

### Infection Control Risk Assessment (ICRA)

**Instructor Guide** 

Version II September 2016



# CPWR THE CENTER FOR CONSTRUCTION RESEARCH AND TRAINING

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### BACKGROUND

Construction work in a healthcare facility such as a hospital, or other occupied facilities such as office buildings and schools may require special procedures, equipment and precautions for performing the work. Construction, renovation and demolition activities can affect hospital patients, visitors and can even cause new infections. Dust from construction, renovation and demolition activities can be a hazard for patients, healthcare workers, and visitors. Dust is especially a risk for patients with compromised immune systems.

To help prevent further injury from construction dust, hospitals use a system called Infection Control Risk Assessment (ICRA) to decide how to protect their patients, staff, and visitors during a construction project. The ICRA will determine the level of barriers, dust control, cleaning, and patient protective apparel you must use during your construction project. You may have to build barriers, maintain negative air pressure inside your work area, or use special air filtering equipment. You may have to put up a temporary plastic sheeting barrier while you build a long-term rigid barrier behind it. The ICRA may require you to spend more time putting up barriers to isolate your work area than it takes to actually perform the work.

### **GENERAL INFORMATION**

### Purpose of the instructor guide

This guide is designed to provide instructors/trainers with the information needed to successfully conduct the Infection Control Risk Assessment (ICRA) Awareness training.

### **Teaching Materials**

- Instructor Guide Includes:
  - o Thumbnails and numbers of corresponding PowerPoint slides
  - Notes for each slide
- PowerPoint slides Include:
  - Notes for each slide
- Participant Manual
- Handouts

### Suggestion for time management

It takes approximately 6-8 hours to complete the ICRA Awareness training. The schedule has flexibility built into it to allow for site specific information to be included. Site specific information may include PowerPoints and written materials provided by the employer of the hospital administration.



### **Preparing for Class**

### **Classroom**

Set up an LCD projector and computer. Click through the PowerPoint to ensure equipment is working properly.

Each participant should have an application, participant manual, course evaluation, note pad and pen. Ask participants to fill out the application form. Explain the evaluation form is being distributed to them at the beginning of the course so they can write down their comments and suggestions as the class is being conducted.

Distribute a pre-test to each participant and tell them this is designed to help you understand the level of experience and knowledge within the class. This pre-test will not be graded or used to determine if a participant passes the course. The pre-test should not take more than 10 minutes to complete. Collect the pre-tests and determine what information participants already know and what they don't know. Discard the pre-tests when you are done reviewing them.

### Hands-on

Set up the mobile containment cube to make sure all parts are available and working. Disassemble the containment cube and place out of the way of the classroom. The participants will construct the containment cube as part of their hands-on activities.

Collect samples of other materials used on ICRA construction projects; sticky mats, patient protective apparel and soft-wall barrier components (If available). Place the items in the classroom for demonstration/show and tell.



### Lesson Plan

### (TIME 6.0 – 8.0 hours)

Welcome!

### **NOTES FOR SLIDE 2**

Introductions:

- Name
- Trade
- Years in construction

### Introductions

Name
 Trade

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Years in construction

### Goal of the ICRA Awareness Course

### NOTES FOR SLIDE 3

The ICRA awareness course provides the necessary training to understand the Infection Control Risk Assessment (ICRA) procedures for properly performing healthcare or other occupied facility construction and renovation tasks. In addition, participants will examine the

### Goal

 Provide the necessary training to understand the Infection Control Risk Assessment (ICRA) procedures for properly performing healthcare or other occupied facility construction and renovation tasks. In addition, participants will examine the practical use of ICRA tools including containment, negative air, HEPA filtration, and work practice techniques.

practical use of ICRA tools including containment, negative air, HEPA filtration, and work practice techniques. The course uses a variety of adult education classroom activities to build upon the experiences participants have working in construction, renovation, demolition, or healthcare facility environments.

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### ASK CLASS:

How many of you have heard of ICRA before today? Has anyone worked in a hospital environment? Where did you work and what type of work were you doing?

### After a little discussion, let them know you'll be discussing the concepts of ICRA throughout this course.

Or



If no one has any experiences to talk about, let them know you'll be discussing the concepts of ICRA throughout this course.

### Learning Objectives

### **NOTES FOR SLIDES 4-6**

We expect that by the end of today's training each of you will be able to:

- Define ICRA and explain why it is used.
- Describe how healthcare construction worksites differ from regular construction worksites.
- Explain the importance of following work place rules and using designated areas for breaks, as defined by the ICRA.
- Define Hospital Acquired Infections (HAI) and describe the Chain of Infection.
- Identify common pathogens found in a healthcare setting and describe how they are transmitted.
- Identify unique hazards specific to healthcare construction, including hospital utility systems and medical gas lines, and methods to avoid them.
- Describe the steps used in the creation of an Infection Control Risk Assessment Plan.
- Specify the specific infection control precautions used for the four classes of ICRA construction.

### After completing this course, you will be able to:

- · Define ICRA and explain why it is used.
- Describe how healthcare construction worksites differ from regular construction worksites.
- Explain the importance of following work place rules and using designated areas for breaks, as defined by the ICRA.
- Define Hospital Acquired Infections (HAI) and describe the Chain of Infection.

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### After completing this module, you will be able to:

- Identify common pathogens found in a healthcare setting and describe how they are transmitted.
- Identify unique hazards specific to healthcare construction, including hospital utility systems and medical gas lines, and methods to avoid them.
- Describe the steps used in the creation of an Infection Control Risk Assessment Plan.
- Specify the specific infection control precautions used for the four classes of ICRA construction.

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### After completing this module, you will be able to:

- Identify different types of barriers used and guidelines for choosing them.
- Describe the procedure for entering/exiting through an anteroom
- List the two main functions of a negative air machine in an ICRA work environment.
- Describe appropriate methods for transporting trash, tools and materials from the workspace.
- Identify potential hazards to workers in a healthcare setting.
- Define life safety system and explain the use of Interim Life Safety Measures in a healthcare worksite.
- Identify different types of barriers used and guidelines for choosing them.
- Describe the procedure for entering/exiting through an anteroom.
- List the two main functions of a negative air machine in an ICRA work environment.



- Describe appropriate methods for transporting trash, tools and materials from the workspace.
- Identify potential hazards to workers in a healthcare setting.
- Define life safety system and explain the use of Interim Life Safety Measures in a healthcare worksite.

### What is ICRA?

### **NOTES FOR SLIDE 7**

Only show the title of the PowerPoint slide "What is ICRA?"

To get us started, I'd like us to talk about:

### ASK THE CLASS:

"What is ICRA?" Can anyone tell me what ICRA is?

On a white board or flipchart write down the various descriptions given by the participants.

Once everyone is done giving a description, advance the PowerPoint to show the definition from the participant manual.

### ADDITIONAL INSTRUCTOR NOTES

### If students can't come up with ideas, ask a few of these questions.

- What is the primary responsibility of a hospital? (Make people better.)
- What is it about construction that can cause infections to be spread in a hospital? (Uncontrolled construction dust can spread infections to clean parts of a hospital.)
- How can constructions workers, working in a hospital, help control infections?? (Follow the rules established to prevent the spread of infections within the hospital.)





### Where is ICRA Used?

### **NOTES FOR SLIDE 8**

Only show the title of the PowerPoint slide "Where is ICRA used?"

From our previous discussion we identified that ICRA is used to prevent the spread of infections in



healthcare facilities. Now that we know what ICRA is, let's discuss where ICRA can be used.

### ASK THE CLASS:

What are some examples of healthcare facilities where ICRA might be used?

### Write the participant responses on a whiteboard or flipchart.

Once everyone is done giving examples, advance the PowerPoint to show the examples from the participant manual.

### ASK THE CLASS:

Can you think of other types of facilities where controlling dust to protect the occupants or the processes happening within the building might be important during construction, renovation or demolition?

Write the participant responses on a whiteboard or flipchart.

### ADDITIONAL INSTRUCTOR NOTES

If students can only provide a few (or no examples) highlight the last 4 examples on the slide. Ask them what these facilities have in common. (People occupy them and exposure to dust and the air quality of the space is a concern.)

Additional examples include: Factories, food processing plants, electronics manufacturing.



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### Hospital Construction is different

### **NOTES FOR SLIDE 9**

Today's healthcare construction market consists of both new construction and renovation. When we think of hospital construction, we are also talking about renovation and demolition. During the course, when we say "hospital construction" we really are discussing any one of these construction activities.



