



Clean Indoor Air for Healthier Communities: A Toolkit for State Health Leaders

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This toolkit is intended to be used by state health leaders to provide information about improving indoor air quality, especially during high respiratory virus activity and elevated risk of other airborne pollutants.

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INTRODUCTION

Background

With Americans spending approximately 90% of their time indoors, **maintaining healthy indoor air quality (IAQ) is essential for overall health and well-being.¹** Improving IAQ—through ventilation, filtration, and disinfection—is a powerful public health strategy for reducing the spread of respiratory viruses and mitigating the effects of other airborne pollutants, such as allergens and wildfire smoke.²⁻⁴

Although improving IAQ remains an underutilized public health tool, clean indoor air has proven to be highly effective in protecting health. Research shows that increasing ventilation can reduce respiratory virus transmission by up to 80%.⁵ Clean indoor air also plays an important role in reducing allergies and protecting individuals from exposure to wildfire smoke.^{6,7} Moreover, improved IAQ can yield significant economic benefits, potentially saving up to \$38 billion annually through reduced illnesses, fewer absences, and greater productivity in workplaces.⁸

In 2023, ASHRAE—an international society of heating, refrigerating, and air-conditioning professionals—published **Standard 241: Control of Infectious Aerosols.**⁹ This first-of-its-kind standard establishes minimum requirements for controlling airborne infectious pathogens in buildings to reduce the risk of disease transmission.⁹ ASHRAE Standard 241 introduces the concept of an Infection Risk Management Mode, which is a period of higher levels of indoor air cleaning that can be utilized at all times or especially during high infection risk in the community.⁹

As health-based IAQ standards, like ASHRAE Standard 241, are not yet widely adopted, promoting the importance of IAQ in the community remains essential. State health departments are uniquely positioned to fill this gap by guiding individuals and building owners to improve IAQ year-round and particularly during respiratory virus season, allergy season, or wildfire smoke events. **By leveraging established communication channels with the public, state health departments can implement an IAQ guidance system that raises awareness during these high-risk periods. These efforts can foster community resilience against respiratory viruses, allergens, wildfire smoke, and other airborne health hazards moving forward.**

About the Toolkit

This toolkit is designed to equip state health departments with resources for implementing an IAQ guidance system to raise awareness during high-risk periods.

- Pages 3-6 outline key components of the system to help state health departments identify next steps for implementation.
- Page 7 provides IAQ guidance templates for high-risk periods, which can be adapted by state health departments for various means of communication. State health leaders are encouraged to use these templates by filling in placeholder brackets and adjusting the language to reflect local context and community needs.
- Page 8 includes additional IAQ handouts and resources that can be printed, shared on websites, or posted to social media by state health departments.

Users of the Toolkit

The primary users of this toolkit are state health leaders who are encouraged to review and reference these materials. Secondary users of this toolkit include building owners who may find building-specific resources helpful in guiding ventilation and other facility-level interventions.

We envision this toolkit to support state health departments in launching targeted campaigns that promote clean indoor air broadly and also during high-risk periods. We hope that this toolkit serves as a starting point for broader conversations between state health departments and their communities about the importance of indoor air quality for protecting health.

IAQ GUIDANCE SYSTEM

Overview

The goal of this system (Figure 1) is to provide a framework for issuing guidance to the public that increases awareness of IAQ. While it is important to promote clean indoor air year-round, state health leaders can release recommendations on measures individuals and building owners can take to improve IAQ during high-risk periods. State health departments can implement the system as-is or adapt the framework to better align with current needs, existing infrastructure, or specific airborne health hazards.



Figure 1: Proposed steps for IAQ guidance system



Step 1: Issue IAQ Guidance

Description:

While clean indoor air is important year-round, state health leaders can release guidance to the public during particular high-risk periods. This guidance informs the public on the risk of specific airborne pollutants in the community and encourages individuals to take steps to improve IAQ.

Key considerations:

- High-risk periods—when this guidance is released—could be defined by state health departments. These periods could include respiratory virus season, allergy season, back-to-school season, or wildfire smoke events.
- Guidance could be published as press releases on state health department websites, social media posts, or through other means of public dissemination.
- The [templates](#) in this toolkit provide information on recommended language and structure.



Step 2: Link to IAQ Webpage

Description:

Guidance released by state health leaders directs individuals to a webpage with more information and resources on the impact of IAQ on airborne pollutants, such as respiratory viruses, allergens, and wildfire smoke. This webpage provides additional recommendations and steps individuals can take to improve IAQ.

Key considerations:

- The webpage could explain the importance of IAQ for general health and well-being and its important role in reducing the transmission of respiratory viruses and mitigating other airborne pollutants.
- The webpage can provide additional information on steps to improve IAQ, similar to the [webpage](#) published by the California Department of Public Health.
- [Resources](#) included in this toolkit can be used on the webpage.



Step 3: Public Takes Action

Description:

Based on information provided by state health leaders, individuals implement measures to improve IAQ and protect themselves from airborne pollutants during high-risk periods. Key audiences include **residents**, **building owners**, and leaders or building managers of **schools, hospitals, and nursing homes**.

