

Chapter 6

Work Area Preparation, Decontamination, and Disinfection



Infectious Disease Operations – Instructor Guide

Preparing for Delivery

Time

The Work Area Preparation, Decontamination, and Disinfection chapter is approximately 10 hours and 30 minutes of classroom training.

Follow the Lesson Plan for a guide to scheduling this course. Time allotments for specific topics are provided within the plan. You may devote more time to classroom and hands-on activities as needed, as the plan reflects the minimum suggested time allotments.

Staffing

The maximum participant – instructor ratio is 25:1.

During classroom activities, the recommended participant – instructor ratio is 10:1.

During hands-on activities, the recommended participant – instructor ratio is 5:1.

Materials Needed

For this chapter, you will need the following:

- A copy of the Infectious Disease Operations Participant Guide (PG)
- A flip chart or whiteboard and markers
- A computer and projector or monitor
- Sticky mats (if being used)
- ZipWall barrier system materials
- Negative air machine (optional)
- Calculators
- Materials and equipment to construct a decontamination unit, including poly sheets, chairs, signage, covered disposal containers, infectious waste bags
- Full-Face APRs
- Hooded Tyvek suits



- Disposable mid-calf foot covers
- Rubber boots
- Double-nitrile inner gloves
- Extended-cuff nitrile outer gloves
- Painters' tape
- Alcohol-based hand rub (ABHR) and disinfectant wipes
- Materials to perform decontamination and disinfection, including spray bottles and rags

The table on the following page lists the materials needed for this lesson.

Chapter 6: Work Area Preparation, Decontamination, and Disinfection

Lesson	Media	Handouts
Overview		
Introduction and Objectives (10 min.)	Slides 1 to 5	
Exercise 1: Work Area Preparation (70 min.)	Slides 6 to 10 ZipWall or other poly barrier materials	HO 26: Work Area Preparation
Exercise 2: Negative-pressure Enclosures (70 min.)	Slides 11 to 16 Calculators	HO 27: Negative Air Machines
Exercise 3: Decontamination, Disinfection, and Leaving the Work Area (120 min.)	<i>Slide 10</i> <i>Video: Decontamination</i> <i>and Disinfection</i>	HO 28: Decontamination and Disinfection HO 29: Six-Stage Decon Process



Lesson Overview	Media	Handouts
Exercise 4: Work Area Preparation, Decontamination, and Disinfection: Hands-On (360 min.)	Slide 10 FFAPR + PPE (1 set per participant) Materials for work area preparation Materials for decon and disinfection practice	 HO30: Work Area Preparation Performance Checklist HO 31: Donning PPE Performance Checklist HO 32: Decontamination and Disinfection Performance Checklist HO 33: Doffing PPE Performance Checklist Review of HO 25: PPE Donning/Doffing Procedures
Summary (10 min.)	Slides 2 to 5	Chapter 6: Things to Remember

Introduction and Objectives

Open the lesson by telling participants that in Chapter 5, they learned about the different types of PPE used in infectious disease environments. In this chapter, they will learn more about containment and isolation of pathogens, including constructing a decontamination unit, donning and doffing PPE, and performing decontamination and disinfection on a mock infectious disease site.

Display Slides 1 to 5. Introduce the chapter and review the chapter objectives. At the end of this chapter, participants will be able to:

- 1. Explain the importance of preparing an infected work area before decontamination and disinfection work begins.
- 2. Describe isolation and containment procedures for working around infectious diseases.
- 3. List the steps in preparing the work area for infectious disease decontamination and disinfection.
- 4. Define the purpose of the decontamination chamber on an infectious disease cleanup project.
- 5. List the elements of the decontamination chamber and explain the function of each.
- 6. Explain the purpose and function of a negative air machine.
- 7. Given scenarios of spaces, calculate the number of negative air machines needed to meet air change requirements.
- 8. Describe setting up a negative-pressure enclosure.
- 9. Describe decontamination and disinfection procedures for infected areas.
- 10. Describe the process for passing through a six-stage decontamination unit to leave the work area.
- 11. Demonstrate proper techniques for eliminating contaminants on surfaces.
- 12. Demonstrate setting up a six-stage decontamination unit to enclose a work area.
- 13. Demonstrate the proper inspection and donning of PPE.
- 14. Demonstrate the proper disinfection and doffing of PPE through the stages of the decontamination process.

