
Subject: Improving Indoor Air Quality to Sustainably Prevent COVID-19, Improve Health, & Keep Society Open for Good

Report to: Public Health & Social Services Committee

Report date: Tuesday, June 14, 2022

Recommendations

1. That Regional Council, as the Board of Health, **DIRECT** the Chair to write to the Provincial Government (Minister of Health; the Minister of Municipal Affairs and Housing; the Minister of Finance; and the Chief Medical Officer of Health) and the Federal Government (Minister of Health; Minister of Intergovernmental Affairs, Infrastructure and Communities; Minister of International Trade, Export Promotion, Small Business and Economic Development; Minister of Finance; and the Chief Public Health Officer) requesting that they urgently:
 - 1.1 Update building codes to incorporate higher standards of air quality such that respiratory diseases, especially COVID-19 and other emerging infections, can be sustainably prevented in all new buildings, with regular updates to these building codes as best available evidence evolves; and
 - 1.2 Create a fund to support small business and local organizations to upgrade the ventilation and filtration in their existing buildings, as well as invest in validated air cleaning/disinfection technologies with demonstrated safety and effectiveness, so that current public spaces and workspaces can be made safer from COVID-19 and other respiratory infections, including future pandemics of a respiratory virus; and
2. That the above correspondence **BE SHARED** with Niagara's Members of Provincial Parliament, Members of Parliament, and all Ontario Boards of Health.

Key Facts

- The purpose of this report is to seek Council's endorsement and advocacy for provincial and federal actions that improve indoor air quality, thereby sustainably protecting Niagara from COVID-19, improving health, and keeping society open.
- Air has long been known to play a role in human disease whether through transmitting pollutants such as cigarette smoke which cause illnesses such as lung injury, asthma attacks, and cancers; or through transmitting infectious agents such as tuberculosis bacteria and measles virus.

- Numerous infectious agents, such as chicken pox, influenza or measles, are transmitted through the air by droplet and/or airborne mechanisms, and research is clarifying that airborne transmission is a significant factor in the COVID-19 pandemic.
- Improved indoor air handling systems (e.g. by ensuring appropriate ventilation, filtration, and/or air cleaning/disinfection) could sustainably reduce the risk of COVID-19, and likely many other respiratory infections, while also making society safer from future pandemics of respiratory infections. Such changes could also reduce respiratory injuries, asthma attacks, and cancers making society healthier overall.
- Retrofitting existing indoor air systems would also be an opportunity to simultaneously address climate change goals, which would itself have further health benefits.
- Provincial and federal leadership is needed to achieve these improvements in indoor air quality through changes to building codes and funding retrofits of ventilation systems.

Financial Considerations

There are no costs to Niagara Region associated with the recommendations of this report.

Analysis

Air represents an important medium through which pollutants or infection can spread thereby causing or worsening pre-existing illnesses in humans. The associated illness ultimately depends on the pollutant or infectious agent but can range from the infection of tuberculosis, to worsening of asthma and all the way to causing cancer.¹ Research continues to clarify the importance of indoor air quality (IAQ) in COVID-19 transmission.

A well-functioning air handling system (e.g. heating, ventilation and air conditioning (HVAC) system), is one of numerous important tools to help reduce the risk of COVID-19 as outlined by Public Health Ontario and other expert bodies.^{2,3} The Centers for Disease Control & Prevention (CDC) states improved ventilation (e.g. such as continuously running the HVAC fan) can help dilute any COVID-19 viral particle present thereby reducing the risk of disease spread.⁴ Additional recommendations by the CDC include using the highest efficiency filter appropriate as well as around the potential use of air cleaning/disinfection technologies, such as ultraviolet germicidal irradiation which have previously been used to protect against airborne spread of tuberculosis (the body

of knowledge around air cleaning/disinfection technologies is still developing and caution needs to be used when assessing the efficacy as well as safety of these devices).⁴

Prior to COVID-19, numerous infectious agents were known to be transmitted through the air whether including measles, chicken pox, and tuberculosis. COVID-19 is now known to be transmitted through the air as well, resulting in society's challenges to control this infection and allowing it to cause widespread destruction to our lives. While improved IAQ will not completely eliminate the risk of infectious disease transmission from person to person, it will reduce that risk for all members of the public including those at higher risk of serious outcomes. Additionally, air handling systems protect health by working automatically in the background requiring minimal operator input or behaviour change by individuals. This allows individuals and the economy to continue activities without interruption, while simultaneously benefiting from reduced risk of COVID-19.

Currently, the Ontario Building Code (OBC) specifies the number of air changes per hour but does not include more detailed IAQ standards. Amending the OBC to include IAQ standards prioritizes and invests in the health of Ontarians with the goal of illness prevention whether caused by pollutants or infectious agents. These standards will sustainably reduce the spread of COVID-19 and other infections without necessitating ongoing effort by individuals (e.g. keeping physical distance) prevent needing to resort to more onerous and disruptive measures such as lockdowns. In particular, improved indoor air quality can make society safer from future pandemics of respiratory infections.

