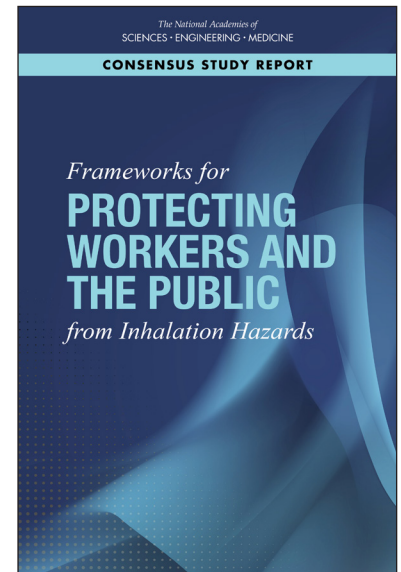




Frameworks for Protecting Workers and the Public from Inhalation Hazards

Recent and reoccurring disasters—including the COVID-19 pandemic and the frequent and large wildfires in the western United States—have highlighted major gaps in the nation’s system for ensuring timely access to and guidance on appropriate respiratory protection for the public and for many workers. The scale of these events and the increasing magnitude of their impacts on public health, particularly for the most vulnerable populations, have underscored the need to take action now to address the unmet respiratory protection needs of the public and all workers.

Recognizing this imperative, the National Institute for Occupational Safety and Health (NIOSH), the Environmental Protection Agency, the Department of State, and the CDC Foundation requested that the National Academies of Sciences, Engineering, and Medicine convene an ad hoc committee of experts to formulate recommendations for a framework of responsibilities and authorities that would provide a unified and authoritative source of information and effective oversight for the development, approval, and use of respiratory protection.



KEY RESPIRATORY PROTECTION TERMINOLOGY

Much of the technical terminology used in this area—such as the distinctions among masks, face coverings, and respirators (see examples of devices in Figure 1)—is unfamiliar to the public. Importantly, terms and their definitions used by federal agencies and others to describe these devices vary depending on the source. The committee anticipates that this terminology will be refined or new terms implemented as the report’s recommendations are pursued. Box 1 defines key terminology used by the committee for the purposes of this report.

Air-Purifying Respirators			Medical Mask	Barrier Face Covering (complies with ASTM F3502-21)	Face Covering
					
Elastomeric Facepiece Respirator	Filtering Facepiece Respirator	Powered Air-Purifying Respirator			

FIGURE 1 Examples of masks, face coverings, and respirators.

SOURCES: Photo of powered air-purifying respirator provided courtesy of 3M. Photo of barrier face covering provided courtesy of Puraka Masks, www.purakamasks.com.

BOX 1

Report Terminology

Inhalation hazards are gases, vapors, or particles, including airborne transmissible microorganisms (e.g., bacteria, viruses), that can be breathed in and potentially cause harm.

Respirators are personal protective devices worn on the face, cover at least the nose and mouth, and are designed to reduce the risk of inhaling hazardous airborne contaminants by removing them from the air or by supplying clean air from a safe source. These devices are approved by NIOSH for use in the workplace.

Surgical/medical masks are unfitted, Food and Drug Administration–regulated devices worn on the face and covering the mouth and nose that are designed to reduce the release of infectious agents from the wearer (i.e., source control) and may also provide some protection against splashes and droplets.

Face coverings are devices that cover the nose and mouth and may be mask-style, but do not conform to any specific standard and do not provide a known degree of protection.

Barrier face coverings are face coverings that are designed and manufactured to comply with the ASTM F3502-21 standard, and are intended to provide source control and a measured degree of particulate filtration.

Respiratory protective devices are any personal devices that provide protection against inhalation hazards when used effectively, acknowledging that each device may offer either personal protection or source control or both at varying levels; the blend of personal protection and source control is context specific (i.e., depends on both the device and the hazard in question).

