

School Ventilation: A Vital Tool to Reduce COVID-19 Spread

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NASEM Workshop: Indoor Air Management of Airborne
Pathogens: Back to School

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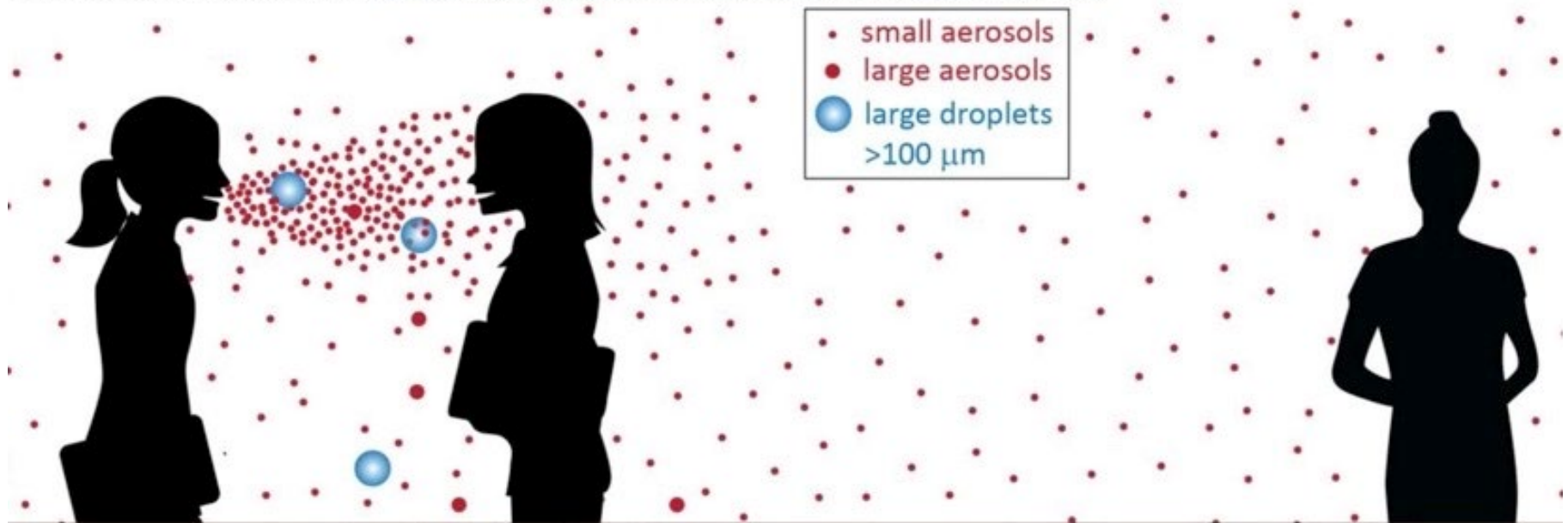
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Graphic from Prof. Linsey Marr

The virus travels on particles

Graphic by Prof. Linsey Marr, published in [https://www.journalofhospitalinfection.com/article/S0195-6701\(21\)00007-4/fulltext](https://www.journalofhospitalinfection.com/article/S0195-6701(21)00007-4/fulltext)





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Major Conclusions

- Airborne transmission of SARS-CoV-2 virus, the virus responsible for the COVID-19 pandemic, can be reduced by improving ventilation.
- Federal funds are now available to enable schools to make the needed changes. These changes will make our schools healthier during the current pandemic.
- If improved ventilation is properly installed, operated, and maintained, students and educators will benefit for years to come.

Important Definitions

- Ventilation
- Air changes per hour (ACH)
- Minimum efficiency reporting values (MERV)
- HEPA filter

Ventilation

- The process of supplying air to or removing air from a space for the purpose of **controlling air contaminant levels**, humidity, or temperature within the space.*
- Ventilation improvements are a cost-effective public health measure.
- Flexible funds available to schools to reduce risks related to Covid 19 under the American Rescue Plan

Definition from ASHRAE, <https://xp20.ashrae.org/terminology>

Air changes per hour (ACH)

- The number of times in one hour that the air volume of a space is supplied with either outdoor air or air that has been pushed through a filter
- Homes: 1 ACH
- Hospitals: 6-12 ACH (every 10-5 minutes!)
- Schools: designed for 2-3 ACH, much less in practice

MERV

- Scaled rating on the effectiveness of air filters
- Worst case performance when dealing with particles in the range of 0.3-1, 1-3, and 3-10 microns
- MERV 13 captures 50%, 85% and 90% in the three ranges
- HEPA filters remove 99.97% or higher for 0.3 micron particles

Three proven methods to improve indoor air quality

- Ventilation- dilution
- Filtration-removal
- Germicidal Ultraviolet Germicidal (G-UV)- disinfection
- All three are effective regardless of the Covid Variant

Poor indoor air quality is a longstanding problem

- Ventilation rates for classrooms fell short of minimum ventilation rates for air quality (before COVID)
- Poor ventilation has a negative impact on learning
- 41% of school districts need to update or replace HVAC systems in at least half of their schools (2020 GAO report)

Many schools have poor indoor air quality

Focus on indoor air quality in schools during and after Covid-19 pandemic.

