Cohorting Inpatient Units for PUI and COVID-19 Positive Patient Guidelines

Updated April 16, 2020

Based on experience involving the largest cohort of COVID-19 patients (WHO):

- about 40% of patients with COVID-19 may have mild disease, where treatment is mostly symptomatic and does not require inpatient care;
- about 40% of patients have moderate disease that may require inpatient care;
- 15% of patients will have severe disease that requires oxygen therapy or other inpatient interventions; and
- about 5% have critical disease that requires mechanical ventilation.

Therefore, clustering patients into a defined geographic location in the facility will improve efficiency and effectiveness of the three key aspects of responding to a pandemic; space, staff and "stuff" (supplies, equipment, etc.).

Key Concepts:

- Isolate symptomatic patients as soon as possible. Set up separate, well-ventilated triage areas, place patients with suspected or confirmed COVID-19 in private rooms with door closed and private bathroom (as possible), prioritize airborne infection isolation rooms (AIIRs) for patients undergoing aerosol-generating procedures.
- Protect healthcare personnel. Emphasize hand hygiene, install barriers to limit contact with patients at triage, cohort COVID-19 patients, limit the numbers of staff providing care, prioritize N95 respirators and AIIRs for aerosol-generating procedures.

1. Establish COVID-19 treatment areas within health facilities (rooms/ward/unit) based on needed response to surge in number of patients with COVID-19.
   a. COVID-19 and PUI treatment areas should be designed to allow uniform implementation of all required infection prevention and control precautions and work practices.
   b. COVID-19 treatment areas should be designed to deliver life-saving oxygen therapy. Most patients hospitalized with severe disease will need oxygen, and a smaller proportion will require mechanical ventilation. See Figure 1 for examples of respiratory support needed for patients with COVID-19.

2. Designate inpatient units for cohorting care of COVID-19 applying the following elements:
   a. Apply decision flow guide for placing patients needing admission for clinical care.
   b. Assess volume and frequency of PUs and/or confirmed COVID-19 requiring inpatient care. If this is approaching or at surge levels identify inpatient unit(s) for cohorting care of these patients, e.g. an ICU and possibly a med-surg ward. See examples of designated unit design in Figures 2 & 3.
c. Most inpatient units will have a limited number of AIIRs. Give priority for initial placement of PUIs who the care team anticipates will need continuous or frequent AGPs, e.g. nebulizer treatments, high flow nasal cannula delivery of oxygen, non-invasive ventilation (e.g. BiPap) or bedside tracheostomy.
d. If incident command determines a cohort unit is needed, involve facilities manager in determining strategies for the heating, ventilation and air conditioning (HVAC) system to enhance exchange and removal of exhaust air from the designated unit. See also Figures 4 & 5 for possible strategies for creating additional negative pressure spaces or rooms.

Here are examples of scalable changes for the HVAC system that the facilities manager needs to oversee and coordinate:

- Normal mode - COVID patients best practice placement in Airborne Infectious Isolation (AI) Rooms
- Small Scale Surge Capacity Mode – Create Additional Dedicated AI or Temporary Patient Observation/Segregation Rooms with HEPA and negative pressure.
- Large Scale Surge Capacity Mode – Establish Dedicated Ward/Suite(s) and Establish Protocols with Clinical and Environmental Action Plans

a. Avoid cohorting PUIs and COVID-19 patients together as many PUIs could be ruled out if they test negative for SARS-CoV-2.
b. Limit transport of PUIs or COVID-19 from the room in which they are being isolated to essential diagnostic or therapeutic care as determined by the care team.
c. Avoid designating a room or area for AGPs as this will require transfers and movement of patients in and out of their inpatient room.
Figure 1. Respiratory Support for COVID-19

General schema for respiratory support in patients with COVID-19

Low flow nasal cannula
- Typically set at 1-6 liters/minute.

