THE UNIVERSITY OF KANSAS HEALTH SYSTEM

Get to Know ICRA 2.0

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Objectives

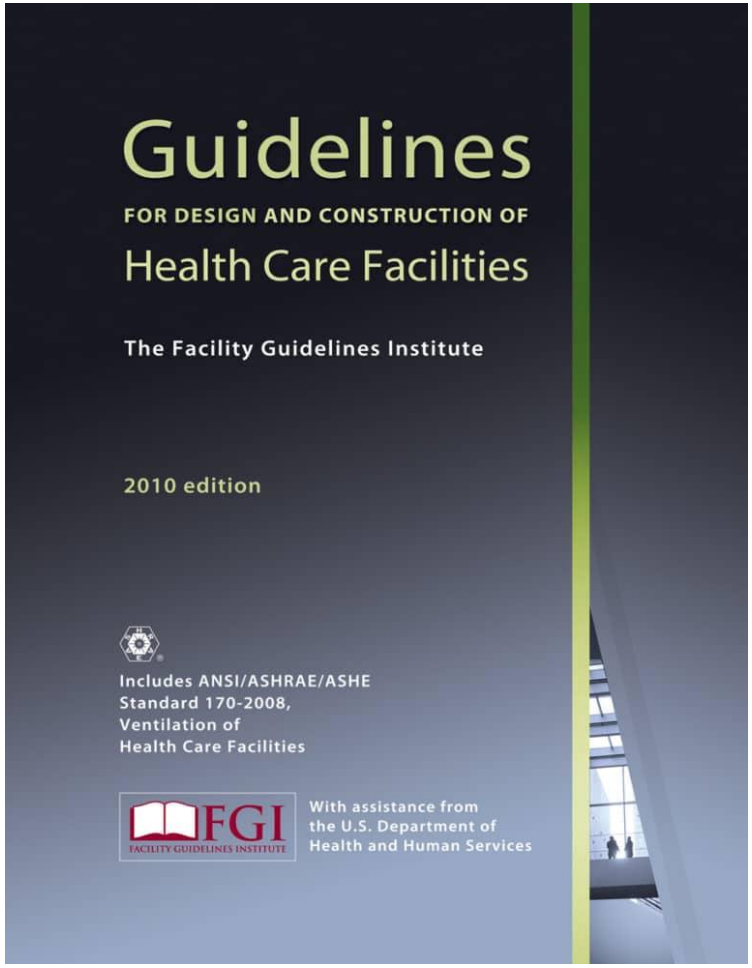
- Describe changes to the ICRA process
- Determine infection control risk, using an ICRA matrix, for construction and renovation projects
- Identify infection control risk mitigation techniques based on level of risk
- Apply various ICRA tools for use in construction and renovation activities

Introduction

- Registered Nurse for 14 years
- Infection Preventionist for 7 years
- Construction and renovation liaison for 5 years
- NO Construction background!

Infection Control Risk Assessments

- Infection Control Risk Assessments (ICRA)
  - Used in healthcare for decades
  - 1996 edition of the Facility Guidelines Institute's (FGI's) Guidelines for Design and Construction of Hospital and Healthcare Facilities
  - Mandated in 2001 FGI guidelines
- American Society for Healthcare Engineering (ASHE) gathered experts in the field to define the ICRA process



State Guidelines for Construction

Kansas: Follows the 1996-97 FGI Guidelines for Design and Construction

Missouri: Follows the 2010 or 2014 FGI Guidelines for Design and Construction

ICRA 2.0

- Next version of the ICRA
- ASHE gathered multidisciplinary group in 2020
  - Infection prevention and control
  - Industrial hygiene
  - Construction
  - Facilities management specialists
- Reviewed processes in the ICRA to update

Major Changes to ICRA 2.0

- More specific language used throughout
- Updates to examples in the different types of work
- Updates to the Patient risk groups
- Addition of a class to the different levels of precautions
- More specific recommendations throughout the classes
- New tools

Surrounding Area Assessment

Step Four:

Assess potential risk to areas surrounding the project. Using Table 4, identify the surrounding areas that will be affected and the type of impact that will occur. If more than one risk group will be affected, select the higher risk group using Table 2 - Patient Risk Group.

Table 4 - Surrounding Area Assessment

Unit Below:	Unit Above:	Unit Lateral:	Unit Behind:	Unit in Front:
Risk Group:	Risk Group:	Risk Group:	Risk Group:	Risk Group:
Contact:	Contact:	Contact:	Contact:	Contact:
Phone:	Phone:	Phone:	Phone:	Phone:
Additional Controls: ☐ Noise ☐ Vibration ☐ Dust control ☐ Ventilation ☐ Pressurization ☐ Vertical Shafts ☐ Elevators/Stairs **Systems impacted:** ☐ Data ☐ Mechanical ☐ Med Gases ☐ Hot/Cold Water	**Additional Controls:** ☐ Noise ☐ Vibration ☐ Dust control ☐ Ventilation ☐ Pressurization ☐ Vertical Shafts ☐ Elevators/Stairs **Systems impacted:** ☐ Data ☐ Mechanical ☐ Med Gases ☐ Hot/Cold Water	**Additional Controls:** ☐ Noise ☐ Vibration ☐ Dust control ☐ Ventilation ☐ Pressurization ☐ Vertical Shafts ☐ Elevators/Stairs **Systems impacted:** ☐ Data ☐ Mechanical ☐ Med Gases ☐ Hot/Cold Water	**Additional Controls:** ☐ Noise ☐ Vibration ☐ Dust control ☐ Ventilation ☐ Pressurization ☐ Vertical Shafts ☐ Elevators/Stairs **Systems impacted:** ☐ Data ☐ Mechanical ☐ Med Gases ☐ Hot/Cold Water	**Additional Controls:** ☐ Noise ☐ Vibration ☐ Dust control ☐ Ventilation ☐ Pressurization ☐ Vertical Shafts ☐ Elevators/Stairs **Systems impacted:** ☐ Data ☐ Mechanical ☐ Med Gases ☐ Hot/Cold Water
Noise & Vibration Mitigation Strategies				
☐ Use diamond drills instead of powder-actuated fasteners. ☐ Schedule noise-making periods with adjacent spaces. ☐ Use beam clamps instead of shot. ☐ Prefab where possible. ☐ Use tin snips to cut metal studs instead of using a chop saw. ☐ Install metal decking with vent tabs, then use cellular floor deck hangers. ☐ Consider compression style fittings instead of soldering, brazing or welding. ☐ Wet core drill instead of dry core or percussion. ☐ Instead of jackhammering concrete, use wet diamond saws. ☐ Use HEPA vacuums instead of standard wet/dry vacuums. ☐ Use mechanical joining system sprinkler fittings instead of threaded. ☐ Where fumes are tolerated, use chemical adhesive remover (flooring glue) instead of mechanical. ☐ To remove flooring, consider abrasive blasting instead of using a floor scraper. ☐ Use electric sheers instead of reciprocating saw for ductwork cutting. ☐ Install exterior man/material lifts.				
Ventilation & Pressurization Mitigation Strategies				
☐ HEPA to exterior. ☐ Install temporary ductwork. ☐ Utilize temporary HVAC equipment. ☐ Vacate the area. ☐ Install temporary partitions. ☐ Use carbon filtration to filter odors.				
Impact to Other Systems Mitigation Strategies				
☐ Schedule outages. ☐ Provide temporary systems. ☐ Back-feed electricity or medical gases.				

