

Research Brief

SCIENCE AND TECHNOLOGY POLICY INSTITUTE AT RAND

Emergency Responders' Views on Their Protection Needs

Emergency responders face serious hazards in their jobs, placing them at high risk of occupational injury or death. Using various forms of personal protective technologies (PPTs)—e.g., protective garments, respiratory protection, environmental monitoring and communications equipment, and practices and protocols that focus on safety—can mitigate that risk.

Limitations in existing protective technologies, as well as the continually expanding roles of emergency responders, drive a need to better understand the safety and health risks and protection needs these responders face. The views and experiences of the professional emergency responder community are critical to assessing these hazards and associated protection needs.

Sponsored by the National Personal Protective Technology Laboratory of the National Institute for Occupational Safety and Health, RAND researchers helped address this concern by conducting in-depth, structured discussions with 190 representatives from 83 emergency responder, technology supplier, and research and policy organizations across the nation. Findings focus on firefighters, law enforcement, and emergency medical services (EMS) responders and include special operations units, such as hazardous material (hazmat) and anti-terrorism squads.

INDIVIDUAL-LEVEL VIEWS

Calls for fires are less than 10 percent of service calls for **firefighters** but account for about half of firefighter injuries and fatalities and represent most of the hazard and protection needs identified. Principal concerns raised in the RAND discussions focused on the performance of turnout gear (i.e., protective clothing), heat stress and exhaustion while working in turnout gear, respiratory protection and ways to improve the self-contained breathing apparatus (SCBA), communications difficulties, personnel command and control at the fireground, logistical questions about PPT management, and, for front-line firefighters, protection from chemical and biological hazards.

EMS responders were very concerned about exposure to infectious diseases (e.g., AIDS). Although such exposure accounts for very few actual responder illnesses,

pathogens were seen as a growing hazard that is very difficult to protect against. Many participants, especially in the larger departments, were concerned about the increasing threat of assault. As for all emergency responders, terrorism was a major concern. EMS personnel also noted they receive little technical or financial support for improving health and safety from government and professional organizations.

Protecting the health and safety of “mainline” **law enforcement responders** may be the most challenging protection task. Much of the challenge stems from the difficulties in characterizing the hazards they face. They are typically the first on the scene and, thus, have the least amount of advance information about the potential hazards. Top concerns raised with RAND are assaults, automobile hazards, exposure to infectious diseases, and terrorism.

While **hazmat and anti-terrorism responders** are confident they can respond to conventional hazmat incidents (such as cargo spills), they are greatly concerned about their ability to respond to large or multiple acts of terrorism. Further, terrorism response could require the participation of rank-and-file first responders who are not equipped or trained for such activities. Uncertainty about the potential threats and hazards also frustrates protection efforts. Protective gear that minimizes interference with responder activities and improved environmental hazard monitoring capabilities were raised as important components to protecting such responders.

CROSS-CUTTING VIEWS

Many protection issues cut across individual services. *Systems-level issues* include fundamental problems with the interoperability of radio communications systems, an increasing need for improved hazard assessment capabilities, the desire for personnel location monitoring technology, and the importance of such human factors as physical fitness and the role tradition and culture can play in hindering the adoption of safety and health innovations.

Procurement and logistics of PPTs is another critical issue area affecting responder safety. This includes concerns about getting enough information to guide technology

acquisitions; storing, maintaining, and deploying ever-increasing amounts of protective gear; interoperability of equipment so that different agencies can share equipment; and trade-offs between universal and hazard-tailored protective equipment.

RESPONDER COMMUNITY PRIORITIES AND POLICY RECOMMENDATIONS FOR THE FUTURE

In discussions across the emergency responder community, a number of consensus concerns emerged. Table 1 captures the priorities, along with some recommendations for addressing them.

Beyond these priorities for protective equipment and practices, the discussions elicited some broader policy recommendations (see Table 2) marked by diverging opin-

ions within the emergency responder community on several issues.

Most of these issues center broadly around the balance between distributed and centralized decisionmaking. Emergency response is handled in a highly decentralized, grassroots manner, with solutions to problems largely being left to the local departments. Given increasingly varied and uncertain hazards in the post-9/11 environment, as well as the increasing complexity of protective technologies, some community members put forth ideas that suggested the need for a more top-down, directed, hierarchical approach to decisionmaking.

These issues merit focused discussion across the emergency responder community as the nation enters a new era in which emergency responders must be fully prepared to meet not only the challenges of routine emergencies but also the new challenges emerging from an increasingly unpredictable environment.

Table 1. Responder Community Priorities and Recommendations

Priorities	Specific Recommendations
Reduce physical stress/improve comfort	<ul style="list-style-type: none"> • Improve garment breathability • Reduce equipment weight • Ensure consistent/appropriate sizing of components • Enhance ergonomic characteristics
Improve communications	<ul style="list-style-type: none"> • Make radio systems interoperable • Improve communications capabilities with SCBA • Improve radio design to allow hands-free use and use with gloves
Upgrade communicable disease protection	<ul style="list-style-type: none"> • Increase protective equipment options for EMS personnel and police
Develop practical respiratory/chemical protection equipment and guidelines for first responders	<ul style="list-style-type: none"> • Improve chemical/biological protection of garments and respirators • Design equipment to minimize interference with responder activities • Require more chemical/biological hazard training
Improve PPT standby performance	<ul style="list-style-type: none"> • Develop integrity monitoring and service-life monitoring technologies • Enhance compactness/portability of protective equipment • Address logistical complications • Reduce protective equipment maintenance complexity and cost
Expand training and education	<ul style="list-style-type: none"> • Require more training on sophisticated protective equipment • Reduce complexity of new equipment
Benchmark best safety practices	<ul style="list-style-type: none"> • Study/benchmark safety practices, particularly for EMS and police • Study/benchmark PPT enforcement practices

Table 2. Key Policy Recommendations

Priorities	Specific Recommendations
PPT research and development	<ul style="list-style-type: none"> • Research should be more strategic and multidimensional, including more fundamental, long-term research • Greater emphasis on ensembles is needed • R&D should address response activity rather than services • Decentralized market limiting innovation and purchasing power should be addressed
Discretion in personal protection decisionmaking	<ul style="list-style-type: none"> • Expanding role of emergency responders and improved hazard assessment warrant increased attention to activity-specific tailoring of protection
PPT standards for emergency medical services and law enforcement	<ul style="list-style-type: none"> • EMS and police communities need dedicated personal protection, safety, and standardization efforts
PPT performance assessment	<ul style="list-style-type: none"> • Reliable and objective equipment performance assessments need to be developed
PPT standardization and interoperability	<ul style="list-style-type: none"> • Mutual aid agreements and extended operations should be facilitated by enhanced standardization and interoperability
The role of risk in emergency response	<ul style="list-style-type: none"> • Examine emergency responders' perceptions of and their responses to risks inherent in emergency response • Promote efforts to decrease risk through improved information management, clarified protocols, and improved equipment

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