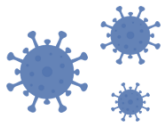


Organizing
bodies:



There is still time to address aerosol transmission of COVID-19

January 4, 2021

Dear Dr. Theresa Tam, Hon. Patty Hajdu, Premiers and Medical Officers,

We are a group of physicians, scientists, occupational health and safety experts, engineers and nursing professionals who have been following the COVID-19 developments closely. We are deeply concerned by the recent increase in cases and hospitalizations across Canada. We urge you to update the provincial COVID-19 guidelines, workplace regulations and public communication to reflect the science – COVID-19 spreads through inhaled aerosols.

In July of 2020, 239 international scientists brought this issue to the world stage¹. Since the publication of their letter, some progress has been made gaining recognition from the World Health Organization, Centre for Disease Control and Public Health Agency of Canada for aerosol transmission of COVID-19². However, this has not resulted in any significant improvement in workplace protection for Health Care Workers (HCWs) and other essential workers. There also continues to be a lack of public messaging at the provincial level to reflect the risk of transmission in shared room air. While other countries promote avoiding the 3 C's (closed spaces, crowded places and close-contact settings), we continue to focus on deep-cleaning and two-metre physical distancing. With winter upon us, our activities are moving indoors and it is therefore imperative that workplaces, public institutions and individuals understand the risk of aerosol transmission as well as the actions that can be taken to combat it.

The rapid global spread of COVID-19 has sparked unprecedented cross-disciplinary research. Contributions from the fields of engineering, life science, aerosol science, medicine, occupational hygiene and epidemiology are driving a paradigm shift in our understanding of aerosol transmission of respiratory viruses, including COVID-19.

The evidence is now overwhelming - aerosol transmission of COVID-19 is common and is an important route of transmission.³⁻⁶ This was elegantly summarized by Fang et al: "perhaps the biggest surprise about the issue of airborne spread of SARS-CoV2 is that it has been surprising to so many people".⁴ Virus-laden aerosols frequently infect susceptible contacts at close proximity where they are most concentrated – like smoke. In suboptimally ventilated environments, infectious aerosols can accumulate in shared room air and reach dangerous concentrations. Control strategies targeting close-proximity transmission, such as physical distancing and effective face-fitted masks, are key to reduce short-range aerosol transmission risk. For transmission in shared room air, ventilation and air filtration are critical additional measures, as expelled aerosols build up in poorly ventilated spaces. We know that many workplaces, buildings and residences in our communities have substandard ventilation.

With this evolving science, the importance of monitoring and improving ventilation has become increasingly clear. The September 28, 2020 report by Canada's Chief Science Advisor Expert Panel on





COVID-19 summarizes high-yield short-term and long-term goals to reduce indoor transmission of COVID-19 and improve indoor air quality.⁷ Despite this report, there continues to be a lack of attention to the importance of ventilation at the provincial and federal levels.

The acknowledgement of aerosol transmission also calls into question the provincial directives for personal protective equipment for HCWs and other essential workers. Most HCWs and essential workers in Canada continue to use “droplet and contact precautions”, wearing poorly-fitted surgical masks, even in high-risk settings. A letter from the Workplace Health Without Borders international board of directors to Dr. Theresa Tam in April 2020 highlights these concerns well.⁸

To reflect the current scientific evidence, we call on provincial leaders to:

- ❖ **Update COVID-19 guidance to address the risk of aerosol transmission of COVID-19**
- ❖ **Promote strategies to reduce transmission risk in private homes and businesses through clear public health messaging and education**
 - Avoid the “3 C’s”, indoor mask wearing even when distanced, routinely opening windows to refresh the air, regular HVAC maintenance and filter replacement, turning on available vented range hoods and bathroom exhaust fans
- ❖ **Mandate and fund ventilation assessments and upgrades of essential public institutions such as schools and long-term care homes**
- ❖ **Ensure that no high risk healthcare worker (HCW) or other essential worker is denied access to a fit-tested respirator (N95, elastomeric or equivalent)**
 - Risk assessment by HCWs should go beyond the presence of “aerosol generating procedures” and should take into consideration aerosol generating behaviours (ie. shouting, singing, coughing, sneezing, heavy breathing), proximity to the patient, time spent with the patient, building air quality, and patient compliance with masking for source control
 - Risk assessment for other essential workers should consider crowding, close contact, presence of aerosol generating behaviours, and building air quality
- ❖ **Recommend and deploy carbon dioxide (CO₂) monitors as a surrogate measure of inadequate ventilation to reduce long-range transmission risk in shared room air**
 - During a TB outbreak, CO₂ concentrations above 1000 PPM significantly increased the risk of becoming infected with TB.⁹ Improving the building ventilation to a CO₂ concentration of 600 PPM stopped the outbreak in its tracks.
- ❖ **Include appropriately sized portable air filtration (HEPA) units or low-cost homemade devices using MERV-11/13 filters and box fans as options for filtering out bioaerosols indoors when ventilation is suboptimal**
- ❖ **Engage engineers and other ventilation specialists to develop clear ventilation standards for indoor institutions and integrate these standards into the reopening guidelines for businesses with a higher risk of aerosol transmission (e.g. restaurants, bars and gyms)**

Specific strategies to reduce indoor aerosol transmission of COVID-19 are adeptly summarized in Canada’s Chief Science Advisor Expert Panel on COVID-19 bioaerosol report⁷, the Occupational Safety





and Health Administration (OSHA) Alert¹⁰, the Harvard TC Chan Risk Reduction Strategies for Reopening Schools Report¹¹, the CDC’s “COVID-19 Ventilation in Buildings” guidance¹², the European CDC’s “Heating, Ventilation and Air-conditioning Systems in the Context of COVID-19: First Update”¹³, and the “ASHRAE Position Document on Infectious Aerosols”¹⁴.

Experts warn that future respiratory viral pandemics are likely.¹⁵ Investing in ventilation, indoor air quality and appropriate personal protective equipment now will save lives and prevent economic hardship in the future. Germany is investing €500m to improve ventilation systems in public buildings.¹⁶ China implemented airborne precautions for HCWs in January 2020. Italy, New Zealand, and Japan have all accepted and promote aerosol messaging. The public health “sanitary reformers” of the late 1800s led the way in overcoming water-borne diseases like cholera and typhoid fever through investments in sewer systems and water treatment plants.¹⁷ We are certain that there were those who thought the task at hand was insurmountable. When the history of Canada’s response to COVID-19 is written, we hope that our country is once again viewed as a public health innovator.

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