

Addressing Indoor Air Quality in Schools

The Importance of Indoor Air Quality in Schools for Improved Educational Outcomes and Occupant Health

Nearly 57.5 million students and school employees enter the doors of our nation's schools every day. According to estimates from the U.S. Environmental Protection Agency, half of these adults and children spend their school days breathing air polluted with toxic chemicals, mold, viruses, bacteria, asbestos, pesticides, smog and particulates from vehicle pollution, and more. Despite efforts by school employees and their unions to improve indoor environmental quality in classrooms and other school buildings, many of the conditions that cause unhealthy indoor air and environmental quality continue to plague our nation's schools.

Poor indoor air and environmental quality results from:

- Deferred building maintenance, which leads to dampness, mold, high humidity and uncontrolled classroom temperatures;
- Improper ventilation, which is the result of outdated designs, aging or badly maintained systems, or human error;
- Site contamination from toxic chemicals previously used or dumped at the school site, no environmental testing of sites, or poor leasing practices;
- Hazardous neighbors; school locations are located close to known sources of air pollution and contaminated facilities;
- Toxic construction materials, which are often banned or no longer used, but still in place in many schools;
- Unhealthy practices, such as misuse of harsh cleaning products that can cause asthma and lung irritation; and
- An absence of state or federal mandatory standards that would ensure healthy indoor air in all schools.

The underlying conditions in schools that cause poor indoor air and environmental quality harm not only the health of students and school employees, they also limit academic achievement and teacher and staff productivity. Whether inadequate ventilation, deferred maintenance or toxic chemicals are

making the air unhealthy in any particular school, these conditions result in a variety of common problems that the educational system must grapple with every day.

Poor indoor air and environmental quality:

- Increases the severity and frequency of asthma, allergies and other respiratory illnesses;
- Aids transmission of viruses and bacteria resulting in more colds, flu and serious infectious diseases, such as pertussis or tuberculosis;
- Can raise the risk of long-term, even life-threatening illnesses, such as cancer and cardiovascular disease, particularly among school employees;
- Leads to more school and workdays missed;
- Results in higher medical bills and more doctor visits for all
- Lowers student scores on standardized math and reading tests;
- Leads to higher dropout rates, limiting students' long-term potential and earning power; and
- Increases school employee dissatisfaction and staff turnover.

Indoor air and environmental quality solutions must incorporate racial and social justice analyses so that marginalized communities are not further disadvantaged by the failure to identify and remediate these problems their schools face or to dedicate the resources necessary to do so.

The EPA's Science Advisory Board has consistently ranked indoor air pollution among the top five environmental risks to public health.

It is estimated that [Americans spend about 90 percent of their time indoors](#) where levels of pollutants may be two to five times higher than outdoor levels, reaching more than [100 times higher](#) on occasion. Comparative risk [studies by the EPA's Science Advisory Board](#) place indoor air pollution among the top five environmental risks to public health.

Ventilation rates in classrooms regularly fall below minimum standards necessary for a healthy indoor environment, and HVAC (heating, ventilating and air-conditioning) systems in many U.S. schools are failing.

A 2017 [literature review](#) found that school ventilation rates regularly fall below the ASHRAE (formerly, the American Society of Heating, Refrigerating and Air-Conditioning Engineers) standards deemed necessary for a healthy indoor environment. Proper installation, operation and maintenance of HVAC systems are key to proper ventilation in classrooms, but existing systems often fall short. In addition, many schools do not have HVAC systems. [A study by the University of California, Davis, and Lawrence Berkeley National Laboratory](#), for example, found that nearly 85 percent of newly installed HVAC systems in California schools failed to provide sufficient ventilation. A 2020 [analysis of U.S. schools by the United States Governmental Accountability Office](#) found that 41 percent of school districts need to update or replace HVAC systems in at least half of their schools.

Good indoor air quality contributes to healthier indoor environments and better student outcomes.

The [2017 literature review](#) found a positive association between ventilation rates and student health and performance. For example, higher ventilation rates were associated with a decrease in absences and reductions in visits to the school nurse for respiratory symptoms. Asthma, mold and other problems also can be mitigated by appropriate ventilation. A [study](#) of 100 U.S. schools found a direct association between student academic achievement and classroom ventilation rates, and that measurable progress in math and reading scores were observed when school indoor air quality was improved. Finally, as the EPA writes: “Good indoor air quality is shown to promote a pleasing learning and working environment, along with promoting a sense of welfare. A [positive working and learning environment](#) assist schools in providing the most efficient education for students.”

How Schools and Institutions of Higher Education Can Address IAQ

- The [Environmental Protection Agency’s Clean Air in Buildings Challenge](#) provides specific steps schools and other buildings can take to improve indoor air quality (IAQ) and reduce the risk of airborne spread of viruses and other contaminants. The [Ventilation Verification Program](#) designed by UC Davis and the National Energy Management Institute outlines the steps that must be taken to make sure HVAC systems are operating properly and comply with the Centers for Disease Control and Prevention guidelines and other applicable national standards such as the ASHRAE 62.1 standard—2019 edition. EPA’s [Tools for Schools](#) program also provides helpful resources. Ventilation recommendations for different types of buildings can be found in the [ASHRAE Epidemic Task Force’s guidance for schools and universities](#).
- Proper installation, operation and maintenance of HVAC systems are necessary to provide adequate ventilation in classrooms. Per the [Biden administration’s back-to-school plan for 2022](#), the administration is collaborating with organizations—including the International Association of Sheet Metal, Air, Rail, and Transportation Workers (SMART)—to provide expert guidance and technical support from skilled, trained and certified technicians. The goal is to help make indoor air quality improvements easier for schools to navigate, help districts develop and implement plans to improve ventilation, and help schools get connected to local technical experts.
- Unions and school administration should negotiate collective bargaining agreements that require workplace safety committees, and they should work together through these committees to develop policies to ensure healthy indoor air quality. Unions can also train union members as safety officers. The United Federation of Teachers/New York City Schools union contract, for example, includes a requirement that every school have a safety committee with representatives from labor and management that meets at least once a month. When schools prepared for reopening in fall 2020, health and safety union representatives were dispatched to assess school ventilation systems and overall readiness for reopening. New York City Schools, working with the UFT, also adopted HVAC protocols for school reopening, requiring regular

