

Standards, Regulations and Guidelines Related to Hospital OR Air Quality

CMS (Centers for Medicaid and Medicare Services): There is no CMS standard on OR air quality. CMS defers to FGI and AORN. https://www.cms.gov/Regulations-and-Guidance/Guidance/Manuals/downloads/som107ap_a_hospitals.pdf accessed April 8, 2018. Although not required, CMS recommends that hospitals maintain the upper range of RH at 60 percent or less, as excessive humidity is conducive to microbial growth and compromises the integrity of wrapped sterile instruments and supplies. Each operating room should have separate temperature control. Acceptable standards such as from the Association of Operating Room Nurses (AORN) or the Facilities Guidelines Institute (FGI) should be incorporated into hospital policy.

A hospital with a comprehensive hospital-wide infection control program should have and implement policies and procedures, based as much as possible on national guidelines that address the following: Maintaining safe air handling systems in areas of special ventilation, such as operating rooms.

FGI (Facilities Guidelines Institute): FGI provides a guideline versus mandate. "Guideline for design and construction of healthcare facilities", written and maintained by the Facilities Guidelines Institute with assistance from the U.S. Department of Health and Human Services. Also known as "ANSI/ASHRAE/ASHE Standard 170-2008, Ventilation of Health Care Facilities." http://www.ashe.org/compliance/ec_02_05_01/01/specialdept_or.shtml accessed April 8, 2018. Key points include:

- Minimum 20 room air changes in Class B and Class C operating rooms (operating rooms where sedation/anesthesia greater than local or topical is administered).
- Procedure rooms (Class A operating rooms limited to local or topical anesthesia) continue to require 15 room air changes per hour.
- The updated standards apply to new facilities, additions to existing facilities, and modifications to existing ventilation systems.
- ASHRAE Standard 52.2: Two filter banks for air handling serving ORs are required. Filter bank number 1, MERV 7, is located prior to any cooling coils, while filter bank number 2, MERV 14, is located downstream of any fan, coil, or drain pan.
- ASHRAE *Applications 2008* recommends MERV 17 HEPA filters in orthopedic ORs, bone marrow transplant ORs, and organ transplant ORs.

AORN: AORN provides a guideline versus mandate. The recommended temperature range in an operating room is between 68°F and 75°F. Collaborate with infection prevention, and facility engineers when determining temperature ranges. Each facility should determine acceptable ranges for temperature in accordance with regulatory and accrediting agencies.

The recommended humidity range in an operating room is 20% to 60% based upon addendum d to ANSI/ASHRAE/ASHE Standard 170-2008. Each facility should determine acceptable ranges

for humidity in accordance with regulatory and accrediting agencies and local regulations. The center for Medicaid and Medicare systems has modified their requirements to allow for the 20% lower limit effective June 2013.

The total number of air changes (of both outdoor and recirculated air) in the OR should be maintained at a minimum of 20 changes per hour, with a minimum of four outdoor air changes per hour (or the applicable rate at the time of the HVAC system's design or most recent renovation).¹⁻³ The total air changes per hour is the sum of the outdoor air changes plus the recirculated air changes.¹⁻³

Maintaining positive pressure airflow in the OR promotes an airflow direction from ceiling to floor.¹ The air enters the OR through vents in the ceiling and moves downward over the patient and perioperative team. The HVAC system exhausts the air through return vents near the floor of the OR.

Equipment and supplies should not be placed near return vents because unobstructed airflow out of the OR is required to maintain the correct air pressure.¹

1. Guideline for a safe environment of care, part 2. In: Guidelines for Perioperative Practice. Denver, CO: AORN, Inc.
2. ANSI/ASHRAE/ASHE Addendum d to Standard 170-2008: Ventilation of Health Care Facilities. 2010.
3. Centers for Medicare & Medicaid Services. State Operations Manual Appendix A: Survey Protocol, Regulations and Interpretive Guidelines for Hospitals. Rev; 84.2013.