Environment of Care & Infection Prevention & Control: A Partnership

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Objectives

Infection Prevention (IP) participants should be able to:

• Identify the risks and the correlation between the environment of care (EC) and infection control (IC)
• Integrate the EC and IC Performance Monitoring and Staff Development standards into your organization’s practices
• Analyze the EC and IC trends to improve your organization’s performance
Background

• Although the environment serves as a reservoir for a variety of microorganisms, it is rarely implicated in disease transmission except in the immunocompromised population.

• Inadvertent exposures to environmental opportunistic pathogens (e.g., Aspergillus spp. and Legionella spp.) or airborne pathogens (e.g., Mycobacterium tuberculosis and varicella-zoster virus) may result in infections with significant morbidity and/or mortality.

• Lack of adherence to established standards and guidance (e.g., water quality in dialysis, proper ventilation for specialized care areas such as operating rooms, and proper use of disinfectants) can result in adverse patient outcomes in health-care facilities.
Construction-Related Nosocomial Infections

- Construction-related Nosocomial Infections

By Dr. Michael Berg, EMLab P&K Senior Molecular Biologist

- The risk of nosocomial (also known as hospital-acquired) infections increases significantly when hospitals are undergoing constructions and renovations. Dust particles contaminated with bacteria and fungi are dispersed and pose a health risk for patients, staff and visitors. In order to minimize the risk and prevent hospital-acquired infections, construction projects within and adjacent to hospitals should integrate infection prevention and control into their project management plans.

Reported construction-related nosocomial infections are primarily caused by fungi, and to a lesser extent, by bacteria. The most common etiological agent is *Aspergillus*, in particular, *A. fumigatus*, *A. flavus*, *A. niger* and *A. terreus*. *Aspergillus fumigatus* is considered the most pathogenic species and responsible for more than 90% of all *Aspergillus* infections. It is the most rapidly growing species, extremely tolerant to temperatures, and binds laminin and fibrinogen (glycoproteins) more efficiently than other species, possibly promoting better airway adhesion before invasion. *Aspergillus fumigatus* spores have a hydrophobic protein-coat layer, which may help the organism to evade the host's defense system. In addition, the very small spore size enables deep penetration into the lung.

<table>
<thead>
<tr>
<th>Characteristics of the most common major pathogenic Aspergillus species:</th>
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</thead>
<tbody>
<tr>
<td><strong>Aspergillus fumigatus</strong></td>
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<tr>
<td><strong>Aspergillus flavus</strong></td>
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<tr>
<td><strong>Aspergillus terreus</strong></td>
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<td><strong>Aspergillus niger</strong></td>
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<tr>
<td><strong>Aspergillus nidulans</strong></td>
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<tr>
<td><strong>Aspergillus ustus</strong></td>
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</table>
Organizations

- Association For Health Care Facility Managers, Engineers, And Other Professionals (ASHE)
- Association for Professionals in Infection Control and Epidemiology (APIC)
- American Institute of Architects (AIA)
- Association of periOperative Registered Nurses (AORN)
- American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)
- Centers for Medicare & Medicaid Services (CMS)
- Centers for Disease Control and Prevention (CDC)
- Det Norske Veritas (DNV) - International Standards Organization
- Facility Guidelines Institute (FGI)
- Infection prevention and control (IPC)
- Office of Statewide Health Planning and Development (OSHPD) - California
- The Joint Commission (TJC)
Management Plans

Standard EC.01.01.01
The hospital has a written plan for managing the following:

• Safety
• Security
• Hazardous Materials & Waste
• Medical Equipment
• Utilities
• Construction
Faulty environment of care issues can lead to infection prevention and control issues.

EC involves:

- Construction and renovation;
- Equipment and environmental service's needs;
- Utility maintenance and use;
- Emergency management;
- and much more…


Maintenance and Engineering

• Healthcare settings vary in a number of ways, including type and physical structure of the facility, patient services, community surroundings, and geographical location.

• Major areas of responsibility of the maintenance and engineering staff relate to buildings, utilities, associated equipment, and property or grounds.

• Within these components are multiple activities ranging from preventive maintenance through major projects.

• A strong working relationship between the IPs and maintenance and engineering staff is essential to maintain a safe environment and minimize potential risks.
Infection-control strategies & engineering controls

- Effective in preventing opportunistic, environmentally-related infections in immunocompromised populations when consistently implemented.

- Adherence to proper use of disinfectants, proper maintenance of medical equipment that uses water (e.g., automated endoscope reprocessors and hydrotherapy equipment), water-quality standards for hemodialysis, and proper ventilation standards for specialized care environments (i.e., airborne infection isolation [AII], protective environment [PE], and operating rooms [ORs]), and prompt management of water intrusion into facility structural elements will minimize health-care associated infection risks and reduce the frequency of pseudo-outbreaks.

- Routine environmental sampling is not advised except in the few situations where sampling is directed by epidemiologic principles and results can be applied directly to infection control decisions, and for water quality determinations in hemodialysis.
Nursing Theory

- A theory is a plausible or scientifically acceptable general principle or body of principles offered to explain phenomena.

- Nursing theories fall into three categories:
  - Conceptual models - broad and abstract
  - Grand theories
  - Middle-range theories - tend to be more grounded and applicable to practice
Florence Nightingale, the first nursing theorist

- Environmental factors concept:
  - Environment impacts health and illness
  - Fresh air, light and cleanliness, adequate nutrition and quietness fosters healing and wellness
  - Environment can aid in the body’s reparative processes
Infection Prevention and Control Standards Are Supported By Other Chapter’s Standards

