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# SARS-CoV-2 in size-fractionated aerosols from hospital corridors and relations to the indoor environment

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Although most hospital wards treating patients with infectious diseases have isolation rooms with airlocks and regulated pressure systems, there is a risk that virus might be present in the air of corridors. In the corridors, less personal protective measures are in place than in patient rooms, posing a risk of infection for the hospital staff. Airborne virus might also be emitted by pre- or asymptomatic staff.

The aim of the current study was to evaluate the presence of airborne virus, specifically SARS-CoV-2, in infection ward corridors, and the size distribution of the virus-containing aerosols. Associations between virus presence and relative humidity and/or temperature in the facilities was also investigated.

Aerosol particles were collected in hospital corridors from March 2020 to April 2021 at infectious disease wards in Southern Sweden. Collection was performed using an 8-stage cascade impactor (Next Generation Impactor, Copley Scientific, UK) operating at a flowrate of 60 L $min^{-1}$ for 12 hours a day, 7 days a week. The impactor plates were exchanged every 7 days. After collection, each impactor stage was swabbed with a wetted nylon swab (Copan Scientific) and stored in universal transport media in -80 °C until analysis with real time reverse transcription polymerase chain reaction (RT-qPCR) for detection of SARS-CoV-2 RNA. The size fractions collected were: >8.1 µm, 4.5–8.1 µm, 2.9–4.5 µm, 1.7–2.9 µm, 0.9–1.7 µm, 0.6–0.9 µm, 0.3–0.6 µm, and 0.1–0.3 µm.

Indoor temperature, relative humidity and $CO_2$ concentration was recorded with a CL-11 or CP-11 multiple parameter meter (Rotronic, Germany). Recording was done 24 hours a day, 7 days a week, during the entire sampling period.

So far, only a small fraction of the collected samples (48 of 816) have been analysed by RT-qPCR. The majority of these are negative for SARS-CoV-2. Temperature measurements showed a mean corridor temperature of 23.4°C (SD: 0.38). Relative humidity varied between 6 and 67 % (mean: 28.4, SD: 10.6).

Results are expected to increase our understanding about virus presence in hospital corridors, and what aerosol particle sizes that contain SARS-CoV-2. Size information is important for understanding the particle origin, transmission patterns indoors, and where these particles deposit in the respiratory system when inhaled. Possible relations to temperature and relative humidity could improve mitigation strategies related to controlling the indoor environment.