

Respiratory Protection for the Public and Workers Without Respiratory Protection Programs

Respiratory hazards associated with recent and reoccurring disasters—like wildfires, catastrophic weather events, and the COVID-19 pandemic—have highlighted the need for greater focus on respiratory protection by public health agencies at all levels, including local, state, tribal, and territorial health departments. Exposure to respiratory hazards, such as airborne infectious agents, wildfire smoke, and mold spores, cause a substantial burden of disease both in the United States and globally. These burdens are not borne equitably, and some populations may experience greater exposure to certain hazards and may be less able than other population groups to avoid or mitigate those hazards. Additionally, some individuals, including children, the elderly, and people with underlying health conditions, are at heightened risk of adverse health outcomes associated with respiratory hazards.

Community members may face exposures to respiratory hazards in different contexts, both in and outside of the workplace. For example, an individual may be exposed to wildfire smoke while running errands, to an airborne respiratory virus while working as a grocery store clerk during a pandemic, and/or to high concentrations of mold spores while doing construction work in a water-damaged building. Respiratory protection can help protect both the public and workers against these threats, but many may not know how to select appropriate protective devices and when and how to use them effectively. When other control methods are inadequate for protecting workers from a respiratory hazard, an employer is required to establish a Respiratory Protection Program (RPP) as defined by the Occupational Safety and

Health Administration (OSHA). RPPs in the workplace provide access to protective devices and education and training on appropriate use of these devices. But the public and many workers whose jobs do not typically involve exposure to respiratory hazards will not be covered by such programs and therefore may seek information and guidance on respiratory protection from trusted sources in their communities.

By taking action to address the information and guidance needs of their communities, public health practitioners can reduce confusion and improve the ability of individuals and families to make decisions that protect their health. To meet these needs, public health practitioners will need to

- improve their own knowledge of respiratory protection;
- develop and implement education strategies to target all affected populations, including the most vulnerable; and
- proactively build relationships with community partners to serve as trusted messengers.

UNDERSTAND THE STATE OF THE SCIENCE ON RESPIRATORY PROTECTION

In order to effectively communicate the nuances of respiratory protection, public health practitioners must understand the purpose and use of respiratory protection themselves. This includes knowing



FIGURE 1 Examples of respirators, masks, and face coverings.
SOURCES: Photo of powered air-purifying respirator provided courtesy of 3M. Photo of barrier face covering provided courtesy of Puraka Masks, www.purakamasks.com.

DESCRIPTIONS OF RESPIRATORS, MASKS, AND FACE COVERINGS

Respirators, such as N95 filtering facepiece respirators (FFRs), are personal protective devices worn on the face that 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 workplace respiratory protection programs but may also be used by members of the public and workers not covered by such programs. In addition to providing personal protection for the wearer against particulate respiratory hazards when fitted properly, N95 FFRs can also function as source control to reduce the spread of airborne infectious agents to others. Some types of respirators, such as elastomeric facepieces and powered air-purifying respirators, can be cleaned and reused over long periods of time.

Surgical or 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. Medical and surgical masks exhibit variable filtration efficiency and poor fit, which reduces overall effectiveness as compared to tight fitting respirators.

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 against respiratory hazards. Face coverings made from common cloth or fabric materials generally do not achieve the level of filtration efficiency provided by FFRs. For many types of ambient air pollution, including wildfire smoke, face coverings often have low filtration efficiency and therefore offer little to no protection for the wearer.

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 for airborne infectious agents and a measured degree of particulate filtration.

- the factors that impact the effectiveness of a device used for respiratory protection (e.g., fit and filtration),
- which available devices (see Figure 1 for examples) are appropriate for specific hazards,
- how to find the correct device, and
- how to correctly put on and safely remove such devices.

Understand the Needs of Specific Populations

It is important to know which populations or medical conditions may require specialized communications regarding the use of devices for respiratory protection. For example, children may receive less protection from devices than adults because of poor fit to children’s faces. Currently, no National Institute for Occupational Safety and Health (NIOSH)–certified respirator is specifically designed to fit the face of young children. Respirator use is well tolerated by healthy individuals, including pregnant people and children, but the risks for people

with serious chronic health conditions—a group that likely would benefit the most from protection against respiratory hazards—are not currently well understood. Certain respiratory impairments (e.g., chronic obstructive pulmonary disease, emphysema) or other health conditions (e.g., congestive heart failure) may lessen tolerance to the increased resistance to breathing associated with prolonged use of respirators.

