

The COVID Clinical Response Committee (CCRC) has been asked to provide guidance on the **inpatient (ward)** use of High Flow Nasal Cannula (HFNC) for **patients with COVID-19**.

This strategy was developed to care for high acuity patients with COVID-19 outside of a critical care unit in the setting of a pandemic.

Guidance

1. High flow nasal cannula (HFNC) may be used for COVID+ ward patients in appropriate rooms (Airborne Infection Isolation Room (AIIR) or Negative Relative Pressure with HEPA filter (NRP-HEPA)).
 - CCRC has reviewed NPR-HEPA rooms in a separate guidance. For the purpose of this document, it refers to a room in which a HEPA filter is placed at the head of the bed (where possible), functioning and in which engineering modifications to air flow have allowed at least a partial negative pressure to be generated as opposed to neutral or positive pressure airflow. The door should remain closed.
 - During immediate routine care *or* during an aerosol generating medical procedure (AGMP), health care staff in the room are protected by appropriate PPE not by air flows or filtration of air within the room.
 - The air changes in AIIRs, or HEPA-filtration of the non-AIIR 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.
2. Under the precautionary principle, HFNC is considered a continuous AGMP and appropriate PPE must be used for all patient interactions.
3. The primary indication for HFNC is severe hypoxemia not requiring invasive mechanical ventilation. Hypercapnic patients are *generally* not appropriate for HFNC.
4. With respect to offering HFNC:
 - If the patient is not a candidate for intubation, the patient will not be offered HFNC as an alternative.
 - If the patient is a candidate for intubation but the patient's values, wishes, and beliefs do not align with intubation (i.e. does not want intubation), the patient can be offered HFNC if indicated.
5. HFNC will not be used during patient transfers. The patient can be placed on a filter mask (e.g. Tavish) or traditional non-rebreather for transfer.
6. HFNC patients at risk of requiring invasive mechanical ventilation (IMV) include, but are not limited to:
 - Greater than 70% oxygen to maintain sat greater than or equal to 92%
 - Respiratory rate greater than 30 at rest
 - Significantly increased work of breathing on clinical assessment
 - Increased or rising CO₂ on a blood gas with acidosis
 - Decreased level of consciousness
 - Active vomiting not responding to anti-emetics
 - Shock requiring vasopressor support

7. Relative contraindications to ward-based HFNC:
 - Delirium and/or pulling off oxygen
 - Heavy burden of secretions leading to desaturations (uncommon in COVID patients without bacterial superinfection)
 - Any of the above risk factors for requiring Invasive Mechanical Ventilation (IMV)
 - Patients who are not candidates for IMV
 8. New initiations of HFNC can only be ordered by a critical care physician.
 - If HFNC is initiated in the Emergency Department (ED), the patient will not be transferred until in the judgement of the critical care physician and the registered respiratory therapist (RRT), they are stable (recommend at least 2 hours of observation in the ED)
 - If a ward patient is being transitioned from face-mask oxygen to HFNC, they should be re-assessed frequently after initiation of HFNC
 9. HFNC in conjunction with a non-rebreather oxygen mask or Tavish mask has been used to temporarily improve oxygenation when HFNC alone is inadequate. While this can be done temporarily, this practice is strongly discouraged as a strategy to avoid endotracheal intubation, even within the ICU.
 10. The RRT will round on patients on HFNC every four hours.
 11. The Critical Care Response Team (CCRT) will follow all patients newly initiated on HFNC.
 - The CCRT RN will follow the patient on the ward every 12 hours for 48 hours.
 - The CCRT RN may be asked to re-engage with care of a HFNC patient on the ward if the patient is deteriorating or to help transition the patient to the critical care unit.
 - The CCRT MD will:
 - Review the list of HFNC patients with the Respiriology Ward Resource RN daily by a target time of 10 am in consultation with the RRT.
 - See patients on more than FiO₂ 0.60.
 - See patients who are confused or delirious.
 - Ensure all patients have an updated Physician Ordered Scope of Treatment (POST) Order Set completed.
 - All members of the CCRT will provide patient education on the importance of never removing HFNC and calling for help prior to mobilizing or going to the bathroom.
 12. Anyone may call for CCRT support using the usual mechanism of calling the CCRT RN at any time if a concern arises about a patient on HFNC or who meets usual CCRT calling criteria.
 13. Where possible, all patients on HFNC on the ward will be subject to remote monitoring:
 - Remote oximetry with a central station, where possible
 - Remote video monitoring with a central station, where possible
 14. Patients on HFNC should not mobilize independently or use the bathroom without assistance from a member of the healthcare team knowledgeable in the placement and removal of HFNC. Patients should receive frequent reminders from all members of the healthcare team, and language-appropriate signage should be placed in the room as a reminder.
 15. Patients who are nasopharyngeal swab positive for COVID-19 on HFNC can be cohorted in the same multi-bed room with the following caveats:
 - The room door must remain closed.
 - Cohorting should occur in an AIIR or a NRP-HEPA room.
 - The room would be considered to be undergoing a continuous AGMP.
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Rationale

1. COVID-19 patients often have severe hypoxemia disproportionate to their work of breathing or sensation of dyspnea making high-flow nasal cannula (HFNC) an appealing modality for this patient population as they require high oxygen, but not necessarily positive pressure ventilatory support.
2. HFNC is an alternative to conventional face-mask oxygen delivery in hypoxemic patients that may offer additional benefits:
 - a. HFNC may reduce the need for intubation and mechanical ventilation in patients with hypoxaemic respiratory failure as compared to conventional face-mask oxygen (pre-COVID literature). There is no current level 1 evidence to support this in COVID-19 patients.
 - b. Despite significant oxygen requirements, most COVID-19 patients on HFNC are awake, not delirious, and able to participate in their own care as well as use a call bell when assistance is needed.
 - c. HFNC can make eating, communication and self-proning easier for the patient.
 - d. There is no evidence of mortality benefit from the use of HFNC in COVID-19 patients.
3. HFNC and Critical Care are limited resources:
 - a. Space in which HFNC can be offered is in limited supply as it requires a room capable of performing a continuous AGMP. Appropriate rooms are available in Critical Care as well as on wards.
 - b. Space and staffing in Critical Care units are limited by the current surge of patients requiring mechanical ventilation.
4. Experience in caring for patients with COVID-19 pneumonia suggests that they do not rapidly deteriorate with desaturations but rather show a continuous decline in oxygenation over hours to days. The exception is when a patient either purposely or accidentally removes their oxygen which may result in precipitous and dangerous desaturation. This underscores the importance of additional monitoring for ward-based HFNC use.
5. A non-rebreather and high flow nasal cannula may provide temporary improvement in oxygenation in a patient while preparing for intubation. In our experience it has almost never avoided intubation and if required represents a marker of a severely ill individual with Acute Respiratory Distress Syndrome who should almost certainly be intubated if that is consistent with what is on offer and what is desired by the patient. Delaying intubation in this circumstance is exceedingly unlikely to avoid it.