HCID Airborne Infection Isolation Room Downtime Checklist - Managing HVAC-related AIIR Malfunctions During Special Pathogen Activation

Purpose: The purpose of this checklist is to aid facilities in preparing for and responding to Airborne Infection Isolation Room (AIIR) disruptions when caring for a suspected or confirmed patient with a special pathogen. This checklist assumes that the facility has established processes in place to manage general Heating, Ventilation, and Air Conditioning (HVAC) malfunction in other situations.

PREPARATION

Ideally completed prior to an event as part of the facility's preparedness plan.

1. ☐ Identify stakeholders (e.g., Facilities, Infection Prevention and Control, Unit/Area Managers, Patient Placement, Occupational Health, Emergency Management).
2. ☐ Establish communication and notification pathways or algorithms.
3. ☐ Develop and make available standardized signage (e.g., Airborne Isolation Signage, Do Not Enter Without..., Limited Personnel, etc.).
4. ☐ Partner with Facilities to understand the HVAC setup for the facility, for example:
    a. ☐ Does the facility operate off a single HVAC system or are AIIR(s) isolated?
    b. ☐ Does the Laboratory or other key departments (e.g., Operating Room. Sterile Processing Department) have their own HVAC systems? Would they be affected by a malfunction of an AIIR?
    c. ☐ Assess availability of backup systems (standalone air handling units, HEPA filters, etc.).
    d. ☐ Assess space with HVAC off to determine how the air would flow in a downtime scenario.
    e. ☐ Partner with Facilities to obtain HVAC schematics/blueprints for planning purposes.
5. ☐ Identify AIIR parameters, including monitoring methods (e.g., central monitor vs manometer), role for monitoring (who performs the monitoring), monitoring frequency, and record keeping.
    a. ☐ Partner with Facilities to perform ongoing assessment of AIIR performance throughout the facility to identify AIIR malfunction early on.
        i. ☐ Identify list of most likely issues to cause outages and develop a checklist (e.g. breakers).
        ii. ☐ Establish a regular reporting cadence by Facilities (or another designated role) at Infection Control Committee or similar committee meetings.

- b. ☐ Partner with Facilities to perform routine preventative maintenance on HVAC and AIIR systems to decrease risk of malfunction.
  - i. ☐ If using a dual blower system, evaluate what happens during an event when switching from first blower to the second blower.
- c. ☐ Define AIIR parameters for the facility (e.g., negative pressure room with an air flow rate of 6-12 air changes per hour and direct exhaust of air from the room to the outside of the building or recirculation of air through a HEPA filter).

6. ☐ Establish response plans if HVAC or AIIR malfunction were to occur.
   - a. ☐ Identify appropriate support staff (e.g., Facilities, Infection Control).
   - b. ☐ Ensure PPE availability (Airborne and/or PAPR/CAPR).
     - i. ☐ PPE needed is based on risk assessment and pathogen of concern.
     - ii. ☐ PPE may be required for clinical staff and for Facilities personnel or other staff who are around the affected area, not just within the patient room.
   - c. ☐ Update or establish policies or procedures formalizing this process.
     - i. ☐ Establish room downtime procedures before the room is deemed usable again.
   - d. ☐ If no AIIR exists in the facility, establish processes to manage patients presenting with an airborne pathogen or suspected of a special pathogen.
     - i. ☐ Consider developing processes to manage patients such as:
       1. ☐ Masking the patient.
       2. ☐ Utilizing portable HEPA devices (Note: this process is laborious, requires pre-planning and diligent effort, and may impact the time it takes to open the patient room door).
       3. ☐ Patient transfer to a more capable facility.
       4. ☐ Alternate rooms/wards of the facility with the ability to have air pressure become negative.
   - e. ☐ Consider Just-in-Time (JIT) training, including Standard Operating Procedures (SOP) for necessary facilities and/or HVAC personnel that would respond to downtime incidents if key system components were located within the isolation zone.
     - i. ☐ Additional considerations could be made for remote viewing and assessment options for necessary personnel.