Invite questions about the objectives.









PG: 6–5 to 6–6



Chapter 6: Work Area Preparation, Decontamination, and Disinfection Exercise 1: Work Area Preparation

70 Minutes

Exercise 1: Work Area Preparation

Objectives



SL 6 to 10



HO 26: Work Area Preparation



Flip Chart



PG: 6-7 to 6-16

ZipWall materials

Sticky mat (optional)

- 1. Explain the importance of preparing an infected work area before decontamination and disinfection work begins.
- 2. Describe isolation and containment procedures for working around infectious diseases.
- 3. List the steps in preparing the work area for infectious disease decontamination and disinfection.
- 4. Define the purpose of the decontamination chamber on an infectious disease cleanup project.
- 5. List the elements of the decontamination chamber and explain the function of each.

Open the lesson by asking how many participants have experience constructing a decontamination unit for another environmental project. Ask volunteers to give a brief description of the type of decontamination unit they worked on, including how many stages, what materials were used, its purpose, and how effective it was at containment.

Display Slides 6 and 7. Ask, "What do *containment* and *isolation* mean in the context of infectious diseases? What's the difference between *decontamination*, *disinfection*, and *sterilization*?" Have participants share their information with the class and note their answers on the board. Display Slide 8 to reveal the answers, and compare the information to the answers that participants provided.

Explain that work area preparation procedures, including isolation and containment, will differ for every situation, depending on the space available, the type of infectious substance, and its routes of transmission. Display Slide 9. Have participants look at the list of planning consideration for a containment area. Answer any questions participants may have about the information.

Display Slide 10. Have participants look at the sample decontamination unit, and note the different areas. Ask them to think about how the different areas help ensure containment of infectious pathogens and different stages of decontamination and disinfection.

Divide the class into three groups and assign each group a number (1, 2, or 3).

Instructor Note: For large classes, assign two Group 1s, Group 2s, as needed. Ideally, there should be no more than five participants in each group.

Exercise 1: Work Area Preparation (continued)

Note that Handout 26: Work Area Preparation is used as a guide for groups as they prepare their presentations, as well as a note-taking worksheet as participants listen to other groups' presentations.

Distribute Handout 26: *Work Area Preparation*, a flip chart, and markers to each group. Point out that the information needed to complete the handout can be found on PG pages 6–7 to 6–16. Instruct groups to read the instructions and find and read their group's assignment.

Review the instructions for the activity:

- Participants work in groups to prepare a 5–10 minute presentation on their group's assigned topic.
- Groups should use the Participant Guide to find the information about their topic.
- In groups, participants take 5–10 minutes to read the instructions individually, and then work together to discuss which points to include in the presentation. Each group chooses one person to take notes during the group discussion.
- Think about how the group can present the information to the rest of the class so that the others may understand it best.
- Use the flip chart and markers to prepare a visual for the presentation.
- Each group member must take part in the presentation. For example, one or two participants can explain the questions on the handout and others can present visual information on the flip chart paper.
- Groups have 20 minutes to prepare their presentations.

Give each group up to 10 minutes to present. During each presentation, the other groups should listen and take notes on the topic in the appropriate section on the handout. After all the groups have completed their presentations, elicit the key points from participants' notes on the handout. (See the answer key on the following page.)

Instructor Note: It is very important that participants understand the information presented during the presentations. As you go over participants' notes, fill in any gaps and clarify any information that may have been missed or unclear during the presentations.

Option: You may want to display equipment for a ZipWall pole system, including the zipper used to construct zipper doors, as well as sticky mats (if they are used), and the correct procedure for removing one layer of the sticky mat, as described in the PG.

Conclude by saying that knowledge and skills they learned in this exercise related to work area preparation will help them ensure that proper containment and isolation are in place, so that work can occur safely for all involved.



Chapter 6: Work Area Preparation, Decontamination, and Disinfection Handout 26: Work Area Preparation



Handout 26 Work Area Preparation

Group 1

Instructions: Prepare notes for a presentation about the following topics.

