Aerosol-Generating Procedures and Patients with Suspected or Confirmed COVID-19

GUIDANCE AS OF APRIL 9, 2020

Some procedures performed on patients are more likely to generate higher concentrations of infectious respiratory aerosols than coughing, sneezing, talking, or breathing. These aerosol-generating procedures (AGPs) may put health care workers (HCWs) at an increased risk for exposure to SARS-CoV-2 and infection. There are limited data available to evaluate which procedures may generate potentially infectious aerosols and pose a risk of transmission to HCWs. This statement is a summary of the evidence surrounding AGPs and the current Centers for Disease Control (CDC) guidance.

Aerosol-Generating Procedures and COVID-19

- Minnesota Department of Health (MDH) and CDC currently recommend that HCWs wear an N95 respirator or equivalent, eye protection, gown, and gloves when performing an AGP or providing care in the ICU to patients with known or suspected COVID-19.1,2
- AGPs should be performed in airborne infection isolation rooms (AIIR), if available.
- Per CDC guidance, the following procedures should be considered AGPs, due to the creation of uncontrolled respiratory secretions:3
  - Open suctioning of airway secretions
  - Sputum induction
  - Cardiopulmonary resuscitation
  - Endotracheal intubation and extubation
  - Noninvasive positive pressure ventilation (NIPPV) (e.g., BiPAP, CPAP)
  - Bronchoscopy
  - Manual ventilation
- There are limited data on whether other procedures may generate infectious aerosols and represent a transmission risk. These may include but are not limited to:
  - Nebulizer administration
  - High-flow oxygen delivery
  - Tracheostomy
  - Nasal endoscopy or endoscopic sinus surgery
  - Flexible laryngoscopy
  - Transsphenoidal surgeries
  - Nasogastric or nasojejunal tube placement

Nebulizers and Infection Transmission Risk

- One study has demonstrated aerosol stability of SARS-CoV-24 in a laboratory setting, but whether this is applicable to clinical situations outside of laboratory conditions is unknown.
- A 2012 review article on aerosol-generating procedures concluded that there was no significant evidence of transmission risk related to nebulizers, utilizing evidence from the SARS outbreak.5
A 2004 study performing polymerase chain reaction (PCR) air sampling around a patient with SARS undergoing nebulizer treatment found no evidence of virus.6

Current UK guidance on infection prevention for COVID-19 does not list nebulizers as a potential transmission risk, due to the fact that the aerosol generated by the device is derived from the medication fluid within the nebulizer chamber and not the patient.7

Based on these data, nebulizer administration likely represents a lower infection risk than other AGPs, but close-range viral aerosol generation remains a possibility.

Based on this potential risk, MDH recommends the following to minimize risk to health care providers:

- If patient can tolerate, switch to metered-dose inhalers with a dedicated spacer.
- HCWs should wear a facemask (as well as eye protection, gloves and a gown) during treatment if a respirator is unavailable.
- Close patient’s door when providing nebulizer treatment.
- Upon set-up of nebulizer, have HCWs maintain a safe distance (6 feet or greater), possibly outside the door.
- Patients do not need to be transferred to a higher level of care solely for the purpose of providing nebulizer treatment.

NIPPV and Infection Transmission Risk

Based on clinical experience from China and the U.S., high-flow nasal cannula (HFNC) are preferred over NIPPV for patients with hypoxemic respiratory failure from COVID-19.

This is due to reports of lack of efficacy of NIPPV as a rescue therapy for those with respiratory failure and a higher likelihood in general of progression to intubation.

If HFNC are not available, a short trial of NIPPV with frequent patient reassessment is reasonable, but providers should not delay intubation if the patient is not improving.

When patients are on NIPPV, HCWs should take the following precautions:

- HCWs should wear a facemask (as well as eye protection, gloves and a gown) during treatment if a respirator is unavailable.
- Close patient’s door when providing NIPPV treatment.
- Upon set-up of NIPPV, have HCW maintain a safe distance (6 feet or greater), possibly outside the door, depending on patient’s clinical stability and need for reassessment.

Other Procedures

To date, there are limited data and a lack of expert consensus on whether other potentially aerosol-generating procedures represent an infection transmission risk.

When PPE supplies are short, facilities should work with their clinicians and infection preventionists to identify which procedures may be safely postponed so that N95 and equivalent respirators may be prioritized for those AGPs as defined by CDC.

Providers are strongly encouraged to monitor MDH communications, CDC and other guidance for additional updates on this issue.
References


Minnesota Department of Health
PO Box 64975
St. Paul, MN 55164-0975
651-201-5414
www.health.state.mn.us

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To obtain this information in a different format, call: 651-201-5414.