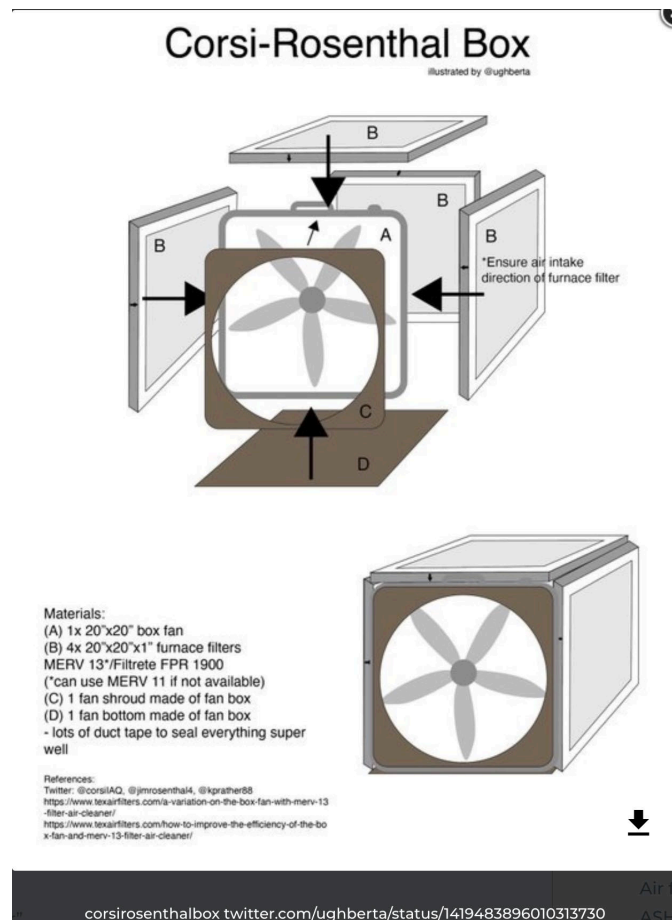
Ventilation improvements are a cost-effective public health measure.

No-regret investments.

School administrators and decision makers should

1. Improve school ventilation now by bringing in as much outdoor air as the HVAC system will safely allow and upgrading filtration.
2. Purchase HEPA air filtration units to be placed in classrooms and common occupied space

Corsi-Rosenthal Box



School administrators and decision makers should

3. Use only proven technologies for improving IAQ: appropriate ventilation, filtration, or ultraviolet germicidal irradiation. They should not use chemical foggers or any “air cleaner” other than filtration and ultraviolet germicidal irradiation.

The primary aim for improving air quality should be to remove contaminants from the air and not introduce new substances in the air.

School administrators and decision makers should

4. Stop enhanced cleaning, disinfecting, “deep clean” days, and any other expensive and disruptive cleaning.

Fomite (surface) transmission is not a major driver of the spread of Covid-19.

Investments in ventilation will provide more value in risk reduction!

School administrators and decision makers should

5. Install mechanical ventilation systems where none exist and upgrade those that do not meet current standards.

All students, teachers, and staff deserve healthy air, and many are not currently getting it. Proper ventilation will improve health and education.

Upgrades to facilities will take time but will improve ventilation in schools for the long term.

Questions?

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Extra Slides

The US Government should

6. Convene a federal task force dedicated to school air quality to develop guidance for long-term, sustainable, cost-effective improvements to indoor air quality in schools. This guidance should include accountability measures to assess improvements

Task force should create standards, develop a certification system for HVAC personnel, and provide recommendations for oversight and accountability.



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Improve Indoor Ventilation in K-12 Schools to Help Reduce COVID-19 Transmission

Ensuring that K-12 schools have healthy air to breathe is a no-regret investment and a cost-effective public health measure to reduce SARS-CoV-2 transmission, provide a safer environment, and improve learning.

Airborne transmission of SARS-CoV-2 can be reduced by improving ventilation in school buildings and classrooms.

Ventilation improvements are a cost-effective public health measure. We can and should act to ensure good, safe indoor air quality for all students, educators, and school staff.

School administrators should:



- Use funding provided by the American Rescue Plan to improve school ventilation and upgrade air filtration, so that the heating, ventilation, and air conditioning system can bring in as much outdoor air as it will safely allow.



- Purchase or build HEPA air filtration units to be placed in classrooms and commonly occupied spaces.



- Use only proven technologies for improving indoor air quality: appropriate ventilation, filtration, or ultraviolet germicidal irradiation.



- NOT USE unproven technologies such as ozone generators, ionization, plasma, and air disinfection with chemical foggers and sprays.

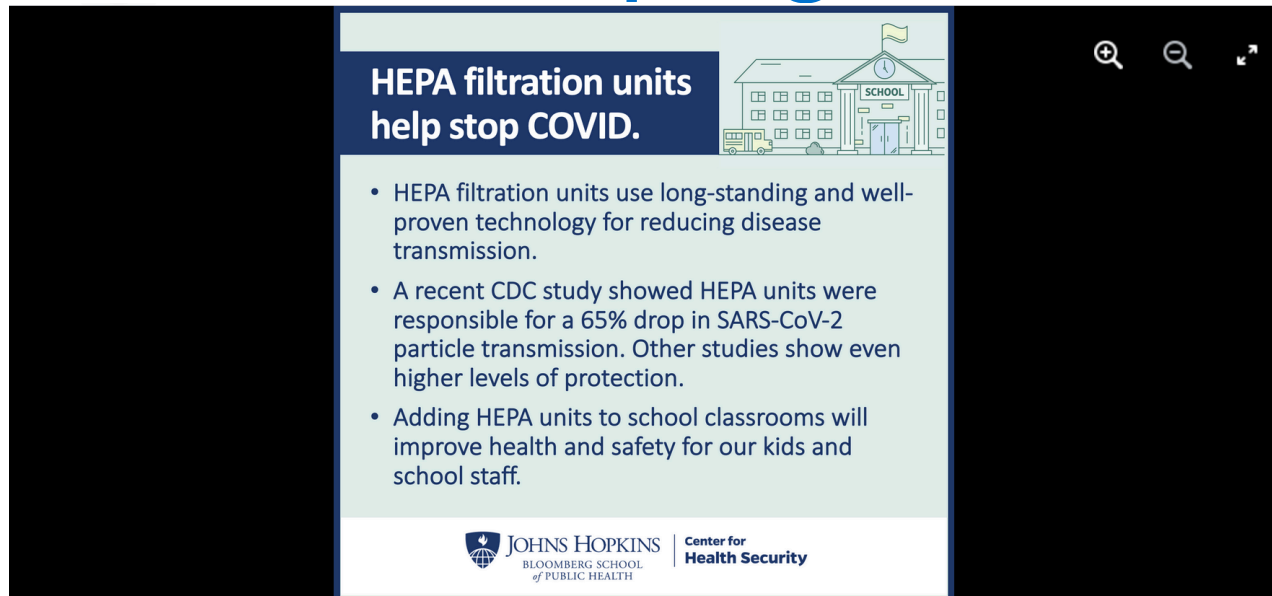
Improved Ventilation, Mask Wearing, Routine Testing, and Vaccination Help Reduce SARS-CoV-2 Transmission in Schools



Read more: [School Ventilation: A Vital Tool to Reduce COVID-19 Spread](#)



Facebook Campaign



Johns Hopkins Bloomberg School of Public Health

August 24, 2021 · 🌐

Parents are facing hard decisions right now about in-person schooling. They may not know, for instance, that HEPA filtration units help reduce COVID-19 spread in the classroom or that the Johns Hopkins Center for Health Security has released detailed recommendations for improving air in schools.

Ask your child's school today what they have done to improve air quality and lower risk. If your child's school is not able to meet updated COVID-19 air filtration guidance (includin... [See more](#)



Destiny Aman, Corbett Lunsford and 2.3K others

208 Comments 3.6K Shares



Letter to Administrators

- Experts Encourage School Administrators to Reduce COVID-19 Transmission by Improving Indoor Air in Schools
- Full letter available
<https://www.centerforhealthsecurity.org/news/center-news/pdfs/220111-SchoolVentilationLetter-Dec2021.pdf>

Federal Funding Available

American Rescue Plan and Bipartisan Infrastructure Law funds can be used to supplement investments in ventilation and indoor air quality improvements in public settings.