As noted earlier, the benefits of improved IAQ extend beyond infections. Health Canada currently lists many indoor air pollutants that can harm health including carbon monoxide, formaldehyde, ozone, and radon.¹ For many of these, illness arises only after years of exposure at a low-level. Therefore, reduction in exposure to these pollutants over the long-term can help facilitate reduced illness. Improvement of IAQ would protect individuals from the many illnesses and chronic disease caused by these pollutants as well as preventing infections, helping to make our society healthier overall.

Any amendments to the OBC will not apply retroactively to buildings already in existence. Retrofitting existing high risk public spaces (e.g. restaurants) is not something that the private sector will be able to afford after two years of pandemic disruption. Therefore, it is crucial for a funding mechanism to be established to assist building owners to make the necessary air handling system retrofits in order to protect the health of the public. Additionally, a funding mechanism would allow the health

benefits of improved IAQ be distributed equitably throughout the community, and not only to communities with the most resources. Additionally, replacing aging and inefficient HVAC infrastructure along with other building improvements could support Niagara Region's climate change goals leading to further health benefits.

Alternatives Reviewed

Recently, the City of Toronto Board of Health initiated a review of whether updates to their Property Standard By-Laws might be useful to reduce the spread of infectious agents through the air.⁵ Our analysis in Niagara is that municipalities are not able to create stricter requirements than outlined in the OBC.

If the OBC is not amended to include IAQ standards, one alternative could be to expand the scope of Public Health or Property Standard Officers to inspect for evidence of regular HVAC maintenance. However, replacing aging systems may be too costly for businesses and no common standard exists to ensure any upgraded system is adequate to protect the public from infection. Additionally, only ensuring that regular HVAC maintenance is being performed does not guarantee that the IAQ is acceptable, only that the system is functioning.

Niagara Region Public Health has proactively begun a pilot of assessing indoor air quality of public spaces that Public Health already inspects (e.g. restaurants, pools, personal services) and providing education to owners around improving their IAQ for their voluntary follow-up. However, without an obligation through provincial or federal standards to improve the IAQ, improvement may not actually occur. In particular, even the most conscientious operators who are motivated to make improvements will be unable to afford to do so without provincial or federal support.

Relationship to Council Strategic Priorities

Amending the OBC to include IAQ standards and funding retrofits of air handling systems, primarily aligns with Niagara Region Council's strategic priorities for a Healthy and Vibrant Community, in that it will improve the health of our people and enable a post-pandemic return to vibrancy, as well as Supporting Business and Economic Growth by enabling businesses and the economy to stay open and recover with a much reduced risk of COVID-19 spread. Retrofitting ventilation also creates opportunities to put in place more energy efficient technology decreasing greenhouse gas emissions.⁶ This aligns with Council's strategic priority for Responsible Growth and Infrastructure Planning, specifically Environmental Sustainability and Stewardship.

Other Pertinent Reports

N/A

Prepared by:

Mark Cachia
Resident Physician
Public Health & Emergency Services

Recommended by:

M. Mustafa Hirji
Medical Officer of Health &
Commissioner (Acting)
Public Health & Emergency Services

Submitted by:

Ron Tripp, P.Eng.
Chief Administrative Officer

This report was prepared in consultation with Jackie Gervais (Health Promoter, Chronic Disease and Injury Prevention, Niagara Region Public Health) and John Lane (Chief Building Official, City of St. Catharines).

References

1. Health Canada. Indoor air quality resources for professionals [Internet]. Ottawa, ON: Government of Canada; 2022 Feb 02 [cited 2022 May]. Available from: <https://www.canada.ca/en/health-canada/services/air-quality/residential-indoor-air-quality-guidelines.html>
2. Public Health Ontario. Heating, ventilation and air conditioning (HVAC) systems in buildings and COVID-19 [Internet]. Toronto, ON: Queen's Printer for Ontario; 2021 [cited 2022 May]. Available from: <https://www.publichealthontario.ca/-/media/documents/ncov/ipac/2020/09/covid-19-hvac-systems-in-buildings.pdf?la=en>
3. Peterborough Public Health. Carbon Dioxide (CO₂) Monitoring for Indoor Air Quality [Internet]. Peterborough, ON: Peterborough Public Health; [cited 2022 May]. Available from: <https://www.peterboroughpublichealth.ca/your-health/home-health-and-safety/carbon-dioxide-co2/>
4. Centres for Disease Control and Prevention. COVID-19 – Ventilation in Buildings [Internet]. Atlanta, GA: U.S. Department of Health & Human Services; 2021 June

- 2 [cited 2022 May 31]. Available from: <https://www.cdc.gov/coronavirus/2019-ncov/community/ventilation.html>
5. Toronto City Clerk. Tracking Status HL35.8 [Internet]. Toronto, ON: City of Toronto; 2022 [cited 2022 May 31]. Available from: <http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2022.HL35.8>
6. Natural Resources Canada. Canada Greener Homes Grant [Internet]. Ottawa, ON: Government of Canada; 2022 May 12 [cited 2022 May]. Available from: <https://www.nrcan.gc.ca/energy-efficiency/homes/canada-greener-homes-grant/23441>