High flow nasal cannula
- Titrate FiO2 based on patient’s saturation. If FiO2 requirement escalating (e.g., over ~80%) consider awake pronation or CPAP trial.
- Consider limiting flow rate below ~40 L/min to reduce aerosolization.
- N95 mask & aerosol precautions.

CPAP
- Titrate CPAP up as tolerated (in more severe hypoxemia might target ~15-18 cm).
- Viral filter.
- N95 mask & aerosol precautions.
- Helmet interface likely ideal if available.

Awake pronation plus (High Flow Nasal Cannula or CPAP):
- If tolerated, awake patient may lie in a prone position (ideally for 12-18 hr/day).
- Limited to cooperative patients. May be useful if access to ventilator is limited.

Invasive mechanical ventilation
- Target tidal volumes of ~6 cc/kg.
- Permissive hypercapnia may be useful to allow for lung-protective settings.
- May use conventional lung-protective ventilation strategies or APRV.

Prone positioning
- Consider for severe hypoxemia (e.g., PaO2/FiO2 < 150) that doesn’t respond to ~12-24 hours of invasive ventilation with high mean airway pressure (e.g., high PEEP or APRV).

ECMO

COVID-19 Bed Management- FINAL
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Emergency Department

Patient Arrives → COVID-19 Test
- Positive
  - Implement Respiratory Hygiene and Cough Etiquette
  - Is dedicated location to evaluate RHM in place?
    - Yes → Isolation patient in room or other location for evaluation and, if needing admission, collect specimen for testing
    - No
      - Is patient medically stable?
        - Yes → Discharge
        - No → Insert RHM options
      - Offer patient option to wait in personal vehicle or outside the healthcare facility and call when room available

- Unknown
  - Fever, respiratory infection, cough, and/or difficulty breathing?
    - Yes → Is patient in area in HHS (e.g., NY City) or other country with widespread, sustained transmission?
      - Yes → Insert RHM options
      - No → Contact with someone with known or suspected COVID-19?
        - Yes → Follow standard procedures for bed management
        - No → Insert RHM options

- Negative
  - Recent travel from area in HHS (e.g., NY City) or other country with widespread, sustained transmission?
    - Yes → Insert RHM options
    - No → Insert RHM options

Aerobic Generating Procedures (AGP) are procedures that are likely to induce coughing (e.g., positive pressure ventilation with aerosol generation, bronchoscopic procedures, high flow nasal cannula/RNPPV, mechanical ventilation, tracheostomy, bronchology).

Airborne Infection Isolation Room (AIR) are negative-pressure rooms.

Patient Under Investigation (PUI) is a patient suspected of having COVID-19.
COVID-19 Bed Management - FINAL

ICU Placement

- Inpatient admit with COVID+ patient
  - ICU Bed needed?
    - Yes
      - ICU Bed needed
    - No
      - Admitt to Regular ICU bed

- Is there a bed in a dedicated COVID-19 ICU unit?*
  - Yes
    - Admitt to Dedicated ICU
  - No
    - Place in private room in COVID ICU

- Will patient need AGPs?
  - Yes
    - Place confirmed COVID-19 patient in same multi-occupant room
  - No
    - Admitt to Airborne Infection Isolation Room (AIIR) available in COVID dedicated ICU

Med/Surg Bed Placement

- Admitt to Med/Surg Bed
  - Will patient need AGPs?
    - Yes
      - Admitt to AIIR
    - No
      - Place confirmed COVID-19 patient in same multi-occupant room

- Is a bed in a dedicated COVID-19 unit available?
  - Yes
    - Place confirmed COVID-19 patient in non-COVID-19 unit
  - No
    - Patient may cohort with another COVID-19 confirmed patient or be placed in a private room

Airborne Infection Isolation Room (AIIR) are negative-pressure rooms.
Patient Under Investigation (PUI) is a patient suspected of having COVID-19.

*Consider creating a PUI cohort unit as needed. The unit needs to be separate from COVID-19 positive patients but could be on the opposite site of the COVID-19 unit.
References:
