COVID-19 Inpatient Surge Guidance: Unit Ventilation Recommendations

May 22, 2020

The following System Office guidance and recommendations are for heating, ventilation, and air conditioning (HVAC) systems servicing inpatient care units designated for COVID-19, persons under investigation (PUI), and lab confirmed cases. System Office recommendations are aligned with CDC recommendation.

HVAC Controls & Equipment
Due to the lack of buoyancy of the SARS-CoV-2 in respiratory secretions encountered in the clinical environment from a PUI or lab confirmed case of COVID-19, there is an extremely low chance of viral contamination reaching the air handler via the return air in the HVAC system. Even if contamination occurs, return air is mixed with outside air and would therefore be diluted even further and filtered in the air handling unit (AHU) before it is then supplied to occupied patient care or other areas.

CDC Recommendations for Engineering Controls to Prevent Transmission of SARS-CoV-2:

Engineering Controls
- Design and install engineering controls to reduce or eliminate exposures by shielding healthcare providers (HCP) and other patients from infected individuals. Examples of engineering controls include:
  - physical barriers or partitions to guide patients through triage areas
  - curtains between patients in shared areas
  - air-handling systems (with appropriate directionality, filtration, exchange rate, etc.) that are properly installed and maintained

System Office Recommendations:
- Confirm the MERV rating of the filters in the AHU that service the designated unit. ASHRAE 170-2017 design standard calls for minimum filter efficiencies of MERV 7 for filter bank number 1 and MERV 14 for bank number 2. MERV 14 will capture > 90% of particles in size of 1.0 microns. (1) While the size of SARS-CoV-2 is sub-micron, approximately 0.16 microns, it is contained within respiratory secretions which are larger than 1 micron and therefore MERV 14 filters are effective in capturing any virus if it reaches the air handler through return air.
**6.0 Systems & Equipment – 6.4 Filtration**

**Table 6-2**

<table>
<thead>
<tr>
<th>Space Designation</th>
<th>Filter Bank 1-MERV</th>
<th>Filter Bank 2-MERV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Rooms; Inpatient and Ambulatory Diagnostic and Therapeutic Radiology; Inpatient Delivery and Recovery Spaces</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td>Inpatient Care, Treatment, Diagnosis, and those Spaces Providing Direct Service or Clean Supplies and Clean Processing</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td>Airborne Infectious Isolation (All) Rooms</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td>Protective Environment (PE) Rooms</td>
<td>7</td>
<td>HEPA</td>
</tr>
<tr>
<td>Laboratories, Procedure Rooms</td>
<td>13</td>
<td>N/R</td>
</tr>
<tr>
<td>Administrative, Bulk Storage, Soiled Holding Spaces, Food Preparation Spaces, and Laundries</td>
<td>7</td>
<td>N/R</td>
</tr>
<tr>
<td>All Other Outpatient Spaces</td>
<td>7</td>
<td>N/R</td>
</tr>
<tr>
<td>Skilled Nursing Facilities</td>
<td>7</td>
<td>N/R</td>
</tr>
</tbody>
</table>

- Maintain filters in the air handlers using routine facility maintenance procedures and processes.
- Frequency of replacement of filters should be based on health ministry's preventive maintenance schedule and reflect instructions from the filter manufacturer.
- Filter racks, gaskets, and spacers should be properly aligned to minimize or eliminate air leaking past filters.
- Facility maintenance colleagues should follow standard operating procedures for removal of filters needing replacement. CDC has stated that biological aerosols are not likely to become an airborne infectious problem once removed by filter media. They recommend the
air handler be shut down during filter change-out and used filters be placed plastic bag(s) and sealed upon removal. A study using a type of Mycobacteria to examine survival once captured in a HEPA filter found over 99% was no longer viable within 48 hours and little if any of this bacteria was released from the filter media even vortexing / sonication. (2) Continue to operate in ‘economizer’ mode; meaning the supply air is decreased (but more outdoor air) and increased return air. This will remove more air than is supplied to the cohort unit, maximizing outside air flow and diluting the air supplied to the designated unit.

- HVAC engineers will need to monitor and assure that these changes to the HVAC system:
  - Do not alter the negative pressure in the Airborne Infection Isolation Rooms (AIIR)
  - Unintentionally imbalance the HVAC system
  - Negatively impact occupant comfort
  - Has adequate environmental controls as warm/humid weather increases

Not Recommended:
- Installation of additional HEPA filtration in the return air at point of use from the designated unit. Additional filtration equipment will not provide any substantial improvement in safety of patients or personnel based on the aerobiology of SARS-CoV-2.

References: