The Personal Protective Technology Program at NIOSH

An estimated five million workers are required to wear respirators in 1.3 million U.S. workplaces to protect themselves from occupational hazards. For some workers, such as firefighters, protective equipment is the only form of protection against life-threatening hazards, while for those such as healthcare workers, respirators, protective clothing, gloves, or other personal protective technologies are one component in a series of protective controls. The National Institute for Occupational Safety and Health (NIOSH) was created in 1970 to address worker safety, focusing primarily on research, training, and education.

As part of a series of planned reviews of NIOSH research programs, the Institute of Medicine (IOM) and the National Research Council (NRC) convened a committee of experts to review the NIOSH Personal Protective Technology (PPT) Program to evaluate the relevance and impact of its work in reducing hazardous exposures and improving worker health and safety. The PPT Program is a cross-sector program at NIOSH where work is conducted at the National Personal Protective Technology Laboratory (NPPTL) as well as in other NIOSH divisions. This report is the result of the fifth review by the IOM and NRC for NIOSH.

MISSION AND GOALS OF THE NIOSH PPT PROGRAM

Although the NIOSH PPT Program was not established until 2005, NIOSH initiated a research program on personal protective technologies as early as 1973. The mission of the NIOSH PPT Program is to prevent work-related injury, illness, and death by advancing the state of knowledge and application of personal protective technologies. The NIOSH PPT Program works to fulfill its mission through three major areas:

1. Research
2. Participation in standards setting and policy making
3. Respirator certification

THE REVIEW PROCESS

In July 2007, the Institute of Medicine and the NRC convened the Committee to Review the NIOSH Personal Protective Technology Program. The committee chose to review the period of time between 2001, NPPTL’s inception, and 2007. The committee was asked to form qualitative assessments and assign a score using a five-point scale (with 5 being the highest score) to summarize its evaluation. The committee assessed the program based on the relevance of its work to improvements in health and safety and the impact of the program’s work in reducing workplace illnesses and injuries.

External factors such as the PPT Program’s limited budget and the federal regulatory mandate for respirator certification were also taken into consideration by the committee in its evaluation of the PPT Program.
ASSESSMENT OF RELEVANCE

The committee found that the PPT Program’s extensive work on respirator certification is highly relevant to occupational safety and health because it provides workers with respirators that have been rigorously tested to meet performance criteria for protection against hazardous respiratory exposures. NIOSH certification is well-respected as a thorough assessment of the capabilities of respirator equipment and is the accepted standard in the United States and other countries. The PPT Program’s research on respiratory protection encompasses a wide range of efforts to improve respirators and respirator-related technologies, and efforts to update federal regulations for certifying respirators are ongoing. In addition, the PPT Program has effectively leveraged its minimal resources in the area of personal protective technologies designed to reduce exposures to dermal hazards by playing a key role in the development of standards as well as the test methods to support those standards. There has been particular emphasis on the needs of the fire service and other emergency responder communities.

On the basis of its review, the committee assigned the NIOSH PPT Program a score of 4 for relevance, indicating that the PPT Program is working in priority areas and is engaged in transferring its research into improved products and processes (see Box 1).

ASSESSMENT OF IMPACT

The effectiveness of personal protective technologies is visible in situations such as firefighting, where conditions can be life-threatening; everyday throughout the nation firefighters survive and avoid harm with the help of this equipment. In 2006, firefighters responded to more than 1.5 million fire-related calls and suffered 44,210 injuries and 38 deaths due to operations at the fire site. Manufacturers, work-site managers, individual workers, federal and state regulatory agencies, research programs, and organizations and associations that set product standards and certify product effectiveness all contribute to minimizing the potentially negative end outcomes. The committee found that the NIOSH PPT Program is a critical component of this effort. The PPT Program’s major intermediate outcomes include increases in the number of certified respirators, improvements in scientific knowledge regarding protection from respiratory hazards, and the development and implementation of federal regulations and consensus standards.

The committee assigned the NIOSH PPT Program a score of 4 for impact. The committee found that the PPT Program has made probable contributions to end outcomes and has achieved well-accepted intermediate outcomes (see Box 2).

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**BOX 1  Scoring Criteria for Relevance**

5 = The program’s work is in high-priority subject areas, and NIOSH is significantly engaged in appropriate transfer activities for completed projects or reported results.

4 = The program’s work is in priority subject areas, and NIOSH is engaged in appropriate transfer activities for completed projects or reported results.

3 = The program’s work is in high-priority or priority subject areas, but NIOSH is not engaged in appropriate transfer activities; or the focus is on lesser priorities, but NIOSH is engaged in appropriate transfer activities.

2 = The program is focused on lesser priorities, and NIOSH is not engaged in or planning some appropriate transfer activities.

1 = The program is not focused on priorities, and NIOSH is not engaged in transfer activities.
BOX 2 Scoring Criteria for Impact

5 = The program has made major contribution(s) to worker health and safety on the basis of end outcomes or well-accepted intermediate outcomes.
4 = The program has made some contributions to end outcomes or well-accepted intermediate outcomes.
3 = The program’s activities are ongoing, and outputs are produced that are likely to result in improvements in worker health and safety (with explanation of why not rated higher). Well-accepted outcomes have not been recorded.
2 = The program’s activities are ongoing, and outputs are produced that may result in new knowledge or technology, but only limited application is expected. Well-accepted outcomes have not been recorded.
1 = Activities and outputs do not result in or are NOT likely to have any application.

RECOMMENDATIONS FOR PROGRAM IMPROVEMENT AND FUTURE WORK

The committee notes that the NIOSH PPT Program has made great strides in advancing agendas in the areas of research, standards-setting, and certification. However, it also identifies opportunities for improvement in broadening the program’s breadth and depth of responsibility in order to protect workers more effectively from hazardous workplace exposures, illnesses, and injuries. The committee offers the following recommendations:

- Implement a comprehensive National Personal Protective Technology Program. NIOSH should work to ensure the implementation of the 2001 congressional mandate for a comprehensive state-of-the-art PPT Program.
- Establish PPT research centers of excellence and increase extramural research. The PPT Program should develop and support PPT research centers of excellence and work to increase other extramural research opportunities.
- Enhance the respirator certification program. The program should expedite the revision of the respirator certification regulations, develop a mechanism for registering the purchase of NIOSH-certified respirators, expand the product audit program, monitor the site audit program, and disseminate respirator certification test results.
- Increase research on the use and usability of PPT. The PPT Program should intensify its research about the barriers to and facilitators of personal protective technology use by workers. Such research should examine human factors and ergonomics, as well as individual and organizational behaviors, particularly workplace safety culture.
- Assess PPT use and effectiveness in the workplace using a life-cycle approach. The PPT Program, in collaboration with partner organizations, should oversee an ongoing surveillance and field testing program that includes pre-market and post-market testing.
FOR MORE INFORMATION . . .

Copies of The Personal Protective Technology Program at NIOSH are available from the National Academies Press, 500 Fifth Street, N.W., Lockbox 285, Washington, DC 20055; (800) 624-6242 or (202) 334-3313 (in the Washington metropolitan area); Internet, www.nap.edu. The full text of this report is available at www.nap.edu.

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