 What's different between doing construction in a hospital and regular construction?

ASK THE CLASS:

What's the difference between doing hospital construction and regular construction?

### Write the participant responses on a whiteboard or flipchart.

### ADDITIONAL INSTRUCTOR NOTES

In case participants cannot think of any differences, below are some examples you can use to get them thinking:

- 1. Hospitals cannot shut down for construction. They have to operate 24 hours a day, seven days a week.
- 2. Nurses, doctors, and other hospital staff may be working around you.
- 3. Patients may be close to your activities.
- 4. The pace on a normal construction project is typically fast paced with the goal of finishing the project as fast as possible.

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### Rules regarding how construction workers behave.

### NOTES FOR SLIDES 10 and

11

Only show the title of the PowerPoint slide "Rules regarding how construction workers behave."

Working on a hospital project has different rules than normal construction. Because you are working around staff, patients and visitor, our behavior has to be respectful. Remember, being in a hospital is already stressful so we do not want to add to the stress level.

## Divide the participants into 3 or 4 groups. Tell them to designate



- Act respectfully toward the hospital staff and patrons.
- Do not stare or point at patients or visitors.
- Take the next elevator if the elevator is already occupied.
- Most hospital campuses are tobacco free and not just smoke free!
- Only appropriate language should be used.
- Voice levels should be kept low.

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one person to write down the group's responses on a piece of flip chart paper.

### ASK THE CLASS:

What behaviors do you think construction workers need to follow when working in a hospital?

Tell the groups they have about 5 minutes to write down as many ideas they can come up with. Remind them to write their list on the flip chart.

Check in after 5 minutes. If they groups are done proceed to the next step. If the groups are still working, give them 1 more minute.

Go around the room and ask each group to read one item from their list.

On a white board or flipchart write down the various descriptions given by the participants.

Review the information on slides 10 and 11 to fill in any gaps the list might have.

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### There are special hospital rules to comply with.

### **NOTES FOR SLIDE 12**

Along with specific behaviors to follow, hospitals may also have special rules construction workers need to follow. These rules are put into place to minimize the disruption construction workers can have on the hospital staff, patients and visitors.

### There are special hospital rules to comply with.

- Only park in designated areas.
- · Requirements to wear ID badges.
- Specific paths through the building for workers, materials, and debris.
- Emergency exit routes.
- The restrooms you can use.
- Whether you can use public vending machines.
- Whether you can use their public cafeteria.
- Break area locations.

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### Keeping the participants in the same groups:

### ASK THE CLASS:

What specific rules do you think construction workers need to follow when working in a hospital?

### Tell the groups they have about 5 minutes to write down as many ideas they can come up with. Remind them to write their list on the flip chart.

Check in after 5 minutes. If they groups are done proceed to the next step. If the groups are still working, give them 1 more minute.

Go around the room and ask each group to read one item from their list.

### On a white board or flipchart write down the various descriptions given by the participants.

Review the information on slide 12 to fill in any gaps the list might have.

- Only park in designated areas parking may be limited and the hospital will want its staff, patients and visitors to have the best spots.
- Requirements to wear ID badges security is important and the hospital will want to make sure authorized workers are easily identifiable.
- Specific paths through the building for workers, materials, and debris to minimize interactions with patients and visitors, you may be restricted to certain hallways, elevators, etc.
- Emergency exit routes you will need to become familiar with the emergency exits.
- The restrooms you can use the hospital may not allow you to use specific bathrooms. They may require you to use specific ones only.



- Whether you can use public vending machines these may be reserved for hospital staff, patients and visitors only. The hospital may try to limit the amount of exposure patients and visitors have with the construction folks.
- Whether you can use their public cafeteria this again is a way to limit the amount of interaction between you and the hospital.
- Break area locations the hospital may specify where you can take breaks. They may set aside a separate break room for the workers.

### Your job requires a level of confidentiality.

### **NOTES FOR SLIDE 13**

Working around file cabinets or computer workstations that contain patients' medical records creates a legal hazard under HIPAA. HIPAA stands for the Health Insurance Portability and Accountability Act of 1996, a federal law which requires healthcare providers to maintain the



Your job requires a level of

security and confidentiality of patients' health information.

- Do not touch or look at medical files!
- **Do not** share anything you see or hear at a hospital!
- You may have to sign the hospital's internal HIPAA confidentiality policy.

Contact the hospital staff if you see medical records in your work area. You and/or your employer could be sued if you are involved in a privacy violation.

# *There are specific hospital alarms you need to be aware of.*

### NOTES FOR SLIDE 14

Only show the title of the PowerPoint slide "There are specific hospital alarms you need to be aware of."

Explain to the class that they need to become familiar with the hospital emergency codes.

### There are specific hospital alarms you need to be aware of.





### Click on the PowerPoint one more time so the following questions appear:

What does "Code Blue" mean?

What does "Code Red" mean?

What does "Code Green" mean?

### Ask the class

Would anyone like to answer the first question?

### Once they answer it, click on the PowerPoint. Repeat this for the next 2 questions until all 3 questions have been answered.

### Click on the PowerPoint once, "Site Specific Codes" appears.

Explain that hospitals may have different codes. These will be explained in a facility briefing when you start working on the job. You need to know what these codes mean, and what to do when an alarm is announced. Some codes won't affect you, but some might require you to evacuate the building.

# Working in a health care facility carries with it certain risks.

### NOTES FOR SLIDE 15

Before working in a health care setting, all of your immunizations should be current. To avoid getting the hospital patients sick, it is very important not to come to work sick. Additionally, your supervisor should be notified if anyone on your crew becomes sick while working at a health care facility.

### Working in a health care facility carries with it certain risks.

- Your immunizations should be current.
- It is very important not to come to work sick.
- Notify your supervisor if anyone on your crew becomes sick while working at a health care facility.
- If you have an immune compromised condition, you should consult with your doctor.

The following are examples of immunizations workers should consider when working within an ICRA environment:

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- Influenza vaccination (flu shot)
- Tetanus, diphtheria, and acellular pertussis (Td/Tdap) vaccination
- Varicella vaccination (Chickenpox)
- Measles, mumps, rubella (MMR) vaccination
- Hepatitis B vaccination

Something as simple as catching a cold at work may be an indication the precautions are not working. Any illness or infection contracted at the facility



should be reported to the infection control department so they can take whatever steps necessary to trace, track and contain any potential outbreaks.

Examples of immune compromising conditions are:

- Hepatitis
- chronic pneumonia
- HIV
- asbestosis

# Hospitals hazards that are not on typical construction sites.

Hospitals hazards that are not on

typical construction sites.

· Medical Gas Lines

Low-pressure "medical air"
 High-pressure "instrument air"

· Negative-pressure vacuum

Oxygen
 Nitrogen
 Nitrous oxide
 Carbon dioxide

Glass Pipes
 Helipads

.

· MEP systems are critical, and can't be interrupted.

### NOTES FOR SLIDE 16

Only show the title of the PowerPoint slide "Hospitals hazards that are not on typical construction sites."

### ASK THE CLASS:

Think about the various utilities and

medical devices in a hospital room, are there any unique hazards in these rooms that are not found on typical construction hazards?

### Write the participant responses on a whiteboard or flipchart.

### Review the information on slide 16 to fill in any gaps the list might have.

Mechanical, Electrical and Plumbing systems are critical, and can't be interrupted.

Medical Gas Lines - Medical gas lines are an extra utility to be concerned with in hospitals. You may encounter color-coded outlets, and lines inside the walls.

- Oxygen
- Nitrogen
- Nitrous oxide
- Carbon dioxide
- Low-pressure "medical air"
- High-pressure "instrument air"
- Negative-pressure vacuum



Glass Pipes - The glass is very resistant to chemicals and won't corrode, so it is typically used for waste lines in hospitals and laboratories. You should assume that these lines contain hazardous chemicals or biohazards.

### Once the class has reviewed the hazards found in a hospital room ask them if there are any unique hazards outside of the hospital that we need to be aware of.

Helipads - Many hospitals have helipads, landing areas for ambulance helicopters. If your construction project involves a crane or excavator, it must lower its boom when a helicopter is operating nearby, as well as at the end of the shift. Workers using aerial lifts near helipads must also watch for approaching helicopters, the downwash could cause the lift to overturn.

# Hospitals are concerned about hospital-acquired infections.

### **NOTES FOR SLIDE 17**

Hospital-acquired infections or HAI, is when a patient acquires, or gets, an infection inside the hospital.

