

Fire Fighter Fatality Investigation and Prevention Program Evaluation

Executive Summary

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The findings and conclusions in this report are those of the authors, and do not necessarily represent the views of the National Institute for Occupational Safety and Health.

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NIOSH developed the original study design and contributed substantively to the content of the questionnaire, the sampling and analysis designs, and the data analysis and presentations. In collaboration with NIOSH staff, RTI developed the operational evaluation design, including the questionnaire and focus group guide; conducted the survey and focus groups; and performed all data analysis. RTI was responsible for developing recommendations from the study findings. All listed authors contributed to this report.

Authors' individual contributions, from RTI: Kristina Peterson, PhD., was RTI's Project Director for the study, had overall responsibility for the evaluation and was the lead author of the final report. Michael Witt, MA, was the sampling and analysis task leader for the study, designed the sampling and analysis approach, and oversaw all statistical operations. Katherine Morton, MS, is a research statistician at RTI, conducted the statistical analysis. Murrey Olmsted, PhD, a survey methodologist at RTI, led the development of the questionnaire and all focus groups activities.

From NIOSH: Harlan Amandus, PhD, Chief of the Analysis and Field Evaluations Branch, provided critical review and management. James T. Wassell, PhD wrote the original research protocol and the request for task order proposal, was chair of the technical evaluation panel of proposals, and technical monitor for the RTI contract. Steven Proudfoot contributed to questionnaire content, provided subject matter expertise and was technical monitor for the RTI contract.

About RTI International: RTI International is an independent, nonprofit research institute based in Research Triangle Park, North Carolina. Established in 1958 as the Research Triangle Institute, RTI has a distinguished history of scientific achievement in the areas of health and pharmaceuticals, education and training, surveys and statistics, advanced technology, democratic governance, economic and social development, energy, and the environment. RTI has ongoing projects in more than 40 countries and a staff of more than 2,600. RTI was selected for this project by a technical evaluation of their proposal through a competitive process.

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.

In the fall of 2003, NIOSH undertook a study to determine the extent to which recommendations from NIOSH investigations of fire fighter fatalities are being implemented by fire departments. This study was largely funded through CDC's evaluation program. This study, along with a public stakeholder's meeting that was convened in March 2006, was part of a strategic effort by NIOSH to seek input on the program from across the fire service with the goal of improving the impact of this program.

Through this survey, we learned that a large number of fire departments are aware of the FFFIPP and use findings and recommendations in efforts to improve fire fighter safety and health. We also learned that we need to undertake efforts to improve our outreach to small and rural departments. We gained numerous suggestions from focus groups for improving our program and products. In May 2007, NIOSH posted on the program's website future directions for the program based on preliminary findings from the 2003 study and input provided at the March 2006 stakeholders' meeting, <http://www.cdc.gov/niosh/fire/future.html>

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.

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 (<http://www.cdc.gov/niosh/fire>). The NIOSH reports are produced in both hard copy and electronic formats. Periodically, 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,
2. gain insight into the impact of FFFIPP recommendations and information products on the safety knowledge, attitudes, and behavior of the nation's firefighters; and
3. 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 has issued several hundred recommendations. Although circumstances of investigations are varied, similar recommendations may often apply in multiple investigations. 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 is only moderately known. 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 also 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 also 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 “at least several times a year”. 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 when responding to structure fires. 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.

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 fit 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). 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. 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. About two thirds of officers who are aware of

the NIOSH reports agree that they are practical, easy to understand, specific, and concrete. Nevertheless, 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 more 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 to enhance the effectiveness of 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.