Upon Completion of Work

Infection Control Risk Assessment 2.0
Matrix of Precautions for Construction, Renovation and Operations

Table 6 - Minimum Required Infection Control Precautions | Upon Completion of Work Activity

Class of Precautions	Mitigation Activities (Performed upon Completion of Work Activity)
Classes I, II and III	Cleaning: 1. Clean work areas including all environmental surfaces, high horizontal surfaces and flooring materials. 2. Check all supply and return air registers for dust accumulation on upper surfaces as well as air diffuser surfaces. HVAC Systems: 1. Remove isolation of HVAC system in areas where work is being performed. Verify that HVAC systems are clean and operational. 2. Verify the HVAC systems meet original airflow and air exchange design specifications.
Classes III, IV and V	Class III (Type C Activities only), IV, and V precautions require inspection and documentation for downgraded ICRA precautions. Construction areas must be inspected by an infection preventionist or designee and engineering representative for discontinuation or downgrading of ICRA precautions. Work Area Cleaning: 1. Clean work areas including all environmental surfaces, high horizontal surfaces and flooring materials. 2. Check all supply and return air registers for dust accumulation on upper surfaces as well as air diffuser surfaces. Removal of Critical Barriers: 1. Critical barriers must remain in place during all work involving drywall removal, creation of dust and activities beyond simple touch-up work. The barrier may NOT be removed until a work area cleaning has been performed. 2. All (plastic or hard) barrier removal activities must be completed in a manner that prevents dust release. Use the following precautions when removing hard barriers: i. Carefully remove screws and painter tape. ii. If dust will be generated during screw removal, use hand-held HEPA vacuum. iii. Drywall cutting is prohibited during removal process. iv. Clean all stud tracks with HEPA vacuum before removing outer hard barrier. v. Use a plastic barrier to enclose area if dust could be generated. Negative Air Requirements: 1. The use of negative air must be designed to remove contaminates from the work area. 2. Negative air devices must remain operational at all times and in place for a period after completion of dust creating activities to remove contaminants from the work area and before removal of critical barriers. HVAC systems: 1. Upon removal of critical barriers, remove isolation of HVAC system in areas where work is being performed. 2. Verify that HVAC systems are clean and operational. 3. Verify the HVAC systems meets original airflow and air exchange design specifications.

Type of Work

Type A	**Inspection and non-invasive activities.** Includes but is not limited to: • Removal of ceiling tile for visual inspection-limited to 1 tile per 50 square feet with limited exposure time. • Limited building system maintenance (e.g., pneumatic tube station, HVAC system, fire suppression system, electrical and carpentry work to include painting without sanding) that does not create dust or debris. • Clean plumbing activity limited in nature.
Type B	**Small-scale, short duration activities that create minimal dust and debris.** Includes but is not limited to: • Work conducted above the ceiling (e.g., prolonged inspection or repair of firewalls and barriers, installation of conduit and/or cabling, and access to mechanical and/or electrical chase spaces). • Fan shutdown/startup. • Installation of electrical devices or new flooring that produces minimal dust and debris. • The removal of drywall where minimal dust and debris is created. • Controlled sanding activities (e.g., wet or dry sanding) that produce minimal dust and debris.
Type C	**Large-scale, longer duration activities that create a moderate amount of dust and debris.** Includes but is not limited to: • Removal of preexisting floor covering, walls, casework or other building components. • New drywall placement. • Renovation work in a single room. • Non-existing cable pathway or invasive electrical work above ceilings. • The removal of drywall where a moderate amount of dust and debris is created. • Dry sanding where a moderate amount of dust and debris is created. • Work creating significant vibration and/or noise. • Any activity that cannot be completed in a single work shift.
Type D	**Major demolition and construction activities.** Includes but is not limited to: • Removal or replacement of building system component(s). • Removal/installation of drywall partitions. • Invasive large-scale new building construction. • Renovation work in two or more rooms.