### ASK THE CLASS:

Does anyone have an example of a hospital acquired infection that happened to them or someone they know?

### Hospitals are concerned about hospital-acquired infections.

- HAI = Hospital Acquired Infections
- This is when a patient acquires, or gets, an infection inside the hospital.
- Patients in U.S. hospitals get about 1.7 million HAIs each year.
- HAIs are costing healthcare facilities almost \$10 billion a year.
   More importantly, HAIs kill about 99,000 hospital patients each year.

### Limit the number of stories to one or two in the interest of time.

Hospital-acquired infections are a huge problem. HAIs occur in all settings of care, including hospitals, surgical centers, ambulatory clinics, and long-term care facilities such as nursing homes and rehabilitation facilities.

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According to a study published online September 2, 2013 in JAMA Internal Medicine, HAIs are costing healthcare facilities almost \$10 billion a year.

According to the Centers for Disease Control (CDC), about 1.7 million hospitalacquired infections occur each year and more importantly, about 99,000 hospital patients die from HAIs each year. THE CENTER FOR CONSTRUCTION RESEARCH AND TRAINING

# Understanding the chain of infection can help with the prevention of infectious diseases.

### NOTES FOR SLIDE 18

The spread of an Infectious disease results from the interaction of a pathogen, a host (patient), and an environment. Most of these diseases follow a typical chain of infection that ends with an infected patient.

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The chain of infection is made up of

six different links: pathogen, reservoir, portal of exit, means of transmission, portal of entry, and the new host. Each link has a unique role in the chain and each can be interrupted, or 'broken', through various means.

ICRA is designed to break the infection chain in multiple places to ensure infections do not spread as a result of our construction activities.

The Chain of Infection is principle used in epidemiology to described infectious diseases. See:

http://www.cdc.gov/ophss/csels/dsepd/ss1978/lesson1/section10.html

### The next series of slides will address each link of the chain.

### A pathogen is a substance that causes a disease.

### **NOTES FOR SLIDE 19**

Before starting the PowerPoint presentation, distribute handouts 1 through 6.

Instruct the participants to answer the questions on the handouts as you go through the information on the next 15 slides.



### FYI: The plural of fungus is fungi, and the plural of bacterium is bacteria.

A pathogen is a substance that causes a disease, especially a living microorganism such as a fungus or bacterium. Typically the term is used to describe an infectious agent such as a bacterium, fungus, virus, or parasite that causes disease in its host.



Yeasts, molds, and mushrooms are all types of fungi. Some fungi are useful—we use yeast to make bread and beer, penicillium mold to make antibiotic drugs and blue cheese, and we eat many kinds of mushrooms.

This training will only discuss bacteria, fungi and viruses because these are the most common pathogens associated with ICRA.

# Serious infection or death can occur when mold spores are inhaled or enter the bloodstream.

### **NOTES FOR SLIDE 20**

Serious infection or death can occur when mold spores are inhaled or enter the bloodstream. Mold releases spores that can become airborne when disturbed by activities such as housekeeping, renovation, maintenance and construction work and even from air flow! These spores



are easily inhaled and can cause health problems in people who come in contact with them.

# Bacteria can cause diseases in people with weakened immune systems.

### NOTES FOR SLIDE 21

Bacteria are single-cell organisms that can also be helpful or harmful. We all have many different species of beneficial bacteria living in our intestines, which help us digest food. But other types of bacteria can make you sick. They can be resistant to



antibiotics and can be easily transmitted through the air, on contaminated surfaces and from person to person.

Exposure to bacteria can result from any type of contact, including breathing, touching or ingesting. Most bacteria are opportunistic organisms meaning they can cause diseases in people with weakened immune systems.



### Viruses are a type of pathogen.

### **NOTES FOR SLIDE 22**

A virus is a small infectious agent that replicates only inside the living cells of their hosts. They can cause minor illnesses like the common cold, but some cause life-threatening infections, such as liver infections from hepatitis B.

Viruses spread in many ways;



- By coughing and sneezing.
- By the fecal–oral route. Hygiene and handwashing can act as effective barriers to stop the transmission of diseases via fecal-oral pathways.
- Are passed from person to person by contact, or by entering the body in food or water.

### A pathogen is a substance that causes a disease.

### **NOTES FOR SLIDE 23**

Common pathogens that are of concern in hospitals especially when disturbed by construction activities are:

• Aspergillus - The most common cause of construction-related hospital-acquired infections.



 Legionella - is a bacterium that can cause Legionnaires' disease, or legionellosis



### Aspergillus is common in the environment.

### **NOTES FOR SLIDE 24**

Aspergillus is in soil, on plants, and in decomposing plant matter. It is also in the dust inside buildings, such as the dust on top of suspended ceiling tiles. Most people breathe in aspergillus spores every day without getting sick. However, people with weakened immune



systems or lung diseases are at a higher risk of developing health problems due to aspergillus.

Common sources (non-construction) of aspergillus in a hospital are:

- Ventilation systems
- Cleaning activities especially concerning is the use of non-HEPA vacuums.
- Waste containers
- Potted plants
- Water systems Water can contain fungi, and water systems may become colonized. *Aspergillus* species have been recovered from water taps, patient showers, and ice making machines.
- Aspergillus can be found growing on damp walls, as a major component of mildew.

Construction dust can spread infection because of fungi spores sticking to the dust particles. Fungi spores are like the seeds of plants, except they are smaller and usually just single-celled. But unlike seeds, fungi spores aren't damaged by drying out, or by extreme temperatures. Some spores are microscopic, and can spread in the air, or be airborne.



# Aspergillus fungus can cause an infection called aspergillosis.

### **NOTES FOR SLIDE 25**

Aspergillus fungus can cause an infection called aspergillosis. This disease usually affects people with weakened immune systems, such as hospital patients. A less-serious form of aspergillosis causes allergic symptoms like coughing and wheezing, but doesn't invade the body and destroy tissues.



Invasive aspergillosis most commonly causes lung disease, but it can spread throughout the body and infect other organs. Aspergillosis is usually caused by inhaling aspergillus spores. The very small size of aspergillus spores lets them settle deep into the lungs. A hospital patient could also become infected by spores on dust particles falling out of the air into an open wound or surgical incision.

According to a 2006 report in the Journal of Hospital Infections\*, medical researchers who traced aspergillosis outbreaks in hospitals found that almost half of those infections were related to construction activity in the hospital. Dust is a prime carrier of aspergillus spores, and construction activities create dust. This is why ICRA procedures to control dust are so critical.

\*(The Journal of Hospital Infection July 2006 Volume 63, Issue 3, Pages 246–254)

# Legionella is a bacterium that can cause Legionnaires' disease.

### **NOTES FOR SLIDE 26**

These bacteria were named in 1976, when many people who went to an American Legion convention in Philadelphia got sick from this disease. Among more than 2,000 attendees of a Legionnaires' convention held at the Bellevue-Stratford Hotel, 221 attendees contracted the disease and 34 of them died.





Legionnaires' disease is transmitted by inhalation of water mist or vapor and/or soil contaminated with the Legionella bacteria. Legionnaires' disease is not transmitted from person to person.

The length of time between exposure to the bacteria and the appearance of symptoms is generally two to 10 days, but can extend to as much as 20 days. For those in the hospital, between 0.4 to 14% exposed to the bacteria will develop the disease. While among those in the general population exposed, between 0.1 to 5% will develop the disease.

### Legionella can be found throughout healthcare facilities.

### **NOTES FOR SLIDE 27**

Legionella bacteria are found naturally in the environment, usually in warm water. Sources where temperatures allow the bacteria to thrive include hot-water tanks, cooling towers, evaporative condensers of large air-conditioning



systems, and even decorative fountains, such as those commonly found in hospitals.

During construction projects, hospital water systems are often disrupted. If the water is shut off, there could be legionella bacteria that were harmlessly stuck to the inside of a pipe that come loose when the water is turned back on. Shutting off some of the water during construction could create a dead end in the system, allowing water to stagnate and bacteria to multiply.

In 2015, five cooling towers in the South Bronx NY tested positive for legionella — including towers at the Lincoln Medical and Mental Health Center. None of the people who became ill had been patients or staff members at Lincoln Medical and Mental Health Center. The towers at all five contaminated sites were flushed and cleaned with antibacterial solutions to decontaminate and sterilize them.



# The reservoir is the environment in which the pathogen is found.

### **NOTES FOR SLIDE 28**

Only show the title of the PowerPoint slide "The reservoir is the environment in which the pathogen is found."