Use Trusted Resources on Respiratory Protection

There are many resources for learning about respiratory protection, such as resources from NIOSH, the Centers for Disease Control and Prevention, and the Environmental Protection Agency (trusted resources can be found at the end of this Guide). Public health practitioners can use these resources to understand the current and evolving state of the science about respiratory protection, the range of devices available, and factors that impact the effectiveness of devices when in use. Additionally, as the science of respiratory protection advances, public health practitioners should update their professional competencies to ensure they provide the most up-to-date information to the public, specifically on new

QUESTIONS THE PUBLIC MAY HAVE ABOUT RESPIRATORY PROTECTION

DEVICE TYPE

Which device will fit my face or my child’s face?

How much will this device reduce my risk of disease or the risk to others?

Do any devices on the market meet a measurable standard?

Has the device been certified for safety and performance by an accredited organization?

How do I know if the device is protecting me or others?

SAFETY

Is the device safe for me to use?

Will the device harm me if I have certain health challenges?

ACCESS

Can I afford the device?

Where can I get the device?

How can I tell if the device is counterfeit?

USE

Why should I use this device?

When should I use the device?

How should I put on and wear the device and then store it?

How do I know when the device is no longer effective and should be thrown away?

products or use recommendations that might better serve the needs of special populations (e.g., young children or individuals with certain chronic health conditions) in their communities.

BE PREPARED TO EDUCATE COMMUNITY MEMBERS ABOUT USING RESPIRATORY PROTECTION

Devices used for respiratory protection are effective when the right device is worn correctly and available research suggests that improper use of devices is common. For example, one study conducted prior to the COVID-19 pandemic observed that only 24% of untrained individuals were able to correctly put on and use a filtering facepiece respirator. Common mistakes observed included failing to tighten the nose clip, putting straps in the wrong place, or wearing the device upside down. Therefore, educating community members about how to select the right device and to put it on and use it correctly is essential.

Tailor Education Efforts to the Community and the Hazard

Education efforts should consider the specific context of the community (e.g., demographics, literacy levels, past experiences) and the hazard. For example, in the case of infectious aerosols, respirators, barrier face coverings, and surgical masks can all be used as “source control” to reduce the quantity of infectious particles released by the wearer (e.g., during coughing, talking, or sneezing) and thus helping to protect those nearby. However, for other hazards, like wildfire smoke, the use of devices for source control purposes is not relevant and the focus must be on personal protection and other potential strategies to reduce exposure to the hazard. For populations facing multiple types of hazards, the communication of these essential differences is critical to ensuring that the public has the tools needed to protect themselves and others.

Consider Communication Strategies as Part of Preparedness Efforts

It is best to develop effective messaging and educational materials about respiratory protection before a crisis. This preparedness work necessitates public health practitioners anticipate the public’s questions (see box above for questions the public may have regarding respiratory protection).

To increase appropriate selection and proper use of the devices, public health practitioners also need to consider in advance the strategies and resources that may be needed to communicate these messages. Existing resources such as those at the end of this guide may help public health practitioners with these communication strategies. Some questions that should be considered when developing educational efforts and may be raised when engaging community partners include:

- Are there existing tools from reliable sources?
- How should interventions and messages be designed to promote consistent and effective use of respiratory protection by the public for specific audiences and specific hazards?
- Who should be responsible for designing and evaluating effective interventions and messages for the public?
- Which devices used for respiratory protection are most effective for protection against which hazards, and how is that information best communicated to the general public and workers?
- How can common mistakes in use of respiratory protection be prevented?
- How do misinformation and other barriers to consistent and accurate use of respiratory protection vary among specific audiences, and how can those barriers best be addressed in educational efforts?
- What other actions can people take to protect themselves, in addition to use of respiratory protection?
- What are the trusted sources of accurate information for different user populations, and how can communicators work with these sources?
- How effective are existing interventions and messages for promoting consistent and effective use of respiratory protection by the public for specific audiences and specific hazards?

