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Improving Ventilation in Schools, Colleges, and Universities to Prevent COVID-19

> ***Did you know?*** You can use American Rescue Plan (ARP) education funds further described below to improve indoor air quality for in-person instruction, including through:
> - Inspection, testing, and maintenance of current ventilation systems and approaches
> - Purchasing portable air filtration units, such as HEPA air filters
> - Purchasing MERV-13 (or higher) filters for your HVAC system and ACs
> - Purchasing fans
> - Repairing windows and/or doors so that they can open to let fresh air in
> - Servicing or upgrading HVAC systems consistent with industry standards
> - Purchasing equipment to run outdoor classes
> - Purchasing carbon dioxide (CO_2) monitors, air flow capture hoods, and anemometers for custodians and building personnel to assess ventilation
> - Paying for increased heating/cooling costs due to increased use of heating/cooling systems
> - Other spending that supports inspection, testing, maintenance, repair, replacement, and upgrade projects to improve the indoor air quality in school facilities, including mechanical and non-mechanical heating, ventilation, and air conditioning systems, filtering, purification and other air cleaning, fans, control systems, and window and door repair.

Clean air is essential for living and learning, and effective ventilation is an important part of COVID-19 prevention. We know that even before the pandemic, some schools, colleges, and universities had indoor air quality challenges, which many school, district, and higher education leaders worked to address as they reopened schools for in-person learning over the course of the last year.

As we move into the 2021-2022 school year, ventilation continues to be a top concern for many communities. Proper ventilation is a key prevention strategy for maintaining healthy environments and, along with other preventive actions, can reduce the likelihood of spreading disease. Wearing a well-fitting, multi-layer mask helps keep virus particles from entering the air and protects mask wearers. Good ventilation is another critical step to help reduce the number of airborne virus particles.

The ARP provided $122 billion for the Elementary and Secondary Schools Emergency Relief (ESSER) Fund (https://oese.ed.gov/offices/american-rescue-plan/american-rescue-plan-elementary-and-secondary-school-emergency-relief/) to help schools prevent the spread of COVID-19 and recover from its effects, including by improving indoor air quality, so school leaders across the country can act now to improve ventilation in their buildings. The ESSER funds and Governors Emergency Education Relief (GEER) funds (https://oese.ed.gov/offices/education-stabilization-fund/governors-emergency-education-relief-fund/) provided under earlier appropriations can also support this work. In addition, Higher Education Emergency Relief (HEER) funds (https://www2.ed.gov/about/offices/list/ope/arp.html) provided under the ARP and previous stimulus funds can support many ventilation improvements in institutions of higher education (IHEs). While these funds provide an important foundation, President Biden's Build Back Better agenda would tackle longstanding school infrastructure needs, including ventilation improvement.

ESSER, GEER, and HEER funds can support both immediate actions and longer-term projects, including the inspection, testing, maintenance, repair, replacement, and upgrading of projects to improve indoor air quality in school facilities. This can include system upgrades, filtering, purification and other air cleaning, fans, and window and door repair.

Strategies for Improving Ventilation

The below resources are based on current recommendations by the Center for Disease Control and Prevention (CDC) and the Environmental Protection Agency (EPA).

The Centers for Disease Control and Prevention (CDC) and the Environmental Protection Agency (EPA) outline ways that schools and IHEs can improve ventilation, including:

- **Bringing in as much outdoor air as possible.**
  - Open windows wherever it is safe to do so, including in classrooms and on school buses and other transportation. Where safe, opening doors can also improve airflow. Using child-safe fans in accordance with CDC guidance increases the impact of open windows and doors.
  - Hold classes, activities, and meals outdoors when safe and feasible.
- **Using heating, ventilation, and air conditioning (HVAC) settings to maximize ventilation.**
  - Service or upgrade HVAC systems consistent with current industry standards (https://www.ashrae.org/technical-resources/ashrae-standards-and-guidelines).
  - Set systems to bring in as much outdoor air as the system can safely support, including for 2 hours before and after occupancy.