Construction projects uncover reservoirs of disease producing pathogens during demolition,



renovation, maintenance and construction; the risk for transmittal must be identified prior to starting any work.

### ASK THE CLASS:

Can you think of any areas in a hospital that would be considered a reservoir?

Write the participant responses on a whiteboard or flipchart.

Click on the PowerPoint to reveal the suggested areas. Compare the list the class generated with the list from the PowerPoint.

### ASK THE CLASS:

Are there any new areas they have thought of after seeing the PowerPoint?

Add them to your whiteboard or flip chart.

### Review the following areas as a minimum number of areas considered to be reservoirs:

- Behind drywall
- Ceilings/Plenum spaces
- Ductwork
- Plumbing systems
- Cooling towers



# Portal of exit means how the pathogen is released into the ambient air.

### NOTES FOR SLIDE 29

Portal of exit means how the pathogen is released into the ambient air. Examples would be opening in walls, doors, ductwork, open ceilings, and plumbing.

Proper barriers and work practices can reduce or completely break this link within the chain.



### ASK THE CLASS:

Are there other Portals of Exit that have not been mentioned?

Write their responses on a whiteboard or flip chart.

# Pathogens are spread by three routes that are a concern for infection control.

### **NOTES FOR SLIDE 30**

A mode of transmission is the movement or the transmission of pathogens from a reservoir to a susceptible host. Once a pathogen is released it can be transmitted over large areas through air current, water supply, construction equipment, carts and debris and clothing of workers.



Pathogens are spread by three routes that are a concern for infection control:

- In the air (airborne)
- In water (waterborne)
- On surfaces (surface transfer)

When pathogens become airborne, meaning moved by or through air, they can be inhaled into the respiratory system, ingested or enter the body through open



wounds or sores. Pathogens can become airborne through common activities, such as tearing out carpet, grinding, moving ceiling tiles, or cutting into a wall.

Pathogens can be waterborne, meaning moved by or through water. With any source of water, there is potential exposure to waterborne pathogens. A water supply system can become contaminated in a variety of ways, such as sediment buildup in plumbing, stagnant water or a backed up sewer.

Pathogens are transferred by skin or clothing coming in contact with a contaminated surface. Surface transfer can happen at any time, especially during construction, renovation, maintenance and demolition because of the amount of airborne particles that settle out of the air onto a surface.

# The Portal of Entry is the opening that allows the pathogen to enter the host.

### **NOTES FOR SLIDE 31**

The Portal of Entry is the opening that allows the pathogen to enter the host. As construction workers we are not in direct contact with the patients but how we do our work directly affects whether we indirectly expose the patients through the above portals. Improper control at the



Portal of Exit is one way the HAI's are transmitted to the patients via the health care workers, water and HVAC system. Using proper ICRA controls at the Portal of Exit has a tremendous impact on HAIs at the Portal of Entry.

# Immunocompromised patients are most at risk during construction activities.

### **NOTES FOR SLIDE 32**

The medical term for a weakened immune system is immunocompromised.

A susceptible host is a person who has little resistance against a particular pathogen and who, if exposed to this



pathogen, is likely to contract an infection. When healthy people are exposed to



small amounts of pathogens, their immune systems can fight off the invaders and prevent an infection. But people with weakened immune systems could catch a deadly infection, since their defenses are compromised.

### Examples of patients who are immune compromised.

### NOTES FOR SLIDE 33

Only show the title of the PowerPoint slide "Examples of patients who are immune compromised."

### ASK THE CLASS:

Now that we know what a susceptible



host is, can you think of any type of patients in a hospital who would be considered immunocompromised patients?

### Write the participant responses on a whiteboard or flipchart.

Click on the PowerPoint to reveal the examples of immunocompromised patients. Compare the list the class generated with the list from the PowerPoint.

Ask the class if there are any other groups of patients they have thought of after seeing the PowerPoint. Add them to your whiteboard or flip chart.

You have completed all of the slides related to the Chain of Infection.

Now ask the participants to take a few minutes to complete Handouts 1 through 6. Review each handout by reviewing the answers to all six sheets.

The answers to the handouts can be found below.



### Handout 1



Handout #1

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### Handout 2

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### Handout 3

### What is a Portal of Exit? Portal of exit means how the pathogen is released into the ambient air. Example of Portals of exit include? Portal of Opening in walls Doors Exit Ductwork Open ceilings Plumbing CPWR Handout #3

### Handout 4



Handout #4



### Handout 5

### What is a Portal of Entry?

The Portal of Entry is the opening that allows the pathogen to enter the host.

How does construction affect the portal of entry? As construction workers we are not in direct contact with the patients but how we do our work directly affects whether we indirectly expose the patients through the above portals.





Handout #5

### Handout 6

#### What is a susceptible host?

A susceptible host is a person who has little resistance

against a particular pathogen and who, if exposed to this

pathogen, is likely to contract an infection.

### Examples of patients who are immune compromised:

#### Patients who have HIV

Patients with new unknown diseases, or who are receiving new treatments Pregnant women

Newborns, especially those born prematurely Elderly patients

Terminally ill patients

- Patients on specialized equipment, such as dialysis or ventilators Patients with open sores, wounds or burns
- Patients undergoing chemotherapy or radiation therapy
- Organ and bone marrow transplant patients
- Patients undergoing steroid, or other treatments for such things as transplants, asthma and rheumatoid arthritis





# ICRA is a planning tool to minimize hospital-acquired infections.

### **NOTES FOR SLIDE 34**

Only show the title of the PowerPoint slide "ICRA is a planning tool to minimize hospital-acquired infections." and the first 2 bullets. Discuss the information with the class.

### ICRA is a planning tool to minimize hospital-acquired infections.

- ICRA is a systematic method of evaluating the type of construction activity, and the group of patients who could be exposed to infection risks, in order to decide what precautions are required.
- The results of the evaluation and planning are documented in the ICRAplan.
- The ICRA will typically be done by the hospital staff, with input from other parties like architects, consultants, and contractors.

ICRA is a systematic method of

evaluating the type of construction activity, and the group of patients who could be exposed to infection risks, in order to decide what precautions are required. The results of the evaluation and planning are documented in the ICRA plan.

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### Before advancing the slide, ASK THE CLASS:

What groups of people do you think should be involved in the development of the ICRA Plan?

### Write the participant responses on a whiteboard or flipchart.

### Advance the slide and compare the list generated by the participants with the information below.

In larger hospitals, a team of people may be involved in writing the ICRA: the construction manager, infection control staff, safety staff, epidemiology department staff, and doctors or nurses in charge of the areas under construction. Sometimes a construction company employee, such as the safety manager, might be involved in the ICRA planning.

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# The ICRA process does a lot of things beyond identifying risks.

### **NOTES FOR SLIDE 35**

It influences design decisions. It sets and communicates expectations from the hospital to the construction contractors. It helps educate and train both hospital staff and you, the construction worker. It tells what equipment you will need for the job, and what instruments you might use to measure the effectiveness of that equipment. It documents compliance with accreditation requirements.

### The ICRA process does a lot of things beyond identifying risks.

- It influences design decisions.
- It sets and communicates expectations from the hospital to the construction contractors.
- It helps educate and train both hospital staff and the construction work force.
- It tells what equipment is needed for the job, and what instruments are used to measure the effectiveness of that equipment.
- · It documents compliance with legal requirements.

- ....

# The ICRA plan will include a detailed list of precautions that must be followed.

### NOTES FOR SLIDE 36

The key principles of ICRA will be discussed in greater detail later in the class.

At most hospital construction sites, the ICRA Plan will be posted at the jobsite so you can review it to make sure you have all of the proper

#### The ICRA plan will include a detailed list of precautions that must be followed.

- The key principles for infection control are separation or isolation with barriers, negative air pressure, and housekeeping.
- The list of required infection control precautions will be posted at your work area.
- The ICRA precautions help you do the right thing while making decisions on the jobsite.

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precautions in place before beginning your work. Contact your supervisor if the ICRA Plan is not posted.

Always follow the Plan. If you see something that is not right, speak up! Mistakes do happen and it is better to correct them in the beginning.



