

Evaluating Heating, Ventilation, and Air Conditioning Systems in Healthcare Facilities That Care for Measles Patients

This checklist aims to help public health partners work with healthcare facilities to quickly assess heating, ventilation, and air conditioning (HVAC) systems in specific areas of the facilities where care for measles patients could occur, improving worker, patient, and visitor safety. Infection preventionists and healthcare facility managers can also refer to this checklist to consider actions they can take to prepare for a patient with measles.

The following departments at the healthcare facility may be involved to complete this checklist:

- **Facilities Management (FM):** Evaluate and adjust HVAC systems according to applicable building codes, regulations set by authorities having jurisdiction, evidence-based guidelines, and professional association recommendations. Consult with HVAC professionals as needed.
- **Infection Prevention and Control (IPC):** Coordinate with FM to identify and assess areas at increased risk for measles transmission, such as those where environmental conditions could most promote transmission of the virus to persons in those areas.
- **Clinical Leadership:** Provide support and resources to implement recommended ventilation interventions.
- **Environmental Services:** Support ventilation interventions where needed.

This checklist is solely to assist in applying existing guidance from the [CDC Guidelines for Environmental Infection Control in Health-Care Facilities](#) and [ASHRAE Standard 170—Ventilation of Health Care Facilities](#)^{*}, and is not new or independent guidance. It is meant to support but does not replace a complete evaluation of the facility's overall readiness or HVAC systems and does not replace the need for hospitals or facilities to regularly check their HVAC systems to meet applicable building codes, local regulations, and [ASHRAE Standard 170](#)^{*}. For detailed guidance on ventilation design, operation and maintenance, refer to the relevant standards and local regulations. See the Resources section of this checklist for links to web resources.

^{*}Disclaimer: references to non-CDC sites on the Internet are for information purpose only and do not constitute or imply endorsement of these organizations or their programs by CDC or the U.S. Department of Health and Human Services. CDC is not responsible for the content of pages found at these sites. URL addresses listed in the document were current as of the date of publication.



U.S. Centers for Disease
Control and Prevention
National Institute for
Occupational Safety and Health

Section 1: Documentation and Facility Information

Documentation

- Document procedures noted in Section 3, 4 or 5 for each room or area evaluated in separated pages, as applicable.
- FM to provide completed evaluations to IPC.
- Document the implemented control measures and assess system performance during outbreak for future improvements.

Assessment Details

Facility Name:	<input type="text"/>
Type of Assessment:	<input type="checkbox"/> On-site <input type="checkbox"/> Off-site <input type="checkbox"/> Other (specify): <input type="text"/>
Assessment Date:	<input type="text"/>
Next Assessment Date:	<input type="text"/>
Completed By:	<input type="text"/>
Approved By:	<input type="text"/>

Section 2: General Preparedness

Elements to be assessed	Status	Notes/Areas for Improvement
Individuals responsible for evaluating HVAC systems are designated and possess the required licenses or certifications required by authorities having jurisdiction	<input type="checkbox"/> Yes <input type="checkbox"/> NA [†] <input type="checkbox"/> No	
HVAC systems' schematics and maintenance logs are available and up to date	<input type="checkbox"/> Yes <input type="checkbox"/> NA <input type="checkbox"/> No	
FM and IPC teams are briefed on risk assessment and ventilation preparedness with respective responsibilities aligned	<input type="checkbox"/> Yes <input type="checkbox"/> NA <input type="checkbox"/> No	
IPC has identified high-risk areas for priority evaluation (e.g., airborne infection isolation rooms (AIIRs), emergency department, emergency waiting room, pediatric units)	<input type="checkbox"/> Yes <input type="checkbox"/> NA <input type="checkbox"/> No	

[†]NA: This indicates that a particular item or category is not assessed. This designation is used consistently throughout the document.