- Leadership
- Management of the Environment of Care
- Management of Human Resources
- Improving Organization Performance
- Emergency Preparedness
  - Medication Management
  - Data Management
  - Behavior Health
<table>
<thead>
<tr>
<th>Function</th>
<th>Activities</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facilities design, planning, and space allocation</td>
<td>Using design to improve performance</td>
<td>Patient-, associate-, and environment-friendly designs</td>
</tr>
<tr>
<td></td>
<td>Planning, building, acquiring, and divesting facilities</td>
<td>Facilities management plan</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Construction and renovation management</td>
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<tr>
<td></td>
<td></td>
<td>Facilities leasing and purchase</td>
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<tr>
<td></td>
<td></td>
<td>Space allocation</td>
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<td></td>
<td>Promoting environmental sustainability</td>
<td>LEED certification</td>
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<tr>
<td></td>
<td></td>
<td>Recycling</td>
</tr>
<tr>
<td>Facilities maintenance and guest services</td>
<td>Housekeeping</td>
<td>Cleanliness</td>
</tr>
<tr>
<td></td>
<td>Groundskeeping</td>
<td>Landscaping and decorating</td>
</tr>
<tr>
<td></td>
<td>Transportation</td>
<td>Snow removal</td>
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<td>Parking</td>
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<tr>
<td></td>
<td></td>
<td>Food service</td>
</tr>
<tr>
<td></td>
<td>Support for associates, patients, and visitors</td>
<td>Signage and wayfinding</td>
</tr>
<tr>
<td></td>
<td>Preventive maintenance</td>
<td>Preventive maintenance schedules</td>
</tr>
<tr>
<td>Environment-of-care safety and regulatory compliance</td>
<td>Safety</td>
<td>Accident and harm prevention and risk management; elimination of hazards</td>
</tr>
<tr>
<td></td>
<td>Security</td>
<td>24/7 facility security and risk mitigation</td>
</tr>
<tr>
<td></td>
<td>Hazardous materials and waste</td>
<td>Chemical and radiation hazard management</td>
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<tr>
<td></td>
<td>Fire safety</td>
<td>Fire prevention and management</td>
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<td></td>
<td>Medical equipment</td>
<td>Maintaining and repairing medical equipment</td>
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<td></td>
<td>Utilities</td>
<td>Compliance with Safe Medical Device Act</td>
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<td></td>
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<td>Utility backup and failure prevention</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Function</th>
<th>Activities</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials management</td>
<td>Purchasing, receiving, storing, and distributing supplies</td>
<td>Clinical supplies, Foodstuffs, Drugs, Office supplies, Medical gases, Value analysis and selection of supplies</td>
</tr>
<tr>
<td>Emergency management and disaster preparedness</td>
<td>Emergency preparedness</td>
<td>Preparing for large-volume disasters—internal and external, Weather-related disasters, Response to internal fire or safety problem</td>
</tr>
<tr>
<td>Performance improvement</td>
<td>Customer-focused identification of OFIs</td>
<td>Ensuring that internal and external customer needs are met, Developing a long-range vision</td>
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<td></td>
<td>Contracting with service vendors</td>
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<td>Coordinating multiyear plans</td>
<td>Maintaining competitive services</td>
</tr>
</tbody>
</table>
EXHIBIT 12.2
Facilities Planning Process
<table>
<thead>
<tr>
<th>Program</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency preparedness</td>
<td>Disaster plan, Disaster training and routine drills, Disaster utilities and communications management, Leadership involvement, Collaboration with community response partners, Annual review and approval by senior leadership, Evaluation of all disaster occurrences and drills to identify OFIs</td>
</tr>
<tr>
<td>Life safety and fire protection</td>
<td>Evacuation plans and routes, Routine inspection and testing of fire suppression equipment, Preparation for radioactive or chemical contamination, Life-safety training and drills</td>
</tr>
</tbody>
</table>

OFI: opportunity for improvement
Accountability

Leaders are accountable for accountability.
CMS Conditions of Participation

• CMS issued a proposed rule in the October 24 Federal Register that revises the requirements
  – commonly referred to as **Conditions of Participation** (CoPs) - that hospitals and critical access hospitals must meet to participate in the Medicare and Medicaid Programs.
• CoPs are designed to protect patient health and safety and ensure quality of care
# CMS infection control surveyors’ worksheet

## Module 1: Infection Control/Prevention Program

### Section 1. A. Infection control/prevention program and resources

<table>
<thead>
<tr>
<th>Elements to be assessed</th>
<th>Manner of Assessment Code (check all that apply) &amp; Surveyor Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. A.1 The hospital has designated one or more individual(s) as its Infection Control Officer(s).</td>
<td>○ Yes ○ No ○ N/A ○ 1 ○ 2 ○ 3 ○ 4 ○ 5</td>
</tr>
</tbody>
</table>

If no, cite at 42 CFR 482.42(a) (Tag A-0748)

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<tr>
<td>1. A.2 The hospital has evidence that demonstrates the Infection Control Officer(s) is qualified and maintain(s) qualifications through education, training, experience or certification related to infection control consistent with hospital policy.</td>
<td>○ Yes ○ No ○ N/A ○ 1 ○ 2 ○ 3 ○ 4 ○ 5</td>
</tr>
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<tr>
<td>1. A.3 The Infection Control Officer(s) can provide evidence that the hospital has developed general infection control policies and procedures that are based on nationally recognized guidelines and applicable state and federal law.</td>
<td>○ Yes ○ No ○ N/A ○ 1 ○ 2 ○ 3 ○ 4 ○ 5</td>
</tr>
</tbody>
</table>

If no, cite at 42 CFR 482.42(a) (Tag A-749)

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<tbody>
<tr>
<td>1. A.4 The hospital has infection control policies and procedures relevant to construction, renovation, maintenance, demolition, and repair. An infection control risk assessment (ICRA) to define the scope of the project and need for barrier measures is performed before a project gets underway.</td>
<td>○ Yes ○ No ○ N/A ○ 1 ○ 2 ○ 3 ○ 4 ○ 5</td>
</tr>
</tbody>
</table>

https://apic.org/Resource_/TinyMceFileManager/Advocacy-PDFs/Comments_on_CMS_IC_Surveyor_Worksheet.pdf
TJC-IC Standards

I. Planning
   a. Responsibility (IC.01.01.01)
   b. Resources (IC.01.02.01)
   c. Risks (IC.01.03.01)
   d. Goals (IC.01.04.01)

II. Implementation
   a. Activities (IC.02.01.01)
   b. Medical Equipment Devices and Supplies (IC.02.02.01)
   c. Transmission of Infections (IC.02.03.01)
   d. Influenza Vaccinations (IC.02.04.01)

III. Evaluation (IC.03.01.01)
The Joint Commission Standards

Environment of Care
- Standard EC.01.01.01 – The hospital has a written plan for managing its utility system
- Standard EC.02.01.01 – The organization manages safety and security risks
- Standard EC.02.05.01 – The organization manages risks associated with its utility systems
- Standard EC.02.05.05 – The organization inspects, tests, and maintains utility systems

Infection Control
- Standard IC.01.03.01 – The organization identifies risks for acquiring and transmitting infections
- Standard IC.01.05.01 – The organization has an infection prevention and control plan
- Standard IC.02.01.01 – The organization implements its infection prevention and control plan
- Standard IC.03.01.01 – The organization evaluates the effectiveness of its infection prevention and control plan

Healthcare facilities may be cited under any of these standards if a water management program is absent or inadequate
1. When planning for new, altered, or renovated space, the hospital uses one of the following design criteria:
   • State Rules & Regulations
   • Guidelines for Design and Construction of Health Care Facilities 2010 edition administered by FGI and published by ASHE
2. When the above rules, regulations, and guidelines do not meet specific design need use other reputable standards and guidelines that provide equivalent design criteria. (EP.02.05.01, EP 1)
   • When planning demolition, construction, or renovation, the hospital conducts a preconstruction risk assessment for air quality requirements, infection control, utility requirements, noise vibration, and other hazards that affect care, treatment, and services.
   NOTE: See LS.01.02.01 for information on fire safety procedures to implement during construction or renovation
3. The hospital takes action based on its assessment to minimize risks during demolition, construction or renovation.
Monitoring the EC

Standard EC.04.01.01

• The hospital establishes a process for continually monitoring internally reporting and investigating the following:
  – Injuries to patients or others within the hospital’s facilities
  – Occupational illnesses and staff injuries
  – Incidents of damage to property or the property of others
  – Security incidents involving patients, staff or others within its facilities
  – Hazardous materials and waste spills and exposures
  – Fire safety management problems, deficiencies and failures
  – Utility systems management problems, failures or use errors
  – Every 12 months the hospital evaluates each environment of care management plan, including a review of the plan’s objectives, scope, performance and effectiveness
Improving the Environment of Care

