Managing Air Pressure, Temperature and Humidity in Critical Health Care Settings

Wm. (Bill) Morgan, CHFM, FASHE
MSL Dedicated Healthcare Partners
bmorgan@mslhealthcare.com
EC 02.05.01: EP 15

- Highest scored finding currently with the Joint Commission.
- Not Just in the Environment of Care, but in all standards currently scored.
- 53% of hospitals are not in compliance with this element of performance.
• In areas designed to control airborne contaminants (such as biological agents, gases, fumes, dust), the ventilation system provides appropriate pressure relationships, air-exchange rates, and filtration efficiencies.

• Include spaces such as OR’s, special procedure rooms, rooms used for patients in “protective environment”, suspected airborne communicable diseases, Laboratories, Pharmacies, and sterile supply rooms.
Reference Material


• Or the edition of the AIA Guidelines for Design and Construction of Healthcare Facilities used for approval when space is built out.

• Unless change to a space requires a new permit for construction the space would use the initial standard year originally approved.
The Joint Commission organization continues to review data from thousands of hospitals across the nation related to patient safety. Measures for improvement come from that data and are used to target areas for improvement in both the environment of care and direct patient care.

The need to provide a safe environment for patient services has been looked at with greater intensity for several years due to increased infection rates and exposures to new and more difficult exposures to patients.

With the latest outbreak of EBOLA and the stringent environmental controls needed to control exposure, along with the increased respiratory infections and the increased scrutiny from media on how hospitals perform when managing patient safety, the need to improve management of the environmental is only going to increase.

The best way to ensure healthcare facilities are managing the spaces called out in EC 02.05.01 is with a management program that reviews all aspects of space design, monitoring, response, and reporting of the functions needed to meet patient safety requirements.
Building a Plan

• Inventory from the FGI for spaces in your system.
• Identifying the level of monitoring and type (manual or automated) used.
• Identify the response used when a space is out of range identified in plan.
• Identify record keeping standards.
• Identify Construction Work requirements.
Inventory

• Using the guidelines document to develop a list of space to review for inclusion in a program.

• ASHRA design requirements identify the rooms that need consideration for new construction. I believe we will eventually be held to this list to ensure continued operation to design once space in built out and in use.
Using “Risk Assessment” to help manage space needs.

• There are two commonly used processes we can use to help identify a level of risk in evaluating what our inventory requires for monitoring and response.

• 2012 NFPA 99 Chapter 4, section 4.1 identifies four levels of risk for equipment.

• Common Clinical Engineering risk assessments used to identify levels of risk for clinical equipment.
NFPA 99

• **4.1** Building System Categories.
  * Building systems in health care facilities shall be designed to meet system Category 1 through Category 4 requirements as detailed in this code.

• **4.1.1** Category 1. Facility systems in which failure of such equipment or system is likely to cause major injury or death of patients or caregivers shall be designed to meet system Category 1 requirements as defined in this code.

• **4.1.2** Category 2. Facility systems in which failure of such equipment is likely to cause minor injury to patients or caregivers shall be designed to meet system Category 2 requirements as defined in this code.

• **4.1.3** Category 3. Facility systems in which failure of such equipment is not likely to cause injury to patients or caregivers, but can cause patient discomfort, shall be designed to meet system Category 3 requirements as defined in this code.

• **4.1.4** Category 4. Facility systems in which failure of such equipment would have no impact on patient care shall be designed to meet system Category 4 requirements as defined in this code.
Clinical Engineering Direction

• 1) Potential Impact of failure- Death, Injury, Delayed Treatment/increased Risk, Inconvenience

• 2) Equipment History(Failure Rate)- High Medium Low

• 3) Equipment Maintenance Requirements - High Medium Low

• 4) Area/Patients Served- Critical Patient Care, General Patient Care, Outpatient, Support Services, Business
Monitoring

• Monitoring can be set by “Risk”, more frequent monitoring with higher risk areas like surgery or sterile supply is needed than to monitor non patient care areas like a dirty utility room on a patient floor.

• Monitoring can be done using automation, manual reading of gauges, or a combination of both.
Monitoring

• If building automation is used for monitoring make sure there is a good record of how this is done.
• Ensure a good record is kept on how follow up occurs.
• What is monitored is also determined by risk. Temperature, Humidity, Pressure relationships, and other conditions can be included in the monitoring.
Monitoring

• If using automation for monitoring space include a routine calibration of equipment to ensure accurate measurements.

• If using automation for monitoring space make sure a history is maintained for inspections.

• Separate monitoring could be done for air exchange rate, particulate counts (if used), and any other monitoring done.
Response

• Just recording conditions isn’t enough. A good process must be in place to follow up on any variance of conditions in spaces identified in your plan.

• Risk assessment will help with this also. A time delay could be appropriate to respond for a short term period of low humidity or temperature if a risk assessment is done.

• Include Nursing and Infection control in RISK!
Response

• Document all response to variations per your plan.
• Document all risk assessment work done as part of your plan.
• Recommend any required response to a variation in your plan be reported to the Environment of Care Committee in regular utility reports or safety reports required.
Construction

• Infection Control Risk Assessment will identify any areas where critical space is impacted by construction.

• Utility Management Plans should also include response required when construction impacts a critical space.

• Even temporary shutdowns can have a major impact on patient care areas.
Questions

• Who does particulate counts?
• Will the local AHJ approve of this plan?
• How long to keep records?
• What about filter efficiency?

• THANK YOU!!!!!