

SYNOPSIS

04/30/2020

Review of “Aerodynamic analysis of SARS-CoV-2 in two Wuhan hospitals”

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One-Minute Summary

- The authors sampled total and size fractionated aerosols and aerosol deposition filters for genetic material of SARS-CoV-2, the etiologic agent of COVID-19.
- Sampling was done at two hospital sites in Wuhan, China; one was a make-shift hospital for mild COVID-19 patients and the other was a tertiary hospital for patients with severe illness.
- In total 30 were samples were obtained.
 - Areas with the highest amount of detectable viral RNA from aerosols included a poorly ventilated mobile toilet room, some personal protective equipment (PPE) removal rooms ventilated with an air purifier, medical staff change rooms and warehouse under natural ventilation, and a mechanically ventilated meeting room.
 - Low levels of aerosolized viral RNA were detected in a passageway and a dining room for medical staff and from some public crowded areas.
 - No aerosolized viral RNA was detected in intensive care units and ward room under negative pressure. However, viral RNA was detected on deposition filters located on the ICU floor corners 2-3 metres (m) from the patient’s bed.
- Overall the concentration of viral RNA in aerosols was very low in isolation wards and ventilated patient rooms. The authors postulate that the source of the aerosols could be from environmental or PPE surface deposition and resuspension.

Additional Information

- Sampling was conducted between February 17 and March 2, 2020.
- Some of the air samplings in the make-shift hospital were taken after the inpatient counts were reduced by over fifty percent, and more rigorous environmental and PPE disinfection was implemented in patient care areas.
- A presterilized gelatin filter was used to collect aerosol samples for varying lengths of time, including 30 samples of total suspended particles with no size discrimination and 3 aerodynamic size-segregated samples to determine size distribution. Samplers were located in the centre of the sampling area about 1.5m from the floor. In addition, 2 aerosol deposition samples were collected using 80 mm diameter filters over 7 days to determine the deposition rate.
- Virus detection was performed using a Droplet Digital Polymerase Chain Reaction (ddPCR) test.

PHO Reviewer’s Comments

- The authors appropriately identify that they did not culture live virus and the results do not necessarily indicate that the aerosols detected by ddPCR are infectious.
- The authors use of the term “airborne” may generate some confusion by readers since this study did not evaluate for “airborne transmission”, which refers to small droplet nuclei containing infectious virus remaining suspended in the air for long periods of time. The risk of infection transmission via these aerosols is uncertain as the quantity of viral RNA was low and the length of time these aerosols remained afloat in the air was not explored.
- The authors did not evaluate health care worker COVID-19 infections which may have contributed to the aerosolized viral RNA detected outside of patient care areas in both hospital sites.
- Further study into the viability and transmissibility of identified aerosols is needed.
- The study does highlight the importance of environmental cleaning, careful doffing of PPE, and meticulous hand hygiene to control nosocomial spread of COVID-19.

Citation

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