**Standard EC.04.01.03**

- Annually, representatives from clinical, administrative and support services recommend one or more priorities for improving the environment of care

**Standard EC.04.01.05**

- The hospital takes action on the identified opportunities to resolve environmental safety issues
- The hospital evaluates changes to determine if they resolved environmental safety issues
WHERE IT COULD BE SCORED

Standard EC.01.01.01
- The hospital has a written plan for managing its utility system

Standard EC.02.01.01
- The organization manages safety and security risks

Standard EC.02.05.01
- The organization manages risks associated with its utility systems

Standard EC.02.05.05
- The organization inspects, tests, and maintains utility systems

Standard IC.01.03.01
- The organization identifies risks for acquiring and transmitting infections

Standard IC.01.05.01
- The organization has an infection prevention and control plan

Standard IC.02.01.01
- The organization implements its infection prevention and control plan

Standard IC.03.01.01
- The organization evaluates the effectiveness of its IC plan
Top 10 most-cited Joint Commission standards 2018

EC.02.06.01 (maintenance of a safe environment), 56%
EC.02.05.01 (management of utility system risks), 53%
IC.02.02.01 (reduction of infection risk from equipment, devices, and supplies), 52%
LS.02.01.20 (maintenance of egress integrity), 50%
RC.01.01.01 (maintenance of accurate, complete medical records for all patients), 49%
EC.02.03.05 (maintenance of fire safety equipment and building features), 48%
LS.02.01.10 (minimization of fire, smoke, and heat damage via building and fire protection features), 46%
LS.02.01.30 (building features provided and maintained to protect from fire and smoke hazards), 43%
LS.02.01.35 (fire extinguishment features provided and maintained), 43%
EC.02.02.01 (management of hazardous materials and waste risks), 36%
Top 10 Cited Infection Control Standards
All Surveyed Healthcare Facilities: 2018

IC.02.01.01 EP1  Implement IPC activities
IC.02.02.01 EP2  High-Level Disinfection / Sterilization
IC.02.01.01 EP2  Standard Precautions
IC.02.02.01 EP4  Storage
IC.02.02.01 EP1  Cleaning / Low-Level Disinfection
IC.02.04.01 EP5  90% Influenza Vaccination
IC.01.03.01 EP1  Identify Risks
IC.01.04.01 EP1  Written Goals
IC.02.04.01 EP7  Evaluate Reasons for Influenza Vaccine Declination
IC.02.04.01 EP6  Written Description for Influenza Rates
Approach to IC Related Standards

- Regulation
- Conditions of Participation (if deemed)
- Manufacturer’s instructions
- Evidence-based standards or guidelines
- Consensus documents or position statements
- Incorporate into facility-based risk assessment and policy
Facility-Based Risk Assessment

There are some things that cannot be “risk-assessed.” Do NOT write a policy that conflicts with:

- Regulations
- CoPs – look at interpretive guidelines or seek clarification from CMS ([HospitalISC@cms.hhs.gov](mailto:HospitalISC@cms.hhs.gov))
- Manufacturer’s instructions for use – must resolve conflicts
Policy and Procedure

- Policy and procedures should be based on above hierarchy
- Evidence based
- Reviewed per hospital policy or when changes occur
- Care should be taken to address the unique aspects of the organization
  - Setting
  - Equipment
  - Physical space
Evidence Base Practice (EBP) Guidelines

- AORN
- FGI
- ASHRAE
- OSHPD
EBP / Guidelines

- Facilities must use EBP and standards when developing IP activities (IC.01.05.01)
- Facilities should be able to articulate the source of their IP practices if they are based on EBP
- What guidelines you choose will guide your practice and policy
- Chosen EBP cannot be less strict than regulation, CoPs, or IFUs

<table>
<thead>
<tr>
<th>EBP</th>
<th>Research</th>
<th>QI</th>
</tr>
</thead>
<tbody>
<tr>
<td>The translation of evidence and applying it to clinical decision making</td>
<td>Generation of new knowledge or validation of existing knowledge based on a theory</td>
<td>A systematic, data-guided approach to improve structures, processes or outcomes</td>
</tr>
</tbody>
</table>
Program Specific
State Operations Manual

State Operations Manual
Appendix A - Survey Protocol
Regulations and Interpretive Guidelines for Hospitals

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Task 2: Survey Activities
Task 3: Survey Conferences
Task 4: Provider/Program/Unit and Area of Focus
Task 5: On-Site Conference
Task 6: Post-Survey Activities

Psychiatric Hospital Survey Module
Psychiatric Unit Survey Module
Rehabilitation Hospital Survey Module
Inpatient Rehabilitation Unit Survey Module
Hospitals Status and Survey Module
Regulations and Interpretive Guidelines

§482.42 Condition of Participation: Infection Control

Infection Control is integrated throughout – do not limit search to one section
Waste Management

- Varying levels of involvement with healthcare waste management; often focused on regulated medical waste.
- An effective waste management program is complex due to;
  - Numerous regulations and guidelines, evolving technologies, expanding healthcare delivery settings, emerging infectious diseases, and the potential for bioterrorism.
  - Responsibility for the management of healthcare waste is typically outside the area of responsibility for most IPs, they may still be included in a wide range of areas related to management of healthcare wastes beyond the traditional role.
Heating, Ventilation, & Air Conditioning

- IPs have a specific role & focus on heating, ventilation, and air conditioning systems in healthcare facilities.
- Maintaining both comfort and safety of indoor air quality in healthcare facilities is essential for all occupants.
- Poor design and installation, system performance problems, and inadequate maintenance of heating, ventilation, and air conditioning systems have all been associated with transmission of airborne infectious agents and/or building-associated illness.
- Environmental containment/mitigation of airborne infectious agents (e.g., Mycobacterium tuberculosis, Aspergillus spp., varicella zoster and measles viruses, plus newly emergent pathogens such as severe acute respiratory syndrome-associated coronavirus) and preparedness for deliberate use of pathogens as bioweapons are vital areas the IP can provide expertise for their affiliated facility.
Water can cause infection and disease when building water systems are not properly engineered and managed.
Healthcare Acquired Infections (HAI)

- Nosocomial infections
- 1 in 25 U.S. patients develop a HAI during a hospital stay
- Transmission pathways
  - Direct contact (hydrotherapy)
  - Ingestion (contaminated ice)
  - Indirect (improper instrument reprocessing)
  - Inhalation (cooling towers)
  - Aspiration (ventilators)
Legionella

> #1 cause of waterborne disease outbreaks
  > 7,458 reported cases of Legionnaires’ disease in 2017
> Bacteria found naturally in soil, surface water, and groundwater
> 60+ species with *Legionella pneumophila* causing most of the reported cases of disease
> Legionellosis
  > Legionnaires’ disease – fatal
  > Pontiac fever – not fatal
> *Legionella* may travel from the source water through a treatment system and into a building water system

Prevention of Outbreaks is Possible with Effective Water Management

9 in 10
CDC investigations show almost all outbreaks were caused by problems preventable with more effective water management.

People definitely got Legionnaires’ disease from a health care facility in 76% of locations reporting exposures.

Legionnaires’ disease kills 25% of those who get it from a health care facility.

