



Carpenters International Training Fund

Infection Control Risk Assessment
(ICRA):
Best Practices in Health Care
Construction

Course Number: ICRA 620



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Infection Control Risk Assessment (ICRA): Best Practices In Health Care Construction

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Infection Control Risk Assessment (ICRA): Best Practices In Health Care Construction

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Infection Control Risk Assessment (ICRA): Best Practices In Health Care Construction

Course Description

This course will discuss some of the challenges faced during construction in Health Care Facilities.

Healthcare-Associated Infections (HAIs) continue to be a top priority of the CDC and healthcare facilities. Federal, Provincial, State, and Local agencies as well as many organizations play active roles in the effort to reduce HAIs. Healthcare Design, Infection Control Professionals as well as Construction Professionals also play a major role in these efforts.

Studies indicate that mold and other contaminants released during construction and renovation activities are responsible for a number of those infections. In the ICRA: Best Practices in Health Care Construction Course, construction personnel are made aware of their role within the healthcare environment. They are shown how their actions can help better protect themselves, staff, and patients during construction and renovation.

Infection Control Risk Assessment (ICRA): Best Practices In Health Care Construction

Objectives

1. Discuss the importance of a comprehensive and multidisciplinary approach to create an effective infection control program.
2. Examine an Infection Control Risk Assessment (ICRA) to determine the work type, patient risk group, and work classification.
3. Understand the importance of having a well-trained construction team.
4. Identify process's and procedures to ensure compliance with ICRA precautions



Infection Control Risk Assessment (ICRA): Best Practices In Health Care Construction

- There are around 1.7 million healthcare acquired infections annually with nearly 100,000 associated deaths.
- 5%-7% of HAI's can be linked directly linked to construction Projects.



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The Challenges

- While there have been significant improvements for most types of infections, it is estimated by the CDC that approximately 1 in every 31 U.S. patients has at least one infection related to their hospital stay.

Infection Control Risk Assessment (ICRA): Best Practices In Health Care Construction

- **Healthcare Associated infections continue to be a costly problem**
- **Human- loss of life, pain, suffering, long term medical issues, new or worsening health issues**
- **Economic- extensive treatment, lawsuits, potential loss of funding**
- **Reputation- In competitive markets is critical to attracting patients to your facility**



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The Challenges

- **Construction and renovation projects within the healthcare facility increase the potential risk to patients if proper procedures are not followed**
- **The disturbance of contaminants can make them become airborne**
- **Mold and bacteria as well as other pathogens are easily transported and spread through the air**

Positive Changes

- Rates of healthcare-associated infections have shown significant reductions due to aggressive
- Staff Awareness and Training
- Monitoring and Reporting procedures
- Procedural changes for task



Regulatory and Standards Organizations

- **The Joint Commission (TJC)**
- **Center for Disease Controls (CDC)**
- **Centers for Medicare and Medicaid Services (CMS)**
- **Americans with Disabilities Act (ADA)**
- **American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE)**

Regulatory and Standards Organizations

- **Local, State, and Regional Building Codes**
- **International Code Council (ICC)**
- **Occupational Safety and Health Administration (OSHA)**
- **National Fire Protection Association (NFPA)**
- **US Environmental Protection Agency (EPA)**

Resources

- **AIA- Planning, Design, and Construction of Health Care Facilities 4th edition**
- **CDC- Guidelines for Environmental Infection Control in Health-Care Facilities (July 2019 update)**
- **Facilities Guidelines Institute (FGI)**
- **National Fire Protection Association (NFPA)**
- **American National Standards Institute (ANSI)**
- **National Institute for Occupational Safety and Health (NIOSH)**



Safety Risk Assessment

- **All hospital projects shall be designed and constructed to facilitate the safe Delivery of Care**
- **To Support this goal, an interdisciplinary team shall develop a Safety Risk Assessment (SRA)**
- **After completing the SRA process a document providing information and recommendations shall be established and incorporated into the planning and design documentation**
- **There are 7 components that are required for all projects**

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Safety Risk Assessment (SRA)

- 1. Infectious control risk assessment (ICRA)**
- 2. Patient handling and movement assessment (PHAMA)**
- 3. Fall prevention assessment**
- 4. Medication safety assessment**
- 5. Behavioral and mental health risk assessment**
- 6. Patient immobility assessment**
- 7. Security risk assessment**

(FGI Guidelines, 2018 edition, 1.2-4.1.2)



Infection Control Risk Assessment (ICRA)

“For a hospital project to support safe designs. HVAC/plumbing systems, and surface and furnishing material selections, an infection control risk assessment shall be part of integrated facility planning, design, construction, and commissioning activities and shall be incorporated into the safety risk assessment.”

(FGI Guidelines, 2018 edition 1.2-4.2.1.1)

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- **Infection Control Risk Assessment (ICRA)**

- The Infection Control Risk Assessment (ICRA) is intended to proactively identify and mitigate risk for healthcare-associated infections that may result when fungi or bacteria are dispersed into the air via dust or water aerosolization during construction, renovation, or repair activities.



Infection Control Risk Assessment (ICRA):

Best Practices In Health Care Construction

- **Infection Control Risk Assessment (ICRA)**
- The ICRA should be a continuous process from design through Construction
- There will be a coordinated multidisciplinary team actively engaged with the development of the ICRA
- The ICRA ensures accountability through assessment, monitoring, and documentation

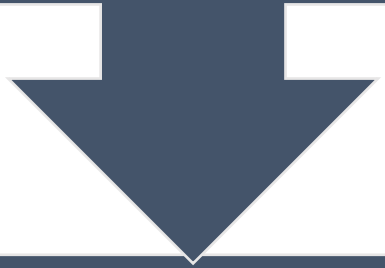
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ICRA Team

The ICRA team is appointed by the health-care facility and may include:

- Architects
- Mechanical/Electrical/Structural Engineers
- Facilities Engineers
- Department directors
- Epidemiologists
- Infection Preventionist Professionals
- Risk Management personnel
- Industrial Hygienist
- Interim Life Safety Measures Team

The ICRA Shall Address



Design Elements	Construction Elements	Infection Control Mitigation	Monitoring plan and procedures
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Design Elements

- Number and location of Airborne Infection Isolation and Protective Environment rooms
- Special HVAC Needs
- Water/plumbing systems
 - Handwash stations
 - 1st aid and emergency stations
- Selections of surfaces and finishes related to Infection Prevention

Construction Elements

- **Impact of disruption of essential services to patients and employees**
 - **Who is affected**
 - **How long will it affect services**
- **Specific hazard and protection levels**
 - **What are hazards associated with different areas**
 - **What areas are affected, and which need greater protection**
- **Each patient location and risk level**
 - **Who is affected by the project**
 - **What is the risk to those patients in each area affected**

Construction Elements

- **Impact of the movement of materials**
 - **Construction material**
 - **Debris**
 - **Traffic flow**
 - **Testing and certification of installed systems**
- **Assessment of Construction Activities**
 - **Internal**
 - **External**
- **Location of known hazards**



Infection Control Risk Mitigation Recommendations (ICRMRs)

- **These written plans shall describe the specific methods by which transmission of airborne and waterborne biological contaminants will be avoided during construction as well as during commissioning, when HVAC and plumbing systems and equipment are started/restarted**
- **Planning shall be prepared by the ICRA Team**

(ICRMRs) Content

- **Patient Proximity to construction**
- **Standards for Barriers**
- **Provisions for Phasing or modification of HVAC and water supply**
- **Protection from demolition**
- **Training for staff, visitors, and construction personnel**
- **Impact on patients in case of utility outages or evacuation**
- **Impact of debris, material, and traffic flow**
- **Provisions for bathroom and food facilities used by construction workers**
- **Installation of clean materials that have not been damaged by water**

ICRM Monitoring plan and procedures

- **Monitoring plans and shall be provided by governing body**
- **Provisions shall include**
 - **Written procedures for emergency suspension of work**
 - **Protective measures indicating scope of work and limitations for each party**

Patient Handling and Movement Assessment (PHAMA)

- **PHAMA requirements**
 - **Specific patient handling and movement needs of all areas affected by project**
 - **Special considerations including number of patients in area, risk group, size of patients and special equipment needed**
- **The recommendations of the PHAMA shall be incorporated into the SRA**

PHAMA Design Considerations

- **Special Equipment required**
- **Size and type of door openings**
- **Adequate space for movement and handling**
- **Electrical and mechanical considerations including future needs**
- **Floor surfaces**
- **Storage requirements**
- **Impact of Installation of equipment on patient handling and aesthetics of space**

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Fall Prevention

- **Specific Fall mitigation methods in and around construction zones**
- **Barriers and other protective measures to protect patients**

Medication Safety Assessment

- **Location and number of medication safety zones shall be included in the SRA**

Behavior and Mental Health Risk Assessment

- **Identify areas where patients are at risk of mental health injury and suicide**

Patient Immobility Assessment

- **Assess the design factors to discourage patient mobility for sedentary patient treatment**

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Security Risk Assessment

- **Assessment plan to address risk from phasing and demolition on the existing site protection Strategies**
- **Assess the needs for temporary security barriers, fencing, and systems**
- **Schedule installation to protect facility and equipment during move-in**
- **Identify security risk specific to patient population**

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Interim Life Safety Measures (ILSM)

- **The purpose is to address Life Safety Code Issues during ICRA planning.**
 - **Maintaining unobstructed egress**
 - **Substitution of equivalent fire protection when Fire protection system is disabled or taken out of service**
 - **Assuring Barriers are constructed properly to meet life safety codes**

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Interim Life Safety Measures (ILSM)

- **Monitoring and inspections for construction hazards**
- **Monitoring and enforcement of specific housekeeping and storage practices**
- **Training and drills for affected personnel**
- **Approval and maintaining documents**
 - **Hot Work Permits**
 - **Fire Stopping**
 - **Confined Space**
 - **SDS**

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Interim Life Safety Measures (ILSM)

Daily Monitoring: ILSM — ICRA Precautions				
Date of assessment/survey:	Assessment completed by:			
Area assessed/surveyed:	Date distributed to safety/IC:			
Project no.:	Project name:			
	Yes	No	NA	List time, documentation, or action/ follow-up as needed
A. EXITS				
1. Exits provide free and unobstructed egress through construction.				
2. Alternative exits are clearly identified.				
3. Means of egress in construction area inspected daily.				
4. Free and unobstructed access to ED/ Services and for emergency forces.				
B. FIRE EQUIPMENT AND SAFETY				
5. Fire alarms, detection, and suppression systems are in an operational function.				
6. Fire alarms, detection, and suppression systems are not impaired.				
7. Temporary fire alarm, detection, and suppression systems have been inspected and tested monthly.				Date:
8. Training and additional fire equipment have been provided for personnel.				
9. Power has been properly secured at the end of each workday.				
10. No smoking policy has been implemented in and adjacent to the construction areas.				
11. Construction areas are free of storage and housekeeping materials, food waste, and debris from daily operations to reduce flammable and combustible fire load of the building; floor area leading to/from construction site cleaned daily.				Date or time:

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ILSM Team

- The Joint Commission requires an ILSM team to complete an assessment for construction projects
- The ILSM team is generally comprised of the hospital fire marshal, risk management personnel, and facilities engineers
- They can use the same ICRA team or create another team.
- The ILSM should be coordinated with the ICRA assessment to ensure continuity and ensure all issues are addressed in both assessments

Infection Control Risk Assessment (ICRA): Best Practices In Health Care Construction

ICRA Form

14 Steps Based on CDC Guidelines

Step 1-Identify the type of construction activity and Duration

- **Type A –Inspection and noninvasive**
- **Type B- Small-scale, short-duration**
- **Type C- Multiple shift, Moderate-High levels of dust.
Removal or replacement of building components**
- **Type D- Major demolition and construction projects**

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ICRA Form

Step 2 Determine Patient Risk Group

Low risk	Medium risk	High risk	Highest risk
Office areas	• Cardiology • Echocardiography • Endoscopy • Nuclear medicine • Physical therapy • Radiology/MRI • Respiratory therapy	• CCU • Emergency room • Labor & delivery • Laboratories (specimen) • Newborn nursery • Outpatient surgery • Pediatrics • Pharmacy • Post-anesthesia care unit • Surgical units	• Any area caring for immuno-compromised patients • Burn unit • Cardiac cath lab • Central sterile supply • Intensive care units • Medical unit • Negative pressure isolation rooms • Oncology • Operating rooms including C-section rooms

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ICRA Form

Step 3 the Matrix

- The Matrix is a graph used to determine the class of precautions required
- Uses Project Type and Patient Risk Group to determine Classification
 - 4 different classes of precaution
 - I,II,III,IV
 - Class I and II normally only require facility-issued work order
 - Class III or IV will require and ICRA Permit
 - Permit must be completed and signed before any construction work can begin

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ICRA Form

Step 3 the Matrix

Infection Control Matrix				
Class of Precautions: Construction Project by Patient Risk				
Construction Project Type				
Patient Risk Group	TYPE A	TYPE B	TYPE C	TYPE D
LOW Risk Group	I	II	II	III/IV
MEDIUM Risk Group	I	II	III	IV
HIGH Risk Group	I	II	III/IV	IV
HIGHEST Risk Group	II	III/IV	III/IV	IV

Note: Infection Control approval will be required when the Construction Activity and Risk Level indicate that Class III or Class IV control procedures are necessary.

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ICRA Form

Step 4: Surrounding Project Area

This step evaluates the impact on the areas surrounding the project area

Step 5: Identify Specific Site

What the specific project area is used as

Step 6: Related Issues

All issues related to mechanical systems including possible disruptions

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ICRA FORM

Step 7: Containment Measures

Determining if containment is needed and what type is to be used

Step 8: Potential Risk of Water Damage

Assessing any potential water damage as well as any compromise of the structural integrity of components in the project area

Step 9: Work Hours

Actual times work will, or can be conducted to minimize the amount of disruptions to the facility

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ICRA FORM

Step 10-13: Facility Design

Any issues involved with the design such as: Life Safety Codes, ADA, and Local Building Codes

Step 14: Placement of Containment

What type of containment is to be used based off of traffic patterns, debris removal, housekeeping, and fire codes

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ICRA Permit

- **Requires posting on jobsite for worker recognition of precautions**
- **Contains the following project information**
 - **Construction activity, patient risk group, work class**
 - **Location, project coordinator, contractor**
 - **Start/duration dates, permit number**
 - **Additional requirements and authorized signatures**

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ICRA Permit

Infection Control Construction Permit					
Location of Construction:				Permit No:	
Project Coordinator:				Project Start Date:	
Contractor Performing Work:				Estimated Duration:	
Supervisor:				Permit Expiration Date:	
				Telephone:	
YES	NO	CONSTRUCTION ACTIVITY	YES	NO	INFECTION CONTROL RISK GROUP
		TYPE A: Inspection, non-invasive activity			GROUP 1: Low Risk
		TYPE B: Small scale, short duration, moderate to high levels			GROUP 2: Medium Risk
		TYPE C: Activity generates moderate to high levels of dust, requires more than one work shift to complete			GROUP 3: Medium/High Risk
		TYPE D: Major duration and construction activities requiring consecutive work shifts			GROUP 4: Highest Risk
CLASS I		1. Execute work using methods to minimize raising dust from construction operations.			
CLASS II		2. Immediately replace any ceiling tile displaced for visual inspection.			
		3. Minor demolition for remodeling			
		6. Contain construction waste in tightly covered containers before transport.			
		7. Wet mop and/or vacuum with HEPA-filtered vacuum before leaving work area.			
		8. Place dust mats at entrances and exits to work area.			
		9. Isolate HVAC system in areas where work is being performed; restore when work completed.			
CLASS III		6. Vacuum work with HEPA filtered vacuums.			
Date		7. Wet mop with disinfectant			
		8. Remove barrier materials carefully to minimize spreading of dirt and debris associated with construction.			
Initial		9. Contain construction waste in tightly covered containers before transport.			
		10. Cover transport receptacles or carts. Tape covering.			
		11. Upon completion, restore HVAC system where work was performed.			
CLASS IV		7. All personnel entering work site are required to wear shoe covers.			
Date		8. Do not remove barriers from work area until completed project is thoroughly cleaned by the Environmental Service Department.			
		9. Vacuum work area with HEPA-filtered vacuums.			
Initial		10. Wet mop with disinfectant.			
		11. Remove barrier materials carefully to minimize spreading of dirt and debris associated with construction.			
		12. Contain construction waste in tightly covered containers before transport.			
		13. Cover transport receptacles or carts. Tape covering.			
		14. Upon completion, restore HVAC system where work was performed.			
Additional Requirements:					
Date:		Initials:		Exceptions/Additions to this permit are noted by attached memoranda	
Permit Request By:		Permit Authorized By:			
Date:		Date:			

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Training

- **ICRA “Best Practices” Comprehensive training to enhance site specific training**
- **Teaches fundamentals; site-specific focuses on facility-specific information**
- **Training the workforce on the precautions and risk involved is the best way to protect the facility, workers, staff and most importantly the patients**
- **Training should include both classroom and hands-on instruction**



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Training

Personal Responsibilities

- **Respect of patient privacy as required by privacy laws**
- **Conduct and appearance standards of the facilities**
- **Notify supervisors if becoming ill while working in the facility**
- **Awareness of the unique environments of health care facilities**

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Barriers

- **Types of barriers commonly specified are**
 - **Portable cube**
 - **Soft wall**
 - **Hard wall**
- **The type of barrier is determined by the ICRA Assessment and the ICRA permit (if required)**
- **The type of barrier is primarily determined by project type, duration, life safety issues and policy**

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Portable Cube

- Small, Single-person containment area used for inspections and short-term work
- Collapsible barrier that is easily moved and deployed
- Acceptable for work Class I, II, III, and IV



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Soft wall Systems

- Installed for short-term work that is often completed within a single shift
- Highly adaptable for air differential environments
- Constructed of fire-resistant 6 mil poly sheeting
- Work well in emergency isolation events
- Acceptable for class I or II work



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Hard wall systems

- Required for consecutive work shifts
- Predominantly constructed of metal studs and drywall
- Prefabricated systems are available
- Acceptable for Class I, II, II, and IV



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Anterooms

- Create an additional layer of patient protection from work areas
- Require Negative pressure using HEPA filtration
- Provide area for donning or doffing PPE/PPA
- Premanufactured Anterooms are available



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Air Flow

- Type of air pressure is determined by ICRA team
 - Positive
 - Negative
 - Equal
- Maintained using HEPA filtration units and barriers
- Regular monitoring, documentation, and maintenance required (amount varies by project daily at minimum)



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Firestopping

- Containment of the work area is typically defined on the Life Safety Drawing
- Worker training follows site-specific protocols
- Firestop Permits
- Submittal and approval process
- Penetrations may be required to be labeled, pictured and documented
- With all UL tested assemblies the barrier integrity must be maintained



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Activities and Considerations Concerning Mold

If Mold is discovered:

- **Work should stop immediately**
- **Pre-determined lines of communication are activated**
- **Supervisor should be notified who will notify the ICRA team**
- **New precautions are put into place**
- **Normally the work class is elevated**
- **Remediation is performed by qualified workers**



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Activities and Considerations Concerning Mold

- ***“Dampness and Mold Assessment Tool”*** from the CDC and NIOSH is commonly used for mold assessment
- **ANSI/IICRC S520 2015 Standard for Professional Mold Remediation practices**

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Collaboration

The Facilities

- **Healthcare facility managers who understand the procedures that are involved in construction-related infection control, help reduce the risk**

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Collaboration

Architects

- **Architects who understand the specific risks involved, help to communicate the facility's needs to the contractor; decisions made can also enhance long-term planning**

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Collaboration

Contractors

- **Contractors and workers who understand the issues involved in healthcare construction help to add value, safety, and professionalism to the project**

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Dampness and Mold Assessment Tool General buildings- Center for Disease Control/ National Institute for Occupational Safety and Health

3rd Edition S520-2015 Standard for Professional Mold Remediation-American National Standards Institute/ Institute of Inspection Cleaning and Restoration Certification

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