Section 3: Airborne Infection Isolation Rooms (AIIRs)

Elements to be assessed	Status	Notes/Areas for Improvement
Facility has at least one functional AIIR that is operational and designed to meet CDC guidelines and ASHRAE Standard 170* (major items are covered immediately below)	<input type="checkbox"/> Yes <input type="checkbox"/> NA <input type="checkbox"/> No	
AIIRs achieve minimum total air changes of 12 air changes per hour (ACH), with at least 2 ACH of outdoor air, or achieve minimum ACH as specified by requirements set by authorities having jurisdiction	<input type="checkbox"/> Yes <input type="checkbox"/> NA <input type="checkbox"/> No	
Filters for supply air meet requirements	<input type="checkbox"/> Yes <input type="checkbox"/> NA <input type="checkbox"/> No	
Filters are installed properly per manufacturer instructions	<input type="checkbox"/> Yes <input type="checkbox"/> NA <input type="checkbox"/> No	
Filter efficiencies comply with the authorities having jurisdiction (e.g., at least Minimum Efficiency Reporting Value (MERV) 14 per ASHRAE Standard 170 , or local/state requirement if higher)	<input type="checkbox"/> Yes <input type="checkbox"/> NA <input type="checkbox"/> No	
Negative pressure relative to adjacent spaces is verified using a calibrated differential pressure gauge and monitored continuously with a visual differential pressure monitor	<input type="checkbox"/> Yes <input type="checkbox"/> NA <input type="checkbox"/> No	
Presence of permanently installed differential pressure monitors and visual indicators	<input type="checkbox"/> Yes <input type="checkbox"/> NA <input type="checkbox"/> No	
Minimum 0.01 inches of water gauge of negative air pressure (i.e., air flowing into the AIIR from adjacent corridors and anterooms)	<input type="checkbox"/> Yes <input type="checkbox"/> NA <input type="checkbox"/> No	
Exhaust air is either vented outdoors directly or completely passes through high-efficiency particulate air (HEPA) filtration before mixing with other exhaust systems. For venting outdoors, discharge outlets are properly located to prevent re-entry of exhaust into the building and meet requirements set by authorities having jurisdiction, which are typically:	<input type="checkbox"/> Yes <input type="checkbox"/> NA <input type="checkbox"/> No	
At least 25 ft horizontally from outdoor air intakes, openable windows and doors, and areas that are normally accessible to the public	<input type="checkbox"/> Yes <input type="checkbox"/> NA <input type="checkbox"/> No	
In a vertical direction and at least 10 ft above the adjoining roof level	<input type="checkbox"/> Yes <input type="checkbox"/> NA <input type="checkbox"/> No	
Airflow direction is evaluated and verified to be from clean to less-clean areas (e.g., exhaust directly above or in the wall behind the patient's bed)	<input type="checkbox"/> Yes <input type="checkbox"/> NA <input type="checkbox"/> No	
Anterooms (if present) meet requirements set by authorities having jurisdiction, which are typically:	<input type="checkbox"/> Yes <input type="checkbox"/> NA <input type="checkbox"/> No	
Minimum 10 total ACH	<input type="checkbox"/> Yes <input type="checkbox"/> NA <input type="checkbox"/> No	
Airflow direction that is into the anteroom from the corridor and from the anteroom into the AIIR (i.e., anteroom air pressure relationship is positive to AIIR, negative to corridor)	<input type="checkbox"/> Yes <input type="checkbox"/> NA <input type="checkbox"/> No	

Area Name (for both Sections 4 and 5):

Section 4: HVAC Systems in other high-risk areas

Elements to be assessed	Status	Notes/Areas for Improvement
General ventilation complies with ACH and pressure recommendations set by the authorities having jurisdiction or ASHRAE Standard 170*	<input type="checkbox"/> Yes <input type="checkbox"/> NA <input type="checkbox"/> No	
HVAC system filters meet requirements	<input type="checkbox"/> Yes <input type="checkbox"/> NA <input type="checkbox"/> No	
Filters are installed properly per manufacturer instructions	<input type="checkbox"/> Yes <input type="checkbox"/> NA <input type="checkbox"/> No	
Filter efficiencies comply with the authorities having jurisdiction or ASHRAE Standard 170*	<input type="checkbox"/> Yes <input type="checkbox"/> NA <input type="checkbox"/> No	
All the outdoor discharge outlets of exhaust air are properly located to prevent re-entry of exhaust into the building and meet requirements set by authorities having jurisdiction, which is typically: at least 25 ft horizontally from outdoor air intakes, openable windows and doors, and areas that are normally accessible to the public	<input type="checkbox"/> Yes <input type="checkbox"/> NA <input type="checkbox"/> No	
Recent testing, adjusting, and balancing report confirms that supply air and exhaust systems are properly balanced	<input type="checkbox"/> Yes <input type="checkbox"/> NA <input type="checkbox"/> No	
Ventilation systems that may potentially cross-contaminate air between identified high-risk areas and other patient care areas are identified, and interim control measures are assessed or planned as needed	<input type="checkbox"/> Yes <input type="checkbox"/> NA <input type="checkbox"/> No	
Airflow direction is evaluated and verified to be from clean to less-clean areas	<input type="checkbox"/> Yes <input type="checkbox"/> NA <input type="checkbox"/> No	

