HAI-Lights Newsletter

An infection prevention and control resource

Spring 2024
Volume 2 | Issue 2

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HAI-Lights Refresher Question:
According to the Spaulding Classification System, what type of medical equipment requires at least high-level disinfection?
a) Non-critical
b) Semi-critical
c) Critical
*Answer on page four (4)

In This Issue:

Environmental Infection Control

Environmental infection prevention helps ensure healthcare environments meet the appropriate standards for patient safety. Air, water, and environmental services are among the many aspects that must be maintained and monitored in healthcare settings.[i] This HAI-Lights edition continues the last edition's environmental infection management discussion by delving deeper into the topic of air.

To view the Centers for Disease Control and Prevention (CDC) Environmental Infection Prevention Guidelines, visit:

Guidelines for Environmental Infection Control in Health-Care Facilities (cdc.gov).

Environment of Care

Air

Germs spread in the air through various means, including construction, ventilation systems, and open windows, and may cause airborne infections that spread through tiny particles called droplet nuclei.

Common airborne organisms include *Aspergillus, Mycobacterium tuberculosis*, and Measles. To avoid airborne healthcare-associated infections (HAIs), it is critical to adhere to all environmental prevention measures in healthcare settings.[ii]

Hospitals have clearly defined requirements specific to different ways that germs spread. To maintain a safe environment, it is important to ensure facilities follow the correct guidelines for:

- Heating, Ventilation, and Air Conditioning (HVAC) Systems
- Construction

Heating, Ventilation, and Air Conditioning Systems

In healthcare facilities, heating, ventilation, and air conditioning (HVAC) systems assist in preventing the spread of airborne infections. HVAC systems maintain temperature, humidity, and air quality. A properly engineered HVAC system is critical for preventing the dispersal of airborne particles. All parts of the HVAC system, including filtration, ventilation, and pressurization must also function effectively.

Some specialized HVAC systems can produce negative and positive pressure airflow, allowing airflow to move in or out of rooms to prevent contamination. Negative pressure airflow is used for Airborne Infection Isolation Rooms (AIIR) with airflow moving into the room to prevent the spread of highly contagious diseases spread via the airborne route. Rooms have unique airflow requirements, filtration efficiency, and air changes per hour (ACH) In addition, ACH is maintained throughout the healthcare facility.

Different areas or units of a facility may require different ACH, including an operating room requiring higher ACH (i.e., 15 ACH) so the air is replaced at a faster rate to reduce germs from spreading.

Specifications	All room (includes bronchoscopy suites)	PE room	Critical care room§	Isolation anteroom	Operating room
Air pressure¶	Negative	Positive	Positive, negative, or neutral	Positive or negative	Positive
Room air changes	≥6 ACH (for existing rooms); ≥12 ACH (for renovation or new construction)	≥12 ACH	≥6 ACH	≥10 ACH	≥15 ACH

Figure 1. Example of special air handling requirements in specific units.[ii] Ex: Transplant unit.

Construction

Environmental control measures must be implemented during any construction project at a healthcare facility, whether it be remodeling, remediation, repair, or demolition, to safeguard patients from acquiring infectious diseases. Before construction starts, a multidisciplinary team should be assembled to complete the Infection Control Risk Assessment (ICRA) assessing the type of work to be completed and the patient risk. The type of work can range from non-invasive to major demolition, and patient risk group categories range from low to highest risk. This information is combined to decide what class of precautions should take place. The American Society for Healthcare Engineering (ASHE) provides a free ICRA matrix online. Once the appropriate class of precautions is determined, there is additional guidance on the minimum activities that should take place before and during the construction.

