



**BSR/ASHRAE/ASHE Addendum o  
to ANSI/ASHRAE/ASHE Standard 170-2017**

**Public Review Draft**

**Proposed Addendum o to  
Standard 170-2017, Ventilation of  
Health Care Facilities**

**Second Public Review (June 2019)  
(Draft shows Proposed Changes to Current Standard)**

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**(This foreword is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard. It has not been processed according to the ANSI requirements for a standard and may contain material that has not been subject to public review or a consensus process. Unresolved objectors on informative material are not offered the right to appeal at ASHRAE or ANSI.)**

## **FOREWORD**

*Infection prevention and control (IPC) strategies include risk assessment, identification of people receiving care who are at increased risk of infection due to procedures and therapy they are undergoing and aligns the environment of care to mitigate risks. IPC strategies also identify and segregates those with communicable disease to spatially separate them from others at risk. This segregation and protection can be done through engineering controls, but it can also be accomplished through operational/administrative controls. Moreover, infection preventionists are required to conduct an annual risk assessment that is focused on safety of patients their affiliate serves as well as support and facilitate readiness to respond to emergencies that include those related to infectious diseases. (TJC 2018, CMS 2017). Requirements from both agencies include-all acute care hospitals are able to take community-levels of risk into account in assessing risks they may encounter on an annual frequency or more often if a situation is encountered that changes existing risk assessment and mitigation plan. This operational and administrative function supports readiness and response to changes that a design standard cannot address over the duration of use of a healthcare occupancy. This experience is therefore basis for offering a risk-based approach to operation that departs from space requirements as defined below from 170 standard. -This change to the standard does not change any design requirement for new construction, renovation or change of use of any space covered under the standard. The operation of HVAC systems is not specified or required under this standard and the informative appendix contained in this addendum is offered as a suggestion to those healthcare organizations who are able and willing to assume all risk of financial and legal liability stemming from the use of the informative appendix.*

*For those health care providers that have the expertise to analyze, implement, and document their specific ventilation requirements, this proposed addendum provides a voluntary risk-based approach to establish operational ventilation rates for spaces required in this Standard.*

***[Note to Reviewers: This addendum makes proposed changes to the current standard. These changes are indicated in the text by underlining (for additions) and ~~striketrough~~ (for deletions) except where the reviewer instructions specifically describe some other means of showing the changes. Only these changes to the current standard are open for review and comment at this time. Additional material is provided for context only and is not open for comment except as it relates to the proposed changes.]***

## **Addendum o to 170-2017**

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***Add a new Informative note after Section 4.1.2 as shown below.***

***Informative Note: New buildings and additions or alterations to existing buildings that are subject to this Standard and that will be operated according to Informative Appendix D should be designed and constructed according to the provisions of Sections 3-11 in this Standard.***

***Healthcare Organizations who operate buildings according to Informative Appendix D typically assume***

all financial and legal risk for such operation. Healthcare organizations who operate buildings according to Informative Appendix D need to report their activities as described in Section D8.

**Add a new Informative Appendix D as shown below.**

**(This appendix is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard. It has not been processed according to the ANSI requirements for a standard and may contain material that has not been subject to public review or a consensus process. Unresolved objectors on informative material are not offered the right to appeal at ASHRAE or ANSI.)**

## **INFORMATIVE APPENDIX D** **RISK-BASED MEANS OF VENTILATION SYSTEM OPERATION**

### **D1 Applicability**

**D1.1** This Risk-Based Means of Ventilation System Operation is a voluntarily selected approach to the operation of ventilation systems designed and constructed in accordance with this Standard. Where permissible by the authority having jurisdiction, a healthcare organization may choose to utilize the Risk-Based Means of Ventilation System Operation and implement the infection prevention and control hazard risk assessment and mitigation.

**D1.2** This Risk-Based Means of Ventilation System Operation may be used for an entire facility or for a portion of a facility (one or more rooms, room types, or areas). This risk-based approach is intended to be used to establish operational minimum total and outdoor air change per hour rates, exhaust air requirements, air recirculation requirements, temperature, humidity, or ventilation rates for spaces required in this Standard.

**D1.3** The governing body of a Health Care organization may elect to operate ventilation systems at a different level from the design intent which meets the requirements of Section 3-11 but which meets the requirements defined in the organization's annual infection prevention and emergency preparedness plans.

**D1.4** This Risk-Based Means of Ventilation System Operation is intended to be used only upon written approval of the authority having jurisdiction which accredits the facility.