### Hospitals follow three steps in formulating the ICRA.

### NOTES FOR SLIDE 37

The most commonly used tool is the Infection Control Checklist for Risk Assessment and Precautions for Construction & Renovation developed by the Barnard, St Luke's Episcopal Hospital, Houston and Fairview University Medical Center, Minneapolis, MN. The checklist

### Hospitals follow three steps in formulating the ICRA.

- Different hospitals use different ICRA forms, but they generally follow three steps:
- 1. Identify the type of construction project activity
- 2 Identify the patient risk group that will be affected by construction.
  3 Match the type of construction project activity with the patient risk group to find the class of precautions or level of infection control activities required.

takes the ICRA staff or construction project manager through a series of steps to classify the project and provides mandatory precautions and controls.

**Distribute Handout 7**. Review the charts used in development of an ICRA Plan with the class.

Divide the class into 4 groups.

**Distribute Handout 8**. Assign each group a scenario from Handout 8. Tell them to refer to Handout 7 to complete their assigned scenario. Ask participants to write their answers on a flipchart sheet (if available).

**Ask** groups to report their answers back to the class, using their flipchart sheet. Have participants listen and complete the rest of their handout with the other groups' answers.

# ICRA employs three principles to control the spread of infections.

### NOTES FOR SLIDE 38

Controlling the spread of dust and pathogens from our construction activities can help prevent the spread of infections. After the project is assigned a class and the appropriate control measures have been determined, construction practices will start by employing



Isolation/separation with barriers
 Negative air pressure
 Good housekeeping

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three principles used to control the spread of infections:

- 1. Isolation/separation with barriers;
- 2. Negative air pressure, and
- 3. Good housekeeping



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Use the ICRA determination forms listed above to decide which class of precautions (I, II, III, IV) would apply to each scenario. Then write a brief description of the infection control requirements that a contractor must meet during the construction project and for cleanup. (List only the infection control precautions required by the ICRA.)

#### Scenario 1:

Two-week major renovation and construction in a radiology department for installing a new MRI machine.

Class: IV

#### Precautions during:

- Isolate HVAC system in area where work is being done to prevent contamination of duct system.
- Complete all critical barriers (sheetrock, plywood, plastic) to seal area from non-work area before construction begins, or implement control cube method (cart with plastic covering and sealed connection to worksite with HEPA vacuum for vacuuming prior to exit).
- Maintain negative air pressure within worksite utilizing HEPA equipped air filtration units.
- 4. Seal holes, pipes, conduits, and punctures.
- Construct anteroom and require all personnel to pass through this room so they can be vacuumed using a HEPA vacuum cleaner before leaving worksite, or they can wear cloth or paper coveralls that are removed each time they leave worksite.
- All personnel entering worksite are required to wear shoe covers. Shoe covers must be changed each time the worker exits the work area.

#### Cleanup precautions:

- 1. Do not remove barriers from work area until completed project is inspected by the hospital's Safety Department and Infection Prevention & Control Department and thoroughly cleaned by the hospital's Environmental Services Dept.
- Remove barrier material carefully to minimize spreading of dirt and debris associated with construction
- 3. Contain construction waste before transport in tightly covered containers.
- Cover transport receptacles or carts. Tape covering unless solid lid.
- 5. Vacuum work area with HEPA filtered vacuums.
- Wet mop area with cleaner/disinfectant.
- Upon completion, restore HVAC system where work was performed.

Handout #8





#### Scenario 2:

Building new exercise rooms, including the installation of new a new audio/visual system, in the physical therapy department.

Class: III

#### Precautions during:

- Remove or isolate HVAC system in area where work is being done to prevent contamination of duct system.
- Complete all critical barriers (sheetrock, plywood, plastic) to seal area from non-work area before construction begins, or use control cube method (cart with plastic covering and sealed connection to worksite with HEPA vacuum for vacuuming prior to exit).
- 3. Maintain negative air pressure within worksite, utilizing HEPA equipped air filtration units.
- 4. Contain construction waste before transport in tightly covered containers.
- 5. Cover transport receptacles or carts. Tape covering unless solid lid.

#### Cleanup precautions:

- Do not remove barriers from work area until completed project is inspected by the hospital's Safety Department and Infection Prevention & Control Department and thoroughly cleaned by the hospital's Environmental Services Department.
- Remove barrier materials carefully to minimize spreading of dirt and debris associated with construction.
- 3. Vacuum work area with HEPA filtered vacuums.
- 4. Wet mop area with cleaner/disinfectant.
- 5. Upon completion, restore HVAC system where work was performed.

#### Scenario 3:

Replacing faucets in the newborn nursery.

Class: 1

#### Precautions during:

- 1. Execute work by methods to minimize raising dust from construction operations.
- 2. Immediately replace a ceiling tile displaced for visual inspection.

#### Cleanup precautions:

1. Clean work area upon completion of task.



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#### Scenario4:

Sanding and painting walls in hospital administrative offices.

Class: II

#### Precautions during:

- 1. Provide active means to prevent airborne dust from dispersing into atmosphere.
- 2. Water mist work surfaces to control dust while cutting.
- 3. Seal unused doors with duct tape.
- 4. Block off and seal air vents.
- 5. Place dust mat at entrance and exit of work area.
- 6. Remove or isolate HVAC system in areas where work is being performed.

#### Cleanup precautions:

- 1. Wipe work surfaces with cleaner/ disinfectant.
- 2. Contain construction waste before transport in tightly covered containers.
- 3. Wet mop and/or vacuum with HEPA filtered vacuum before leaving work area.
- 4. Upon completion, restore HVAC system where work was performed.

Handout #8





### Preventing dust minimizes patient exposures.

### **NOTES FOR SLIDE 39**

Only show the title of the PowerPoint slide "Preventing dust minimizes patient exposures." and the first 2 bullets. Discuss the information with the class.

Explain to the class how the way they work can also impact how much dust is generated.

### Before advancing the slide, ASK THE CLASS:

### Preventing dust minimizes patient exposures.

- Using engineering controls and modifying how we work can minimize the generation of dust.
- Examples of engineering controls and work practice modifications:
  - Mist edges of ceiling tiles before lifting
  - Use a containment barrier
  - Use HEPA Vacuum attachment when drilling or cutting
     Use hand tools instead of power tools
  - Use hand tools instead of power tools
     Use a sweeping compound if sweeping is necessary
- Perform work in a staging area outside of ICRA environment

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What are some examples of engineering controls or work practice modifications they can do to limit the amount of dust that is generated?

Write the participant responses on a whiteboard or flipchart.

Advance the slide and compare the list generated by the participants with the examples listed on the slide. Emphasize and discuss the information in the last bullet.

# The primary function of a barrier is to control the air quality in occupied areas.

### **NOTES FOR SLIDE 40**

The ultimate goal for erecting barriers is to prevent the spread of construction dust into the hospital by creating an airtight seal within the work area. Small, short duration projects generating minimal dust may use a mobile containment cube or soft wall system to prevent dust



from escaping the work area. Any project that produces moderate to high levels of dust may require a hard wall, dust-proof system

Fire control is important on all jobsites but in healthcare, it's critical. Many hospital patients cannot be evacuated if there is an emergency due to the nature of their illness, dependency on life saving equipment and other medical reasons.



Maintain fire prevention measures such as firewalls is an important consideration when selecting the appropriate barrier.

# Mobile containment cubes are used for inspection and short-term cavity work.

### **NOTES FOR SLIDE 41**

Before starting this section, bring the unassembled mobile containment cube into the classroom or hands-on training area.

Accessing the space above ceilings or behind walls during construction,

#### Mobile containment cubes are used for inspection and short-term cavity work. • Designed for use by one person. • Can be on wheels and is easily transported and maneuvered into small spaces.

 Small enough to fit through doorways and into elevators, but big enough to hold a 6-foot or 8-foot ladder inside.

renovation or maintenance projects can release dust, mold spores and other contaminants into the air. A mobile containment cube is engineered to help contain the spread of these airborne particles into other areas of the facility. Ideal for multiple, quick-entry jobs or longer-term construction projects, a mobile containment cube rolls quickly into position and extends securely against the ceiling to help minimize exposure to building occupants and contamination of products or sensitive equipment.

**WARNING**: Watch out for sprinkler heads in the ceiling when erecting/moving the mobile containment cube.

After providing a brief introduction to mobile containment cubes, show the mobile containment cube assembly video by clicking on the hyperlink attached to the picture.

After the video is done, demonstrate how to set up the containment. Leave the containment cube up if possible. You will use it to show the negative air set up later in the class.



# To enclose a larger work area a soft wall barrier system can be used.

### **NOTES FOR SLIDE 42**

Before starting this section, bring the ZipWall® kit into the classroom or hands-on training area. If there is room in the classroom, assemble a small section of the ZipWall® for the class to see.

