments with a prior on-duty firefighter fatality are generally more positive about the material than those from departments that have not had a fatality. The pattern of responses across department characteristics follows.

**Jurisdiction Type.** Officers in urban fire departments are more satisfied with the NIOSH materials than those in rural fire departments. The proportion of officers in urban departments who are "satisfied" or "very satisfied" with the materials is 65.7%, compared with only 51.0% among those in rural departments. See ***Exhibit 7-6***.

**Size of Jurisdiction.** The larger the jurisdiction, the more satisfied officers are with the NIOSH materials. Officers in fire departments in large jurisdictions are significantly more likely than those in medium and small jurisdictions to be "very satisfied" with the NIOSH materials. Officers in medium-sized jurisdictions are significantly more likely than those in small jurisdictions to be "satisfied" with the materials. The combined proportion of officers who are "satisfied" or "very satisfied" with the NIOSH materials is

- large, 75.3%,
- medium, 61.3%, and
- small, 47.3%.

See ***Exhibit 7-7***.

**Type of Department.** Officers in career fire departments are significantly more "satisfied" and "very satisfied" with the NIOSH materials than officers in other types of departments. The combined proportions of officers who are "satisfied" or "very satisfied" with the NIOSH materials are

- career, 71.4%,
- volunteer, 56.2%, and
- combination, 48.6%.

See ***Exhibit 7-8***.

**Experience with On-Duty Fatality and FFFIPP Investigation.** There are no significant patterns of responses based on whether the department had a prior firefighter fatality or FFFIPP investigation. However, fire department officers are more likely to be satisfied with the NIOSH materials if their department had both a previous fatality and a FFFIPP investigation. The proportions of fire departments that indicated they are "satisfied" or "very satisfied" with the additional NIOSH materials are

- fatality with investigation, 80.4%,
- fatality without investigation, 62.1%, and
- no fatality, 52.0%.

There are no significant patterns by region with respect to satisfaction with NIOSH materials.

**Exhibit 7-6. How Satisfied or Dissatisfied Are You with These NIOSH Materials? (Question 53a), by Jurisdiction Type (Percent)**

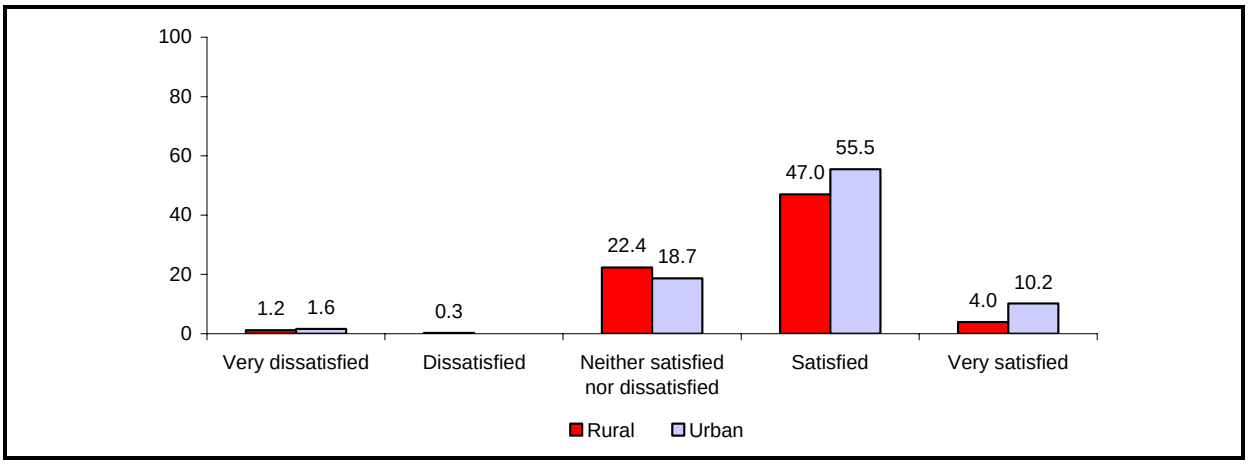



**Exhibit 7-7. How Satisfied or Dissatisfied Are You with These NIOSH Materials? (Question 53a), by Size of Jurisdiction (Percent)**

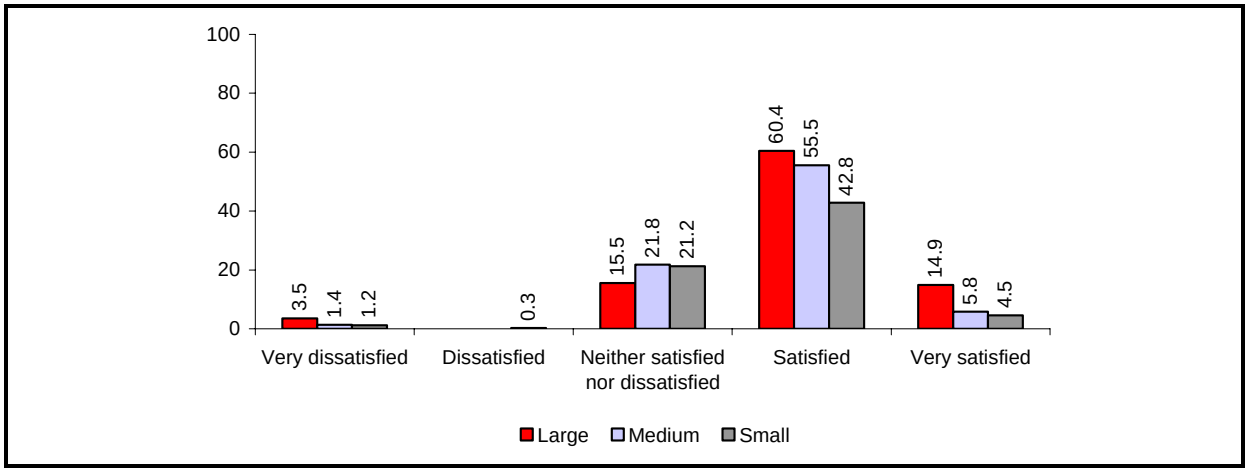
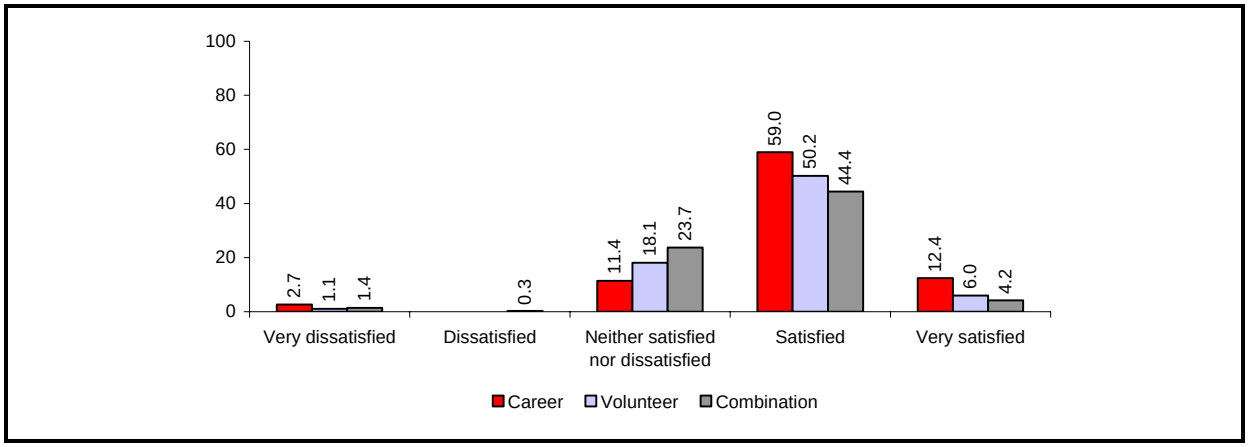



