Guelph Campus Classroom Heating, Ventilation and Air Conditioning Strategy

The University of Guelph is committed to the health and safety of our community.

To ensure a thorough approach to creating and maintaining a safe indoor environment, the role of heating, ventilation, and air conditioning (HVAC) and the maintenance practices associated with them are regularly assessed using current public health guidance along with industry best practices related to COVID-19. An assessment of practices and procedures related to HVAC was completed by U of G Physical Resources (PR), Environmental Health and Safety (EHS) and with the assistance of external consulting engineers.

The most important factors in reducing the risk of COVID-19 remain as:

- Getting the COVID-19 vaccine
- Maintaining physical distance and occupancy levels as recommended by current Public Health guidelines
- Practicing self-evaluation for symptoms each day prior to attending campus using the U of G’s COVID-19 Screening Form
- Staying home when you are sick
- Using well-constructed and well fitted mask
- Practicing effective hand and respiratory hygiene

Vaccinations are an important step in bringing us safely out of the COVID-19 pandemic. We strongly encourage everyone who is eligible for vaccination to get vaccinated.

It is important to note that while indoor ventilation helps to reduce the levels of infectious particles in the air, it will not prevent transmission between individuals in close proximity, especially if those individuals are not taking other protective measures. Most infections are linked to person-to-person transmission through close contact with a person who is infected, even when not showing symptoms. For this reason, it continues to be very important to follow infection prevention and control measures such as self-screening, staying home when not feeling well, effective mask wearing, frequent and effective hand washing and maintaining physical distancing.

The University appreciates that there are many sources of information regarding HVAC and COVID-19. These include numerous independent researchers, international advisory bodies, expert panels, and the news media. The University will continue to use all public health guidance, best practices and information and will update accordingly.
Supporting the Health and Safety of Our Community

Following public health guidance, the University has implemented a series of measures to reduce the risk of transmission:

- Vaccination mandate that requires faculty, staff, students, and visitors over the age of 12 to be fully vaccinated to access U of G campuses and managed facilities.
- Practicing physical distancing (as recommend by current Public Health guidelines) and considering reduced occupancies throughout campus by re-arranging schedules, physical space layouts, and task execution where possible.
- Requiring the proper use of masks while indoors and outdoors as recommended by current Public Health guidelines.
- Widely communicating the effective COVID-19 precautions such as hand washing and physical distancing.
- Via the U of G’s COVID Self Screening Form, managing a self-screening program for all staff, faculty, students, contractors and visitors that visit campus, to be completed prior to attending campus. Advising the community to not come to campus if the form indicates you should stay home.
- Enhanced cleaning and disinfection of high touch surfaces on campus.
- Adjustments to building mechanical systems to continue running them at high standards to support enhanced ventilation and air filtration measures.

These remain the most effective measures against COVID-19.

Implementing ventilation measures on campus

To support the measures to prevent COVID-19 transmission, Physical Resources will continue to monitor and maintain the indoor environment through:

- Regularly reviewing ventilation guidance provided by public health, and industry recommendations.
- Continuing to maintain HVAC systems on campus.
- Bringing as much outdoor air into our ventilation systems as possible. This dilutes the number of viral particles in the air and helps to reduce the risk of COVID-19 transmission, should someone come to campus while contagious. Many of our science, academic and research buildings are continuously supplied with 100 per cent outside air.
- Exceeding industry recommended guidelines by upgrading all mixed air handling units to MERV-15 and MERV-16 filters. Over 92% of classroom air handling units are equipped with MERV-16 filters. Our filters exceed the recommended standard of MERV-13 filters set in the ASHRAE Core Recommendations for Reducing Airborne Infectious Aerosol Exposure.
- Extending HVAC run time before and after occupancy for a time required to achieve the equivalent air changes as recommended by ASHRAE guidelines.
- Increasing relative humidity in buildings to a minimum of 40% where possible. Some evidence shows that higher relative humidity may decrease the viability of the virus.
Classroom Specific Additional Control Measures During the Pandemic

The varied nature of the people using and passing through classrooms could result in greater numbers and densities of people in these spaces compared to other campus spaces. Because of this uncertainty, the following measures are being implemented in classroom environments based on the recommendations formulated through the University’s review and with information from external experts:

1. **Performing an HVAC assessment** in classrooms booked for in-person instructions as identified to Physical Resources by the Registrar’s office. The measurements will establish an equivalent air exchange rate per hour (ACH). Equivalent air changes per hour is the sum of the volume of actual air flow and purified air. The results of these assessments will be posted.

2. **Setting ventilation targets** that meet or exceed the recommended standards for the specific space. This will be guided by recommendations of Health Canada, Public Health Ontario, and HVAC industry guidelines.

3. **Enhancing ventilation in classrooms** that do not meet recommended targets. These classrooms will be further assessed for the following:
   a. Exploring and making changes to equipment if appropriate and possible; and/or
   b. Installing air purification units to augment the HVAC system.

Frequently Asked Questions

1. How does transmission of COVID-19 occur?

   Public Health Ontario actively monitors, reviews, and assesses relevant information related to COVID-19 transmission and continues to emphasize that most cases are linked to person-to-person transmission through direct close contact with someone who is positive for COVID-19, primarily at short range through respiratory particles that range in size from large droplets to smaller droplets (aerosols). Transmission via aerosols over longer distances is also possible under favorable conditions such as prolonged exposures in crowded, poorly ventilated spaces.

