

Testing mobile air purifiers in a school classroom: Reducing the airborne transmission risk for SARS-CoV-2

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ABSTRACT

Airborne transmission of SARS-CoV-2 through virus-containing aerosol particles has been established as an important pathway for Covid-19 infection. Suitable measures to prevent such infections are imperative, especially in situations when a high number of persons convene in closed rooms. Here we tested the efficiency and practicability of operating four air purifiers equipped with HEPA filters in a high school classroom while regular classes were taking place. We monitored the aerosol number concentration for particles > 3 nm at two locations in the room, the aerosol size distribution in the range from 10 nm to 10 μ m, PM_{10} and CO_2 concentration. For comparison, we performed similar measurements in a neighboring classroom without purifiers. In times when classes were conducted with windows and door closed, the aerosol concentration was reduced by more than 90 % within less than 30 minutes when running the purifiers (air exchange rate $5.5 h^{-1}$). The reduction was homogeneous throughout the room and for all particle sizes. The measurements are supplemented by a calculation estimating the maximum concentration levels of virus-containing aerosol from a highly contagious person speaking in a closed room with and without air purifiers. Measurements and calculation demonstrate that air purifiers represent a well suited measure to reduce the risks of airborne transmission of SARS-CoV-2 substantially. Staying for two

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das eigentliche Problem ist doch, das Geräte von Dyson, Philips und co, (von noch schlechteren will ich gar nicht erst reden), nicht für gewerblichen Einsatz gemacht sind und eigentlich bestehende

benötigten Stückzahlen produziert werden. Unternehmen werden sowieso schon ordentlich bestellt haben, ähnlich CO2 Messgeräten, die überall ausverkauft sind.

The real problem is that devices from Dyson, Philips and co, (I don't even want to talk about worse ones) are not made for commercial use and that existing regulations actually speak against the use of such household devices. VDI 6022 test probably impossible.

Devices coming onto the market from manufacturers such as Trox, Asecos and "Bundeswehr" -Trotec could probably never be produced in the required quantities. Companies will have already ordered a lot anyway, similar to CO2 measuring devices that are sold out everywhere.

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Olaf Lange • 10 days ago

This is comprehensive study, which answers many topical questions. Still I am wondering about one part. If I start to observe an empty room and than at a time zero people start breathing I would assume, that the particles, which are able to transport a virus, increase. But they drop by 30% even without purifiers. Do we look at the right parameters, which are able represent the increasing production of respiration?

Another explanation is that the humans acts as filters themselves, as stated in the text. Actually they would filter even more, than they produce. In this case, experiments with empty rooms, with and without purifiers might be a good supplement to determine absorption rate of the humans

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