

## ***Keeping our healthcare workers safe: Current knowledge about occupational exposure risks of COVID-19, prevention and what is being done***

Physician Occupational Safety and Health (POSH) info sheet #2 – April 2, 2020

Given the crucial role of healthcare professional in the COVID-19 response, as well as the stress of this unprecedented time, we aim to share the current knowledge to help keep healthcare workers (HCWs) safe. We will also provide updates on our local situation.

### **Controversies and current knowledge on infection spread in healthcare workers:**

A recent study done in the Netherlands found that eighty-six (6.4%) of 1,353 HCWs were infected with COVID-19. Most suffered from relatively mild disease. Only 46 (53.5%) HCWs had fever and there was a high prevalence of mild clinical presentations that may have gone undetected. **The majority (n=54, 62.8%) reported to have worked while being symptomatic.** While the authors of this study recommend the mass testing of HCWs on an ongoing basis<sup>1</sup> an equally valid conclusion is that all **HCWs should proceed as if they may be infected without knowing it and follow rigorous hand hygiene and PPE recommendations – to protect themselves as well as co-workers and patients.**

**Another recent controversy relates to modes of transmission.** In a recent study from Nebraska, data obtained through samples indicated significant environmental contamination in rooms housing patients infected with COVID-19, regardless of the acuity of illness. Contamination existed in all types of samples: high and low-volume air samples, as well as surface samples including personal items, room surfaces, and toilets. This work, although misinterpreted by some, added to the conclusion that this disease is spread through **both direct (droplet and person-to-person) as well as indirect contact<sup>2</sup>, adding to current evidence supporting this contention<sup>3-8</sup>.** COVID-19 infection may also lead to intestinal infection, although only one study has cultured the COVID-19 virus from a single stool specimen<sup>9</sup> and there have been no reports of faecal–oral transmission of COVID-19.

### ***Difference between droplet and airborne transmission – and the implications:***

Droplet transmission occurs when a person is in close contact (within 1 m) with someone with respiratory symptoms (e.g. coughing or sneezing) and is thus at risk of having their mucosae or conjunctiva (i.e. mouth, nose *and/or* eyes) exposed to infective respiratory droplets (> 5-10 µm). Droplet transmission may also occur through fomites in the immediate environment of the infected person<sup>10</sup>.

Airborne transmission is different from droplet transmission as it refers to the presence of microbes within droplet nuclei (< 5µm in diameter), which result from evaporation of larger droplets or exist within dust particles. They may remain in the air for long periods of time and be transmitted to others over distances greater than 1 m. Airborne transmission of COVID-19 may occur when procedures generate aerosols (e.g. endotracheal intubation, bronchoscopy, open suctioning, nebulized treatment, manual ventilation before intubation, disconnecting the patient from the ventilator, non-invasive positive-pressure ventilation, tracheostomy, and cardiopulmonary resuscitation).

The Nebraska study, and other studies, indeed measured COVID-19 in air samples; in a recent publication in the *New England Journal of Medicine*<sup>11</sup> aerosols were generated under controlled laboratory conditions using high-powered machines. It is important to note that the conditions described are aerosol-generating procedures (AGP) and do not reflect normal human cough conditions in clinical settings. There actually is no evidence to support the contention that, other than for AGP, airborne precautions are needed, as noted in POSH Info sheet #1. **In analysis of 75,465 COVID-19 cases in China, airborne transmission was not reported<sup>8</sup>.**

**Again, the evidence continues to support these recommendations:**

- Strict contact and droplet precautions when caring for COVID-19 patients (surgical mask, gloves, eye protection, gown – donned and doffed properly);
- Surgical mask, gloves and eye protection in all direct patient care;
- N95 respirator as part of PPE if you are in the room during aerosol-generating procedures on patients with suspected or confirmed COVID-19;
- Meticulous hand washing before and after touching a patient, before any procedure, after exposure to body fluids, and after touching patient’s surroundings is essential;
- **Avoid misuse, overuse, and reuse of PPE** (this has been an issue ☺); and
- Ensure surfaces and instruments are properly cleaned.

POSH’s pilot exposure assessment survey identified a few concerns we are following-up (glove size, PPE re-use issue, and a few others) but **the vast majority of physicians in Vancouver Acute seem to be well-protected**; there have been very few major breaches in protocol recently. **Only a very small number of physicians in Vancouver Acute (our initial pilot group for POSH) have tested positive for COVID-19, and we have no evidence to suggest that these were from occupational exposures. So far, so good!** We will share collective data and aggregated test results in future info sheets.

**For confidential questions, or questions unique to your own situation** (your concerns, your exposures, your health, etc.), **please contact us at [posh.covid@ubc.ca](mailto:posh.covid@ubc.ca). We are operating now 8am to 8pm Monday-Saturday.** For general questions for all to see, you can also post your questions under the PPE channel or the FAQ safety channel (whichever is appropriate) on Slack.

**Thanks for your dedicated work. Stay safe!**

**References:**

1. Kluytmans et al. SARS-CoV-2 infection in 86 healthcare workers in two Dutch hospitals in March 2020. <https://doi.org/10.1101/2020.03.23.20041913>.
2. Santarpia et al. Transmission Potential of SARS-CoV-2 in Viral Shedding Observed at the University of Nebraska Medical Center. 2020. <https://doi.org/10.1101/2020.03.23.20039446>
3. Liu et al. Community transmission of severe acute respiratory syndrome coronavirus 2, Shenzhen, China, 2020. Emerg Infect Dis 2020 doi.org/10.3201/eid2606.200239.
4. Chan et al. A familial cluster of pneumonia associated with the 2019 novel coronavirus indicating person-to-person transmission: a study of a family cluster. Lancet 2020 doi: 10.1016/S0140-6736(20)30154-9.
5. Li et al. Early transmission dynamics in Wuhan, China, of novel coronavirus-infected pneumonia. N Engl J Med 2020;
6. Huang et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. Lancet 2020; 497–506.
7. Burke et al. Active monitoring of persons exposed to patients with confirmed COVID-19 — United States, January–February 2020. MMWR Morb Mortal Wkly Rep. 2020.
8. WHO. Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19) 16-24 February 2020. Geneva: WHO; 2020 <https://www.who.int/docs/default-source/coronaviruse/who-china-joint-mission-on-covid-19-final-report.pdf>
9. Zhang Y, Chen C, Zhu S et al. [Isolation of 2019-nCoV from a stool specimen of a laboratory-confirmed case of the coronavirus disease 2019 (COVID-19)]. China CDC Weekly. 2020;2(8):123–4. (In Chinese).
10. Ong et al. Air, surface environmental, and personal protective equipment contamination by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) from a symptomatic patient. JAMA. 2020 Mar 4.
11. van Doremalen N, Morris D, Bushmaker T et al. Aerosol and Surface Stability of SARS-CoV-2 as compared with SARS-CoV-1. New Engl J Med 2020 doi: 10.1056/NEJMc2004973.

*Annalee Yassi MD MSc FRCPC (PHPM), FRCPC (Occ Med),  
Physician Lead, Occupational Health, VCH*