

# Risk of infection: Air purifiers remove 90% of aerosols in school classrooms

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Credit: CC0 Public Domain

The most dangerous route to an infection with SARS-CoV-2 is via the air: For example, when infected persons sneeze or cough, they catapult relatively large droplets which, however, sink to the ground within a

radius of two meters. Important are also aerosols, much smaller droplets, which we emit when speaking or breathing. Studies show that infectious SARS-CoV-2 pathogens can still be detected in such aerosols over three hours after emission and several meters away from an infected person. The fluid in such aerosol particles evaporates quickly, making them smaller and able to disperse in a room within a few minutes.

Together with his team, Joachim Curtius, professor for experimental atmospheric research at Goethe University, tested four air purifiers in a classroom with 27 students and their teachers over a period of a week. The purifiers had a simple prefilter for coarse dust particles and fluff as well as HEPA and active carbon filters. Together, the filters processed between 760 and 1,460 m<sup>3</sup> of air per hour. Apart from [aerosol](#) load, the researchers also measured the volume of fine dust particles and CO<sub>2</sub> concentration and analyzed the [noise levels](#) caused by the device. The result: Half an hour after switching it on, the air purifiers had removed 90 percent of the aerosols from the air.

Professor Curtius explains: "On the basis of our measurement data, we've calculated a model that allows the following estimate: An air purifier lowers the amount of aerosols to such a considerable degree that the risk of being infected by a highly contagious person, a superspreader, is greatly reduced. That's why we're recommending that schools use HEPA [air purifiers](#) this winter with a sufficiently high air flow rate."

Noise measurements and a survey among students and teachers revealed that in most cases the noise made by the air purifier was not considered disturbing, provided that the appliance was not running at the highest level.

The researchers also measured that the air purifier—apart from lowering the risk of infection –additionally reduced allergens and fine dust particles (PM10). Joachim Curtius: "An air filter does not, however,

replace opening the window at [regular intervals](#), which is important for decreasing CO<sub>2</sub> concentration in the room. Our measurements in the classrooms showed that levels often exceeded the recommended limits. Here, we recommend installing CO<sub>2</sub> sensors so that students and teachers can monitor this themselves."

**More information:** Joachim Curtius et al. Testing mobile air purifiers in a school classroom: Reducing the airborne transmission risk for SARS-CoV-2, *medrxiv* (2020). [DOI: 10.1101/2020.10.02.20205633](https://doi.org/10.1101/2020.10.02.20205633)

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