ACTIVE DOWNTIME

Note: The response to an HCID AIIR downtime event is dependent upon several factors including the suspected or confirmed pathogen(s), location of the patient in the facility, and the setup of the HVAC system for where the patient is housed.

1. ☐ Initial Response:
    a. ☐ Ensure the door to the patient room is closed at all times.
    b. ☐ Allow only necessary personnel to enter the patient room.
        i. ☐ Consider limiting the number of times necessary personnel exit and re-enter the patient room.
    c. ☐ Follow established notification pathway to communicate AIIR downtime for an occupied HCID patient room.
        i. ☐ This may include communication to outside partners depending on severity of the malfunction (e.g., Public Health, your regional RESPTC).
    d. ☐ Place signage at entrance of compromised AIIR or special pathogens zone.
    e. ☐ Ensure appropriate PPE and respiratory protection is readily accessible to staff in a clean donning and doffing area, and that staff receive appropriate Just-in-Time Training if deemed necessary.
    f. ☐ Immediately implement masking for source patient(s) to minimize airborne transmission risks.
    g. ☐ Document parameters at time of AIIR failure.
2. ☐ Patient Safety:
    a. ☐ Perform a risk assessment with key stakeholders (e.g., Facilities, Infection Control, Unit Managers, Incident Command, patient care team) to determine patient relocation needs.
        i. ☐ Includes both the PUI/confirmed patient and other patients receiving care in the facility.
    b. ☐ Limit aerosol-generating procedures on source patients if possible.
3. ☐ Team Safety:
    a. ☐ During the resolution, ensure all personnel within the established hot zone wear appropriate PPE (including Facilities and Engineering personnel who are working on the resolution).

RETURN TO SERVICE

1. ☐ Partner with Facilities to verify full HVAC capability and operational status.
    a. ☐ System inspection of affected HVAC, PPE must continue to be worn until all services have been restored.
    b. ☐ Ventilation (Air Exchanges/ Dilution):
        i. ☐ Ensure exhaust vents are open and functional.
    c. ☐ Pressurization:
        i. ☐ May require multiple methods of validation over a period of time to ensure parameters are met.
        ii. ☐ Test adjacent areas/spaces to ensure they are not negatively impacted by changing airflow.
    d. ☐ Filtration.
    e. ☐ Temperature and humidity.
2. ☐ Consider the required time frame to return the room to service.
    f. ☐ This will be affected by many factors, including the size of the room, whether the room is still occupied, the pathogen of concern, and the duration of downtime.
3. ☐ Resume patient care using appropriate infection prevention and control measures after final approval from Infection Control.
4. ☐ Perform ongoing monitoring and routine preventative maintenance of the HVAC system and AIIR.
5. ☐ Consider patient surveillance and preemptive isolation for duration of pathogen incubation period for potentially exposed patients and staff (quarantine).

Additional Considerations

- If a malfunction of the AIIR(s) is identified while the room is unoccupied, consider removing the room from service and work quickly to resolve the issue. You may need to deploy contingency plans if a patient suspected to have a special pathogen were to present to the facility.
- Notify Occupational Health and Infection Control if concerns for staff exposure exist.
- Consider documenting staff that were within a specified distance of patient care area.
- If downtime procedures do not currently exist for managing other aspects of the HVAC system (e.g., temperature, humidity), consider developing those procedures.

Resources

1. Infection Control Guide on HVAC for Health Care Facilities Managers (PDF): https://www.ashe.org/system/files/media/file/2022/04/01 - Health-Care-Facilities-Manager-Guide_FINAL.pdf
2. CDC Environmental Infection Control Guidelines: https://www.cdc.gov/infection-control/hcp/environmental-control/index.html#toc
3. CDC Appendix B. Air Guidelines for Environmental Infection Control in Health-Care Facilities: https://www.cdc.gov/infection-control/hcp/environmental-control/appendix-b-air.html
4. Guidance for Reopening Buildings After Prolonged Shutdown or Reduced Operation: Ensure the Safety of Your Occupants and Building Water System and Devices: https://stacks.cdc.gov/view/cdc/94227