**Exhibit 7-8. How Satisfied or Dissatisfied Are You with These NIOSH Materials? (Question 53a), by Type of Department (Percent)**



### 7.2.4 Visited the NIOSH Website? (Q54)

*The majority of officers have not visited the NIOSH website.*

The majority of officers responding to the Fire Department Survey (59.4%) have not visited the NIOSH website. In general, officers in departments that serve smaller populations, are volunteer, are located in the Midwest, or are located in rural settings are the least likely to visit the NIOSH website. In contrast, officers in departments that are urban, are career, serve large populations, and have a prior firefighter fatality are more likely to have visited the NIOSH website.

However, one training officer said the following in a focus group discussion:

> *I'm on NIOSH's website every day. The LODD reports are invaluable as a teaching tool.*

*To increase the usefulness of the website, "Create a banner with the NIOSH website address that can be posted on fire station bulletin boards."—focus group participant*

Other focus groups recommended ways for NIOSH to increase the usefulness of its website:

> *Create a banner with the NIOSH website address so the firefighters will know where to go to get the LODD reports. It would be designed so that the Web address is very prominent and easy to see. Send enough banners to all fire departments in the country so they can be posted on fire station bulletin boards.*

Others suggest that NIOSH offer a more firefighter-friendly webpage that provides links and indexes designed from the perspective of the firefighter:

> *It's hard to locate a document on a specific topic when you need it. It would be good to have all the FFFIPP reports gathered in one place where it would be easy to find them. It would be great to have some kind of searchable index by topic (e.g., specific equipment).*

The pattern of responses from the Fire Department Survey follows.

**Jurisdiction Type.** Officers in urban fire departments are significantly more likely to visit the NIOSH website than those in rural departments. The proportion of officers in urban departments who indicate they had visited the NIOSH website "in the last year" or "longer than one year ago" is 56.8%, compared with 39.0% of officers in rural departments. See ***Exhibit 7-9***.

**Size of Jurisdiction.** The larger the jurisdiction, the more likely it is officers have visited the NIOSH website. The

proportion of officers in large jurisdictions who had visited the NIOSH website "in the last year" or "longer than one year ago" is 85.6%, compared with 51.5% of those in medium-sized jurisdictions and only 33.9% of officers in small jurisdictions. See ***Exhibit 7-10***.

**Type of Department.** Officers in career fire departments are significantly more likely than officers in other types of departments to have visited the NIOSH website within the past year. The proportions of officers who indicate they had visited the NIOSH website "in the last year" or "longer than one year ago" are

- career, 73.0%,
- volunteer, 43.3%, and
- combination, 36.4%.

See ***Exhibit 7-11***.

**Experience with On-Duty Fatality and FFFIPP Investigation.** Officers in fire departments with a prior firefighter fatality are more likely than those in departments without the experience of a fatality to have visited the NIOSH website. Those in departments with a previous FFFIPP investigation are also more likely to have visited the NIOSH website in the past year than others. The proportions of officers who had visited the NIOSH website "in the last year" are

- fatality with investigation, 66.6%,
- fatality without investigation, 46.1%, and
- no fatality, 34.2%.

See ***Exhibit 7-12***.

There are no significant patterns by region with respect to satisfaction with NIOSH materials.

**Exhibit 7-9. Have You Ever Visited the NIOSH Web Site? (Question 54), by Jurisdiction Type (Percent)**

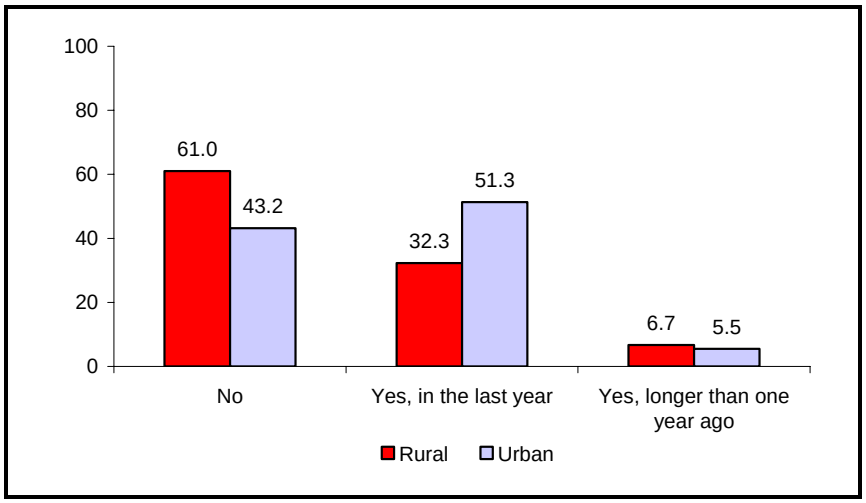



**Exhibit 7-10. Have You Ever Visited the NIOSH Web Site? (Question 54), by Size of Jurisdiction (Percent)**

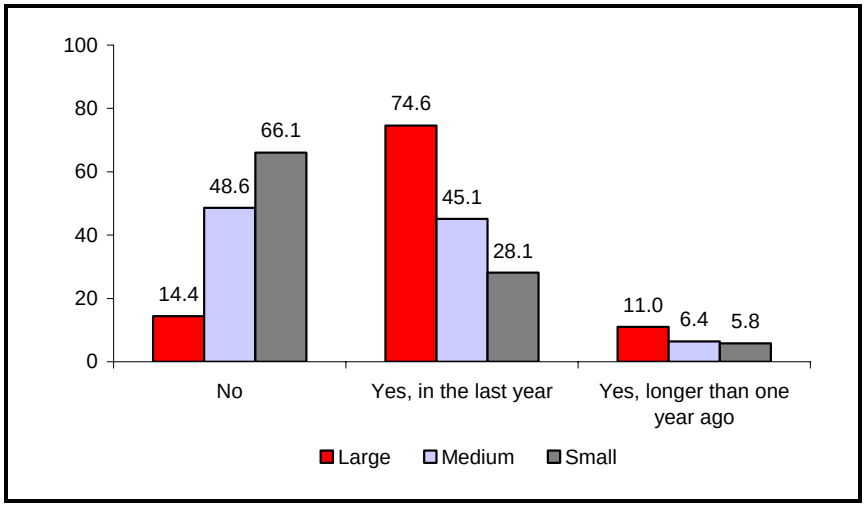



**Exhibit 7-11. Have You Ever Visited the NIOSH Web Site? (Question 54), by Type of Department (Percent)**

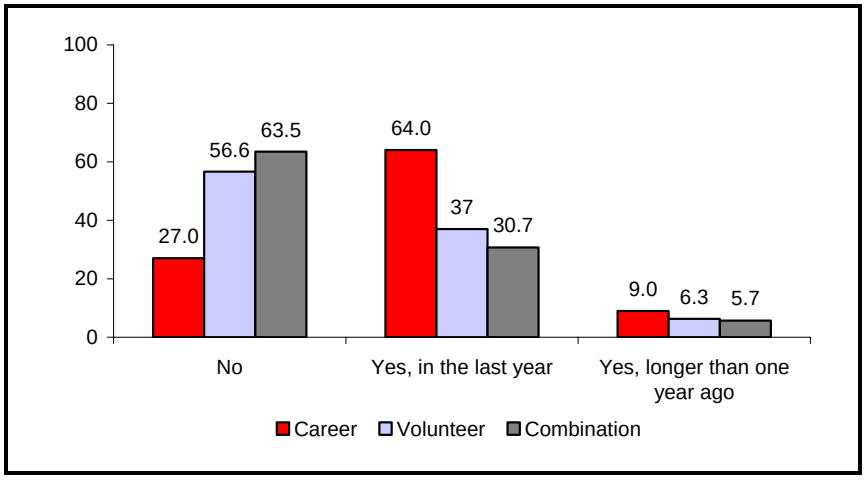
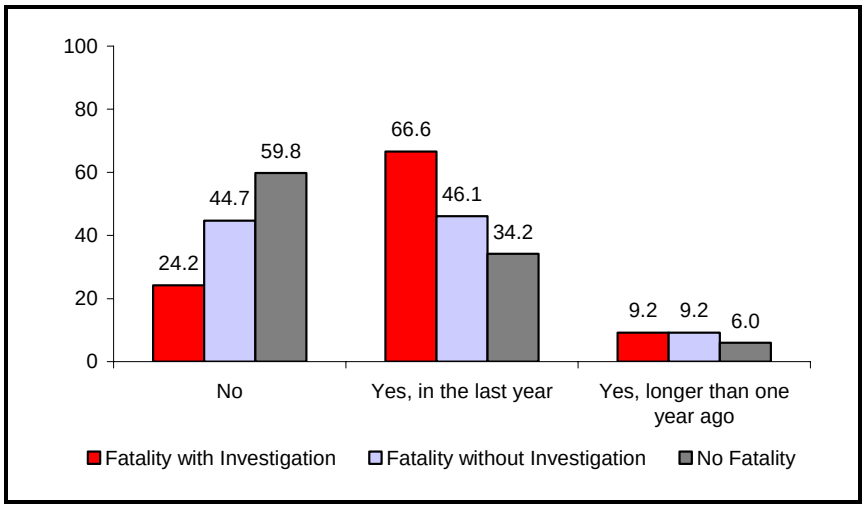


**Exhibit 7-12. Have You Ever Visited the NIOSH Web Site? (Question 54), by Fatality and Investigation (Percent)**




## 7.3 HOW CAN THE FINDINGS OF FFFIPP INVESTIGATIONS BE MADE MORE USEFUL? (Q49, 56)

Two questions in the Fire Department Survey elicited recommendations for how to improve the utility of the findings of the FFFIPP investigations. Question 49 asks officers for suggestions to improve NIOSH reports. Question 56 asks what NIOSH could do to improve the way recommendations are communicated to fire departments. The officers' responses to these two questions fall into six broad categories:

- Improve distribution mechanisms and marketing (259 suggestions).
- Use additional media for dissemination (98 suggestions).
- Design materials for training (26 suggestions).
- Partner with other organizations to promote recommendations (21 suggestions).
- Add information on how to implement recommendations (13 suggestions).
- Link with enforcement (11 suggestions).

Similar questions were posed during the focus group discussions. The focus group participants offered a number of recommendations that very closely mirror the officers' suggestions. Details on the officers' and focus group participants' comments are summarized below.

### 7.3.1 Improve Distribution Mechanisms and Marketing

By far the most common recommendation from the fire department officers is for improvements in the ways FFFIPP materials are disseminated. Comments ranged from the broad "improve the marketing of the materials," to specific suggestions about updated mailing lists. Some officers said they had not known about the materials and asked to be placed on the mailing list. The range of suggestions fell into the following categories:

*Improve the marketing of the materials.*

- Mail materials directly to fire departments, especially smaller departments (71 suggestions).
- Improve the marketing of the materials (61 suggestions).
- Develop and maintain updated e-mail listservs (60 suggestions).
- Improve distribution of reports (40 suggestions).
- Maintain an updated contact list of fire department recipients (27 suggestions).
- Communicate information to state and local agencies (7 suggestions).
- Mail materials directly to Safety and Training Officers (4 suggestions).