Most problems leading to US health care-associated outbreaks could be prevented with effective water management.

15% of outbreaks associated with hospitals
19% of outbreaks associated with nursing homes

Centers for Disease Control and Prevention

**Legionella Environmental Assessment Form**

**HOW TO USE THIS FORM**

This form enables public health officials to gain a thorough understanding of a facility's water systems and assist facility management with minimizing the risk of legionellosis. It can be used along with epidemiologic information to determine whether to conduct *Legionella* environmental sampling and to develop a sampling plan. The assessment should be performed on-site by an epidemiologist and an environmental health specialist with knowledge of the ecology of *Legionella*. Keep in mind that conditions promoting *Legionella* amplification include water stagnation, warm temperatures (77–108°F or 25–42°C), availability of organic matter, and lack of residual disinfectant such as chlorine. For training and information, please visit CDC's legionellosis resources webpage at: [https://www.cdc.gov/legionella/outbreak-toolkit/](https://www.cdc.gov/legionella/outbreak-toolkit/).

Complete the form in as much detail as possible. Do not leave sections blank; if a question does not apply, write “N/A”. If a question applies but cannot be answered, explain why. Where applicable, specify the units of measurement being used (e.g., ppm). Completion of the form may take several hours.

Key Elements of Water Management

Facility risk assessment

- CDC Toolkit provides step by step direction – assess anything related to water

Water management program

- Establish a water management team
- Describe the building’s current water system
- Identify where Legionella and other pathogens can grow
- Determine control measures and how to monitor (does NOT require cultures)
- Establish interventions when clinical limits are not met
- Make sure the program is functioning as designed and effective
- Document and communicate

Testing protocols and acceptable ranges for control measures

- Take corrective action when results of testing and/or control limits are not maintained
Water Systems Issues and Prevention of Waterborne Infectious Diseases in Healthcare Facilities

- Waterborne pathogen risks can be significant in healthcare settings, from unexpected incidents of intrusion of water into occupied areas to mitigation of microbial contamination.
- As a result, water-related problems are among the most challenging infection prevention issues involving the environment of care.
- Prominent among these is prevention and control of Legionella contamination of water distribution systems, which is discussed here.
  - Legionella risks vary by geographic region, and
  - Legionella is just one of many other microorganisms, including fungi, that can be present in the water distribution system.
CDC Toolkit and ASHRAE 188

Legionellosis: Risk Management for Building Water Systems

Developing a Water Management Program to Reduce Legionella Growth & Spread in Buildings
A PRACTICAL GUIDE TO IMPLEMENTING INDUSTRY STANDARDS
Survey and Certification S&C 17-30
Legionella

- Applies to:
  - Hospitals
  - Critical access hospitals
  - Long-term care

- Implement plan that reduces:
  - Legionella
  - Other opportunistic water pathogens
What CMS is Citing Facilities For

- Failure to implement remediation process to temporarily kill *Legionella pneumophila* in facility water system
- Failure to clean corridors, dust noted
- Lack of documentation for cleaning sterilizers
- Failure to ensure infection control measures, including hand hygiene and maintaining a sanitary environment
Construction and Renovation

Active participation by the IP in the development of the Infection Control Risk Assessment (ICRAs) and mitigation processes are important entry points.

- Review the role of IP in the healthcare facility environment during construction and renovation.
- Identify the steps of the infection control risk assessment and mitigation processes,
- Identify and recommend processes of newly constructed or renovated spaces such as;
  - Design and oversight to provide input addressing infection risks to patients, healthcare personnel, and visitors.
  - Address issues that consider the project design phase, construction phase
  - The background of administrative organization and regulatory aspects; CMS, CDPH, CDC, FDA, OSHA, OSHPD, FGI
Construction and Renovation

Prior to beginning construction or renovation, CMS and accrediting organizations require facilities to have an ongoing *Legionella* water management plan and to perform a risk assessment that includes any concerns about infection control.

The Joint Commission’s Environment of Care standard EC.02.06.05 requires hospitals to manage the environment to reduce risks during renovation and construction.

Element of Performance (EP) 2 requires conducting a “preconstruction risk assessment” during planning, which must include an infection control plan.

EP 3 requires having a plan to minimize those risks.
Pre-Construction Infection Control Risk Assessment (PICRA/ICRA)

• These are strict guidelines to keep our patients safe.
• Plan ahead – know the guidelines before the project begins.
• The ICRA is a process to determine:
  – the risk of patient exposure to dust and debris contamination;
  – and the classification of the work involved;
  – Impact on areas above, below and adjacent to the work site.
• Completion of the ICRA is the responsibility of the Facility Services Department in collaboration with the Infection Preventionist.
• Results of the ICRA determine the safest methods to be used in completing the work.
Infection Control Risk Assessment (ICRA)

Your project may not begin until the ICRA has been completed, and signed by both our Facilities Department and Infection Preventionist.

<table>
<thead>
<tr>
<th>Location of construction</th>
</tr>
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<tbody>
<tr>
<td>Permit No:</td>
</tr>
<tr>
<td>Project Coordinator:</td>
</tr>
<tr>
<td>Contractor Performing Work:</td>
</tr>
<tr>
<td>Supervisor:</td>
</tr>
<tr>
<td>Telephone:</td>
</tr>
<tr>
<td>YES NO CONSTRUCTION ACTIVITY</td>
</tr>
<tr>
<td>TYPE A: Inspection, non-invasive activity</td>
</tr>
<tr>
<td>TYPE B: Small scale, short duration, moderate to high levels</td>
</tr>
<tr>
<td>TYPE C: Activity generates moderate to high levels of dust, requires greater than one work shift for completion</td>
</tr>
<tr>
<td>TYPE D: Major duration and construction activities, requiring consecutive work shifts</td>
</tr>
</tbody>
</table>

CLASS I

1. Execute work by methods to minimize raising dust from construction operations.
2. Immediately replace any ceiling tile displaced for visual inspection.
3. Refer to Procedures on Minor Disruption for Remodeling and Procedures for Construction Facilities and Temporary Controls

CLASS II

1. Provides active means to prevent air-borne dust from dispersing into atmosphere
2. Water mist work surfaces to control dust while cutting.
3. Seal unused doors with tape.
4. Block off and seal air vents.
5. Wipe surfaces with disinfectant.

CLASS III

1. Obtain infection control permit before construction begins.
2. Isolate HVAC system in area where work is being done to prevent contamination of the duct system.
3. Complete all critical barriers or implement control cube method before construction begins.
4. Maintain negative air pressure within work site utilizing HEPA equipped air filtration units.
5. Wet mop and/or vacuum with HEPA filtered vacuum before leaving work area.
6. Place dust mat at entrance/exit of work area.
7. Contain construction waste before transport in tightly covered containers.
8. Cover transport receptacles or carts. Tape covering.
9. Remove barrier materials carefully to minimize spreading of dirt and debris associated with construction.
10. Do not remove barriers from work area until complete project is thoroughly cleaned by Env. Services Dept.

