

Indoor Air Quality for Improved Healthcare Outcomes

EXECUTIVE SUMMARY

Indoor Air Quality (IAQ) is critical to the safety and performance of the healthcare environment. Infection control, health and comfort for patients and staff, and cost-effective facility operation rely on meeting strict demands for heating and cooling, ventilation, circulation, and filtering of air.

Special IAQ requirements for healthcare settings include:

- Proper temperature, humidity, air circulation and pressure control to meet the needs of various hospital areas, such as patient rooms, surgical suites, and protected environments
- Ventilation and filtration to reduce contamination in the form of microorganisms and viruses
- Air circulation that prevents indoor pollution, such as odors and chemical contaminants
- Ability to control environmental conditions throughout the healthcare setting for the best possible healing and working conditions

IAQ for control of airborne infections

Hospitals face high risks for transmitting infection because they are populated by people with infectious diseases and those who are immunocompromised due to illness or surgery. In fact, up to 10 percent of people who enter a hospital contract a nosocomial infection. Infections lead to patient suffering, longer hospital stays, and thousands of deaths per year.

High infection rates also are costly to healthcare facilities due to increased hospital stays, exposure to liability, and higher risks for patients and staff (Hudson, 2007)

Proper IAQ combined with private patient rooms, strict hand washing procedures, and equipment sterilization can reduce hospital infection rates.

Reducing indoor pollution in the healthcare environment

The EPA names indoor air pollution as one of the top five environmental risks to public health. Hospital indoor air, as in other buildings, can carry inorganic particulates and allergens that cause discomfort and health problems for occupants.

Air pollutants should be controlled at the source when possible. Air cleaning and ventilation strategies will improve IAQ. The National Institute for Occupational Safety and Health (NIOSH) provides guidelines on using ventilation to control indoor air contaminants by diluting contaminants with outdoor air and isolating or removing them by controlling air pressure relationships.

Temperature and humidity control for a healthier hospital environment

Temperature and humidity control comprise important components of IAQ in healthcare. Excessive humidity can promote the spread of microbes and increase the survival rate of nosocomial infectious agents on surfaces.

Relative humidity levels in healthcare facilities should be kept between 30-60 percent for comfort and contaminant control, according to the CDC. Special dehumidification equipment ensures proper humidity levels.

Proper temperature control is important to create optimal healing conditions for patients, and for staff comfort. Each hospital area has different temperature needs. For example, operating rooms usually need to maintain cool temperature standards, while patient rooms and nursing stations require different temperature settings.

The HVAC system should be designed to allow for the control of specific temperature and humidity requirements in various spaces throughout the healthcare facility.

IAQ during construction

Construction and renovation projects pose special IAQ challenges to healthcare settings. Dust, debris, and the movement of workers in and out of the project site pose elevated risks for contamination. The American Institute of Architects (AIA) recommends an Infection Control Risk Assessment (ICRA) program for every new hospital construction and renovation project.

Standards for Healthcare IAQ

The CDC, the AIA, the Joint Commission on Accreditation for Healthcare (JCAHO) and the American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) all set out guidelines for maintaining IAQ in healthcare environments.

Ultimately, achieving optimal IAQ begins with HVAC system design and continues with best practices in system operation and maintenance.

REFERENCES

- “Guidelines for Environmental Infection Control in Health-care Facilities.” Centers for Disease Control and Prevention Healthcare Infection Control Practices Committee (HICPAC), 2003. www.cdc.gov/ncidod/hip/enviro/guide.htm.
- Hudson, Eric. “Airborne Particle Counters Provide Vital Information.” *The Air Conditioning, Heating & Refrigeration News*, May 28, 2007.