Firefighters want NIOSH to facilitate access to the FFFIPP information. Most of the frontline firefighters who participated in the focus groups are not familiar with the FFFIPP or FFFIPP information products. A recurring theme in the discussions was the value of FFFIPP's investigations and the firefighters' interest in learning about the results of these investigations.

To bridge the wide gap between level of interest and access to materials among this sector of the fire service, firefighters and officers had a number of suggestions. Following are some specific suggestions from officers and focus group participants:

- Update the FFFIPP mailing list and implement procedures for refreshing the list periodically.
- Advertise the mailing list (and how to join it).
- Send LODD reports in PDF format via e-mail:

  *We all have a personal e-mail account, so sending the reports to us electronically would be great.*

*"Send us notifications when there is a new report posted on the NIOSH website!"—focus group participant*

*Send us notifications when there is a new report posted on the NIOSH website!*

*NIOSH should issue press releases to let the average firefighter know that a new LODD has been issued.*

- Mail CD-ROMs of FFFIPP findings to the fire departments:

  *Send a copy of the FFFIPP CD to every training department.*

- Advertise the e-mail listserv (and how to join it) at all fire stations.
- Revise the NIOSH website to make it more firefighter-friendly.
- Communicate recommendations to the state and local agencies that determine funding for fire departments.

### 7.3.2 Use Additional Media

*Firefighters urged NIOSH to consider popularized versions of the reports to make them more accessible to the average firefighter.*

Another consistent theme in the focus group discussions and survey data was the need for NIOSH to disseminate information from FFFIPP investigations in multiple formats, in addition to the LODD reports. Firefighters urged NIOSH to consider popularized versions of the reports to make them more accessible to the average firefighter. When asked how they preferred to receive information, firefighters listed sources that are easily accessible to them and that are presented in modern, cognitively accessible formats. For some firefighters, that means e-mail and Internet sites. For others, information posted on the department's bulletin board and published in magazines is best. Specific magazines mentioned during the focus groups were *Fire Engineering*, *Firehouse*, *National Fire and Rescue*, *Fire Safety Journal*, *Fire Apparatus*, *Fire Chief,* and the National Fire Protection Association's *NFPA Journal*. For others, video reenactments for broadcast on cable television stations or during training sessions are preferred. Frequently mentioned models are firefighterclosecalls.com, the *Firehouse* magazine, and *USA Today*. Following are some firefighter comments:

*Video reenactments for broadcast on cable television stations or during training sessions are preferred by some firefighters.*

*Do something like what they are doing with firefighterclosecalls.com. It's easily accessible. It's an easy address to find on the computer. Also, the Firehouse approach . . . really breaks it down piece by piece.*

*Sponsor broadcasts on a closed circuit cable channel such as FireNet, which uses a news magazine format, and broadcasts a 30-minute-long safety segment and covers a variety of topics.*

Another common request is for one-page summaries. Both firefighters and officers say these would be helpful. Several respondents to the Fire Department Survey also recommend brief summaries of findings about specific issues or equipment. These could be easily used for training firefighters, as well as for justifying budget requests:

*"Create capsule summaries of the reports."—focus group participant*

> *Create capsule summaries of the reports. Keep them brief, with key points. Some people won't read long documents. One page is perfect.*

Another focus group participant recommended his department's one-page summaries of near-miss incidents as an example:

> *It's a quick narrative with a useful picture or diagram at the top to get your attention. It usually has five or six "lessons learned."*

*Develop coordinated campaigns around specific issues to raise awareness throughout the fire service.*

Other Fire Department Survey respondents recommend that NIOSH develop specific safety procedure posters that could be placed in the fire stations. Focus group participants suggest NIOSH develop coordinated campaigns around specific issues, focusing on one issue at a time to raise awareness throughout the fire service.

### 7.3.3 Design Materials for Training

*Training Officers often spend several hours translating information in the LODD reports into a training tool.*

Firefighters also want information in a form that can be readily used for training. Training Officers often spend several hours translating the information in the LODD reports into a training tool. Often, this process involves creating PowerPoint presentations and identifying visuals to illustrate the LODD report's text. There is widespread interest (among the Training Officers who participated in the focus groups and the survey respondents) in receiving from NIOSH ready-made training material (including a PowerPoint presentation and lesson plans) based on the LODD reports:

*"It would be extremely valuable to get some… PowerPoint slides with newspaper and media clips."—focus group participant*

> *It would be extremely valuable to get some audio-visual supporting material in addition to the LODDs. I would use it as a training tool, especially PowerPoint slides to tell about specific incidents. You need to include good pictures and graphics. You need to start with newspaper and media clips. This is what will emphasize the importance of the event and will tell about the level of media attention. That's an important part of the story. This would be material that would mean something to the firefighter; it could really make an impact on them.*

*Put the LODD information in a video or a DVD. Have the firefighters watch it together after lunch, then do a field exercise on it.*

### 7.3.4 Partner with Other Organizations

Respondents to the Fire Department Survey recommend that NIOSH partner with other organizations to enhance the dissemination of FFFIPP findings. Specific partners the officers suggest are trade journals, fire service organizations, and state and federal training programs.

### 7.3.5 Add Content to Materials

*Fire department officers want management tools for implementing recommendations.*

Fire department officers want help translating FFFIPP recommendations into actionable items for their departments. Specific requests for additional information include sample SOPs and other management tools for implementing recommendations. Officers from small fire departments also request information that is tailored to their budget and size constraints:

*How do we implement "2 in 2 out" if we are a volunteer department and there's no way to know who's going to show up? We need recommendations that are "good enough" if we can't be perfect.*

### 7.3.6 Link with Enforcement

Several respondents to the Fire Department Survey want there to be a link between NIOSH recommendations and some form of enforcement. Several respondents recommend that NIOSH get feedback from the fire departments on actions taken to address issues raised in the LODD reports. Two respondents recommend that NIOSH revisit fire departments to see if recommendations are implemented.