Risk Assessment	The risk assessment was covered in Chapter 1 and will be conducted by health and safety experts. Administrators, supervisors, maintenance personnel, and those working closest to the hazard will have the direct experience with the tasks and operations that have the potential for exposure. They can help develop effective interventions that workers can and will use to improve infection prevention and control.
Signage	Danger signs should be placed at each entrance to the work area. Post signs at stairways and elevators warning of the dangers. Stairways and elevators must also be sealed off if leading to the work area. Reusable metal, plastic, or disposable cardboard signs are available. The employer must ensure that employees working in and around the regulated areas understand the signs. This may mean that the signs need to use multiple languages, pictographs, and graphics. These signs are available from most safety supply houses.
HVAC	HVAC systems supplying the work area should be shut down. To avoid activating the HVAC system by mistake while removal operations are in progress, the control panel must be locked and tagged out. All vents and air ducts inside the work area should be disinfected and covered with poly and duct tape. This will most likely be done just prior to the cleanup work activities. HVAC filters, which may be contaminated with airborne pathogens, should be removed and disposed of in the same manner as the other contaminated material.
Securing Work Area	All entrances and exits should be secured when removal operations are not in progress. Make sure decontamination unit entrance will be secured when no one is on the jobsite. Security guards may be a reasonable precaution. When the work area is occupied, padlock must be removed to permit emergency escape routes. Arrows may need to be taped on the walls to indicate the location of exits. The arrows should be approximately one foot of the ground so workers can see them in case smoke fills the work area.

Handout 26: Work Area Preparation (continued)



Handout 26 Work Area Preparation

Group 2

Instructions: Prepare notes for a presentation about the following topics.

Торіс	Notes for Presentation
Setting Up a 6-Stage Decontamination Unit	One way is the use of 2" x 4" lumber for the frame, one layer of 6-mil poly for the walls, floors, and ceilings, duct tape, staples and screws to build the unit. In some cases, ¼" to ½" plywood may be used to reinforce the poly walls. ZipWall is a quick and easy way to put up temporary sheeting walls. This system comes with several types of 'poly hanger' clips to attach the poly to suspended ceiling grids. Poly can then be sealed to the ceiling, walls, and floor by using tape. A modular wall panel system features reusable panels that slide into metal track sections. You can use tape to seal any openings. When using a modular wall panel system, you have to tape the joints in order to get a good seal. Their advantages are that the panels can be assembled and disassembled rather quickly and they form a rigid barrier that can be cleaned easier than by using poly. One disadvantage is that they can be somewhat costly to purchase.
Flap Doors and Zipper Doors	In some instances, a simple flap system may be approved to use. This would involve cutting a slit in the poly in the middle of the doorway and then hanging a separate sheet of rectangular poly at the top of the doorway on both sides of the doorway. The more secure way is to use a zipper door. You get a tighter air seal with a zipper door than a flap door. For a zipper door, you press a self-adhesive zipper onto the poly where you want your opening. Then you open the zipper and use a utility knife to slit the plastic. You should make two cuts close to the zipper teeth on each side, and remove the strip of poly that is created.
Sticky Mats	When working in some facilities cleaning an infectious disease area, the use of sticky mats may be required at the entrance and exit of the work area. These are floor mats covered with a sticky adhesive, which pulls dust and dirt off the bottom of boots and the wheels of equipment. They come stacked in pads of 30 or 60 layers (sheets), and each layer is numbered so not more than one mat is pulled at a time. Sticky mats come in various sizes, from 18x36 inches up to 36x45 inches. Once a sticky mat sheet is dirty and needs to be pulled, don't just grab a corner and yank it off. The proper procedure is to carefully peel up all four corners and fold them inward toward the center.

Page 2 of 3



Chapter 6: Work Area Preparation, Decontamination, and Disinfection Handout 26: Work Area Preparation (continued)



Handout 26 Work Area Preparation

Group 3

Instructions: Prepare notes for a presentation about the following topics.

