Infection Prevention SBAR

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Room Closure Following Aerosolizing Procedure During COVID-19 Outbreak

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Situation: Room closure following aerosolizing procedures and inpatient discharge, for rule out and confirmed COVID-19 patients', needs to be established.

Background: Although researchers are still trying to determine whether the virus can be spread via airborne transmission, the World Health Organization (WHO) and Centers for Disease Control (CDC) advise that COVID-19 disease is spread from person to person through small droplets from the nose or mouth which are spread when a person with COVID-19 coughs, sneezes or exhales.

MultiCare is currently following WHO recommendations for modified droplet transmission based precautions to protect staff, visitors and patients in areas where the potential for transmission of the COVID-19 virus exist. Precautions include hand hygiene, gowns, gloves, masks, eye protection, N95 respirators or respirators that offer a higher level of protection should be used instead of a facemask when performing or present for an aerosol-generating procedure. Ideally these procedures would be performed in an Airborne Infection Isolation Rooms (AIIR) which have more ACH than a standard inpatient or exam room.

Assessment: At MultiCare, AIIR rooms are certified for 12 ACH, Emergency Department exam rooms have a minimum 6 ACH, Inpatient Nursing Rooms have a minimum 4 ACH and Radiology Rooms have a minimum 6 ACH. For the most part, it can be expected that standard exam rooms in other areas have a minimum 4 ACH. Only AIIR rooms are tested on an annual basis.

The following is a table demonstrating room closure in minutes based on the percentage of removal efficiency desired:

Table B.1. Air changes/hour (ACH) and time required for airborne-contaminant removal by efficiency *

ACH § ¶	Time (mins.) required for removal 99% efficiency	Time (mins.) required for removal 99.9% efficiency
2	138	207
4	69	104
6*	46	69
8	35	52
10*	28	41
12*	23	35
15*	18	28
20	14	21
50	6	8

(Table: CDC, July 2019)

Ideally a 99.9% efficiency should be considered. However, Infection Prevention has determined that a 99% efficiency is sufficient for the current outbreak situation to allow a faster room turnover when a surge capacity is reached.

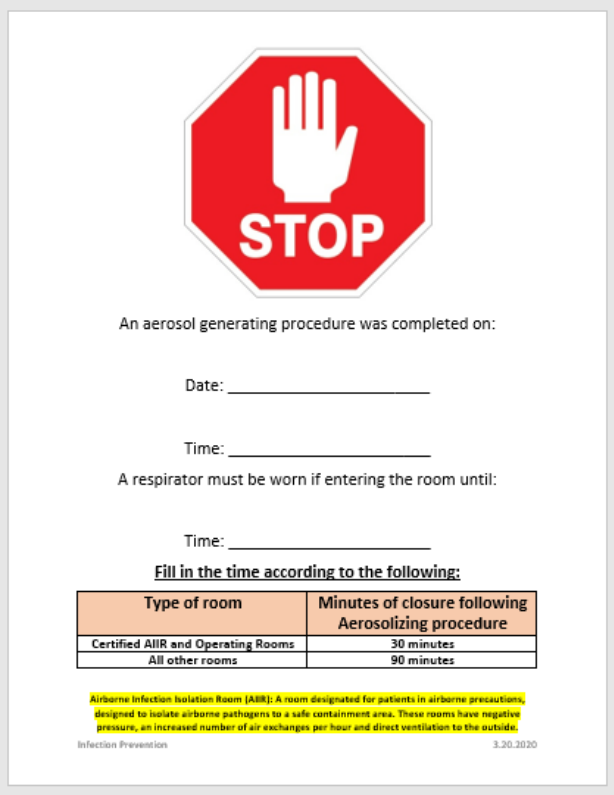
MultiCare has a limited number of AIIR rooms. An assessment of standard exam/procedure rooms without the benefit of increased filtration and air exchanges has been performed by a multidisciplinary team, including; Infection Prevention, Engineering and Facilities.

Recommendation: Following CDC guidelines for ACH, WHO guidelines for modified droplet precautions and information provided by MHS Engineering and Facilities representatives, Infection Prevention has made the following recommendations for room closure:

Room Type	Closure in Minutes
Certified AIIR and Operating Rooms	30
Standard inpatient/exam room following an aerosolizing procedure	90

Staff must follow modified droplet precautions, including the use of a respirator, if entrance into the patient care area takes place within the period of room closure.

To ensure staff are following this updated procedure the following sign will be posted outside the room or area where an adequate number of ACH needs to occur prior to re-entry:



References:

CDC: Coronavirus 2019. https://www.cdc.gov/coronavirus/2019-ncov/prepare/transmission.html

CDC: Guidelines for Environmental Infection Control in Health-Care Facilities (2003). Appendix B: Air. Last updated July 2019.

CDC: Interim Infection Prevention and Control Recommendations for Patients with Suspected or Confirmed Coronavirus Disease 2019 (COVID-19) in Healthcare Settings. Last updated March 19, 2020.

WHO: Q&A on Coronavirus. https://www.who.int/news-room/q-a-detail/q-a-coronaviruses

Formula for determining room closure time (CDC):

$$t2 - t1 = -[\ln(C2 / C1) / (Q / V)] \times 60, \text{ with } t1 = 0$$

where

t1 = initial timepoint in minutes
t2 = final timepoint in minutes
C1 = initial concentration of contaminant
C2 = final concentration of contaminant
C2 / C1 = 1 – (removal efficiency / 100)
Q = air flow rate in cubic feet/hour
V = room volume in cubic feet
Q / V = ACH