### 7.3.7 Reduce Turnaround Time for LODD Reports

Firefighters want to receive the FFFIPP LODD reports as soon as possible after an incident. They say the utility of the reports would be increased if they were released sooner. Typical comments from the focus group participants follow:

*"It's really important to get the information out quickly after an incident."—focus group participant*

*It's really important to get the information out quickly after an incident. Recently, there were fatalities at a silo fire. Two weeks later a similar incident was averted because the fire engineer had made a presentation about the first incident at another local fire department.*

*"People won't be as affected by the old reports because the equipment changes and it won't seem relevant."—focus group participant*

*NIOSH investigates the line of duty deaths, but it takes a long time to get the report. In order to do the most good, it has to happen fairly quickly. If you let it wait 6 months, it will lose some of its value.*

*We need to find a way for NIOSH to be involved sooner. We need to get those reports out to everybody. People won't be as affected by the old reports because the equipment changes and it won't seem relevant. I want to bring immediate events into the classroom. That's why we have to go to Firehouse.com.*

## 7.4 ARE NEEDED SUPPORTING MATERIALS AVAILABLE TO FIRE DEPARTMENTS? (Q51)

Only about a third of fire departments responding to the survey (34.2%) have access to all supporting materials referenced in NIOSH reports. In general, fire departments that are large, career, and located in the Northeast or in urban jurisdictions are the most likely to have access to all supporting materials referenced in NIOSH reports. Fire departments with previous experience with an on-duty firefighter fatality are also more likely than those without a fatality to report having access to all supporting materials.

The statistically significant pattern of responses follows.

**Region.** Fire departments in the Northeast are significantly more likely to indicate that they have access to all supporting materials referenced in NIOSH reports. The proportions are

- Northeast, 40.8%,
- South, 32.4%,
- Midwest, 32.5%, and
- West, 31.6%.

See ***Exhibit 7-13***.

**Jurisdiction Type.** Fire departments in urban jurisdictions are significantly more likely to indicate that they have access to all supporting materials referenced in NIOSH reports (59.0%) than departments in rural jurisdictions (31.8%). See ***Exhibit 7-14***.

**Size of Jurisdiction.** The larger the department, the better the access to supporting materials referenced in NIOSH reports. The proportions that have access are

- large, 78.4%,
- medium, 47.8%, and
- small, 26.4%.

See ***Exhibit 7-15***.

**Type of Department.** Career fire departments are significantly more likely than volunteer or combination fire departments to have access to all supporting materials referenced in NIOSH reports. The percentages are

- career, 62.8%,
- volunteer, 36.5%, and
- combination, 30.7%.

See ***Exhibit 7-16***.

**Experience with On-Duty Fatality and FFFIPP Investigation.** Fire departments with a previous fatality are significantly more likely to have access to all supporting materials referenced in NIOSH reports than fire departments that have not experienced a fatality. The percentages are

- fatality with investigation, 54.3%,
- fatality without investigation, 49.8%, and
- no fatality, 33.9%.

There is no significant pattern based on experience of a FFFIPP investigation. See ***Exhibit 7-17***.

**Exhibit 7-13. Does Your Fire Department Usually Have Access to Documents That Are Referenced in NIOSH Reports? (Question 51), by Region (Percent)**

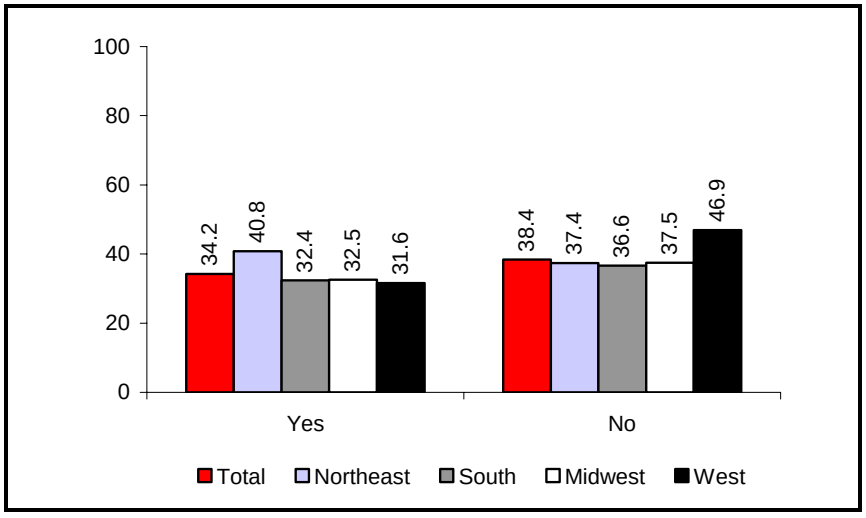


**Exhibit 7-14. Does Your Fire Department Usually Have Access to Documents That Are Referenced in NIOSH Reports? (Question 51), by Jurisdiction Type (Percent)**

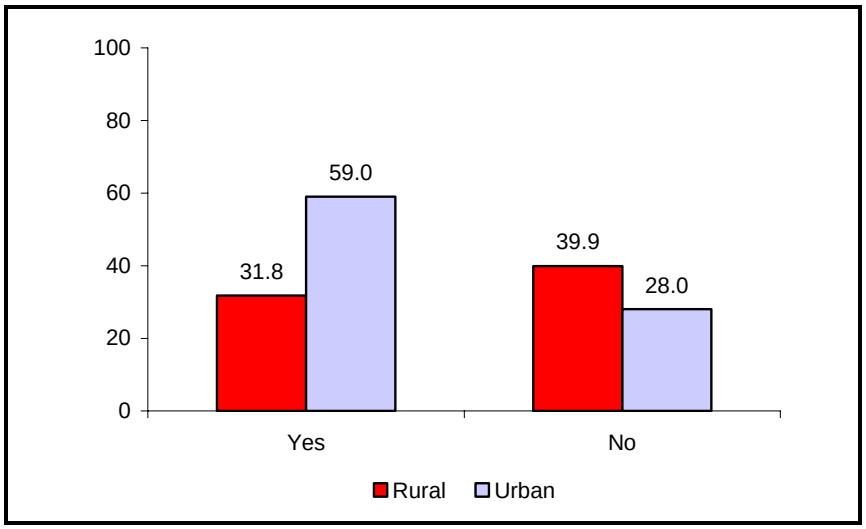



**Exhibit 7-15. Does Your Fire Department Usually Have Access to Documents That Are Referenced in NIOSH Reports? (Question 51), by Size of Jurisdiction (Percent)**

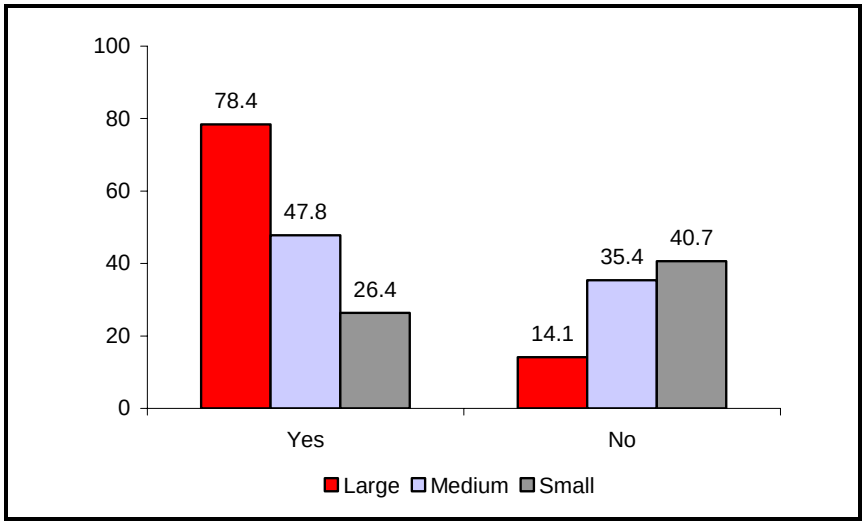



**Exhibit 7-16. Does Your Fire Department Usually Have Access to Documents That Are Referenced in NIOSH Reports? (Question 51), by Type of Department (Percent)**

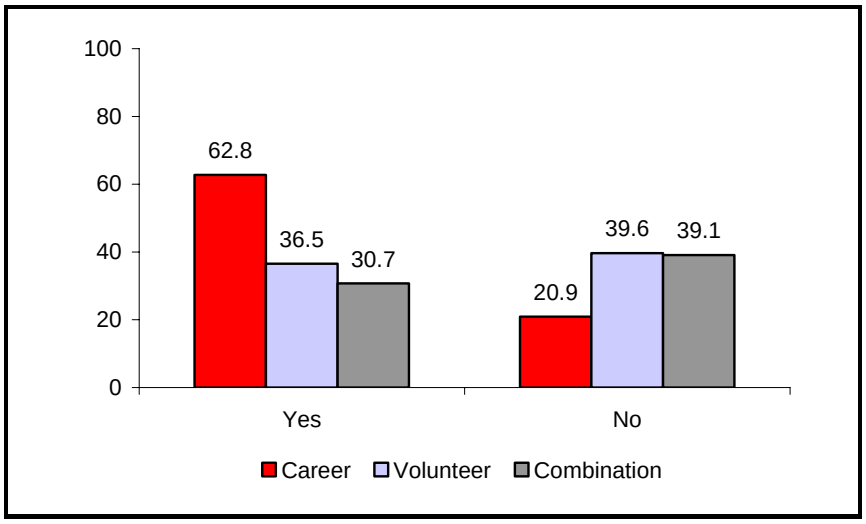
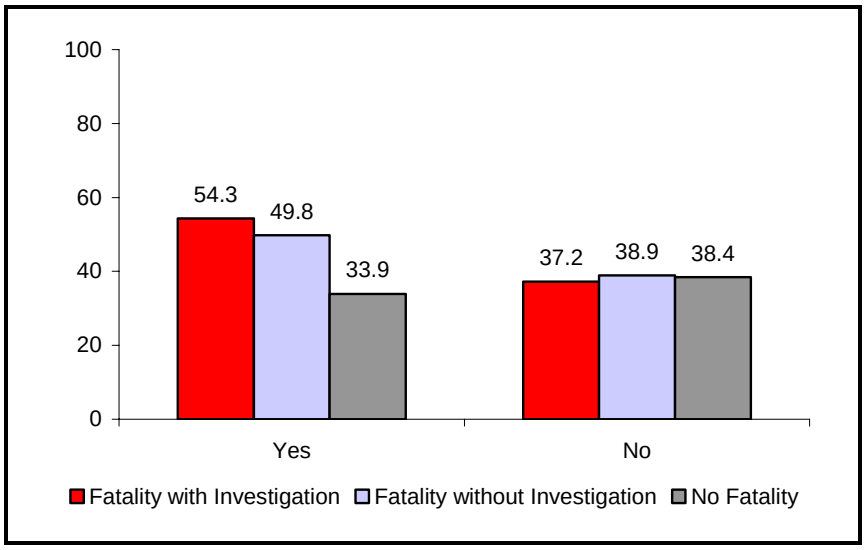


**Exhibit 7-17. Does Your Fire Department Usually Have Access to Documents That Are Referenced in NIOSH Reports? (Question 51), by Fatality and Investigation (Percent)**




## 7.5 MULTIVARIATE MODELS

The preceding discussion documents the results of the bivariate analyses of the survey responses. As in prior sections of this report, these analyses suggest that officers in fire departments in larger, urban jurisdictions and those with career staff are more able than others to learn about and implement FFFIPP recommendations. Four questions from the Fire Department Survey were selected to examine the multivariate relationships among these factors (Questions 52a, 52b, 52c, and 53a). Complete details of the models are provided in the second part of Appendix C (Models 74–76, and 84).

An overview of the key findings is provided in ***Exhibit 7-18***. It shows that the five fire department characteristics seldom play a significant role in the officer's perceptions of the NIOSH materials. The exception is the type of department. In two of the four questions, officers of career fire departments are significantly more likely to have positive perceptions of the FFFIPP recommendations than other officers.

**Exhibit 7-18. Perceptions of NIOSH Materials, by Fire Department Characteristic, Based on Multivariate Models**

| Questionnaire Item | Fire Department Characteristic | | | | |
|---|---|---|---|---|---|
| | Region | Jurisdiction Type | Size of Jurisdiction | Type of Department | Fatality / Investigation |
| 52a. Recommendations are practical: agree or strongly agree | N* | — | — | C | — |
| 52b. Recommendations are easy to understand: agree or strongly agree | — | — | — | C* | — |
| 52c. Recommendations are specific and concrete: agree or strongly agree | — | — | — | — | — |
| 53a. Satisfied or very satisfied with NIOSH materials | — | — | — | CO* | I* |

Note: N = Northeast; C = career; CO = combination; I = prior FFFIPP investigation; — = does not apply (no significant pattern).

Source: Fire Department Survey.

*The p-value for this fire department characteristic is significant at the .05 level. See note “a” in the models in Appendix C.

# 8 Implications and Recommendations

Firefighters have dangerous jobs. They are called on to rescue people and protect property under serious and hazardous conditions. They are also exposed to dangers en route to emergencies and while responding to roadside incidents. Some 100 firefighters die each year in the line of duty, and another 95,000 are injured.

