



RESEARCH IMPACT SUMMARY

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Air Purifiers Can Drastically Reduce Risk of COVID-19 Infection in Closed Spaces, Researchers Show

Air purification can protect against virus-containing aerosol particles known to cause COVID-19 transmission

When the COVID-19 pandemic began, social distancing measures were put into place to avoid transmission of the virus through aerosols and droplets that people can release when they speak, sneeze, or cough. Aerosol particles of a certain size can stay in the air for hours. Now, scientists find that air purifiers with HEPA filters can substantially reduce the risk of airborne transmission of COVID-19 in school classrooms.

The past 2 years have seen significant disruptions globally, owing to the COVID-19 pandemic and the resulting global closures of schools and workspaces to curb the spread of infections. In these times of high uncertainty, it is a challenge for lawmakers to make decisions about the safety of reopening these public spaces.

Now, in a [study published in *Aerosol Science and Technology*](#), researchers from the Institute for Atmospheric and Environmental Sciences, Goethe University Frankfurt am Main, Germany, found that installing air purifiers in closed spaces like school classrooms is a fast, effective, and practical solution to reduce airborne viral transmission. According to their experiments, led by Dr. Joachim Curtius, air purifiers with high efficiency particulate air (“HEPA”) filter reduce the aerosol concentration significantly. Their calculations also show that the purifiers provide 6 times more protection than in the case of rooms without a filter, when a highly infectious person is speaking in the room.

Guidelines for room ventilation have been issued by regulatory bodies and implemented widely, but ventilation alone is not enough. *“Ventilation, especially using windows, depends on several parameters such as the temperature difference between outside and inside, the wind direction and wind speed, the number and size of the windows that can be opened, and the exact duration of venting,”* explains Dr. Curtius. More than 90% of schools in Germany lack heating, ventilation, and air conditioning systems, and during a pandemic, taking the additional step of cleaning the air should be essential, especially in cases where venting is impractical such as in cold weather.

The researchers measured aerosol concentration and particle size in two classrooms, one with and one without air purification, over the course of a week. The measurements show that aerosol concentration decreased by more than 90% in the first 30 minutes, with an even reduction of all particle sizes throughout the room. These results highlight the efficiency of air purifiers in preventing airborne transmission.



The researchers also demonstrate how the effectiveness of air-purification in a closed classroom environment may be maximized. Air purifiers with a clean air delivery rate of 1,000 m³/h, a standard figure of merit for these devices, are the most effective, and positioning many small air purifiers in the classroom is better than using just one.

Of course, these findings do not indicate that air purifiers can replace other measures for reducing transmission, such as wearing face masks, hygiene measures, and social distancing. But they serve as an efficient additional method that schools can implement to be on the safe side. *“The implementation and maintenance costs need to be compared to the substantial advantages of reducing the number of infections and COVID-19 cases, the reduced need for contact tracing, and the avoidance of major disruptions caused by school closures,”* concludes Dr. Curtius.

There’s an added benefit to these: This study shows the beneficial effects of air purification on the amount of *particulate matter* in closed rooms. The WHO has warned that higher exposure to particulate matter increases the risks of many diseases including ischemic heart disease, lung cancer, and more. Given the rising rates of air pollution, installing air purification systems has benefits even in a non-pandemic scenario.

So, the consensus is clear: air purifiers may be a way out of the global pandemic conditions, and towards the pre-pandemic normal.

Reference

Authors	J. Curtius, M. Granzin, and J. Schrod
Title of original paper	Testing mobile air purifiers in a school classroom: Reducing the airborne transmission risk for SARS-CoV-2
Journal	<i>Aerosol Science and Technology</i>
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Classroom environments can be made substantially safer against airborne transmission of COVID-19 using air purifiers with HEPA filters.

Picture courtesy: [Pixabay](#)

About the author

Dr. Joachim Curtius is a Professor of Experimental Atmosphere Research at the Institute for Atmospheric and Environmental Sciences at Goethe University Frankfurt am Main, Germany. He specializes in research of aerosol particles, aerosol nucleation and aerosol precursor gases, atmospheric ions and ion clusters, ice nucleating particles, chemical aerosol composition, trace gases, aerosol-cloud-interaction, aircraft emissions, and influences of aerosol particles on the climate. He was recognized in 2018 with Clarivate's Highly Cited Researcher award, which is awarded to papers that rank in the top 1% by citations for their field.