CLASS IV

1. Obtain infection control permit before construction begins.
2. Isolate HVAC system in area where work is being done to prevent contamination of duct system.
3. Complete all critical barriers or implement control cube method before construction begins.
4. Maintain negative air pressure within work site utilizing HEPA equipped air filtration units.
5. Seal holes, pipes, conduits, and punctures appropriately.
6. Construct anteroom and require all personnel to pass through this room so they can be vacuumed using a HEPA vacuum cleaner before leaving the work site or they can wear cloth or paper coversalls that are removed each time they leave the work site.
7. All personnel entering work site are required to wear shoe covers & change each time worker exits area.
8. Provide adhesive walk-off mats at entrance to work area.
9. Do not remove barriers from work area until completed project is thoroughly cleaned by the Environmental Service Dept.
10. Vacuum work area with HEPA filtered vacuums.
11. Wet mop with disinfectant.
12. Contain construction waste before transport in tightly covered containers.
13. Cover transport receptacles or carts. Tape covering if a lid is not a part of the trash receptacle.

Additional Requirements:

<table>
<thead>
<tr>
<th>Date</th>
<th>Initials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>Initials</td>
</tr>
<tr>
<td>Permit Request By and Date:</td>
<td>Permit Authorized By and Date:</td>
</tr>
</tbody>
</table>
Establishing path of travel
The overall approach?

Consider how you want to assess risks and develop infection prevention strategies

- Design considerations,
- Routine preventive maintenance for operations and equipment, and
- Remediation measures during floods or utility outages.
- Water disinfection/treatment options
- The use and strengths and challenges of various modalities
Construction Safety (it’s everywhere)
Construction activity should never pose a risk to visitors, patients and staff

All employees can review the infection control permit & interim life safety measures at each job

Construction barriers from floor to ceiling and clean

Dirty workers and clothes should remain behind the barrier in construction
Maintain Negative Pressure
Maintain Negative Pressure

Digital Manometer
Maintain Negative Pressure
MAINTAIN NEGATIVE PRESSURE

Critical Ventilation in Healthcare Facilities

Pressurization

✧ ANSI / ASHRAE / ASHE / CDC: 
  *Ventilation of Healthcare Facilities*, requires the minimum pressure differential must be at least 0.01” wc.

✧ National Institute of Health & AABC: 
  The control pressure between pressurized rooms and adjacent spaces must be 0.05” wc and alarm at 0.03” wc.

✧ CMC: 
  Alarm when “a minimum pressure differential differential of 0.001”…..is not being maintained”
Maintain Negative Pressure

Negative Pressure Plans

Bio-hazard & isolation applications
PreConstruction Infection Control Risk Assessment &
(PICRA)Infection Control Risk Assessment (ICRA)

MANDATORY REQUIREMENT OF:

- Guidelines for Design and Construction of Hospital and Healthcare Facilities (American Institute of Architects)
- Joint Commission on Accreditation of Healthcare Facilities
- OSHA regulations
- EPA regulations (regulated medical waste)
Improving the Environment of Care

1. Provide and active means to prevent airborne contaminants from dispersing into the atmosphere
2. Seal unused doors with duct tape
3. Block off and seal air vents
4. Place dust/sticky mats at the entrance and exit of work sites.
Improving the Environment of Care

- Reinforce
- Inspect sites at different times
- Logs
  - Key points documented
- Emails
  - Send to the right people
- Ability to shut down the job

Keck Medical Center of USC DAILY WORKSITE CHECKLIST

28. Workers comply with use of PPE (hard hats, eye protection, etc.) as needed.
29. HEPA filtration units, HEPA vacuum equipment, and/or continuous use of exhaust fans demonstrate they are functioning appropriately.
30. Exhaust ducts sealed/capped as agreed by ICRA.
31. Construction area doors are closed and gaskets and hardware are intact.
32. Construction sites' cabling is covered and consistent with agreements designed to minimize airborne particulate matter from debris.
33. All windows and doors remain closed to prevent circulation of dust/debris.
34. Walk-in mats and adhesive strips are clean and changed sufficiently, or construction exists is cleaned sufficiently to maintain clean entry/exit.
35. No signs of water leakage or pests.
36. Ceiling tiles replaced when space not being accessed.
Construction/Renovation

- Need to control dust .......... why?
  - Outbreaks of *Aspergillosis* linked to construction activity in hospital, including demolition, and excavation
  - Even virgin wall board and other new construction material can contain *Aspergillus* spores
Construction Safety (it’s everywhere)
Construction activity should never pose a risk to visitors, patients and staff

All Employees Can Review The Infection Control Permit & Interim Life Safety Measures At Each Job

Construction Barriers From Floor To Ceiling and Clean

Corner Accent So You or Patients Won’t Hit It

All Contractors Need To Wear Their ID Badge

Dirty workers and clothes should remain behind the barrier in construction
TB Clearance required by OSHA

- You must have a negative PPD skin test within the last year
- A completed TB questionnaire from our facility will be required

---

**TUBERCULOSIS SCREENING QUESTIONNAIRE**

OSHA requires healthcare facilities to assure that personnel not paid by, but working in the facility are screened for TB and offered therapy. Any Yes answer requires review by Infection Control Department before employee is cleared to work at USCUIH or USC Norris.

Have you had any of the following symptoms for the past 3 weeks or longer?

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cough</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is there any drainage?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If yes, what color is it?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unexplained weight loss</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fever</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fatigue or tiredness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Night sweats</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shortness of breath</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Worker signature: ___________________________ Date: ____________
GC Supervisor: _____________________________ Date: ____________
Referred to: ______________________________ Date: ____________

General Contractor is responsible to keep a copy on file for each worker.
Ventilation and Environmental Control

• If mandated by the ICRA, negative air pressure must be maintained in the construction area.
• Use of a Hepa Filter System, when possible, will help maintain negative air pressure.
• Supply ducts should be blocked off and return air ducts should be covered with pleated air filters.
• Exhaust fans may be used in conjunction with a Hepa Filter System and must run continuously.
STOP

Barriers may *not* be removed without being previously inspected and approved for removal by the Infection Prevention Department or its designee if work is completed after hours.

Did you receive the

“Green Light” from the

IP Dept?
Leaving Work Site

What comes in, STAYS IN!! The dust on your clothing makes a difference. This dust can very easily be transferred from your clothes to a patient care environment.

When leaving the worksite on breaks or for meals, be sure to remove dust from clothes and shoes AT THE WORK SITE. Use the buddy system to make sure all dust is removed completely.
Removing Trash and Debris

• All debris removed from construction site must be covered.
• Roll wheels over sticky mat to remove dust
• Follow path with least patient/visitor involvement
Dust and Debris Containment

- Bacteria and other harmful germs travel in dust and can harm patients and workers.
- If a job, (regardless of scope), includes disturbing existing dust, or creating new dust, containment must be used.
- Doors should be closed and sealed with duct tape to prevent the dust and debris from escaping.
- If the work area cannot be contained by walls and doors, use a plastic, fire rated barrier and seal all seams with duct tape.
- If working in high risk area (3 or 4) Hepa filter will be needed in the containment area
Who may be affected by *Aspergillus* spores?

Need to protect vulnerable populations at risk in the inpatient setting & outpatient setting, too

- **Premature babies**
- **Transplant patients**
- **Cancer treatment patients**
- **People with poor immunity**
- **Those with lung problems**

Do You Treat All These Types Of Patients
How to Reduce the Risk

- Proactive identification
  - Hazards
  - Personnel
  - Locations
- Employee health policies
- Routine prevention that focuses on potential routes of transmission
- Knowledgeable, trained, competent staff
- Facility design
- Available supplies and equipment
- Effective communication methods
Key Elements

Six critical areas of emergency response
- Communication
- Resources and assets
- Safety and security
- Staff responsibilities
- Utilities
- Patient clinical and support activities
Legionnaires’ Disease Outbreaks Are Preventable

COOLING TOWER Clean & Disinfect

- Cooling Tower Clean & Disinfect
  - Follow OSHA Best Practice
  - Wear proper PPE

- Use A Contractor Who Is Proficient In Water Management

Cleaning & Disinfection of cooling towers is crucial to the safety of patients, staff and visitors

Source: CDC Vital Signs June 2016
### FLOOD CHECKLIST

**Post outside flood containment area.** Verify Housekeeping has posted the flood checklist.

<table>
<thead>
<tr>
<th>Task</th>
<th>Date Completed</th>
<th>Name/Dept</th>
</tr>
</thead>
<tbody>
<tr>
<td>Call the Security Department at 362-0911 immediately to report the flood.</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Call the Security Department at [telephone number] immediately to report the flood.</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Remove patient(s) from the area</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Identify area manager/point of contact. The Nursing Supervisor will contact areas not open at the time of the flood (i.e. areas not open on weekends or after normal business hours).</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Close flooded area to procedures and patient care during cleanup and disinfection. OR team will decide whether patient will be moved.</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>If floodwater penetrates ceiling tiles, plaster or drywall, place HEPA filter inside contaminated area. HEPA filter remains on until 1 hr after completion of cleanup.</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Seal off flooded area/Security to secure area. Close door to affected room. If large flood in open area, use ceiling to floor plastic barriers for containment.</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Contact Environmental Health and Safety Emergency Pager at 790-7968 for life safety issues regarding plastic barriers and fire safety access.</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Affected areas are disinfected with a 1:10 bleach solution with a 10 min. Contact time. Walls and lateral surfaces disinfected by Housekeeping. Ceilings disinfected by Carpentry. Fans/dehumidifiers may be used to speed drying if it is determined the areas is asbestos free.</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Affected areas remain closed until wall and/or ceiling completely dried.</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Plumbing repair completed</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Walls dry</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Walls replaced if needed</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Painting finished</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ceiling dry</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ceiling/Insulation replaced if needed</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Wall covering dry</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Wall covering replaced if needed</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Final Housekeeping performed</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>HEPA filter left on 1 hour (minimum) after clean-up</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>BJH EH&amp;S will perform and document preliminary assessments and follow-up in the BJH EH&amp;S flood log.</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>BJH Nurse Manager / Area manager or designee reviews checklist for completion of tasks and re-opens to patient(s).</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**EH&S will pick-up flood checklist after final follow-up of the flooded space.**
Water Intrusion Mitigation
Sensitive papers need to be stored. At least stored on a pallet. Water damaged patient records are expensive to restore.
Key Elements to Prevent Mold Infections

Planning and Monitoring
- Involve IP from concept to commissioning
- Project specific protective measures including the responsibilities of each party (governing body, designer, contractor and facility staff)
- Assigned responsibility for monitoring compliance
- Written procedures for suspension of work

Ventilation of Zone
- Dedicated (isolated) ventilation/exhaust system for the area
- Barriers maintained at 0.03 inches of water with airflor from clean to dirty with visual display (FGI 2014)
- Systems cleaned prior to occupance if existing building HVAC used

Disaster Plans for Emergencies
- Written plans for HVAC shutdown, water outage, or leak, etc.
Mold Protocol/Checklist

The following guidelines can be used as standard practice when addressing complaints of mold or mold related problems in either a patient care or non-patient care area.

- Call may come into Facilities, Housekeeping or through Environmental Health and Safety.
- All staff are responsible for the early recognition of potential mold problems. It is the responsibility of staff working in the respective areas who identify a mold problem to ensure that either Facilities, Housekeeping or Environmental Health and Safety is notified.
- Environmental Health and Safety should always be alerted to a complaint of mold. In patient care areas Infection Prevention should also be alerted.
Moisture Meter

Inexpensive Moisture Meter Provides the needed information as the more expensive one below.

Features:
- Popular analog readout
- Two meter scales:
  - Reference Scale-reads from 0 to 100 on a relative basis. Use on non-wood materials such as concrete, plaster, and insulation
- One-year warranty
Water Intrusion Mitigation
Allow the water that has damaged the wallboard to be released. Replace wallboard and clean the bottom track.
Ceiling Tiles (Responsibility of Facilities Engineering)

- Any ceiling tiles that have visible mold should be removed and discarded.
- Areas around the ceiling tile or above the ceiling tile should be evaluated for visible mold or mildew. Areas in close proximity or directly above the ceiling tile with visible mold should be liberally sprayed with a 1:10 bleach solution as a precautionary measure.
- Allow ceiling to air dry for 24 hours prior to replacing the ceiling tiles. While the ceiling is drying out, protect the environment from dust by covering the opening with plastic taped to the surrounding tiles.
- When ceiling tiles are removed for ongoing drips, protect the environment from dust by creating a tube of plastic that surrounds drip bucket and runs from the floor to the ceiling.
- The source of water should be identified and reported to the Manager of PO&M.
- Ceilings should not be left open without some protection, such as plastic.
Walls and Wall Coverings (Responsibility of Facilities Engineering)

- Any drywall, wall coverings, or wall base which have visible mold greater than 2" x 2" collectively should be removed and replaced. Staff should not attempt to clean drywall that contains mold unless the mold is very minimal (less than 2" x 2" collectively) and only on the surface. In this case a 1:10 bleach solution should be used directly on the drywall.
- HEPA filter will be used in the work area during removal of the drywall. The HEPA filter will remain on for 1 hour after the cleanup is completed.
- If the drywall is being removed in a corridor or an area that cannot be adequately sealed, it may be necessary to put up a temporary partition during the cutting, replacing and spackling process. Infection Prevention should be consulted to determine applicability.
Carpeting

A. Carpeting which is suspected to contain mold or mold spores should be initially cleaned by housekeeping using a sanitizer containing antifungal properties.

B. Carpeting should be visually examined for signs of mold and any odor or dampness that could be associated with mold by the responding department.

C. Carpeting suspected to have a mold problem can be evaluated by removing the cove base to determine if there is evidence of water residue on the drywall near the carpet.

D. Carpet tile can be pulled back to determine if there is evidence of mold under the carpet. This will be based on a recommendation from Environmental Health and Safety after trying other alternatives to identify mold.

E. Cabinets and shelving that may be wet underneath should be moved and these areas should be included in the sanitizing process conducted on the entire carpet.
Indoor Air Quality Protocol

• Complaints of mold and mildew will be evaluated by the EH&S office and placed on the IAQ log. The following monitoring and inspections will be conducted in cases where employees are experiencing symptoms which could be related to occupational exposure to mold or other air contaminants.

• Air monitoring will be conducted by Environmental Health and Safety for CO, Co2, VOC, O2 temperature and % humidity.

• If needed requests will be submitted to HVAC department to conduct a visual check of the air handling equipment in the area for mold or standing water (including interior duct work, cooling coils, humidifiers, condensate drains and air filters) and a record of the air exchanges in the affected area. Requests for these shall be called into 7-7000 and a follow up e-mail will be provided to the Manager of Plant Operations.

Source: Barnes-Jewish Hospital, St. Louis, MO
Anderson Sampling
Laser Dust Particulate Counters
## Laser Dust Particulate Reporting

### Second Floor - Air Quality Dust Sampling

<table>
<thead>
<tr>
<th>Sample #</th>
<th>Data Set</th>
<th>Location</th>
<th>Particle Count Results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.5 Micron</td>
</tr>
<tr>
<td>SSB2 - 1</td>
<td>SSB2 East main corridor - outside Rm 278-C</td>
<td>2992</td>
<td>9952</td>
</tr>
<tr>
<td>SSB2 - 2</td>
<td>SSB2 North main corridor - midspan</td>
<td>28682</td>
<td>1072</td>
</tr>
<tr>
<td>SSB2 - 3</td>
<td>SSB2 West main corridor - outside Rm 269</td>
<td>26794</td>
<td>6628</td>
</tr>
<tr>
<td>SSB2 - 4</td>
<td>SSB2 South main corridor - outside Rm 262-B</td>
<td>25212</td>
<td>5752</td>
</tr>
<tr>
<td>SSB2 - 5</td>
<td>SSB2 North clinic hallway - outside Rm 296-E</td>
<td>25694</td>
<td>5694</td>
</tr>
<tr>
<td>SSB - 6</td>
<td>Outside Air at East Elevation ADA ramp</td>
<td>128168</td>
<td>44468</td>
</tr>
</tbody>
</table>

### Notes:
- Air sampling results were performed using: **Handheld 3016 - Lightwave**
- Each sample shall be taken for a 5 minute duration.

### Comments:
- Calibrated 11/13/08
- Instrument Manufacturer and Model
- 153595

---

### Samples Performed by:

**Patrick Weisbrod**

Print Name

**Signature**

---

### Company:

**CSMC**

Date: 11/11/08

Time: 

---

### Witnessed by:

**Signature**

Company: 

---
Particulate Reporting

Isn’t this better

Generally the air inside an office space is cleaner than the air outside. This is true of your results. I’ve only found it different when next to some construction sites. Your results are very close to each other as opposed to the outside air.

Example:

Thank you for letting me test your work space. The results for the test are based on testing from a Lighthouse 3016 laser particle counter. The span of the results includes a range from 0.5µ to 5.0µ particles.

• The air sample results of inside air are compared to air outside the hospital.

• So you get results like this:

• OR is 3.7 times better than outside air.

• ICU is 2.9 times better than outside air

• ICU #2 is 2.9 times better than outside air
Asbestos / Lead Materials

• A part of your hospital built before 1974, there is a good chance it will contain asbestos.
• Mastics used after 1974 may contain asbestos
• Hospital may have hidden lead walls
• Ceramic tiles and paint used before 1978 may contain regulated amount of lead.
Asbestos In Hospitals

"Hush up!" says asbestos...
and hospital noises hush.

Keasbey & Mattison
Company, Ambler, Pennsylvania

How Transite Pipe
keeps water clean and rust-free for every use...helps maintain full pressure, too!

Transite Pipe water mains are contributing to greater community health and safety. Transite Pressure Pipe maintains clean pure water from pumping station to consumer, helps assure pressure for fire protection at low cost to taxpayers.

Transite Pipe resists corrosion. It is nonmetallic, cannot rust, erode. Since deposits from this form of corrosion cannot build up, its initial high flow capacity stays high, pumping costs stay low. And, joints in a Transite system remain tight and sanitary.

Transite Taper Pipe saves costs, too, with quick assembly and high flow capacity. It is rugged, corrosion-resistant. It is easily handled, rapidly installed, minimizing encroachment of turn-up systems. Tight, flexible couplings reduce treatment costs.

For more details write John-Manville, Box 66, New York 16, N. Y. Canada, 563 Lakeshore Road East, Port Credit, Ontario.

Johns-Manville
TRANSITE PIPE
SERVES YOU...BY SERVING YOUR COMMUNITY
Asbestos In Hospitals

YOU CAN SPECIFY Vina-Lux VINYL ASBESTOS TILE
WITH CONFIDENCE
because...

▲ It's an honest product skillfully made by men dedicated to quality.
▲ It's a vinyl flooring reinforced with asbestos fiber — stable, durable and attractive.
▲ It's available throughout the United States through responsible outlets.
▲ It's made by a company earnestly trying to serve the architect with constantly improved products that solve architectural floor problems.
▲ Finally, Vina-Lux performance is guaranteed by its maker.

AZROCK FLOOR PRODUCTS DIVISION
CALIFORNIA ROCK ASPHALT CO. • 101 FRONT DRIVE • SAN ANTONIO, TEXAS

There is a Better way...

Our colorful world of asbestos helps make safety products highly visible and attractive.

Chem, flexible and easy to use Gardian asbestos fabrics now have color as a visible safety advantage. Bright blue FLAMMARD is especially suited for the fabrication of protective items such as smoke hoods and mattress covers for use in hospitals, institutions or wherever people are confined.

Gardian asbestos products will help you meet OSHA requirements with colorful CLEAN- GARD® asbestos. No health hazard label is required. We think that’s a better way.

Other clean, colorful GARDIAN asbestos products include orange WELDARD, green SPLASH- GARD, black SOUNDAARD, beige COVERGARD and many more.

For more information on the entire clean, colorful world of Gardian asbestos products, write Gardian Asbestos Company, P.O. Box 10518, Charlotte, North Carolina 28217.

P.O. Box 10518, Charlotte, North Carolina 28217
CIRCLE 113 ON READER CARD

May 1975, NATIONAL SAFETY NEWS

37
Hazardous Materials/Waste

Standard EC.02.02.01

- The hospital implements its procedures in response to hazardous material and waste spills or exposures
- The hospital monitors level of hazardous gases and vapors to determine that they are in safe range
- For managing hazardous materials and waste, the hospital has permits, licenses, manifests and MSDS required by law and regulation
Medical Equipment

Standard EC.02.04.01

• The hospital maintains either a written inventory of all medical equipment or a written inventory of selected equipment categorized by physical risk associated with use and equipment incident history.

• The hospital evaluates new types of equipment before initial use to determine whether they should be included in the inventory.
Here are just a few ways construction and renovation projects cause infection control problems:

- New people, materials and bacteria are constantly being brought into the healthcare environment.
- More people and traffic in hospitals means particulates, bacteria, etc. can travel further through the healthcare environment.
- Construction workers and materials bring increased levels of dust and chemicals into the hospital.
- Vibration caused by construction and renovation activities can release dust and mold spores into the air.
- Vibration causes patient stress and affects instrument performance.
- Demolition activities can disturb, release and mobilize the spread of harmful bacteria and mold through the hospital.
Medical Equipment Maintenance

Standard EC.02.04.03

- The hospital inspects, tests and maintains all life-support equipment.
- The hospital inspects, tests and maintains non-life-support equipment identified on the medical equipment inventory.
- The hospital conducts performance testing of and maintains all sterilizers.
- The hospital performs equipment maintenance and chemical and biological testing of water used in hemodialysis.
Maintaining a Safe Environment

Standard EC.02.06.01

• The hospital maintains ventilation, temperature and humidity levels suitable for the care, treatment and services provided. Temperature and humidity were big issues in the TJC Survey

• The hospital provides emergency access to all locked and occupied spaces

• The hospital keeps furnishings and equipment safe and in good repair (TB133)
8 tips on how to reduce contractor-related HAIs

- Healthcare facilities are continuously filled with contractor employees performing necessary work. This includes elevator technicians, painters, flooring contractors, plumbers, electricians and more – all without functional knowledge of how their work can negatively affect an immune-compromised patient. More than 50 percent of all Aspergillus, spp. related hospital acquired infections (HAIs), which are contracted due to common molds attached to dust particles, are caused by maintenance or construction related work.

- In an effort to reduce the overwhelming number of HAIs that occur annually, the (CDC) recommends that ALL personnel working in a healthcare facility have infection control training. The following crucial steps should be followed by all contractors working in the facility to reduce the impact of contractor-related HAIs in healthcare systems and maximize patient health.
1. **Flush water supply lines**
Deadly bacteria can be found in water pipes where water does not move – known as dead legs. Dead legs are perfect incubation locations for microbes and must be eliminated. Flushing water systems also controls the debris of potential dislodge from vibration disturbance in the wall.

2. **Store materials in dry areas to prevent molding**
Mold grows quickly in a moisture-filled environment and travels through the air. Patients exposed to mold can acquire serious health issues. Before putting away construction materials, check the storage area for high humidity or water damage.

3. **Clean all equipment daily and thoroughly**
Debris removal and dust control are extremely important to preventing HAIs. Be sure that the ventilation systems in a construction area are securely sealed to prevent bacteria being exposed to clean areas in the facility.

4. **Ensure workers leaving the site are clean**
Before leaving a job site, remove debris from clothing and shoes. Exiting a construction area covered in the smallest amount of dust or other harmful, bacteria-laden debris can expose an immune-compromised patient to a deadly HAI.
5. **Transport all materials correctly**
When transporting materials from one location to the next, correctly cover with tight fitting plastic or a dampened clean cloth to avoid airborne infections.

6. **Become aware of CDC and Centers for Medicare and Medicaid (CMS) requirements**
Knowledge of recommended or required infection control training for contractors is essential in improving hospital efficiency.

7. **Implement facility-wide infection control training**
Facilitating a hospital-wide training model that can be accessed 24/7 for all contractor staff ensures that the staff will be educated to make a difference and improve patient care. Address issues that healthcare staff members encounter on a daily basis to eliminate reoccurrence. Every contractor employee that enters the hospital should complete the training courses and learn about their role in HAI prevention.

8. **Record all construction and renovation work**
Documenting maintenance projects will aid in fighting legal action if a patient acquires an HAI. Lawyers representing an HAI patient build cases around facility negligence, resulting in unsettling legal fees and a loss of credibility.
Patient Safety is # 1

- AS AN IP, IT IS IMPORTANT THAT YOU JOIN WITH OTHERS TO COMMIT TO MAKE YOUR HOSPITAL 100% SAFE

- ATTENTION TO DETAILS CAN HELP US SAVE PATIENTS LIVES!
It's All In the Approach

- Regulation
- Conditions of Participation (if deemed)
- Manufacturer’s instructions
- Evidence-based standards or guidelines
- Consensus documents or position statements
- Incorporate into facility-based risk assessment and policy
Not quite yet!
Summary:

Continued compliance with existing environmental infection control measures will decrease the risk of health-care associated infections among patients, especially the immunocompromised, and health-care workers.
Were there none who were discontented with what they have, the world would never reach anything better.

Florence Nightingale
Questions?
References


References


References


References


Implementation guides and tools

• *Infection Prevention Manual for Construction & Renovation*

• *Comments on CMS infection control surveyors’ worksheet*—APIC

Government Affairs

• APIC Text (subscription required)
  
  • *Chapter 112, “Maintenance and Engineering”*
  
  • *Chapter 113, “Waste Management”*
  
  • *Chapter 114, “Heating, Ventilation, and Air Conditioning”*
  
  
  • *Chapter 116, “Construction and Renovation”*
External resources

• Guidelines for Environmental Infection Control in Health-Care Facilities—The Centers for Disease Control and Prevention
• Guide to Infection Prevention for Outpatient Settings: Minimum Expectations for Safe Care—The Centers for Disease Control and Prevention
• Environment of care—The Joint Commission
• Environment of care management plans—The Joint Commission
• Environment of care and safety self-assessment checklist—American Society for Healthcare Engineering
• Medical safety Environment of care/physical environment risk management toolkit—United States Army Public Health Command
Legionella prevention

- **Legionnaires’ Disease**—Occupational Safety & Health Administration
- **Minimizing the Risk of Legionellosis Associated with Building Water Systems**—American Society for Heating, Refrigerating and Air-Conditioning Engineers
- **Guidelines**—American Society for Heating, Refrigerating and Air-Conditioning Engineers
Example checklists from national healthcare organizations:

- Environment of care/infection control inspection checklists—Northern Arizona Regional Behavioral Health Authority
- EOC rounds checklist—Premier Medical Group
- Environment of care checklist—Massachusetts General Hospital
- Facilities inspection checklist—Clinica Sierra Vista

https://apic.org/resources/topic-specific-infection-prevention/environment-of-care/
Mold References

Molds in the Environment
http://www.cdc.gov/mold/faqs.htm

Protect Yourself From Mold
http://www.bt.cdc.gov/disasters/mold/protect.asp

For healthcare providers
Institute of Medicine’s Damp Indoor Spaces and Health
http://www.nap.edu/books/0309091934/html/
(Summary table: http://www.cdc.gov/mold/iom_sum.htm)
State of the Science on Molds and Human Health
http://www.cdc.gov/mold/pdfs/moldsci.pdf

For the general public and news media - Facts About Mold and Dampness
http://www.cdc.gov/mold/dampness_facts.htm

Get Rid of Mold; simplified flyer

Institute of Medicine’s Damp Indoor Spaces and Health
http://www.nap.edu/books/0309091934/html/
(Summary table: http://www.cdc.gov/mold/iom_sum.htm)

Mold remediation advice from the U.S. Environmental Protection Agency; includes home and school cleanup information
http://www.epa.gov/mold/

Molds in the Environment
http://www.cdc.gov/mold/faqs.htm

Prevention and Remediation Strategies for the Control and Removal of Fungal Growth
http://www.cdc.gov/mold/strats_fungal_growth.htm
Additional Resources

- **Sterilization resources**—Association for the Advancement of Medical Instrumentation
- **HVAC Design Manual For Hospitals And Clinics**—American Society of Heating, Refrigerating and Air-Conditioning Engineers
- **FGI Guidelines available for purchase**—Facility Guidelines Institute
- **The 2007 minimum design standards for health care facilities in Michigan**—Michigan Department of Community Health