Patient Risk Group

Low Risk Non-patient care areas such as:	Medium Risk Patient care support areas such as:	High Risk Patient care areas such as:	Highest Risk Procedural, invasive, sterile support and highly compromised patient care areas such as:
• Public hallways and gathering areas not on clinical units. • Office areas not on clinical units. • Breakrooms not on clinical units. • Bathrooms or locker rooms not on clinical units. • Mechanical rooms not on clinical units. • EVS closets not on clinical units.	• Waiting areas. • Clinical engineering. • Materials management. • Sterile processing department - dirty side. • Kitchen, cafeteria, gift shop, coffee shop, and food kiosks.	• Patient care rooms and areas • All acute care units • Emergency department • Employee health • Pharmacy - general work zone • Medication rooms and clean utility rooms • Imaging suites: diagnostic imaging • Laboratory.	• All transplant and intensive care units. • All oncology units. • OR theaters and restricted areas. • Procedural suites. • Pharmacy compounding. • Sterile processing department - clean side. • Transfusion services. • Dedicated isolation wards/units. • Imaging suites: invasive imaging.

Matrix

- Class I-V
  - Addition of a new class
- Use matrix to determine the class of project

Patient Risk Group	Construction Project Type			
	TYPE A	TYPE B	TYPE C	TYPE D
LOW Risk Group	I	II	II	III*
MEDIUM Risk Group	I	II	III*	IV
HIGH Risk Group	I	III	IV	V
HIGHEST Risk Group	III	IV	V	V

Infection control permit and approval will be required when Class of Precautions III (Type C) and all Class of Precautions IV or V are necessary.

Environmental conditions that could affect human health, such as sewage, mold, asbestos, gray water and black water will require Class of Precautions IV for LOW and MEDIUM Risk Groups and Class of Precautions V for HIGH and HIGHEST Risk Groups.

***Type C [Medium Risk groups] and Type D [Low Risk Groups] work areas [Class III precautions] that cannot be sealed and completely isolated from occupied patient care spaces should be elevated to include negative air exhaust requirements as listed in Class IV Precautions.**

Class I

- Limited to Type A work
  - Noninvasive/Inspection work
- Low-High patient risk groups
  - Non patient care areas
  - Patient care support areas
  - Certain patient care areas

Patient Risk Group	TYPE A
LOW Risk Group	I
MEDIUM Risk Group	I
HIGH Risk Group	I

Class I Risk Mitigation

- Perform work activities in the following way:
  - No interruption or blocking of patient care
  - In areas not directly occupied by patients
  - In a manner that doesn't create dust
- Immediately replace ceiling tiles before leaving the area or when completing work

Class II

- NEW CLASS
- Includes Type B and Type C work
  - Small scale, short duration with minimal dust
  - Large scale, longer duration with moderate dust
- Low and Medium patient risk groups
  - Non patient care areas
  - Patient care support areas

Patient Risk Group	TYPE A	TYPE B	TYPE C
LOW Risk Group	I	II	II
MEDIUM Risk Group	I	II	III*

Class II Risk Mitigation

- **Maintenance only class**
  - Perform only limited dust work and/or activities for basic facility and engineering work
  - Follow standing practice procedures approved by organization for work with limited dust and invasive work
  - **Not to be used for construction and renovation activities**

Class III

- Includes all types of work
  - Noninvasive to major demolition/construction
- Includes all patient risk groups
  - Non-patient to highest risk patients

	Construction Project Type			
Patient Risk Group	**TYPE A**	**TYPE B**	**TYPE C**	**TYPE D**
LOW Risk Group	I	II	II	III*
MEDIUM Risk Group	I	II	III*	IV
HIGH Risk Group	I	III	IV	V
HIGHEST Risk Group	III	IV	V	V

*Projects that can't be completely isolated or sealed from occupied spaces should include negative air exhaust requirements as listed in Class IV precautions

Class III Risk Mitigation

- Provide active means to prevent airborne dust dispersion into the occupied areas
- Means for controlling minimal dust dispersion:
  - Hand-held HEPA vacuum devices
  - Polyethylene plastic containment
  - Isolation of work area by closing room door
- If work area is contained, then it must be neutrally to negatively pressurized at all times
- Seal all doors with tape that will not leave residue