maintenance of HVAC systems and cleaning, modification or replacement of air filters. To ensure that protocols and procedures were followed, the UFT organized COVID-19 building-readiness teams made up of thousands of members who were trained so they had the information they needed to perform their important role.

- Utilize an IAQ application like the one developed by the Philadelphia Federation of Teachers to engage members in reporting issues related to poor indoor air quality. The app allows school staff to submit real-time descriptions and images of problems they see in their buildings directly to the union. The union then shares these submissions with the district and tracks the progress of repairs. Conditions such as leaks and water damage, mold, peeling paint, compromised materials (like mold on chairs or wet books), and floor tile damage can all be reported. The app helps act as an early warning system and can identify problems when they start and prevent more expensive or consequential problems. Parents, students, other staff, community members and the organizations that partner with schools can all use the app. Anyone with information about current school conditions is encouraged to report. This is citizen science and crowdsourcing at its best; people who are most directly affected can identify the issues that need to be addressed.

How Unions Are Partnering with Districts to Use Federal Funding to Improve IAQ

In response to the pandemic, the Boston Teachers Union (BTU), Seattle Education Association (SEA) and local education unions across the country started to negotiate IAQ requirements with their school districts.

- BTU worked with Boston Public Schools to require indoor air quality testing and public posting of results via the [Boston School District Dashboard](#). As of May 2021, the district has undertaken repairs in at least [13 schools](#) where testing identified ventilation problems. Find out more about the original BTU/MassCOSH [campaign](#) here.
- SEA and the Seattle Public Schools negotiated multiple IAQ-related memoranda of understanding (MOU) to provide quality assurances and establish operational practices. The association and the district agreed that HVAC systems, air handling equipment and other mitigation strategies will be monitored, routinely maintained, promptly repaired and comply with ASHRAE standards, Washington's Department of Labor and Industries, and health department requirements to ensure proper fresh air supply, filtration and circulation. The initial MOU stated that employee concerns about indoor air quality will be categorized as high priority by the district's Work Management System, that employees will have the option of another previously assessed room/office until the assessment is complete, and that the district will share the results of any air quality analysis with the SEA. A second MOU, which provided greater operational specificity, establishes a minimum number of effective air exchanges per hour, provides for portable HEPA filtration and MERV-13 filters, develops a facility health management scorecard for all buildings, and establishes a testing program to measure the particulate levels of classrooms and other workspaces.

How Districts Can Access Federal Dollars

American Rescue Plan Act ESSER and GEER

Funds provided through the U.S. Department of Education's [Elementary and Secondary Schools Emergency Relief \(ESSER\) Fund programs](#) and the [Governor's Emergency Education Relief Fund \(GEER\) programs](#) and the Department of Health and Human Services' [Head Start and Child Care American Rescue Plan](#) can support improvements to [ventilation](#); testing, repairs, upgrades and replacements in HVAC systems; purchase of MERV-13 air filters, portable HEPA filters, and [upper-room germicidal ultraviolet irradiation systems](#); as well as implementation of other public health protocols and CDC guidance.

American Rescue Plan Act State and Local Fiscal Recovery Funds

States and local governments can draw on \$350 billion to improve ventilation systems in buildings where people are gathering, including schools, hospitals, nursing homes, restaurants, office buildings, commercial buildings, multifamily residential buildings and transportation hubs. This funding can be used for the assessment, updates, repairs, installation and other projects to improve ventilation and indoor air quality in buildings. Funds must be obligated by Dec. 31, 2024, and spent by Dec. 31, 2026. The Treasury Department recommends that recipients ensure that the inspection, testing, commissioning, maintenance, repair, replacement and upgrading of ventilation systems are performed by a skilled, trained and certified workforce. An overview of this funding is available on the Treasury Department's [website](#), and its [guidance](#) regarding how the funds can be used to assess and improve ventilation systems is outlined on pages 16-19.

Bipartisan Infrastructure Law Funds to Improve Indoor Air Quality in Buildings

The Bipartisan Infrastructure Law provides billions of dollars for different types of buildings to improve ventilation and indoor air quality. This includes a \$500 million grant program titled Renew America's Schools. The funding can be used by schools to update HVAC systems. The opportunity to apply for funding opened in November 2022. Information about the program is available [here](#).

Inflation Reduction Act

The Inflation Reduction Act includes \$50 million for the [Environmental Protection Agency](#) to assist schools to improve air quality and reduce greenhouse gas emissions. Of those funds, \$37.5 million is available via grants for schools in low-income and disadvantaged communities to monitor and reduce air pollution and greenhouse gas emissions, and \$12.5 million will be available via technical assistance to help schools address environmental issues, mitigate ongoing air pollution hazards, and develop school environmental quality plans that include standards for school building design, construction and renovation.