### To enclose a larger work area a soft wall barrier system can be used.

 Temporary enclosure with walls constructed of fireresistant plastic sheeting.
 Used for short-term work that lasts no longer than a single shift.
 A soft wall barrier can be configured in many different ways.



The walls are erected from the floor to the ceiling or from the floor to the deck. Tape is used to secure the plastic to the ceiling, walls, and floor. Soft wall systems can also use sill seals and metal tracks to help seal the plastic sheeting.

After providing a brief introduction to soft wall barriers, show the class the various components that are used to construct a barrier.

Explain to the class the ICRA Awareness class does not teach them how to set up soft wall barriers. This training is done in the longer ICRA Worker course.

### An entry must be created to access the work area.

### **NOTES FOR SLIDE 43**

The type of entry used will depend on the needs of the project. The most common doorway used in a soft wall barrier is the zipper door. The flap-door or T-door is commonly used in the asbestos abatement industry and maybe found on an ICRA hospital jobsite.



It's important to remember to close all doors, including zipper doors after entering or exiting the work site. If you find an open door close it immediately. Leaving it open can affect the negative air pressure in the work area. CPWR C THE CENTER FOR CONSTRUCTION RESEARCH AND TRAINING

# When a longer-term barrier is needed a hard wall barrier or rigid wall is used.

### **NOTES FOR SLIDE 44**

Long-term barriers are used when the work is going to take longer than one shift or if the work is going to generate a large amount of dust.

A hard wall barrier or rigid wall is most commonly constructed using metal studs and drywall. It is When a longer-term barrier is needed a hard wall barrier or rigid wall is used.

 Hard wall barrier systems are used for long-term construction projects that last over multiple work shifts.
 It is critical that the barrier be sealed around the perimeter.

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important that hard-wall barriers are built to local fire codes. If you see a breach in the barrier make sure you report it right away. Preventing the spread of a fire is critical in a hospital.

Occasionally, the existing walls and doors may provide a sufficient barrier to prevent the spread of dust and will be used as the barrier. Regardless if the existing walls and doors are used or a hard-wall barrier is constructed, openings and penetrations need to be sealed.

### ASK THE CLASS:

What are some examples of openings and penetrations that may be found in a hospital that would require sealing?

### Write the participant responses on a whiteboard or flipchart. Compare the list generated by the participants with the examples listed below.

Examples of openings and penetrations that should be sealed:

- Joints of unused doors and windows
- Doors to adjoining rooms
- Air vents
- Floor cracks
- Ductwork
- Pipes
- Deck, the actual ceiling above the ceiling tiles
- Wall and ceiling penetrations such as medical equipment, TVs, or computers, electrical devices, switches, medical gas outlets, receptacles and cabling

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# Anterooms separate work area from the patient occupied area of the hospital.

### **NOTES FOR SLIDE 45**

### ASK THE CLASS:

Do you know what an anteroom is? Explain that an anteroom is a small separate barrier room at the entrance to a work area, with doors at each end. This small room is used to help maintain negative air pressure in the main work area, to



put on and take off Personal Protective Apparel, and to add another layer of dust control at the entry to a worksite.

Remind participates that even though there are two doors in an anteroom, only one door is open at a time, so you don't interrupt or lose the negative air pressure. The doors should be self-closing, with a spring, closer, or spring hinges. Even with these precautions, workers must remember to close the doors.

Doors in/out of the anteroom are large enough and configured so equipment and trash carts can be brought through without damaging the doors.

# An anteroom is as a changing room to put on Patient Protective Apparel.

### **NOTES FOR SLIDE 46**

Review the information on the slide. Explain to the class they will see examples of the Patient Protective Apparel in a few minutes.

The anteroom is also the place where workers will use a HEPA vacuum or damp wipes to remove



dust from their clothing, PPE, tools and equipment leaving the work area.

The anteroom is the last line of defense for keeping dust from leaving the work area!



### ASK THE CLASS:

What is the biggest difference between Patient Protective Apparel and Personal Protective Equipment?

### Answer:

PPA is worn to protect the patients and PPE is worn to protect the worker.

# Personal protective apparel is worn to prevent the spread of construction dust.

### **NOTES FOR SLIDE 47**

Before starting this section, bring samples of PPA into the classroom. Recommend having, as a minimum, a set of gloves, shoe covers and a disposable coverall.

The ICRA Plan will specify the PPA that must be worn. Remember,



PPA is about protecting the patients, not about protecting you. PPA is usually found inside the anteroom. You must put on the PPA before leaving the worksite and entering the hospital. Failure to wear your PPA could result in disciplinary actions including termination!

In most cases, PPA is disposable and will only be worn once. If you are reusing PPA such as cloth or paper coveralls, or putting them back on again after a break, vacuum them before taking them off. Do not contaminate clean disposable garments with dirty ones, such as sticking used boot covers in the pocket of clean coveralls.

### Pass around the samples of PPA so the class participants can get a better understanding of the types of materials the PPA is made of.

Ask if there is anyone who would like to try on the PPA. If no one volunteers, the instructor should demonstrate how to don the PPA. Keep the PPA on. The next slide will discuss how PPA is removed.



### Removing PPA properly is important so dust is not spread.

### **NOTES FOR SLIDE 48**

As you review the information in the slide on how to remove the PPA, demonstrate each step by removing the PPA worn by you or your volunteer. Make sure you have a trash can or bag to put the discarded PPA into.

### Removing PPA properly is important so dust is not spread.

- Carefully roll PPA off—DO NOT just yank them off, you can shake dust and pathogens back into the air.
- · Pull the coverall sleeves inside out as you remove your arms · Pull gloves inside out too, and leave them in the sleeves of the
- coveralls. · Roll the coveralls down past your waist and down your legs.
- turning them inside out as you go. · Pull them down over your boots, turning the boot covers inside out and keeping them inside the legs of the coveralls.

Once all of the PPA is removed, place it in the appropriate trash can or bag. Some work areas may be too small to accommodate a trash can and workers will need to bring a trash bag with them to dispose of their PPA.

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### Typical procedure to follow when entering and exiting through an anteroom:

### NOTES FOR SLIDE 49 and 50

Before starting the class, you will need to make copies of the steps on the next page and cut out each individual step. Make enough copies so each of small group has a complete set of steps. **Recommend you place each** group of steps into an envelope or clip together with a paper clip.

Divide the participants into 3 or 4 groups.

Explain to the class they are going to work on an exercise to see if they can put in order the correct steps for entering and exiting an anteroom.

#### Typical procedure to follow when entering and exiting through an anteroom: · Directions:

- . Open the envelope and remove the contents. . Working in your group, put the steps for entering and then exiting the
- anteroom in the correct order. · When you are finished, ask your instructor if you have the correct order. · Correct if necessary
- · Scenario You are going back to your work area after lunch. You are wearing foot covers. Once inside your work area, you realize you left your reading glasses in the lunch area and you need to go get them.



Read the scenario on the slide. Check to make sure everyone understands the scenario.

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Distribute a set of steps to each group. Tell them they can begin. Walk around and answer any questions.

Once all the groups have completed the exercise, advance the PowerPoint and show the class the correct order. Have each group correct any errors.

Collect the sets of individual steps for use in future classes.

# Hand washing and proper cleaning of clothing are important.

### NOTES FOR SLIDE 51

Germs are very common in hospitals.

Germs from unwashed hands can be transferred to other objects, like handrails, table tops, materials or tools, and then transferred to another person's hands.

### Hand washing and proper cleaning of clothing are important.

 Wash after leaving the work area and before eating, drinking or using the restrooms.
 Remove dust from your clothes by vacuuming yourself with a HEPA filtered vacuum.
 Looking clean leaves a good impression on the hospital staff, patients and visitors!



People frequently touch their eyes, nose, and mouth without even realizing it. Germs can get into the body through the eyes, nose and mouth and make us sick.

Handwashing can prevent about 30% of diarrhea-related sicknesses and about 20% of respiratory infections (e.g., colds) according to the Centers for Disease Control and Prevention (CDC).

To remove dust from your clothes, vacuum yourself with a HEPA filtered vacuum before leaving the work area. If your job requires you to perform work activities outside before entering the health-care facility, you should vacuum your clothes before entering the facility.



# Realized you forgot your reading glasses!

Enter the anteroom and close the door.

Vacuum clothing with HEPA vacuum.

Put on PPA, including shoe covers.

