

This document is specific to the management of patients who are positive with COVID-19 or patients under investigation (PUI) for COVID-19. For the management of non-COVID/PUI patients, usual Infection Prevention and Control (IPAC) guidelines must be followed.

The COVID Clinical Response Committee (CCRC) has been asked to consolidate guidance on the use of Negative Relative Pressure Rooms (NRPR), portable HEPA-filters (HEPA) and Airborne Infection Isolation Rooms (AIIR) in the care of patients with COVID-19 infection.

1. The COVID-19 virus is transmitted through large droplets produced by the patient. This requires droplet/contact isolation and personal protective equipment (PPE: surgical mask, eye protection, gloves and a level-2 gown) for routine care.
2. There is concern for possible aerosolization of COVID-19 during an aerosol generating medical procedure (AGMP) and therefore airborne isolation and PPE (N95 mask, eye protection, gloves and level-3 gown) are recommended during, and immediately following, an AGMP.
3. Tuberculosis, measles and chickenpox are examples of infectious diseases transmitted by aerosolized particles produced by the patient. In these cases, airborne precautions, and AIIR or HEPA-filtration are required continuously for both routine care and during AGMPs.
4. During immediate routine care *or* during an aerosol generating medical procedure (AGMP), health care staff are protected by appropriate PPE not by air flows or filtration of air within the room.
5. The air changes in AIIRs, or HEPA-filtration of the room allows the room to be converted from airborne isolation to contact/droplet precautions after completion of an AGMP where aerosolization may have transiently occurred. That is, airflow in the room and HEPA-filtration are treatments for the room not the patient or staff.
6. Rooms with negative pressure relative to the external environment, but which do not meet the requirements for AIIR, may reduce the already very low risk of aerosolized virus being pushed out of the room as a door opens.
7. For AIIRs in COVID+ patients or PUI:
 - a. The room requires airborne precautions for 40 minutes following an AGMP. After an AGMP (Airborne PPE), wait 40 minutes before changing to Droplet/contact PPE. This time is extrapolated from TB data but it is unclear whether this applies for novel respiratory viruses (e.g. COVID-19). As a precautionary principle, patients with COVID-19 will be treated as having an airborne disease while undergoing an AGMP.
 - b. Staff may exit or enter the room, via the ante-room using airborne precautions prior to the 40 minutes elapsing.
 - c. Ideally, the patient will remain in the room during the 40-minute period prior to transfer. If necessary, the patient may be moved during this time period but the doors should then be closed and the room remain empty for the remainder of the 40-minute period.
 - d. If the patient is stable, investigations such as chest x-ray may be deferred until the 40 minute period has elapsed. However, if urgently required the test should not be delayed and staff should don appropriate PPE.

8. The combination of NRPR and a HEPA-filter (placed as close as possible to the head of the patient and continuously running) provides a possible alternative environment in case an AIIR is not available. **This is an Osler initiative that supersedes current recommendations from Public Health Ontario and may not be necessary.**
 - a. The time to airborne viral clearance and patient movement out of these rooms is not yet clearly defined or measured but is considered to be 60 minutes.
 - b. These rooms are acceptable for AGMPs, including non-invasive ventilation (NIV), high-flow nasal cannula (HFNC), intubation and extubation under the condition of adhering to the applicable procedures.
9. **When continuous aerosolization may be occurring, AIIR or NRPR-HEPA will help to continuously reduce the burden of infection within the room and help prevent the flow of air from inside to outside the room when a door is opened. Examples of possible continuous aerosolization include NIV or HFNC in droplet based diseases (e.g. COVID-19, influenza), and aerosol based diseases (e.g. TB, measles, chickenpox).**
10. **For continuous AGMPs (e.g. high flow nasal cannula, non-invasive ventilation), we recommend the patient be in AIIR or NRPR-HEPA if available. For transportation, the patient can be switched to face mask oxygen and transported out of the room however the room must remain in airborne precautions for the time period specified following the termination of the AGMP (high flow nasal cannula oxygen therapy).**
11. Graphics explaining the status of each room will be developed and posted in signage at the entrance of the room.
12. HEPA-filters should be deployed first to rooms that are established as negative relative pressure.

Airflow in the room and HEPA-filtration treats the room not the patient or staff.	
Room Type	Time required after AGMP to convert from airborne to contact/droplet
AIIR with anteroom	40 minutes with the door closed
NRP-HEPA	60 minutes with the door closed

This decision will be revisited as required.

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Definitions

- **Airborne infection isolation room (AIIR):**
 - The patient room is negative relative to ante-room and ante-room is negative relative to the hallway.
 - 12 air changes per hour inside the patient room
 - Air exhaust vents from AIIRs have built-in HEPA filtration
 - The door must remain closed to preserve the relative negative pressure environment
- **Negative relative pressure room with a portable HEPA filter (NPR-HEPA):**
 - Airflow has been reversed by facilities.
 - A HEPA-filter is required in this room.
 - Pressure within the room is negative relative to the hallway
 - No ante-room
 - The door must remain closed to preserve the relative negative pressure environment
 - Air exchanges less than 12 per hour
 - These rooms do not meet AIIR criteria
- **Portable HEPA filter**
 - High-efficiency particulate air filter
 - No impact on room pressures or airflow
 - No impact on air exchange in the room
 - The portable HEPA-filter circulates the air within the room and filters airborne particles

General

- AIIRs and HEPA-filters are a limited resource.
- This document refers to the management of COVID-19 patients or Person Under Investigation (PUI) for COVID-19. For non-COVID/PUI patients follow usual IPAC guidelines.
- Personal protective equipment:
 - Droplet/contact precautions are required for the routine care of COVID-19 patients
 - Airborne/droplet/contact precautions are required when an aerosol-generating medical procedure (AGMP) is performed on a patient with COVID-19 infection.
- During routine care or during an AGMP, health care staff are protected by PPE, not by negative pressure rooms or HEPA-filters.
- Air exchanges and/or HEPA filtration allows the room to safely return to droplet/contact following completion of the AGMP. Similarly, staff PPE safely returns to droplet/contact.

Airborne Infection Isolation Rooms

- AIIRs ventilation system is maintained by the Facilities Operations team to achieve at least 12 air changes per hour
- AIRs are equipped with a Pressure Monitoring System
- These rooms are ideal for AGMPs.
- After an AGMP (Airborne PPE), wait 40 minutes before changing to Droplet/contact PPE
- Staff may leave the room, via the ante-room prior to the 40 minutes elapsing
- Ideally, the patient will remain in the room during the 40-minute period prior to transfer.

Relative Negative Pressure Rooms plus portable HEPA filter

- The combination of relative negative pressure rooms and a HEPA filter (placed the closet possible to the head of the patient and continuously running) will provide an alternative environment in case an AIIR is not available
- The time to airborne viral clearance and patient movement out of these rooms is not yet clearly defined but is considered to be 60 minutes.
- These rooms are acceptable for AGMPs, including NIV, HFNC, intubation and extubation under the condition of adhering to the applicable procedures.