Key considerations:

- Recommended steps for **residents** include opening doors and windows, upgrading the heating, ventilation, and air conditioning (HVAC) filters to high-efficiency filters (rated MERV-13 or higher) to capture harmful particles, using portable air cleaners, and aiming for 5 air changes per hour. See [Template #1](#) for more information.
- Recommended steps for **building owners** include increasing ventilation, improving air filtration and disinfection, and following ASHRAE Standard 241 or ASHRAE Guideline 44. See [Template #2](#) for more information.

Why should filters be MERV-13 or higher?

- Upgrading filters to MERV-13 or higher is an effective tool for reducing the transmission of infectious pathogens and wildfire smoke particles (Figure 3). While MERV-8 filters (a commonly used filter type) does not capture any infectious aerosols, MERV-13 filters remove 77% of infectious aerosols and 68.9% of wildfire smoke particles. Transitioning from MERV-8 to MERV-13 filters typically costs less than \$20.

MERV	Particle Removal Efficiency	
	Infectious Aerosols (Standard 241)	Wildfires (Guideline 44)
8*	0%	27.1%
11	60%	48.9%
13	77%	68.9%
16	95%	96.3%

*While ASHRAE Standard 241 states a particle removal efficiency of 0% for MERVs <11, data from the filter's manufacturer can be used to estimate their performance.

Figure 3: Particle Removal Efficiency of MERV Filters¹⁰

Case Study: California Department of Public Health

On September 19, 2024, the California Department of Public Health (CDPH) published a [press release](#) on its website, urging the public to stay up to date on vaccinations ahead of the respiratory virus season. The press release also recommends other actions people can take for virus prevention, including opening doors and windows to increase ventilation in indoor spaces. This leads to a [separate web page](#) (Figure 4) in CDPH's website informing individuals on steps they can take to improve IAQ for protection from respiratory infections.



Figure 4: CDPH webpage on IAQ¹¹

GUIDANCE TEMPLATES

Each IAQ guidance template includes the title and sample messaging. Links to webpages on IAQ or other relevant resources could be added at the end of each message.

Template #1: IAQ guidance for residents

Title: Protect Your Health with Clean Indoor Air

Guidance:

Clean indoor air is important for our overall health and well-being. While it's important to achieve cleaner air at all times, it is especially important to improve our indoor air quality during [specific high-risk period, such as respiratory virus season, allergy season, or wildfire smoke events].

Here are steps you can take for cleaner indoor air:

- Open doors and windows to bring in more outdoor air if it is safe to do so
- Upgrade your heating, ventilation, and air conditioning (HVAC) filters to high-efficiency filters (rated MERV 13 or higher) to capture harmful particles
 - Set the system fan to “on” rather than “auto” to keep air circulating
- Use [portable air cleaners](#) that circulate air through high efficiency particulate air (HEPA) filters to remove harmful air particles in specific rooms or areas of your home
- Aim for 5 air changes per hour in rooms (as [recommended by the CDC](#))

Template #2: IAQ guidance for building owners

Title: Steps Building Owners Can Take to Improve Indoor Air

Guidance:

Building owners can play an important role in improving indoor air quality during [specific high-risk period, such as respiratory virus season, allergy season, or wildfire smoke events].

Consult with experts before employing the following strategies for cleaner indoor air:

- Increase outdoor air delivery beyond code-minimum requirements, open windows and doors if it is safe to do so, and adjust HVAC system to increase total airflow to occupied spaces
- Upgrade HVAC filters to MERV-13 or higher, use portable air cleaners with HEPA filters, and/or use germicidal ultraviolet systems
- Follow ASHRAE Standard 241, which outlines minimum requirements for controlling infectious pathogens in the air to reduce the risk of infection in buildings [or, in the case of wildfire smoke events, recommend following ASHRAE Guideline 44]

IAQ RESOURCES

Below are handouts, factsheets, and webpages that could be included in IAQ guidance.



Residents

What is Indoor Air Quality? - U.S. Environmental Protection Agency

This infographic provides information on the importance of clean indoor air and general recommendations to improve IAQ.

Three Ways to Improve Indoor Air and Reduce the Risk of Spreading COVID-19 - Seattle and King County Public Health Department

This handout outlines steps individuals can take in their homes to improve IAQ and reduce the spread of respiratory viruses.

Additional resources:

- [Indoor Ventilation and Filtration Strategies Infographic](#) - U.S. Environmental Protection Agency
- [Wildfire Smoke Factsheet](#) - AirNow
- [Healthier Home Checklist](#) - Asthma and Allergy Foundation of America



Building Owners

Clean Air in Buildings Challenge - U.S. Environmental Protection Agency

This document describes actions building owners and operators can take to improve IAQ and reduce the spread of respiratory viruses and other contaminants.

Indoor Air Quality in Commercial and Institutional Buildings - Occupational Safety and Health Administration

The document provides an overview of indoor air pollutants and steps building owners and operators can take to improve IAQ.

Additional resources:

- [School IAQ Fact Sheets](#) - U.S. Green Building Council
- [Ventilation Mitigation Strategies](#) - Centers for Disease Control and Prevention
- [Companion for ASHRAE Standard 241](#) - Environmental Law Institute

Building Owners

- [Companion for ASHRAE Guideline 44](#) - National Collaborating Centre for Environmental Health

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