Class III Risk Mitigation

- Transport trash and debris
  - Nonporous/smooth and cleanable containers (with a hard lid)
  - Containers must be damp-wiped cleaned and free of visible dust/debris before leaving the contained work area

- Install an adhesive (dust collection) mat at entrance of contained work area
  - Adhesive mats must be changed routinely and when visibly soiled

- Maintain clean surroundings when area is not contained
  - Damp mopping
  - HEPA vacuuming surfaces

Class IV

- Includes Type B-D
  - Small scale, short duration to major demolition
- Includes Medium-Highest risk
  - Patient care support areas to highest risk patients

	Construction Project Type			
Patient Risk Group	**TYPE A**	**TYPE B**	**TYPE C**	**TYPE D**
LOW Risk Group	I	II	II	III*
MEDIUM Risk Group	I	II	III*	IV
HIGH Risk Group	I	III	IV	V
HIGHEST Risk Group	III	IV	V	V

Class IV Risk Mitigation

Barriers

- Barriers meet NFPA 241 requirements including:
  - Extend to the ceiling or to the deck above
  - All penetrations through the barrier shall meet the appropriate fire rating requirements
  - Seal all penetrations using approved materials (UL schedule firestop)

Class IV Risk Mitigation

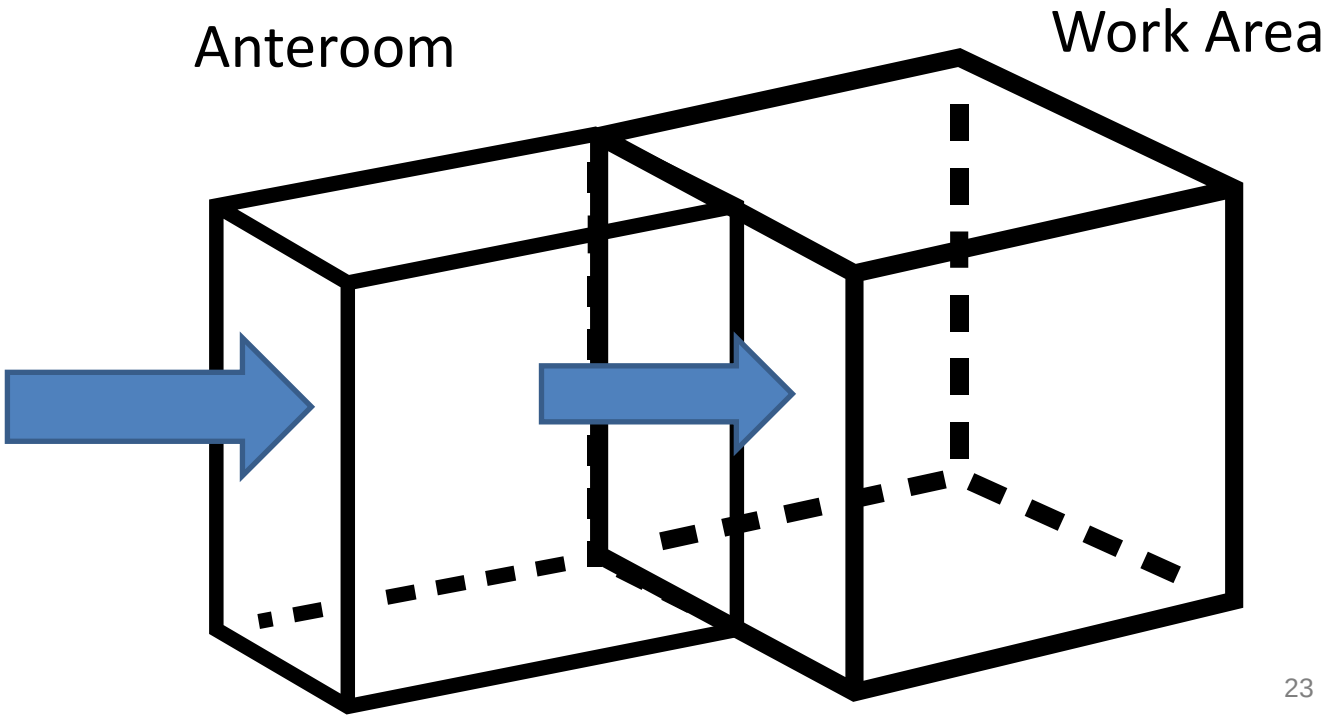
Barriers

- Barrier construction activities must be completed in a manner that prevents dust release
  - Secure plastic barriers to ground and ceiling and secured from movement or damage
  - Apply tape that will not leave a residue to seal gaps between barriers, ceiling or floor
  - Anteroom required
- Environmental Containment units approved for Class IV precautions
  - Must have HEPA filtered exhaust

Class IV Risk Mitigation

Pressurization

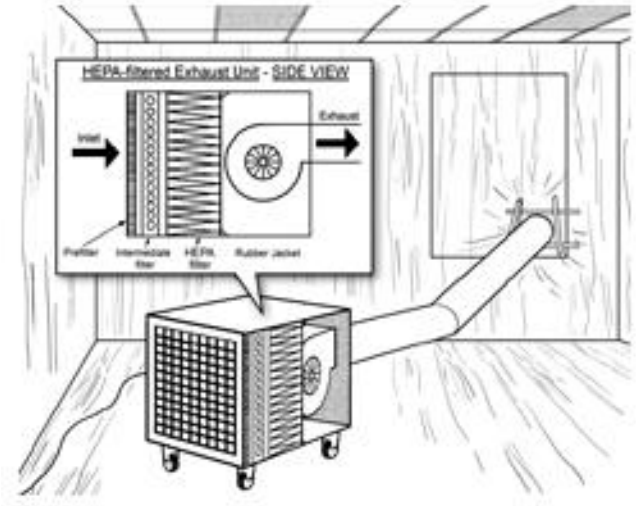
- Negative airflow required
  - The airflow must cascade from outside to inside the construction area
  - The entire construction area must remain negatively pressurized



Class IV Risk Mitigation