Exit the anteroom and close the door.

Retrieve reading glasses.

Re-enter the anteroom and close the door.

Remove PPA and shoe covers.

Open the door to the work area, enter the area and close the door.



# Controlling the air pressure can prevent the spread of dust.

### **NOTES FOR SLIDE 52**

When the air pressure within the work area is less than the air pressure outside the work area, negative air pressure occurs.

Negative pressure is created by balancing the ventilation system so that more air is mechanically

#### Controlling the air pressure can prevent the spread of dust. • Need to create negative air pressure within the work area. • To achieve a negative air pressure, more air must leave the work area than enters.

 If air is continually pulled into the work area, dust and airborne pathogens cannot get out.

exhausted from a room than is mechanically supplied. This creates a ventilation imbalance, which the room ventilation makes up by continually drawing in air from outside the room.

To make up for this loss of air, clean air is pulled from the public or patient occupied areas into the work area.

# A HEPA negative air machine is used to pull air from the work area.

### NOTES FOR SLIDE 53

A negative air machine uses ducting to remove contaminated air from a sealed containment area. The filtered air is exhausted outside of the containment. This creates negative air pressure (a slight vacuum effect) inside the containment relative to surrounding



areas. A negative air machine application helps limit the spread of contaminants to other areas inside the structure.

A HEPA filter is a type of high efficiency particulate air filter. This type of air filter can remove at least 99.97% of airborne particles 0.3 microns in diameter. Particles of this size are the most difficult to filter and thus the most penetrating particle size. Particles that are larger or smaller are filtered with even higher efficiency. HEPA filters are the most effective air filtration filters to remove contaminants from the air.

A micron is a unit of measure in the metric system. It equals one-millionth of a meter and one-thousandth of a millimeter. It is a shorten word for micrometer. To



put in perspective, the average human hair is 150 microns in diameter while dust is typically 5 to 10 microns in size.

Some common names for a negative air machine include:

- HEPA machine
- Air scrubber
- Hog
- Red Baron<sup>®</sup> brand name
- MicroTrap<sup>™</sup> brand name

The different names depend on geographic location, local area preference and historical use.

### How to ensure negative air pressure is being maintained.

### NOTES FOR SLIDE 54

Because it is critical to keep dust from spreading outside of the construction area, the negative air machine must be kept running for as long as the containment is up.

Everyone on the jobsite needs to pay attention to the negative air

### How to ensure negative air pressure is being maintained.

- The negative air machine must run continuously during a project. You need to be sure you maintain negative pressure by
- monitoring:
- That the negative air machine is on. If allowed, the negative air machine can be plugged into emergency power outlets.
   The air flow, air pressure, or particle count in the air.
- The condition of the negative air machine's filters.
- . The condition of the exhaust duct hose

machines. There may be specific people assigned to walk through the job area checking the function of the machines but everyone needs to be able to recognize when a negative air machine is not operating properly. The most obvious condition all workers need to be aware of is if the machines are not on. If you find a machine not working, notify a supervisor immediately.

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Many hospitals allow the negative air machines to be plugged into their emergency power because they recognize the importance of maintaining a clean work environment. If the machines are plugged into emergency power those outlets will be coded red or orange. If you find a negative air machine unplugged, do not assume it always goes into the emergency power. Check with your supervisor.

Checking the air flow, air pressure or particle count in the air, are other methods of determining the effectiveness of the negative air machines. These methods will help identify if dust is escaping from the work area and entering into the clean hospital areas. Additional training is needed if you are going to be responsible for using one of these methods.



To keep the negative air machine functioning properly, the prefilters and filters will need to be changed regularly. The frequency with which the filters have to be changed depends on the activities being performed and the contaminants in the air. Changing the filters is the most common maintenance activity to be done on a negative air machine. The procedures for changing the filters varies between manufacturers, therefore, the individual manufacturer instructions should always be followed.

# Good housekeeping is essential to minimizing the spread of dust.

### **NOTES FOR SLIDE 55**

The appearance of dust outside of your work area will cause concern for the hospital staff. Seeing dust outside of the work area will lead hospital staff to think that you are not following the ICRA Plan. It is vital that you keep clean any visual indicators that dust has spread.



In most cases, you will not be allowed to leave your equipment or materials outside of the work area. This will require you to plan how you are going to have the appropriate tools and materials in place to do your job. This may not be a problem when you have a large work area but in cases where space is limited you will need to coordinate your work activities with those around you.

There are a number of methods to use to keep the hospital area clean;

- Sticky mats/tacky mats
- Covering all trash carts when they entering/leave the work area
- Covering or wrapping all equipment and construction materials
- Use of HEPA vacuums

We will look at each of these in the following slide.



### Sticky mats/walk off mats are used to remove dust.

### **NOTES FOR SLIDE 56**

Before starting this section, bring a packet of sticky pads into the classroom. Recommend allowing participants to pass around the mats.

The ICRA plan will often require the use of sticky mats at the entrance



and exit of the work area. The placement of the mats depends on site specific information and preference. There is no "correct" way to have the mats at the entrance/exit of the work area. Contractors and hospital protocols differ on their placement.

The mats can be secured to the floor with spray adhesive (if allowed), to help keep it in place. Based on the flooring, you may need to put down a sheet of hardboard to protect the floor, and then secure the sticky mat to the hardboard instead. Taping the sticky and walk-off mats to a hardboard or using the self-adhesive strips on the back of the sticky mats is a common practice.

Walk-off mats are typically used in areas of high traffic to remove the gross amounts of dust off of shoes and carts before they pass over the sticky mats. Walk-off mats are usually used inside the work area before you enter the anteroom.

Sticky mats should be cleaned regularly. If hospital personnel see a sticky mat full of dust they assume dust is getting into the clean hospital areas. It is very common on ICRA jobs to use a lot of sticky mats.

### Trash/debris removal requires special handling.

### **NOTES FOR SLIDE 57**

When transporting trash or other construction debris through the hospital, the cart must have a solid lid or be tightly covered with taped down plastic. This prevents the dust from escaping into the clean areas of the hospital.





If materials do not fit into the trash cart, they must be cut into smaller pieces so they don't extend outside of the cart. You can also wrap long pieces of trash/debris in plastic and tightly tape all the seams.

The ICRA plan typically requires the wiping down of the trash cart at each end of the trip, before it leaves the work area, and before it comes back into the hospital from the loading dock or wherever the dumpster is located.

Try to use cleaner or disinfectant supplied by the hospital, so you know it's acceptable, and so a new or strange smell isn't brought into the hospital from different cleaning products.

# The movement of equipment, tools and materials requires special handling.

### **NOTES FOR SLIDE 58**

Just like trash and debris carts, equipment carts, hand trucks and other methods for moving tools, equipment and materials throughout the hospital have to handled properly to prevent the spread of dust.

Workers have to remember that the

#### The movement of equipment, tools and materials requires special handling.

- Equipment carts, hand trucks and other methods of moving equipment, tools and construction materials need to be covered or cleaned.
- The ICRA plan requires the wiping down of the materials at each end of the trip, before it leaves the work area, and before it comes back into the hospital.
- It's a good idea to cover your tools, equipment and materials when not in use.

tools they bring with them onto the job must be wiped down and cleaned before entering the hospital. You may be required to clean your tools before you enter the job and must definitely before you leave the work area. And don't forget to wipe down the tool bag, cart or container you use to carry your tools. If you use an open container to carry your tools, it might be worth the investment to purchase a closed container. This will save you time!

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Large pieces of equipment and materials may need to be sealed in plastic and wiped clean before they can be brought into the hospital. Everything brought into and out of the hospital must be cleaned before it can enter the clean area of the hospital.

# Hospitals contain hazards that could affect a worker's health and safety.

### **NOTES FOR SLIDE 59**

Only show the first bullet of the PowerPoint slide. Discuss with the class the information below.





One goal when working in a hospital is to not make the patients sick by exposing them to dust created by our activities. There are also unique hazards to workers found in a hospital.

### Show the second bullet of the PowerPoint slide, "These hazards include:".

### ASK THE CLASS:

What unique hazards can be found in a hospital that could affect them?

Write the participant responses on a whiteboard or flipchart. Once the class has stopped providing examples, advance the PowerPoint slide to reveal the examples from the participant manual.

Compare the list generated by the participants with the information below.

- Biohazards
- Lead and Asbestos
- Mold
- Medical Equipment

Explain to the class that we are now going to look at each of these topics in more detail.