How many of these deaths and injuries are preventable is unknown. However, the knowledge and technology clearly exist to reduce the rates of firefighter fatalities and injuries from their current levels. Recommendations developed through the National Institute for Occupational Safety and Health's (NIOSH's) Fire Fighter Fatality Investigation and Prevention Program (FFFIPP) point to a number of safety practices that could improve the health and safety of the nation's firefighters. In this section, we present the implications of the evaluation data for these issues and suggest approaches NIOSH could consider to address the existing gap between safety knowledge and practice in the nation's fire service.

Shortfalls persist in current firefighter safety practices. The evidence from this evaluation suggests that not all fire departments and firefighters follow FFFIPP recommendations. FFFIPP investigations regularly conclude with recommendations that had already been promulgated in prior Line of Duty Death (LODD) reports and other NIOSH materials. In the focus groups and survey conducted for this evaluation, firefighters and their officers conceded that safety practices are not always followed.

In Section 5, we present evidence from the Fire Department Survey and focus groups on the extent to which fire

departments implement 17 common FFFIPP recommendations (which serve as the "sentinel" recommendations for this evaluation). The survey data suggest the following, for example:

- Although about 84% of all fire departments have a standard operating procedure (SOP) on the use of Incident Command Systems, only 11% have one for a physical fitness program.
- Over half of fire departments do not require cardiovascular disease screenings. Only 17% require annual screenings.
- Only half of fire departments in small jurisdictions routinely establish Incident Command; 12% never do. Across all departments, only half implement a risk management plan and regularly assign an Incident Safety Officer.
- Only half of all fire departments establish Rapid Intervention Teams (RITs) at the fire scene.
- Although over 80% of fire departments say the drivers of emergency vehicles receive training, only 55% provide refresher training once a year or more. NIOSH recommends refresher training twice a year.
- Only half of fire departments say their firefighters use seat belts at least "most of the time." Only 84% require firefighters to wear seat belts while they ride in emergency vehicles.
- A quarter of fire departments do not have Personal Alert Safety System (PASS) devices for all their firefighters to use when fighting structure fires. Firefighters in about 10% of fire departments in the South and Midwest never use PASS devices.
- Almost a fifth of rural fire departments report problems with their two-way radios, such as bleed over, interference, or loss of communication under field conditions.

Each of these facts represents a shortfall in the level of implementation of FFFIPP recommendations. Each of these applicable recommendations has been featured in multiple LODD reports. The shortfall in implementation indicates that better ways are needed for transferring existing safety knowledge into practice throughout the fire service.

Following are key implications from the evaluation data:

1. Small, volunteer departments have the greatest challenges to following safety guidelines.
2. Existing resources limit safety practices.

3. Gaps in knowledge and attitudes also limit safety.
4. FFFIPP investigations and LODD reports provide useful information.
5. Fire departments need additional information in the LODD reports.
6. Firefighters and fire departments need information presented in additional formats.
7. FFFIPP materials need to be better marketed and distributed.
8. Increasing awareness of the FFFIPP and FFFIPP investigations will likely improve safety practices.

Details about these implications and recommendations for addressing them follow.

**Small, Volunteer Departments have the Greatest Challenges to Following Safety Guidelines.** In the survey data on fire department safety practices, there are a number of distinct patterns that suggest where efforts are most needed to minimize the gap between knowledge and practice. These are summarized in Exhibit 5-1 in Section 5. With few exceptions, the fire departments that are most likely to be implementing FFFIPP recommendations are career departments in large, urban jurisdictions, particularly those in the Northeast. Fire departments with lower levels of implementation tend to be volunteer or combination career-volunteer departments in small, rural jurisdictions, particularly those in the South and Midwest. Small, volunteer fire departments typically have fewer financial resources and staff. These kinds of departments are more predominant in rural areas and away from the country's densely populated Northeast and West regions.

On the basis of these findings, NIOSH may wish to consider a number of outreach efforts to improve the dissemination and use of FFFIPP information.

**Recommendation: Outreach Efforts**

1. Enhance outreach efforts to small, rural, and volunteer fire departments.

**Existing Resources Limit Safety Practices.** The adequacy of financial and personnel resources appears to play a large role in whether a fire department is implementing the FFFIPP recommendations. The survey data reported in Section 6 indicate the following, for example:

- Almost half of all fire departments do not have enough funding for the equipment they need. A third of the departments do not have enough funding for personally fitted facepieces for their Self-Contained Breathing Apparatus (SCBA). A quarter do not have enough SCBA for their firefighters to use.
- About 40% do not have enough funding for training firefighters.
- Over half do not have enough funding for the personnel they need.
- Lack of personnel prevents over half of all fire departments from assigning an Incident Safety Officer and establishing RITs.

These findings may suggest that fire departments need help identifying financial resources. On the basis of these findings, NIOSH and its partner organizations may wish to consider the following recommendations to improve the utilization of the FFFIPP information.

**Recommendations: Technical Assistance**

2. Develop documents about recommended equipment, training, or procedures that could be used to justify budget requests.
3. For smaller, volunteer departments, provide additional technical assistance for preparing grant applications.

**Gaps in Knowledge and Attitudes Also Limit Safety.** There is evidence from the evaluation that the knowledge and attitudes of firefighters and officers play a role in safety practices:

- A quarter of all fire departments do not think personally fitted facepieces are needed for SCBA; 5% didn't know they were recommended.
- About 10% say firefighters sometimes do not think they need SCBA.
- About 15% are not aware of Chemical/Biological/Radiological/Nuclear SCBA.
- About 18% have never established RITs, and 4% say they do not need them.
- A third of the departments do not always establish an RIT, because they think some situations do not warrant one.

- A third of the fire departments say they do not always use an Incident Safety Officer, because fires are not usually big enough.

On the basis of these findings, NIOSH may wish to consider the following actions.

**Recommendation: NIOSH Website**

4. Improve the FFFIPP website with a firefighter-friendly page that connects broad topics with recommendations and action items, with links to specific FFFIPP LODD reports and other FFFIPP materials and resources.

**Recommendation: Outreach**

5. Contact fire departments that experience a firefighter fatality or "near miss" incident, regardless of whether an investigation is planned. Partnering with other organizations as needed, provide relevant FFFIPP materials and offer technical assistance to help address safety issues.