Pressurization

- Maintain negative pressurization of the entire workspace using HEPA exhaust air systems
  - Directed outdoors whenever possible
  - Exhaust discharged outdoors that is >25 feet from entrances, air intakes, and windows does not require HEPA-filtered air



Class IV Risk Mitigation

Pressurization

- If exhaust directed indoors, must be HEPA filtered
  - Prior to start of work, HEPA filtration must be verified by particulate measurement
  - No less than 99.97% efficiency
  - Must not alter or change airflow/pressure relationships in other areas
- Consider particulate counts throughout work to ensure contaminants are not escaping work area
- **Not acceptable** to exhaust into shared or recirculating HVAC systems
- Monitor negative pressure with device on exterior of work containment
  - Device should have a **visual** pressure indicator to assure proper pressure is **continuously** maintained

Class IV Risk Mitigation

Particulate Counts

- HEPA filtration verification using particle counter
  - Prior to start of work
  - Routinely during work
- First reading at HEPA machine within the construction site
- Second reading at exhaust

Calculate Percent Reduction:

$$\frac{(\text{PC at Intake} - \text{PC at exhaust})}{\text{PC at Intake}} \times 100 = \text{Percent Reduction}$$

Class IV Risk Mitigation

Containment of Job site

- Trash and debris removal same as Class III
- Adhesive mat at entry of worksite
- Worker clothing
  - Clean and free of visible dust before leaving the work area
  - HEPA vacuuming of clothing or use of cover suits
  - Wear shoe covers before entering the work area.
    - Change prior to exiting anteroom to non-work areas
    - Replace damaged shoe covers immediately

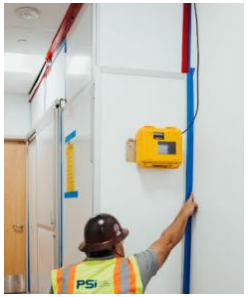
Class V

- Includes Type C and Type D
  - Large scale, longer duration to major demolition
- Includes High and Highest risk group
  - All patient care areas