- What are the issues that most undermine effective use of respiratory protection by the public for specific threats and over time?
- How can public resistance and common barriers to consistent and effective use of respiratory protection, including lack of comfort, be overcome?

DEVELOP EFFECTIVE MESSAGING AND BUILD RELATIONSHIPS WITH COMMUNITY PARTNERS TO STRENGTHEN COMMUNICATION PATHWAYS

Effective public health communication about the health risks from respiratory hazards and guidance on respiratory protection requires repeated and consistent messages that are

- delivered in the audience’s preferred language,
- culturally appropriate,
- take into account health literacy principles, and
- disseminated through multiple trusted channels.

Such guidance needs to address the specific risk perceptions and beliefs about the specific hazard in that community or target population. Risk should be communicated in a relatable way (e.g., using comparisons to commonly known respiratory hazards). When messages need to shift in response to changing circumstances and understanding, it is important to clearly communicate the reason for the change and the science behind it.

Test Tailored Messages with Target Audiences

In some cases, resources from federal agencies and labor, academic, and nonprofit groups for certain subpopulations—like workers who may be incidentally exposed to a respiratory hazard (e.g., wildfire smoke)—already exist and can be adapted for use by public health practitioners in their own communities. In other cases, new materials can be developed and tailored in collaboration with key community partners to better meet the needs of target populations, especially those who are most vulnerable. Importantly, these messages

need to be tested with members of the target audiences to ensure that they have the intended impact.

Engage Trusted Community Partners

Additionally, although messaging and education campaigns can be disseminated broadly and directly to the population, the impact of these materials can be amplified to target audiences when shared via trusted messengers. These partners can include health care providers and health systems, faith leaders, community leaders, schools, and community-based organizations with broad reach to specific population groups (e.g., senior centers, parent- and family-focused organizations). Such partners can also help public health practitioners understand perceived barriers to adhering to public health guidance.

Building this network of trusted community partners cannot be achieved overnight and requires proactive cultivation and ongoing partnerships. Once developed, these mutually beneficial relationships between key partners can be leveraged during a crisis to develop appropriate messaging and pathways for dissemination to target audiences.

RESOURCES FOR PUBLIC HEALTH PRACTITIONERS

CDC

Types of Masks and Respirators

<https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/types-of-masks.html>

Use and Care of Masks

<https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/about-face-coverings.html>

Communication Resources (COVID-19 specific)

<https://www.cdc.gov/coronavirus/2019-ncov/communication/index.html>

Clear Communication Index

<https://www.cdc.gov/ccindex/index.html>

EPA

Protect Your Lungs from Wildfire Smoke and Ash

<https://www.airnow.gov/sites/default/files/2021-12/protect-your-lungs-from-wildfire-smoke-or-ash.pdf>

Wildfire Smoke: A Guide for Public Health Officials

<https://www.airnow.gov/publications/wildfire-smoke-guide/wildfire-smoke-a-guide-for-public-health-officials/>

NIOSH

Respiratory Protection Information Trusted Source

<https://www.cdc.gov/niosh/npptl/topics/respirators/dispart/respsource.html>

OSHA

Respiratory Protection General Guidance

<https://www.osha.gov/respiratory-protection/general>

Note: These are examples of select resources currently available, but this content will not remain static over time. As knowledge gaps are addressed and new respiratory hazards emerge these resources will be updated and new tools and information published.

FOR MORE INFORMATION

This Consensus Study Report Guide was prepared by the Board on Health Sciences Policy based on the Consensus Study Report *Frameworks for Protecting Workers and the Public from Inhalation Hazards* (2022).

The study was sponsored by the CDC Foundation, Department of State, Environmental Protection Agency, and National Institute for Occupational Safety and Health. Any opinions, findings, conclusions, or recommendations expressed in this publication do not necessarily reflect the views of any organization or agency that provided support for the project.

This Consensus Study Report is available from the National Academies Press (800) 624-6242 | <http://www.nap.edu> | <http://www.nationalacademies.org>

To read the full report, please visit www.nationalacademies.org/respiratory-protection

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