**FFFIPP Investigations and LODD Reports Provide Useful Information.** The evidence presented in Section 7 suggests that LODD reports are valued by many firefighters because they are unbiased, detailed, and factual. Learning about specific incidents helps firefighters understand safety issues and appears to improve their safety practices. Most fire departments think the amount of detail provided is about right, but only about half of those who had seen these FFFIPP reports say that they are practical, easy to understand, specific, and concrete. Fire departments that have experienced an on-duty firefighter fatality are more appreciative of the LODD reports than departments that have not.

On the basis of these findings, NIOSH may wish to consider the following actions for disseminating the results of individual FFFIPP investigations of on-duty firefighter fatalities.

**Recommendations: LODD Reports**

6. Continue developing and disseminating LODD reports.
7. Continue providing all four sections of the current reports, including a summary, investigation results, discussion, and recommendations.
8. Consider the use of formatting, headings, and headlines to enhance the messages communicated both in individual LODD reports and over the LODD series.

**Fire Departments Need Additional Information in the LODD Reports.** One of the most common suggestions by firefighters and their officers is for additional graphics in the LODD reports. Adding a timeline, a diagram of the fire scene, and more photos, as well as making more effective use of headings and headlines, would make the information presented in the reports more cognitively accessible and more compelling to read. The repetition across multiple LODD reports of generic recommendations appears not to be effective, however. Many fire department officers say they need more straightforward recommendations.

On the basis of these findings, NIOSH may wish to consider a number of actions to improve the value of the FFFIPP information.

**Recommendations: Content of the LODD Reports**

9. To improve accessibility and information, incorporate more photos, timelines, diagrams, and other visual aids into the FFFIPP reports.
10. Review the investigation protocol, particularly the sources used for developing technical recommendations. Consider using an outside panel of experts to review findings.

**Firefighters and Fire Departments Need Information Presented in Additional Formats.** As the evidence presented in Sections 4 and 7 demonstrates, fire departments are already trying to improve the knowledge-to-practice translation. Training officers spend hours creating training materials based on the LODD reports. Usually these take the form of PowerPoint slides to which they add media clips and other visuals. Because such efforts are more challenging for small, volunteer departments to fulfill, the knowledge-to-practice gap could be narrowed by NIOSH's providing departments with training tools based on the FFFIPP's findings.

Other officers need guidance and tools for implementing FFFIPP recommendations. Needed tools include sample SOPs and material that could be shared with budget authorities and funding agencies to support the departments' requests for additional resources. Officers from small departments also need recommendations that take into account their limited financial and personnel resources.

In addition, firefighters would be more likely to learn about and act on FFFIPP recommendations if the information were presented in more accessible formats. These range from one-page summaries on specific operational issues (such as the "2 in 2 out" rule or the use of Incident Command and RITs), to coordinated campaigns on individual topics. They also include longer summary documents (such as the *Safety First* document NIOSH has developed) with updated graphics and formatting, as well as video reenactments and other more popularized materials.

On the basis of these findings, NIOSH may wish to consider a number of actions to improve the dissemination and use of the FFFIPP information.

**Recommendation: Ancillary Materials**

11. Help transfer knowledge gained from FFFIPP investigations by creating training tools based on the FFFIPP reports, including PowerPoint slides and lesson plans. Incorporate photos, timelines, diagrams, and other visual aids.
12. Expand the production of existing publications, such as Safety First, Workplace Solutions, and Hazard IDs, to include additional topics. Make use of graphics, statistics, and other tools to communicate the level of risk and practical steps firefighters and fire departments can take to promote safety.
13. Explore new technology for disseminating the findings of FFFIPP investigations in a public service campaign format. Use videos, public service channels, and Internet streaming video to present safety messages on each key FFFIPP recommendation. These messages should draw from multiple fatality investigations and should employ public safety advocacy techniques.

**FFFIPP Materials Need to be Better Marketed and Distributed.** The information presented in Section 4 indicates that, although most fire departments are aware of FFFIPP reports, over a quarter have never seen a FFFIPP report. Many fire departments are unaware of FFFIPP resources. The FFFIPP itself has a low profile within the fire service. Firefighters do not understand the FFFIPP's role or how FFFIPP investigations are conducted. Almost half of all officers are not familiar with the FFFIPP. Among small departments, 62% are not aware of the FFFIPP. Similarly, for presenting FFFIPP findings, participants in the focus groups suggested a number of ideas that

demonstrated they were not aware of already existing NIOSH resources. These resources include the NIOSH website, the FFFIPP CD-ROM, and the summary reports.

These findings suggest that there is room for improvement in the way current FFFIPP documents are disseminated. NIOSH could improve its impact by better marketing existing resources and by diversifying the communication channels used for dissemination. Firefighters and their officers offer a number of suggestions to address this issue.

On the basis of these findings, NIOSH may wish to consider a number of actions to improve the dissemination and use of the FFFIPP information.

**Recommendations: Distribution**

14. Ensure that NIOSH materials reach all fire departments by instituting new measures to maintain a complete and up-to-date mailing list.
15. Ensure that NIOSH e-mail lists are up to date. (e.g., with an e-mail cohort maintenance—or refresher—program that generates automatic e-mails to listserv members to confirm addresses.

**Recommendations: Marketing**

16. Improve the promotion of the FFFIPP website. Create a poster suitable for fire station bulletin boards, with the NIOSH website featured prominently.
17. Consider coordinated promotional campaigns on single themes.

**Increasing Awareness of the FFFIPP and FFFIPP Investigations Will Likely Improve Safety Practices.** In both the focus group discussions and the survey responses, firefighters made it clear that they are more receptive to safety information when its importance is reinforced by media coverage, political pressure, potential sanctions from insurance companies, state occupational safety and health agencies, and their officers.

This finding suggests that there is an opportunity to increase knowledge of FFFIPP recommendations by increasing awareness of the program itself. Raising the FFFIPP investigators' profiles, for example, would likely raise the attention given to investigation reports, which in turn would increase the attention firefighters, fire departments, and local funding authorities

would likely give to the FFFIPP recommendations. The recommendation at the 2006 NIOSH stakeholders' conference that FFFIPP investigators wear identifiable clothing (i.e., caps and jackets with the NIOSH acronym) was an acknowledgment of this causal link in the knowledge-to-practice chain.

**Recommendations: Marketing**

18. Develop additional mechanisms for raising awareness about the FFFIPP across the fire service and the public.

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