

## School Ventilation and Air Filtration: Focus Group Findings and Guidance Considerations for Health Agencies

### Background

Building on the national focus on upgrading school ventilation systems to combat the spread of COVID-19, with support from EPA, ASTHO convened two focus groups of self-selected state environmental health directors and/or their designated representatives from 11 states to talk about their agencies' ventilation guidance for school districts. The discussions focused on recommendations for filtration and air cleaning technologies in schools, layered mitigation techniques, partner engagement, and challenges moving forward. The focus groups aimed to:

- Learn more about messaging related to optimal filtration, air cleaning, and ventilation practices for school systems.
- Discuss how Bipartisan Infrastructure Law funds can and have been used most effectively in school systems.
- Understand states' challenges in providing guidance to schools and school districts.
- Discuss how the United States can generally improve indoor air quality in schools.

### Ventilation

Most focus group jurisdictions (57%) have a guidance document for school ventilation and air cleaning practices. However, focus group participants indicated that they generally prefer national guidance resources, such as what [EPA](#), [CDC](#), [Department of Education](#), or [ASHRAE](#) have developed. Some jurisdictions developed their own guidance early during the COVID-19 response, but many of these guidance documents are already outdated or not currently in use. One participant commented that it's hard to establish general ventilation guidance because recommendations should be specific to a school's context.

**Table 1. State Health Agencies' COVID-19 Mitigation Strategies for Indoor Air**

What filtration and air cleaning technologies are you currently recommending for schools? (N=10)	
Traditional HEPA	70%
CO <sub>2</sub> monitoring	70%
Other portable air cleaners	40%
MERV filtration	40%
Other	40%
Ultraviolet germicidal irradiation (UVGI)	20%
Bipolar ionization	0%

Focus group polling showed that states were more likely to recommend using traditional HEPA filtration or CO<sub>2</sub> monitoring technologies than portable air cleaners or [ultraviolet germicidal irradiation](#) (UVGI) to improve indoor air quality. One participant reported that some schools in the state were downgrading their filtration technologies now that the threat of COVID-19 is less imminent. At least one school in that jurisdiction requested to downgrade its [MERV 13 filters](#) to less-fine MERV 8 filters for cost-saving reasons. However, all focus group participants pointed out that superior air quality has benefits outside of COVID-19 prevention.

**Table 2. State Health Agencies’ Ventilation Practice Recommendations**

What ventilation practices are you currently recommending for schools? (N=9)	
Increasing outdoor air intake in the mechanical ventilation system	100%
Servicing, upgrading, or replacing existing HVAC systems	100%
Opening windows	67%
Other	22%

All focus group participants had specific ventilation practice recommendations for their school districts. Although participants admitted that just opening windows is straightforward and effective, several individuals pointed out that opening windows:

- Is weather-dependent.
- Can interfere with the proper functioning of a mechanical ventilation system.
- May introduce other environmental factors such as pollen and noise.
- Involves safety concerns, such as fall hazards in multi-story schools.

Therefore, mechanical ventilation was the preferred way to ventilate schools. Participants noted that many schools have absent or defunct ventilation systems, so being able to upgrade, replace, or install ventilation systems is an important ongoing issue. Focus group participants mentioned that Elementary and Secondary School Emergency Relief Funding and COVID-19 Relief Funding can help support this work.

## Layering Technologies

While both CDC and EPA recommend layered mitigation (using multiple air filtration or ventilation strategies at once) to reduce indoor air pollution and the spread of disease, focus group participants reported that layered mitigation is less prevalent in some jurisdictions. In 2021, some jurisdictions distributed portable air cleaners to schools to use alongside ventilation systems, but these too are not as prevalent due to challenges with noise and maintenance.