# Exposure to bloodborne pathogens are a common biohazard to workers.

### **NOTES FOR SLIDE 60**

Used needles and scalpel (surgical knife) blades are a biohazard for exposure to bloodborne pathogens, such as hepatitis A or B (a liver disease) or HIV

There are special red plastic or metal boxes, called sharps containers, to safely dispose of these materials. Sharps containers should be removed before any

work begins. If you find a sharps container, contact the hospital staff to have it removed before you begin work.

Soiled linen such as bed sheets, towels, and clothing may be contaminated with blood or other bodily fluids.



Some hospital laundry may be in red plastic bags or carts as a warning that it contains infectious materials. As with sharps containers, do not handle any red biohazard materials or containers. That is the responsibility of hospital staff.



Do not touch wheelchairs, beds, or the like in a hospital.

You should always assume that surfaces that have been in contact with patients might be contaminated. Spores from bacterial pathogens, such as Methicillin-resistant Staphylococcus Aureus (MRSA) and Clostridium difficile (C. diff.), can live for months on contaminated surfaces.

# Lead and asbestos hazards may also affect workers in hospitals.

### **NOTES FOR SLIDE 61**

Older hospitals, those built before 1980, may still contain asbestos materials and/or lead paint, lead solder or lead pipes.

If you believe there is lead or asbestos in your work, notify your supervisor immediately.



Only trained and certified abatement workers can remove asbestos or lead.

# It is not uncommon to find mold during hospital construction work.

### **NOTES FOR SLIDE 62**

Only show the first bullet of the PowerPoint slide.

### ASK THE CLASS:

Does anyone know what ingredients are needed for mold to grow?



### The answer:

- Moisture: Mold spores need moist or damp areas to grow and reproduce.
- Food: Mold spores need food organic materials such as: carpet, fabric, upholstery, paper and paper products, cardboard, ceiling tiles, drywall, wood, and wood products, dust, paints, and wallpaper
- Optimum Temperatures: Mold spores thrive in temperatures 32 and 120 degrees Fahrenheit. Temperatures from about 70 – 90 degrees are the most conducive for mold growth.



### Now show the second bullet of the PowerPoint slide.

### ASK THE CLASS:

Where else can mold grow?

### The answer:

Any answer is ok as long as the conditions for mold growth feature the three conditions above. Remember, mold can grow on dust! Anywhere there is dust and you have the conditions above, there can be mold growth.

The concern with mold is inhaling airborne mold spores. Exposure to mold can cause allergic reactions, irritate your eyes, nose, or throat, or cause lung infections.

### Now show the third bullet of the PowerPoint slide.

### ASK THE CLASS:

What types of PPE would you need to wear if you were working around mold?

### The answer:

Any PPE example is ok as long as it falls within these categories:

- Skin and Eye Protection
- Respiratory Protection
- Protective Clothing

Medical equipment in a hospital can be dangerous for construction workers.

### **NOTES FOR SLIDE 63**

Radiation exposure is a concern around X-ray machines or CT scanners.

Nuclear medicine is also a branch of medical imaging that uses small amounts of radioactive material to diagnose and determine the severity Medical equipment in a hospital can be dangerous for construction workers.

 Radiation exposure is a concern around X-ray machines or CT scanners.
 MRI scanners create

extremely strong magnetic fields. • MRIs can disrupt implanted medical devices like pacemakers, cochlear implants, or insulin pumps.

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of or treat a variety of diseases, including many types of cancers, heart disease and other abnormalities within the body. Hospitals have become a major source of nuclear waste, producing and storing millions of radioactive materials each year with no long-term disposal plan. Experts fear that such waste could pose health hazards. Experts also fear that poor storage and disposal practices place

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radioactive materials at risk of being lost or stolen, with potentially grave health consequences.

MRI scanners create extremely strong magnetic fields that can disrupt implanted medical devices like pacemakers, cochlear implants, or insulin pumps. Workers who have any of these devices must use extreme caution if they need to work in areas where there are MRI scanners.

When an MRI scanner is running, the magnetic force can pull metal materials into the magnet. Get too close, and an MRI's magnet can pull a watch off your arm, rip a tool out of your hand, or even pull something as big as a vacuum cleaner or floor buffer across the room.

Remember, an MRI machine usually runs continuously, including after hours and weekends, so extreme caution must be taken when you are working near them.

### Pay attention to your surrounding inside the hospital.

### **NOTES FOR SLIDE 64**

Wheelchairs, beds, and gurneys (wheeled stretchers) are rolled down hospital hallways. So are housekeeping and maintenance carts.

Hospital staff might be running down the hall with a patient on a gurney or

Pay attention to your surrounding inside the hospital.

 In an emergency, hospital staff may be running down the hall with a patient on a gurney orwith emergency medical equipment.
 You can be struck by traffic in hospital hallways.



with emergency medical equipment such as crash carts or isolation carts, so you need to pay attention to your surroundings.

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# Hospitals expose you to unique hazards not encountered on a typical jobsite.

### **NOTES FOR SLIDE 65**

Prior to and during work on roofs, proper steps shall be taken to ensure that workers are not exposed to chemical, biological or radiological materials. All exhaust systems on a roof with potentially hazardous exhaust should be identified with signage/labeling or other identifying methods.



laboratories. • A special hazard on hospital roofs are exhaust fans from infection isolation rooms.





A common system used to warn workers of hazards from roof top exhaust systems is to use a communication system that informs workers of how close they can approach an exhaust vent.

For example, level 1 would indicate it is safe to approach and safe to work on system at any time. No hazardous constituents exhausted. An example would be general building exhaust

Level 2 notification may indicate a potentially hazardous exhaust system meeting minimum safety requirements. Exhaust systems meeting these requirements have sufficient exhaust stack height and velocity to eject potential hazards outside the building envelope. These systems are safe to approach and work around. Actual work on the system or over the exhaust stream may require a shutdown.

Level 3 indicates a potentially hazardous exhaust system that must be shut down in order to approach the exhaust stack.

ILSM are put in place to protect the safety of patients, visitors, and staff who work in the hospital.

### **NOTES FOR SLIDE 66**

A hospital may decide what Interim Life Safety Measures (ILSM) are required for a project. ILSM usually appear as a checklist and may include things like exits, fire alarm and suppression equipment and fire safety, general safety hazards, and ICRA precautions. This checklist



needs to be reviewed daily in most worksites.

The ILSM is one of the topics that is generally covered at a daily work safety briefing at an ICRA worksite. Other topics include: infection control precautions from the ICRA document, emergency plans in case of injury/fire/utility breaks, hospital policies such as using designated areas for breaks, and proper workplace behavior.

The hospital or your construction company may use a daily inspection checklist to monitor Interim Life Safety Measures (ILSM) and ICRA precautions. The checklist could include items such as: exits, fire equipment and fire safety, general safety hazards, and ICRA precautions.

Another method for catching potential hazards before they become big problems is to quickly scan the work area from top to bottom, from the ceiling to the floor,



looking for hazards like new holes or penetrations in a barrier, water leaks, dust or debris, or safety issues unique to hospitals.

If you see something that doesn't look right, report it to your supervisor or the hospital ICRA supervisor. This informal method can be done by everyone on the jobsite.

### Distribute handout 9.

Ask participants to complete the handout individually, and then check their answers with a partner. Encourage them to try and answer as many of the items as possible without referring to the manual. If participants need help with the answers, instruct them to use the Daily ILSM Checklist in the manual.



Complete the assessment items for a daily inspection checklist of Interim Life Safety Measures (ILSM) and ICRA precautions. Use the Daily ILSM Checklist found in the manual, if necessary.

- 1. Alternative \_\_\_\_\_\_ are clearly identified.
- 2. Fire alarms, detection, and <u>suppression systems</u> are not impaired.
- 3. <u>Power</u> is properly secured at the end of each workday.
- Construction areas are free of storage and housekeeping materials, <u>food waste</u>, and debris from daily operations.
- 5. Construction barriers maintain <u>negative pressure</u> relationships.
- 6. Workers demonstrate <u>compliance</u> with traffic patterns.
- HEPA filtration units, HEPA vacuum equipment, and/or continuous use of exhaust fans demonstrate they are <u>functioning</u> appropriately.
- Construction area doors are <u>closed</u> and gaskets & hardware are <u>intact</u>.
- 9. Construction carts transporting debris are <u>covered</u>
- 10. Sticky mats' adhesive strips are <u>clean</u> and <u>changed</u> sufficiently.

Handout #9