2. Is exposure to aerosol droplets the same as airborne transmission?

   Aerosols are liquid droplets which can travel through the air. COVID-19 forms predominately large aerosol droplets (droplet transmission), which are less likely to travel beyond two metres. Aerosols can be generated by coughs and sneezes, and in healthcare settings by certain aerosol generating medical procedures, however, the presence of aerosols does not constitute airborne transmission. Reports of outbreaks in settings with poor ventilation have occurred. However, when looking closely at these situations, these outbreaks are also associated with crowding in an enclosed space, close-proximity conversations, and higher risk activities (e.g., singing, shouting, dancing or exercise, especially without precautions such as wearing a mask, keeping a physical distance and prior to vaccination roll-out).
3. What role do buildings' HVAC systems play?

The standard COVID-19 preventative measures, including vaccination, self-screening, physical distancing, use of non-medical mask, surface cleaning, and disinfection and hand washing are key to prevention and mitigation. There is not one public health measure that can guarantee protection from COVID-19; multiple strategies are needed.

Health Canada states that there is no evidence currently that the virus can transmit over long distances through the air, e.g., beyond 2m proximities within a room, from room to room through air ducts.

COVID-19 has not changed code or regulatory requirements for ventilation in workplaces. Consistent with the hierarchy of health and safety controls and the precautionary principle, public health agencies and industry organizations have developed guidelines for building ventilation during the pandemic.

4. How is U of G implementing guidelines for building ventilation?

This HVAC strategy through these guidelines includes several measures that are being implemented by Physical Resources engineering and technical staff to interpret guidelines in relation to the variety and complexity of buildings and systems on the Guelph campus. The HVAC strategy focuses on verifying that systems are being properly maintained and operating accordingly, adjusting controls for parameters such as the amounts of total air and outdoor air where feasible, and upgrading filtration where feasible with the existing infrastructure. Most ventilation systems at U of G have been running MERV-14 filters since the ventilation upgrades were completed between 2014 and 2016.

Like many other large educational institutions, we have a variety of buildings and systems. Modifications and upgrades depend on the building and system under consideration. Where central HVAC systems cannot be upgraded and in workspaces where there is no mechanical ventilation, other practicable solutions may be considered such as using portable air purifiers and reducing occupancy. Actions to increase natural ventilation, such as using windows and doors, may also be recommended.

It is important to note that a space not having mechanical ventilation does not necessarily mean that there is an elevated risk for COVID-19. Many activities performed on the U of G campus are classified as low risk in that prolonged, close interaction between people is not...
required. For example, office workers who do not have frequent close contact with coworkers, customers, or the public are classified as low risk. Other measures such as vaccination, self-screening, staying home when you are sick, physical distancing, use of masks, enhanced disinfection of high-touch points and increased hand hygiene continue to be emphasized by public health authorities.

5. What role do supplemental air filtration/ purifier units play, e.g., High-Efficiency Particulate Air (HEPA), standard air purifiers?

There is no reliable evidence that supplemental air filtration/ purifier units on their own are effective in reducing transmission risk of COVID-19, but public health authorities suggest they may be useful as a supplement to HVAC ventilation or if there is no outdoor air exchange.

The transient nature of the population using and passing through classrooms results in greater numbers and density of people indoors compared to other spaces. As a result, an HVAC assessment of classrooms is being conducted to determine ventilation rates. Supplemental air filtration with HEPA filters will be considered for classrooms that cannot meet ventilation targets. The units will be managed and maintained by Physical Resources and appropriate operational staff.

6. How has U of G prepared HVAC systems for the resumption of increased on-campus activities?

HVAC systems on the Guelph campus have remained operational since the beginning of the pandemic. Filters have been regularly replaced based on best practices and are monitored in real-time by the building automation system (BAS). All mixed air handling units have been upgraded to MERV-15 or MERV-16 filters. This exceeds the recommended standard set in the ASHRAE Core Recommendations for Reducing Airborne Infectious Aerosol Exposure which recommends a minimum MERV-13 filter.

Physical Resources has been performing the following inspections and maintenance:

- Ensuring filters have been replaced based on the BAS monitoring system.
- Ensuring all setbacks and startup modes are operational.
- Utilizing BAS to provide proof-positive that fans are working, and that air is moving in and out of the building.
- Dampers (outside and return) are monitored and tested daily by the BAS to ensure they are working properly to help ensure the flow of fresh air to the building.
- Operation of filters are monitored in real time to ensure proper operation and set-off alarms if they are not.
Conducting an HVAC assessment on classrooms as identified by the Registrar’s office.

Investigating the installation of air purifiers with HEPA filters in classrooms where the targets cannot be attained. Altering the BAS’ ventilation control logic to maximize the amount of outdoor air.

Extending HVAC run time before and after occupancy for a time required to achieve the equivalent air changes as required by ASHRAE guidelines.

Measuring and comparing carbon dioxide levels within a building to outside air assessing ventilation levels in real time.

7. How is U of G addressing the suggestions of some research papers that we should increase ventilation and air change rates, increase fresh (outdoor) air flow and/or run air change 24/7?

The University’s HVAC Strategy was based on a review of and alignment with relevant legislative requirements and credible industry guidelines, including Public Health Ontario, the Ontario Building Code, Centre for Disease Control and Prevention (CDC) and the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).

ASHRAE is the CDC’s and Ontario’s primary authority on HVAC and it has published core recommendations for the industry. U of G’s facilities group has also worked with the University units to align HVAC operating hours within buildings according to their occupancy. In the event of an emergency, ASHRAE recommends flushing of a space with as much outside air as possible for extended amounts of time. The University defines an emergency in the context of COVID-19 as an outbreak on campus. In the event of an outbreak on campus, the University will follow the recommendations of local public health authorities.

8. Some resources suggest we should have MERV 13 filters installed on all centralized HVAC? What is U of G doing?

Most buildings and HVAC systems on-campus already utilize MERV-15 or MERV-16 filters as the minimal standard for central air handling units. This exceeds the recommended MERV-13 filters as outlined by ASHRAE.

If you have concerns regarding your workspace, please contact your supervisor.