## Engagement with Schools

Participants commented that it has been challenging to progress state-level implementation of indoor air quality management programs in schools. One state pointed out that its environmental department was less concerned with making specific recommendations than how to engage schools better. Indoor air quality strategies need to be implemented and maintained at the individual school level, and the health agency in that jurisdiction was frustrated by efforts to work with the state education department—or even school superintendents—because the impacts weren’t ultimately being seen at the individual school level. In addition, over the last few years, COVID-19 funding to implement new

health and safety measures went directly to schools. Since these kinds of activities are not within the usual purview of a school or education department, they often don't have the subject matter expertise to implement and evaluate these new technologies.

Another participant commented on the importance of gaining support at the school level for ventilation and filtration upgrades because indoor air quality is mostly unregulated, and the local superintendents' receptivity can have a large impact on whether the upgrades happen. Even more important is getting support from principals and facilities personnel, who have the power to ensure that filtration and ventilation technology is up-to-date and well-maintained. Some health agencies have directly messaged school administrators and facility managers about air quality improvements, including new funding sources for improving indoor air quality.

A third participant identified another kind of potential outreach partner—school architects and design firms—because when funding is available for new school construction, these individuals decide which ventilation technologies to use.

On the other side of the discussion, two focus group participants suggested that health departments should perhaps not attempt to make changes at the individual school level but instead operate upstream by developing guidance at the municipality level. State health agencies could do this by recommending sources (e.g., local health dept) that are better positioned to provide school-specific guidance or even providing HVAC certification courses so that those positioned to make school-level changes are better informed about indoor air quality.

## Engagement with Vendors

Two participants noted that their agencies were more often approached by companies hoping the agency would recommend their technology for air quality upgrades than by schools or childcare facilities seeking out recommendations. This has led to challenges in understanding the available air quality research, as participants noted that research conducted by for-profit companies could be less trustworthy than that conducted by unbiased sources.

States were far more comfortable making statements about which air quality technologies had a low evidence base or had been shown to be ineffective and were less comfortable making confident statements about technologies that work. Focus group participants were unanimous in calling for federal funding to research the effectiveness of filtration and air-cleaning technologies.

## Regulation

As stated above, indoor air quality in schools is largely unregulated. Where regulations do exist, as one state pointed out, there are often insufficient funds available to make those requirements feasible. However, school districts are likely to have minimum standards for fresh air turnover rate. While some schools can meet these requirements, some schools—often in lower income areas—have older air systems that don't allow them to meet requirements, and there is little the health agency can do to remediate the situation other than point out that the violation exists.

## Conclusion and Considerations

Based on the focus group discussions, ASTHO has compiled high-level considerations for states to consider when creating guidance for schools and school districts.

- Traditional HEPA filtration and CO<sub>2</sub> monitoring are popular ways for states to improve indoor air quality in schools. There is also potential for schools to use UVGI, but it is not widely recommended since there is less definitive data available on its efficacy. State environmental health directors largely don't recommend bipolar ionization in school HVAC systems due to the lack of research about this method and unknown risks with ozone generation.
- Schools need sustainable funding to allow them to maintain MERV 13 filtration systems.
- Mechanical ventilation is the most widely used ventilation practice in schools. Opening windows can be helpful during optimal weather, but it cannot be the sole ventilation method due to some prohibitive factors.
- States can use Federal Bipartisan Infrastructure Law funds for HVAC system upgrades to improve indoor air quality in schools. Since funds are still limited, states and school districts can prioritize buildings that need them the most.
- Layered mitigation is always a good strategy for improving indoor air quality in schools when feasible.
- If the cost of mitigation strategies is problematic, schools could consider ramping up more protective measures for respiratory disease transmission during times of higher disease transmission and saving on costs and resources when disease risk drops.
- Improving relationships and engagement between state and local health agency staff and school districts can improve how much school staff and administrators know about indoor air quality technology and how willing they are to improve their systems.
- Providing indoor air quality training and HVAC certification courses to school district staff is one way for state health agencies to increase the number of schools and school districts that take their preferred guidance.