- Reduce or eliminate air recirculation in consultation with an HVAC expert.
- Disable demand-controlled ventilation controls. In classrooms or buildings controlled at the thermostat, set the fan to the "on" position instead of "auto," which will operate the fan continuously, even when heating or air conditioning is not required.
- Use a scheduled inspection and maintenance program for HVAC systems to allow repair, modification, or replacement of equipment.
- In consultation with HVAC experts and health officials, consider changing HVAC system filters more often than recommended by normal maintenance requirements.
- **Ensuring exhaust fans** in restrooms and kitchens are working properly and use them during occupancy and for 2 hours afterward to remove particles from the air. Keep all fans and filters clean to maximize airflow.
- **Filtering and/or cleaning the air**.
  - Upgrade HVAC filters to minimum efficiency reporting value (MERV)-13, or the highest MERV rating a building's ventilation system can accommodate to improve air filtration as much as possible without significantly reducing airflow.
  - Ensure HVAC filters are sized, installed, and replaced at least as frequently as according to the manufacturer's instructions.
  - Consider using portable air cleaners that use filtration technology, such as high-efficiency particulate air (HEPA) filters. A July 2021 CDC report (https://www.cdc.gov/mmwr/volumes/70/wr/mm7027e1.htm?s_cid=mm7027e1_w) shows that HEPA filters can reduce exposure to the virus that causes COVID-19, particularly in combination with universal and correct mask wearing. Select air cleaners of appropriate capacity for the space in which they will operate. Portable air cleaners can go in any room of a school building to serve as an additional safety and mitigation layer, including in areas where airflow may be limited, and/or in areas where sick individuals may be present such as a nurse's office or sick/isolation room.
  - The CDC and EPA references listed under "Additional Resources" include valuable guidance on the selection of portable air cleaners. CDC guidance on ventilation in the home (https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/Improving-Ventilation-Home.html) may be relevant for residential dormitories. Caution: Some products sold as air cleaners intentionally generate ozone and are not safe to use when people are present. Consumers should assess any claims about air disinfection devices to determine whether they have been tested in similar conditions to those where they would be used, including in schools, colleges, and universities.[1]
- **Considering the use of portable carbon dioxide (CO2) monitors** to verify how well air is circulating in classrooms and other spaces. School maintenance professionals may also use air flow capture hoods, anemometers, and qualitative tracer techniques to assess airflow. Additional information on using portable CO2 monitors is available in the CDC Ventilation FAQ (https://www.cdc.gov/coronavirus/2019-ncov/community/ventilation.html#Ventilation-FAQs.) related to CO2 monitors.
- **Communicating clearly to school communities, parents, students, faculty, and staff**, in a language they can understand and in accessible formats, including on district, school, college, or university webpages, how you are assessing and improving ventilation. For example, some districts have performed school building ventilation walk-throughs with community leaders to assess needs and share results and plans for how to improve ventilation. Walking through school or IHE buildings with custodial engineers, parent leaders, teacher or faculty leaders, students, and others is one way to educate your community on how ventilation works within your educational spaces and assess ways that you can target upgrades and updates. Some districts and school leaders have created videos touring the ventilation systems of school buildings and explaining the strategies deployed for effective ventilation in plain language to parents so they understand the school's approach. In all cases, school leaders can share the ways rooms have been prepared to maximize air flow for in-person learning.

For more information on how ESSER and GEER funds can be used to support these efforts, please see questions B-6 and B-7 of Frequently Asked Questions (https://oese.ed.gov/files/2021/05/ESSER.GEER_.FAQs_5.26.21_745AM_FINALb0cd6833f6f46e03ba2d97d30aff953260028045f9ef3b18ea602db4b32b1d99.pdf) related to the program. For more information on using HEER funds, see question 24 of the ARP HEERF III FAQs (https://www2.ed.gov/about/offices/list/ope/arpfaq.pdf). In addition, for ESSER and GEER, the U.S. Department of Education (Department) has provided supplementary information (https://oese.ed.gov/files/2021/06/HVAC_Use-of-funds-F06-17-2021.pdf) to States and districts to help them efficiently implement ventilation projects while following applicable requirements. If a district or IHE uses funds for HVAC systems, the Department's applicable regulations require the use of current American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) standards.

Legal Disclaimer

Additional Resources:

- CDC information on improving ventilation in schools at https://www.cdc.gov/coronavirus/2019-ncov/community/schools-childcare/ventilation.html (https://www.cdc.gov/coronavirus/2019-ncov/community/schools-childcare/ventilation.html), in buildings at https://www.cdc.gov/coronavirus/2019-ncov/community/ventilation.html (https://www.cdc.gov/coronavirus/2019-ncov/community/ventilation.html), and in homes at https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/Improving-Ventilation-Home.html (https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/Improving-Ventilation-Home.html).
- EPA resources on indoor air quality tools for schools at https://www.epa.gov/iaq-schools (https://www.epa.gov/iaq-schools).
- Resources related to Lessons from the Field webinar featuring CDC, EPA, and U.S. Department of Education, along with district leaders at https://safesupportivelearning.ed.gov/events/webinar/lessons-field-indoor-air-quality-and-ventilation-america%E2%80%99s-k-12-schools-guidance-and (https://safesupportivelearning.ed.gov/events/webinar/lessons-field-indoor-air-quality-and-ventilation-america%E2%80%99s-k-12-schools-guidance-and).
- CDC Morbidity and Mortality Weekly report on the efficacy of HEPA filters and masking to reduce exposure to the virus that causes COVID-19 at https://www.cdc.gov/mmwr/volumes/70/wr/mm7027e1.htm?s_cid=mm7027e1_w (https://www.cdc.gov/mmwr/volumes/70/wr/mm7027e1.htm?

s_cid=mm7027e1_w).

- ASHRAE guidance for reopening schools at https://www.ashrae.org/technical-resources/reopening-of-schools-and-universities (https://www.ashrae.org/technical-resources/reopening-of-schools-and-universities).
- National Energy Management Institute and U.C. Davis Energy and Efficiency Institute White Paper on Proposed Ventilation and Energy Efficiency Verification/Repair Program for School Reopening at https://ucdavis.app.box.com/v/ProposedVentilationProgram (https://ucdavis.app.box.com/v/ProposedVentilationProgram).

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[1] Testing should validate both efficacy under as-used conditions and safety for all potential occupants, including those with compromising health conditions. (See the CDC FAQ related to air disinfection devices at https://www.cdc.gov/coronavirus/2019-ncov/community/ventilation.html (https://www.cdc.gov/coronavirus/2019-ncov/community/ventilation.html).) Some indoor air filtration devices use ionization technology, including bipolar ionization technology, which has the potential to create ozone that can irritate the airways, unless specific precautions are taken in the product design and maintenance. (See https://www.epa.gov/coronavirus/air-cleaners-hvac-filters-and-coronavirus-covid-19 (https://www.epa.gov/coronavirus/air-cleaners-hvac-filters-and-coronavirus-covid-19).)

How Do I Find...?

- Student loans, forgiveness (https://www2.ed.gov/fund/grants-college.html?src=rn)
- College accreditation (https://www.ed.gov/accreditation?src=rn)
- Every Student Succeeds Act (ESSA) (https://www.ed.gov/essa?src=rn)
- FERPA (https://studentprivacy.ed.gov?src=rn)
- FAFSA (https://fafsa.ed.gov/?src=edgov-rn)
- 1098, tax forms (https://www.ed.gov/1098-e?src=rn)
- More... (https://www2.ed.gov/about/top-tasks.html?src=rn)

Information About...

- Transforming Teaching (https://www.ed.gov/teaching?src=rn)
- Family and Community Engagement (https://www.ed.gov/family-and-community-engagement?src=rn)
- Early Learning (https://www2.ed.gov/about/inits/ed/earlylearning/index.html?src=rn)
- Constitution Day (https://www2.ed.gov/policy/fund/guid/constitutionday.html)

Our mission is to promote student achievement and preparation for global competitiveness by fostering educational excellence and ensuring equal access.

Student Loans (https://www2.ed.gov/fund/grants-college.html?src=ft)

Repaying Loans (https://studentaid.gov/manage-loans/repayment?src=ft)

Defaulted Loans (https://studentaid.gov/manage-loans/default?src=ft)

Loan Forgiveness (https://studentaid.gov/manage-loans/forgiveness-cancellation?src=ft)

Loan Servicers (https://studentaid.gov/manage-loans/repayment/servicers?src=ft)

Grants & Programs (https://www2.ed.gov/fund/grants-apply.html?src=ft)

Apply for Pell Grants (https://www.fafsa.ed.gov/?src=ft)

Grants Forecast (https://www2.ed.gov/fund/grant/find/edlite-forecast.html?src=ft)

Apply for a Grant (https://www2.ed.gov/fund/grant/apply/grantapps/index.html?src=ft)

Eligibility for Grants (https://www2.ed.gov/programs/find/elig/index.html?src=ft)

Laws & Guidance (https://www2.ed.gov/policy/landing.jhtml?src=ft)

Every Student Succeeds Act (ESSA) (https://www.ed.gov/essa?src=ft)

FERPA (https://studentprivacy.ed.gov/?src=ft)

Civil Rights (https://www2.ed.gov/about/offices/list/ocr/know.html?src=ft)

IDEA Website (https://sites.ed.gov/idea/?src=ft)

Data & Research (https://www2.ed.gov/rschstat/landing.jhtml?src=ft)

Education Statistics (https://nces.ed.gov/?src=ft)

Postsecondary Education Data (https://nces.ed.gov/ipeds/?src=ft)

ED Data Express (https://eddataexpress.ed.gov/?src=ft)

Nation's Report Card (https://nces.ed.gov/nationsreportcard/?src=ft)

What Works Clearinghouse (https://ies.ed.gov/ncee/wwc/?src=ft)

Open Data Platform (https://data.ed.gov?src=ft)

COVID Relief Data (https://covid-relief-data.ed.gov?src=ft)

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Press Releases (https://www.ed.gov/news/?src=ft)

FAQs (https://www.ed.gov/answers?src=ft)

Recursos en español (https://www2.ed.gov/espanol/bienvenidos/es/index.html?src=ft)

Budget, Performance (https://www2.ed.gov/about/overview/focus/performance.html?src=ft)

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