	Construction Project Type			
Patient Risk Group	**TYPE A**	**TYPE B**	**TYPE C**	**TYPE D**
LOW Risk Group	I	II	II	III*
MEDIUM Risk Group	I	II	III*	IV
HIGH Risk Group	I	III	IV	V
HIGHEST Risk Group	III	IV	V	V

Class V Risk Mitigation

- Includes recommendations from the previous classes:
  - Critical barriers
  - Pressurization
  - Containment of the job site

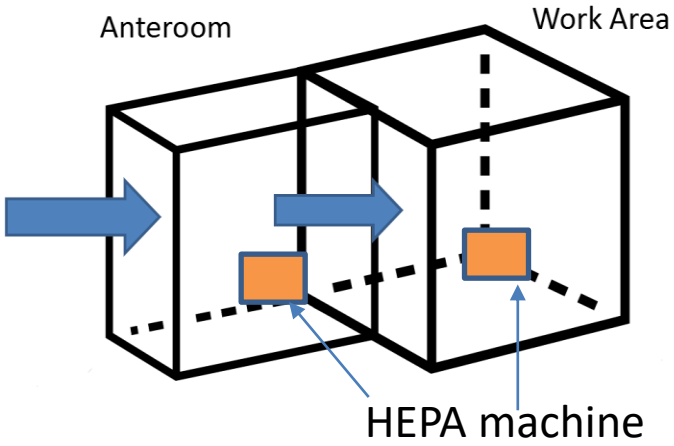


Class V Risk Mitigation

- Construct an anteroom
  - Large enough for
    - Equipment staging,
    - Cart cleaning
    - Workers
  - The anteroom must be constructed adjacent to entrance of construction work area
- Personnel will be required to wear disposable coveralls at all times during Class V work activities
  - Disposable coveralls must be removed before leaving the anteroom
  - Wear disposable shoe covers

Class V Risk Mitigation

- Negative airflow required
  - Airflow must cascade from outside to inside the construction area
  - If construction site HEPA machine is creating enough negative airflow to establish cascading airflow, then HEPA filter is not needed in anteroom
  - If construction site is not creating cascading airflow, then anteroom would need a HEPA filter exhausting into the construction site.



Let's Practice

- Visual inspection above the ceiling
  - Per electricians, work will be inspection only
  - Location will in the materials management

Type A	**Inspection and non-invasive activities.** Includes but is not limited to: • Removal of ceiling tile for visual inspection-limited to 1 tile per 50 square feet with limited exposure time. • Limited building system maintenance (e.g., pneumatic tube station, HVAC system, fire suppression system, electrical and carpentry work to include painting without sanding) that does not create dust or debris. • Clean plumbing activity limited in nature.

Medium Risk
Patient care support areas such as:
• Waiting areas. • Clinical engineering. • Materials management. • Sterile processing department - dirty side. • Kitchen, cafeteria, gift shop, coffee shop, and food kiosks.

	Construction Project Type			
Patient Risk Group	**TYPE A**	**TYPE B**	**TYPE C**	**TYPE D**
LOW Risk Group	I	II	II	III*
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HIGH Risk Group	I	III	IV	V
HIGHEST Risk Group	III	IV	V	V

Let's Practice

- Renovation of breakroom
  - Moderate dust generation
  - Expected work be completed in 2 days
  - Breakroom not on clinical unit

Type C	Large-scale, longer duration activities that create a moderate amount of dust and debris. Includes but is not limited to: • Removal of preexisting floor covering, walls, casework or other building components. • New drywall placement. • Renovation work in a single room. • Non-existing cable pathway or invasive electrical work above ceilings. • The removal of drywall where a moderate amount of dust and debris is created. • Dry sanding where a moderate amount of dust and debris is created. • Work creating significant vibration and/or noise. • Any activity that cannot be completed in a single work shift.