Airborne Diseases

There are several types of airborne diseases, each with distinct symptoms, treatment, and outlook. Two common airborne diseases are:

- Tuberculosis
- Aspergillosis

Tuberculosis

Tuberculosis (TB) is caused by the bacterium *Mycobacterium tuberculosis* (*M. tuberculosis*) which can spread through the air from one person to another. When a person with TB disease of the lungs coughs or speaks, TB bacteria can enter the air. People nearby may breathe in these bacteria and become infected. Once *M. tuberculosis* bacteria is inhaled, it can settle and grow in the lungs. It can also move through the blood to other parts of the body like the spine and brain.[iii] Usually, TB that is not in the lungs but in other internal organs (called extrapulmonary TB) is not infectious. *M. tuberculosis* does not cause disease in everyone-this can be due to a variety of factors including length of exposure, if PPE was used properly in an exposure, and if the infectious individual was in a negative pressure room. When *M. tuberculosis* does cause disease, treatment regimens are long (between four-nine months).[iv] Patients with suspected or confirmed TB should be placed in an airborne infection isolation room on “airborne precautions.” When caring for a patient with suspected or confirmed TB, healthcare personnel should refer to the Guidelines for Preventing the Transmission of Mycobacterium tuberculosis in Healthcare Settings, 2005.

Aspergillosis

Aspergillosis is an infection caused by *Aspergillus*, a common mold (type of fungus) that survives in multiple environments, such as air, water, and dust. *Aspergillus* spreads through airborne transmission but cannot be spread from person to person. Although *Aspergillus* does not normally cause illness in healthy individuals, immunocompromised individuals are at a higher risk of acquiring the disease if particles containing aspergillosis is inhaled. The incubation period for aspergillosis has not been determined. In a healthcare setting, activities that pose a risk for HAIs include construction, renovation, and repairs, so it is important to maintain routine surveillance and adhere to specific infection control practices during these activities for the safety of all individuals.[i]

CDC Project Firstline

When healthcare workers practice infection control consistently – every person, every action, and every day – lives are saved. The Healthcare Safety Unit (HSU) joins Project Firstline in Texas, a CDC-led infection control training collaborative for frontline U.S. healthcare workers. We encourage you to explore and share with your networks the free resources from Project Firstline, along with CDC Project Firstline partners, the National Network of Public Health Institutes (NNPHI) and the National Association of County and City Health Officials (NACCHO):

- Micro-Learn Training Resources
- Infection Control Actions to Stop the Spread of Respiratory Viruses
- Ventilation in Healthcare Settings
- Recognizing Risks in Health Care
- Learn Where Germs Live in Health Care
- NNPHI Infection Control Resources
- NACCHO Infection Prevention and Control Resources Library

PROJECT FIRSTLINE
CDC's National Training Collaborative for Healthcare Infection Prevention & Control

For more information, visit cdc.gov/projectfirstline.

Healthcare Safety Unit

- The HSU at the Department of State Health Services (DSHS) was established to promote safe and quality healthcare through awareness, education, transparency, monitoring, and response, helping to improve the well-being of all Texans.
- The HSU comprises of three groups: HAI Investigations Group, Data and Training Group, and Multidrug-Resistant Organism (MDRO)/Antimicrobial Resistance (AR) Group.
- Learn more about the HSU by visiting: dshs.texas.gov/healthcare-safety-unit.

Additional Resources

Subscribe to the HAI-Lights Newsletter and provide your feedback to help us improve.

- cdc.gov/infectioncontrol/index.html
- apic.org/
- shea-online.org/
- tsicp.org/
- CDC Guidelines for Environmental Infection Control in Health-Care Facilities

HAI-Lights Refresher Answer: B) Semi-critical
Semi-critical devices, like laryngoscopes and speculums, require at least high-level disinfection because, during their use, they encounter the mucous membranes and non-intact skin of patients.

References

I. CDC (2003). Guidelines for Environmental Infection Control in Health-Care Facilities. Centers for Disease Control and Prevention. Guidelines for Environmental Infection Control in Health-Care Facilities (cdc.gov)
II. CDC. (2003). C. Air. Centers for Disease Control and Prevention. Air | Background | Environmental Guidelines | Guidelines Library | Infection Control | CDC
III. CDC. (2023). Basic TB Facts. Centers for Disease Control and Prevention. Basic TB Facts | TB | CDC
IV. CDC. (2023). Treatment for TB disease. Centers for Disease Control and Prevention. Treatment for TB Disease | TB | CDC