GAPS IN THE CURRENT SYSTEM FOR RESPIRATORY PROTECTION FOR WORKERS

In workplaces where respirators are necessary to protect the health of employees, employers may be required by the Occupational Safety and Health Administration (OSHA) or other federal or state agencies, to establish a respiratory protection program (RPP). The RPP guides the selection and the safe and effective use of NIOSH-approved respirators. While this system, when properly implemented, should provide respiratory protection for workers covered by RPPs, large numbers of workers who are not covered by these programs remain exposed to inhalation hazards that increase their risk of illness. Such gaps result from language in the Occupational Safety and Health (OSH) Act that excludes specific workers and workplaces from OSHA coverage and outdated statutory interpretations that constrain the application of OSHA's Respiratory Protection Standard. Further challenges stem from workplace exposures that arise in the context of public health and environmental emergencies. Relevant examples include agricultural and other outdoor workers exposed to wildfire smoke, and workers who are at increased risk of exposure to SARS-CoV-2, the virus responsible for COVID-19. Because these hazards are not typically encountered by workers outside of emergency situations, their employers may not have instituted an RPP.

While workers not covered by workplace RPPs may still have access to NIOSH-approved respirators through the marketplace, such devices are approved on the assumption that they will be used in the context of an RPP. In the absence of fit testing, training, and other RPP components, the protection afforded to workers by such devices may be diminished.

GAPS IN THE CURRENT SYSTEM FOR RESPIRATORY PROTECTION FOR THE PUBLIC

The authority of OSHA and NIOSH for oversight for respiratory protection is limited to occupational settings; there is no central authority responsible for the respiratory protection of the public. In the absence of comprehensive federal regulation, significant authority is left to state and local governments. Although the states may receive guidance from federal agencies, there is no formal system for coordinating the development and distribution of such guidance to state and local health agencies or the public. The lack of a comprehensive regulatory framework makes it difficult to anticipate the level of protection that could be achieved by a device against a known or unknown inhalation hazard. Challenges to obtaining the needed protection include ensuring proper fit given the physical and demographic heterogeneity of the population and sociobehavioral considerations that impact access to and effective use of a device.

Further, the occupational respiratory protection model described above is not easily scalable to or suitable for the use of respiratory protection by the public. For the public a new paradigm is needed that is directed at reducing both population harm and individual risk, and that supports particularly vulnerable groups (e.g., children, the frail elderly, people with certain health conditions) and those with limited access to protective devices.

REPORT FRAMEWORK AND RECOMMENDATIONS

The committee used a systems approach to develop a general framework for oversight and guidance for respiratory protection to be applied to both workers and the public. Figure 2 depicts the functional elements of this framework. The resulting framework incorporates seven core functions, comprising specific subfunctions, which may be ongoing or triggered by a specific hazard. In the context of emergencies, the ongoing subfunctions represent critical aspects of national preparedness. The framework is intended to evolve over time, and to be agile in anticipating and responding to emerging threats.

Key Recommendations Specific to Workers

The report's recommendations oriented to workers are intended to address the significant gaps in OSHA coverage for the many millions of workers not currently covered by an RPP. OSHA's respiratory protection requirements should apply to all workers, which necessitates revision of the OSH Act and updates to current state-level occupational safety and health programs. Additionally, the absence of an OSHA standard for airborne infectious disease agents and the outdated nature of the existing standard for particulate matter (PM) impede efforts to institute respiratory protection measures for workers. OSHA should develop new standards and guidelines for inhalation hazards like wildfire smoke and airborne infectious agents to indicate when respiratory protection is needed. Since many employers and workers will be unfamiliar with respiratory protection and RPPs, relevant federal agencies including OSHA and NIOSH should expand grant programs and other mechanisms used to support the development of tailored guidance and training for employers and workers. Finally, these efforts to meet the respiratory protection needs of all workers must be built on a strong scientific foundation. The committee recommends that NIOSH expand its research and surveillance programs to better understand and meet these needs of all workers, including the most vulnerable and underserved populations.