**D1.5** This Risk-Based Means of Ventilation System Operation is intended to be used only by those facilities in which the governing body of the Health Care Organization is in compliance with the following CMS & The Joint Commission requirements and Centers for Disease Control and Prevention (CDC) guidelines:

- a. (CDC 2003) –, including:
  1. Environmental infection control measures aimed at decreasing the risk of health-care-associated infections among patients, especially the immunocompromised, and health-care workers.
- b. (CDC 2005) including:
  1. A written TB infection-control plan to ensure prompt detection, airborne precautions, and treatment of persons who have suspected or confirmed TB disease.
  2. Appropriate signage advising respiratory hygiene and cough etiquette.
- c. (CDC 2007) –including:
  1. Implementation and evaluation of a comprehensive Infection Control Program, including policies and procedures for early identification and isolation of potentially infectious patients.
  2. Table 2. Clinical syndromes or conditions warranting empiric transmission-based precautions in addition to Standard Precautions pending confirmation of diagnosis
- d. CMS Emergency preparedness requirements, Appendix Z, 2017
- e. The Joint Commission. Emergency management chapter. CAMH, 2018.

## **D2. DESIGNATED TEAM**

D2.1 The governing body of the Health Care Organization appoints the Designated Team from the group responsible for compliance with physical environment accreditation standards. The membership of the Designated Team includes but is not limited to:

- a. The organizational Risk Management Leader, who is a Certified Professional Healthcare Risk Manager (CPHRM) issued by the American Hospital Association. and shall act as the facilitator of the designated team
- b. a person with senior organizational leadership authority to approve final decisions on operation of the facility and for the concomitant financial and legal risk to the organization-
- c. a member of the facilities management staff familiar with the building ventilation system certified by one or more of the following: HFDP, CHC, CHFM.
- d. a member of the Environmental Services (EVS) staff familiar with the building cleaning processes.
- e. An Epidemiologist and/or Infection Preventionist board certified in infection prevention and control (CIC®) by the Certification Board of Infection Control & Epidemiology, Inc. (CBIC);
- f. An experienced engineering Healthcare Design Professional (ASHRAE HFDP certification) and a licensed Professional Engineer.
- g. A representative of employee health.
- h. An Organizational leader responsible for compliance with accreditation and regulatory requirements
- i. An Emergency preparedness coordinator.
- j. A Representative of the applicable local public health agency that has jurisdiction over that area or region in which the organization is located.

D2.2 The Designated Team is responsible for developing, implementing, monitoring, and documenting all applicable requirements of this approach, and any other activities assigned by senior organizational leadership or their designee.

## **D3. PRESCRIPTIVE REQUIREMENTS WITHIN THE RISK-BASED VENTILATION SYSTEM OPERATION APPROACH**

D3.1 To protect vulnerable patients, this Informative Appendix does not apply to the following spaces:

- a. Operating Rooms
- b. Operating/surgical cystoscopic rooms
- c. Delivery room (Caesarean)
- d. Wound intensive care (burn unit)
- e. Newborn Intensive Care
- f. Critical and intensive care
- g. Intermediate care
- h. Trauma room
- i. Protective environment room
- j. PE anteroom
- k. Combination AII/PE room
- l. Imaging rooms
- m. Sterile Storage area
- n. Clean Supply Storage
- o. Pharmacy, or area where pharmaceutical compounds are mixed
- p. Clean workroom
- q. Special exam rooms

**D3.2** To contain potential infectious disease Hazards (defined as infectious that are transmitted in part or entirely by air) or otherwise harmful airborne contaminants) this Informative Appendix does not apply to the following areas:

- a. Medical/anesthesia gas storage
- b. Emergency Department Public waiting areas
- c. Triage
- d. Decontamination
- e. AIJ room and associated ante-rooms
- f. Bronchoscopy sputum collection, and pentamidine administration
- g. Laboratory work area, general
- h. Laboratory work area, bacteriology
- i. Laboratory work area, biochemistry
- j. Laboratory work area, cytology
- k. Laboratory work area for glasswashing
- l. Laboratory work area, histology
- m. Laboratory work area, microbiology
- n. Laboratory work area, nuclear medicine
- o. Laboratory work area, pathology
- p. Laboratory work area, serology
- q. Laboratory, sterilizing
- r. Laboratory, media transfer
- s. Non-refrigerated body-holding room
- t. Autopsy room
- u. Compounding and Mixing Pharmacy
- v. Soiled or decontamination room
- w. Hazardous material storage
- x. Endoscope cleaning
- y. Bedpan room
- z. Janitors closet
- aa. Bathroom
- bb. Soiled linen sorting and storage
- cc. Linen and trash chute room
- cc. Soiled workroom or soiled holding
- dd. Any location performing chemical sterilization or high level disinfection or used to store chemical sterilants and high level disinfectants.
- ee. Any location storing compressed, cryogenic or liquefied gases.

#### **D4. AIR SYSTEM SPACE PLAN**

**D4.1** The Air System Space Plan includes diagrams that includes the following:

- a. space names.
- b. intended presence of immunocompromised patients.
- c. estimated likelihood of presence of infectious agents that are transmitted in part or entirely by air (specify percentage of time of occupied hours).
- d. estimated likelihood of presence of odoriferous contaminants (specify percentage of time of occupied hours).
- e. identification of spaces which may contain more than a single patient.
- f. identification of spaces which may contain chemical contaminants of concern (e.g. halogenated anesthetic agents, nitrous oxide, glutaraldehyde, ethylene oxide, methyl methacrylate, etc.).

**D4.2** The Air System Space Plan is part of the IPC Hazard Risk Management Plan.

#### **D5. NEW CONSTRUCTION, RENOVATION, AND CHANGE OF USE**

D5.1 For new construction, renovation, and change of use for a healthcare space, the Designated Team reviews the scope of work and determines the risk associated with the spaces within the project.

D5.2 The person or persons who have the overall legal responsibility for the operation of the health care facility or their designee requires the building designer and/or builder to prepare and execute a commissioning plan and verify that the HVAC systems serving the new or renovated space is designed and constructed in accordance with the requirements Sections 3-11 of this Standard.

## **D6. EXISTING BUILDINGS**

D6.1 Existing Buildings. The Designated Team conducts an evaluation and re-assesses the estimate of the likelihood of infectious diseases hazard impact as specified in Section D7.1 at least once per year or more frequently based on observation of new experience as required by regulatory and accreditation requirements for each existing building that has utilized this Risk-Based Means of Compliance. In addition, the Team revises the evaluation and airborne hazard risk management plan:

- a. whenever a building or portion of a building is changed such that one or more ventilation system is affected;
- b. whenever major maintenance to a building ventilation system is performed;
- c. whenever intended presence of immuno-compromised patients or airborne hazards in the space changes;
- d. in response to emergence of an infectious disease among the population served, e.g. identified by local public health agency, or ongoing surveillance of infections conducted by the infection prevention and control program and professionals.

D6.2 Based on the results of this evaluation and estimate, the Designated Team modifies the Infection Prevention and Control (IPC) plan hazard risk management plan as necessary. This process is repeated for all affected areas.

## **D7. Infection Prevention & Control (IPC) HAZARD RISK MANAGEMENT PLAN FOR ALTERNATIVE COMPLIANCE PATHWAY**

D7.1 The Designated Team may elect to use Local Codes where such codes exist and apply to the spaces in the building, as long as those codes comply with the IPC hazard risk management plan.

D7.2 The IPC hazard risk management plan may be contained within one or more documents. These documents may contain information that is not part of the IPC hazard risk management plan. A table of contents will provide the location of all such information not physically within the plan. The IPC hazard risk management plan shall include, without being limited to:

- a. name, title, and contact information for the Designated Team leader and the role and contact information for other Designated Team members.
- b. air system space plan, identifying which spaces are served by which supply air systems, return air (ducted and non-ducted) systems, and exhaust air systems.
- c. identification of the spaces excluded from the plan due to listing in Section D3.
- d. identification of areas with higher probability of infection or other hazard for each space in the building based on the likely presence of airborne contaminants, and the relative vulnerability of patients.
- e. an evaluation of the results of Sections D7.2(d) to estimate the likelihood of infectious aerosols.
- f. the design requirements for the prevention and control of infectious aerosols, comfort, and odor control associated with the health care facility's building's operations, including
  1. minimum quantity of outdoor air in relation to the total space air changes,
  2. minimum total space air changes,
  3. air pressure relationships and directional airflow requirements,

- 4. minimum air system filtration.
- 5. air system humidity and temperature controls (as appropriate).
- g. the building monitoring procedures.
- g. the actions to be taken if the Infection Prevention & Control (IC) department personnel identifies probable or confirmed cases of newly emergent or reemergent infectious disease that involves agents that are transmitted in part or entirely through air which shall:
  - a. follow established IC processes, including compliance with most recent requirements of the Joint Commission, CMS, and CDC or other regional or national authority.
  - b. include implementation of remediation actions as necessary identified in the organization's emergency preparedness and management plan.
  - c. include findings and experience with this alternative design process in annual evaluation of the IPC plan and any incorporate any necessary changes.
- h. the procedures established by the Designated Team to confirm initially and on an ongoing basis (at least annually for the life of the facility) that the IPC hazard risk management plan is implemented as designed (verification) and that, when implemented as designed, the airborne hazard risk management plan effectively controls the hazardous conditions throughout the building spaces (validation).
- i. a triage system, to include proactive identification and appropriate management of potentially infectious patients, that operates continuously and includes specific procedures, training and effectiveness monitoring.

#### **D8 IPC Hazard Risk Management Plan Reporting.**

The Hazard Risk Management Plan is prepared and submitted to one of the following authorities at inception and annually thereafter:

1. CMS
2. The Joint Commission
3. Centers for Disease Control
4. ASHRAE
5. Facilities Guidelines Institute

The Hazard Risk Management Plan as submitted includes all probable or confirmed cases of newly emergent or reemergent infectious disease according to D7.2 g and actions taken therefore.

#### **D9. BUILDING VENTILATION SYSTEM PROCEDURES**

D9.1 The IPC hazard management plan shall include procedures for the building ventilation operation and maintenance for all spaces covered in the plan, including at a minimum as described in Informative Appendix A of this Standard.

***Add the following reference to Informative Appendix B, Informative References and Bibliography. The remainder of this appendix is unchanged.***

CDC 2003. Guidelines for Environmental Infection Control in Health-Care Facilities.

CDC 2005. Guidelines for Preventing the Transmission of Mycobacterium tuberculosis in Health-Care Settings, 2005.

CDC 2007. Guidelines for Isolation Precautions: Preventing Transmission of Infectious Agents in

*Healthcare Settings*. Centers for Disease Control and Prevention. Atlanta, GA

Centers for Medicare & Medicaid Services (CMS). Appendix Z, Emergency Preparedness Final Rule Interpretive Guidelines and Survey Procedures. (S&C 17-29-ALL). Center for Clinical Standards and Quality/Survey & Certification Group. June 2, 2017.

The Joint Commission. Emergency Management Chapter. Comprehensive Accreditation Manual for Hospitals, 2018. Oak Brook, IL: Joint Commission Resources. 2018.

Additional resources – Appendix material beyond 170 standard requirements:

Le AB, et al. A Highly Infectious Disease Care Network in the US Healthcare System. Health Secur. 2017 May/Jun;15(3):282-287.

Riccardo F, et al. Key Dimensions for the Prevention and Control of Communicable Diseases in Institutional Settings: A Scoping Review to Guide the Development of a Tool to Strengthen Preparedness at Migrant Holding Centres in the EU/EEA. Int J Environ Res Public Health. 2018 May 30;15(6).

Meyer D, et al. Lessons from the domestic Ebola response: Improving health care system resilience to high consequence infectious diseases. Am J Infect Control. 2018 May;46(5):533-537

Smit MA et al. Ebola Preparedness Resources for Acute-Care Hospitals in the United States: A Cross-Sectional Study of Costs, Benefits, and Challenges. Infect Control Hosp Epidemiol. 2017 Apr;38(4):405-410.

Fraenkel CJ, et al. Risk factors for hospital norovirus outbreaks: impact of vomiting, genotype, and multi-occupancy rooms. J Hosp Infect. 2018 Apr;98(4):398-403

Skyum F, et al. Infectious gastroenteritis and the need for strict contact precaution procedures in adults presenting to the emergency department: a Danish register-based study. J Hosp Infect. 2018 Apr;98(4):391-397

Darley ESR, et al. Impact of moving to a new hospital build, with a high proportion of single rooms, on healthcare-associated infections and outbreaks. J Hosp Infect. 2018 Feb;98(2):191-193.

Rea D. Decreasing contagion in high-traffic areas. ES department's routine cleaning and disinfection key to infection prevention. Health Facil Manage. 2017 May;30(5):45-7

Coleman BL et al. Active Surveillance for Influenza Reduces but Does Not Eliminate Hospital Exposure to Patients With Influenza. Infect Control Hosp Epidemiol. 2017 Apr;38(4):387-392

Blanco N. What Transmission Precautions Best Control Influenza Spread in a Hospital? Am J Epidemiol. 2016 Jun 1;183(11):1045-54