Section 5: Additional ventilation enhancements

Elements to be assessed	Status	Notes/Areas for Improvement
Create temporary negative pressure isolation as needed to provide surge isolation capacity by following proper methods (e.g., Airborne Infectious Disease Management)*	<input type="checkbox"/> Yes <input type="checkbox"/> NA <input type="checkbox"/> No	
Increase outdoor air intake where feasible to enhance dilutional ventilation and reduce transmission	<input type="checkbox"/> Yes <input type="checkbox"/> NA <input type="checkbox"/> No	
Deploy supplemental air cleaning per manufacturer recommendations to help eliminate airborne viruses and reduce transmission, such as	<input type="checkbox"/> Yes <input type="checkbox"/> NA <input type="checkbox"/> No	
Portable HEPA air cleaners (see FAQ #9 from CDC)	<input type="checkbox"/> Yes <input type="checkbox"/> NA <input type="checkbox"/> No	
Upper room ultraviolet germicidal irradiation (UVGI) systems	<input type="checkbox"/> Yes <input type="checkbox"/> NA <input type="checkbox"/> No	

Section 6: Maintenance and Monitoring

Elements to be assessed	Status	Notes/Areas for Improvement
Pressure differentials in isolation areas are maintained and monitored with logs of daily pressure checks whenever an isolated infectious patient is present	<input type="checkbox"/> Yes <input type="checkbox"/> NA <input type="checkbox"/> No	
Airflow and ACH measurements are recorded and reviewed at least annually	<input type="checkbox"/> Yes <input type="checkbox"/> NA <input type="checkbox"/> No	
Filters are inspected and replaced per manufacturer's recommendations or more often if needed	<input type="checkbox"/> Yes <input type="checkbox"/> NA <input type="checkbox"/> No	
UVGI , if installed, is functional when needed and maintained per manufacturer recommendations	<input type="checkbox"/> Yes <input type="checkbox"/> NA <input type="checkbox"/> No	

Section 7: Emergency and Overflow Readiness

Elements to be assessed	Status	Notes/Areas for Improvement
Portable HEPA filtration units (see FAQ #9 from CDC) are available and functioning if needed	<input type="checkbox"/> Yes <input type="checkbox"/> NA <input type="checkbox"/> No	
Temporary isolation areas are identified (e.g., converting rooms or wings), and modification plans of HVAC systems are validated	<input type="checkbox"/> Yes <input type="checkbox"/> NA <input type="checkbox"/> No	
Backup power systems for ventilation are functional	<input type="checkbox"/> Yes <input type="checkbox"/> NA <input type="checkbox"/> No	

Section 8: Coordination with Infection Control

Elements to be assessed	Status	Notes/Areas for Improvement
HVAC system performance and identified potential cross-contamination are reviewed with the infection prevention team	<input type="checkbox"/> Yes <input type="checkbox"/> NA <input type="checkbox"/> No	
Visitor and non-essential staff routing avoids high-risk areas	<input type="checkbox"/> Yes <input type="checkbox"/> NA <input type="checkbox"/> No	
Signage is in place for airborne precautions and restricted access zones	<input type="checkbox"/> Yes <input type="checkbox"/> NA <input type="checkbox"/> No	

Section 9: Resources

CDC

- [Interim Infection Prevention and Control Recommendations for Measles in Healthcare Settings | Infection Control | CDC](#)
- [Guidelines for Environmental Infection Control in Health-Care Facilities](#)
- [Ventilation FAQs Frequently Asked Questions](#)
- [Environmental Control for Tuberculosis: Basic Upper-Room Ultraviolet Germicidal Irradiation Guidelines for Healthcare Settings](#)
- [About Germicidal Ultraviolet \(GUV\)](#)
- [Expedient Patient Isolation Rooms](#)

Others

- [ASHRAE. Standard 170-2021—Ventilation of Health Care Facilities. \(Read-Only Versions of ASHRAE Standards\)](#)
- Minnesota Department of Health. [Airborne Infectious Disease Management - Methods for Temporary Negative Pressure Isolation](#)