Key Recommendations Specific to the Public

The committee recommends the creation of an entity within the Department of Health and Human Services (HHS) with the authority, resources, and expertise necessary to coordinate and oversee the development, approval, and use of respiratory protective devices for the public. Importantly, this coordinating entity cannot fulfill all functions independently and needs to harness the authorities, resources, and domain-specific expertise of all stakeholders to ensure that the framework can be carried out. This entity would ensure that processes are in place to evaluate hazards continuously, identify appropriate devices when needed, engage with the public regarding what devices they should use and how to use them, and guide efforts to ensure adequate supplies of and access to such devices. Currently no federal entity is responsible for overseeing the development, approval, marketing, and post-marketing surveillance of all respiratory protective devices for the public. To address this significant gap, HHS should designate a laboratory to oversee the development of standards for and the assessment and approval of respiratory protective devices intended for use by the public.

CONCLUDING REMARKS

For decades, the nation's systems for ensuring respiratory protection have been focused on those workers who are exposed to inhalation hazards as an intrinsic consequence of their jobs and for whom RPPs are required by law. As described in this report, the threats from inhalation hazards extend far beyond this group of workers, potentially impacting every person in the United States, as well as Americans abroad. It is impossible to know what is coming next, but the nation must be better prepared for future airborne threats.

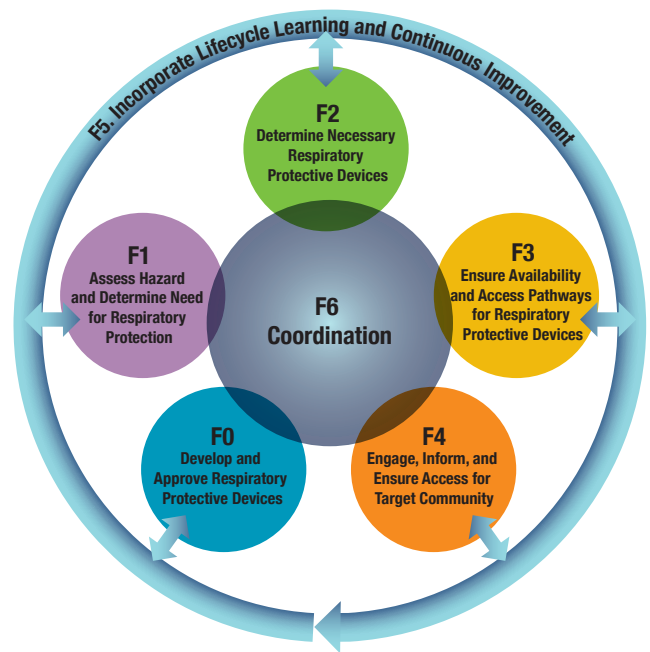


FIGURE 2 Core functions of the committee's framework.

Committee on Respiratory Protection for the Public and Workers Without Respiratory Protection Programs at Their Workplaces

Jonathan Samet *Chair*
Colorado School of Public Health

Gloria Addo-Ayensu
Fairfax County Department of Health

Wändi Bruine de Bruin
University of Southern California

Sarah Coefield
Missoula City-County Health Department

Howard Cohen
University of New Haven (Emeritus)

Joseph Domitrovich
United States Forest Service

Karen Emmons
Harvard T.H. Chan School of Public Health

Shawn Gibbs
Texas A&M University School of Public Health

Ayse P. Gurses
Johns Hopkins University

Robert Harrison
University of California, San Francisco

Stephanie Holm
University of California, San Francisco; California EPA

Sundaresan Jayaraman
Georgia Institute of Technology

James Johnson
JSJ and Associates

Bruce Lippy
The Lippy Group, LLC

David Michaels
The George Washington University

Mary Rice
Beth Israel Deaconess Medical Center

Kevin Riley
University of California, Los Angeles

Daniel Shipp
International Safety Equipment Association (retired)

Rosemary Sokas
Georgetown University School of Nursing and Health Studies; Georgetown University School of Medicine

John Volckens
Colorado State University

Study Staff

Autumn Downey
Study Director

Olivia Yost
Program Officer

Aurelia Attal-Juncqua
Associate Program Officer

Claire Giammaria
Associate Program Officer
until June 2021

Michael Berrios
Research Associate

Lydia Teferra
Research Assistant

Scott Wollek
Senior Program Officer

Andrew M. Pope
Senior Director, Board on Health Sciences Policy

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To read the full report, please visit
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