Low Risk
Non-patient care areas such as:
• Public hallways and gathering areas not on clinical units. • Office areas not on clinical units. • Breakrooms not on clinical units. • Bathrooms or locker rooms not on clinical units. • Mechanical rooms not on clinical units. • EVS closets not on clinical units.

	Construction Project Type			
Patient Risk Group	**TYPE A**	**TYPE B**	**TYPE C**	**TYPE D**
LOW Risk Group	I	II	II	III*
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HIGH Risk Group	I	III	IV	V
HIGHEST Risk Group	III	IV	V	V

Let's Practice

- Renovation of multiple rooms
  - Work will take 4 weeks
  - Multiple procedural rooms being renovated

Type D	**Major demolition and construction activities.** Includes but is not limited to: • Removal or replacement of building system component(s). • Removal/installation of drywall partitions. • Invasive large-scale new building construction. • Renovation work in two or more rooms.

Highest Risk

Procedural, invasive, sterile support and highly compromised patient care areas such as:

- All transplant and intensive care units.
- All oncology units.
- OR theaters and restricted areas.
- Procedural suites.
- Pharmacy compounding.
- Sterile processing department - clean side.
- Transfusion services.
- Dedicated isolation wards/units.
- Imaging suites: invasive imaging.

	Construction Project Type			
Patient Risk Group	**TYPE A**	**TYPE B**	**TYPE C**	**TYPE D**
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Incorporating ICRA 2.0 in our Facility

- Multidisciplinary team
  - Construction and Renovation Project Managers
  - Director of Engineering
  - Facilities Maintenance Leadership
  - Environmental Health and Safety
  - Infection Prevention and Control Department

Incorporating ICRA 2.0 in our Facility

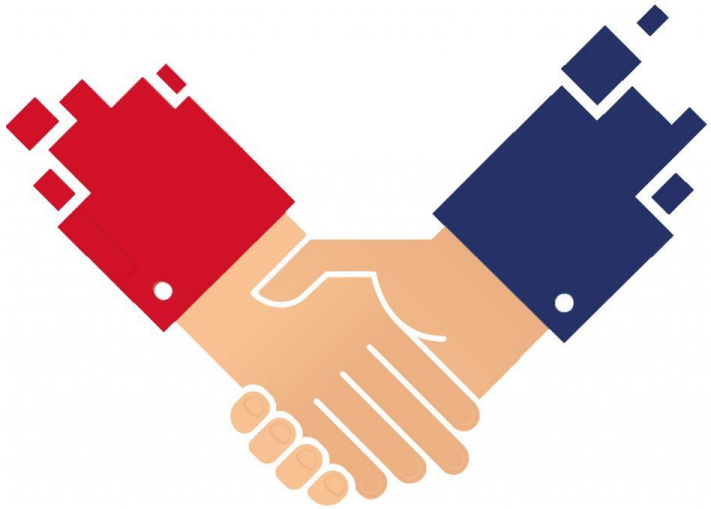
Review of all recommendations

Discussed changes and made edits to existing ILSM/ICRA document

Future state: Create Facilities Maintenance Standing practice procedures

Partnerships is key to success!

- Key partnerships
  - Construction project managers
  - Engineers
  - Facilities Maintenance
  - Contractors



Contractor Training

Revamping our Contractor training program

Annual training for contractors

Training modality

Tools

- [ASHE Infection Control Risk Assessment 2.0 (ICRA 2.0™) Toolkit | ASHE]

Tools

Start here with two complimentary tools: Matrix of Precautions for Construction, Renovation and Operations and Infection Control Risk Assessment and Permit.

Download

Process Guide

Your how-to manual for successfully engaging the ASHE ICRA 2.0™ tool and process. Plus how to engage an ICRA team and detailed guidance about mitigation control.

Learn More

Education

Two learning opportunities to enhance and round out the toolkit. Take the online course at your own pace or take it to the next level with a train-the-trainer program.

Trainer-The-Trainer

E-Learning Course

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Questions?