Proposing to Eater	
Preparing to Enter	Unce your decontamination unit is constructed and complete, you are now ready to do
the work Area	They trying they work and the sing PPE in the clean ream of the depart optimizing unit in this
(Review of Donning PPE)	They cypically will don their r r E in the clean room of the decontamination unit. In this
	it is the first stage when about to anter the work area
	The first stage when about to enter the work area.
	The following are steps a worker should perform in the clean room and before entering
	the work area:
	1. Inspect all PPE that will be used.
	2. Remove clothing and personal items.
	3. Put on disposable boxers or cotton underwear (optional).
	4. Don inner suit (Tyvek® for example).
	5. Using duct tape, prepare and put on disposable belt and attach the PAPR
	battery to the disposable belt (if a PAPR is being used).
	6. Put on inner gloves.
	7. Put on outer suit (chemical suit), do not zip the suit up at this time.
	8. Put on rubber boots. The outer suit should be placed over the rubber boot and
	should be taped. If being used, put on boot covers at this time.
	9. Connect PAPR battery and put on respirator face-piece and perform the user
	seal checks.
	10. Put on double hoods over respirator head harness (straps) and zip up (seal)
	outer coverall. De sure to tape outer nood to the respirator face-piece brim t
	gain proper seal.
	11. Fut on out on elever (here a duty nitrile) and apply tape. Be supe to put the
	sleeve of the outer suit over the outer glove.
	13.Put on plastic apron (if used).
	14. Proceed through the decontamination unit to the work area.

Exercise 2: Negative-pressure Enclosures

Objectives

- 6. Explain the purpose and function of a negative air machine.
- 7. Given scenarios of spaces, calculate the number of negative air machines needed to meet air change requirements.
- 8. Describe setting up a negative-pressure enclosure.

Display Slides 11 and 12. Open the lesson by asking, "How many of you have worked with negative air machines before? In what types of situations?" Invite volunteers to come up and explain the different parts of a negative air machine if they can, and the process the NAM uses to filter contaminated air. Explain that negative air machines are sometimes used in infectious disease cleanup operations, and that they're going to review their operation and practice calculating the number of NAMs required given some different spaces.

Distribute Handout 27: *Negative Air Machines*. Instruct participants to work individually to answer the true/false questions about negative air machines in Part A of the handout. Encourage them to make educated guesses if they do not know the answers. Explain that they will have an opportunity to review their answers and change any that are incorrect.

Have participants check their answers to Part A in pairs. Write the following page numbers on the board: PG pages 6–16 to 6–21. Instruct pairs to find the answers to Part A of the handout in the Participant Guide. Participants can correct any wrong answers on their handout.

Explain that for Part B of the handout, participants will need a calculator. Distribute calculators for participants who need one. (Participants can use the calculator feature on their smartphones if they have one.)

Display Slides 13 to 14 and present the information on how to figure out how many negative air machines are needed in any given space. Have participants follow along on the slides as you work out Sample Scenario 1 with the whole class. Encourage participants to follow along and write the correct answers for Sample Scenario 1 in Part B of the handout.

Instruct participants to continue with the other scenarios in Part B of the handout. Participants use the formula and follow the steps for calculating how many machines would be needed for each room. Allow 10 minutes. After the allotted time, ask for volunteers to write their calculations and answers on the board (or flip chart) and share their answers with the class.









HO 27: Negative Air Machines



PG: 6-16 to 6-21

Negative air machine (optional)

Calculators



Chapter 6: Work Area Preparation, Decontamination, and Disinfection Exercise 2: Negative-pressure Enclosures (continued)

Display Slides 15 to 16 to review the answers to Sample Scenarios 2–3 with the class. Explain the importance of having an extra negative air unit on site in case of breakdowns or having to change out the HEPA filter.

Option: If time allows, ask participants to come up with their own scenarios, similar to those in Part B of Handout 27. Tell them to share their scenarios with a partner, and check the partner's answers. Answer any questions that may have come up in the completion of the handout.

Conclude by pointing out that it's important to know how to calculate how many negative air machines are needed for each room on each job site. Do not rely on others to do the calculations. As a precaution, always check it for yourself.

Handout 27: Negative Air Machines



Handout 27 Negative Air Machines

Part A: True/False

Instructions: Read each statement and decide whether it is true or false. Make a check ($\sqrt{}$) in the correct column. Correct the false statements by rewriting the statement in the "correction" column.

Statement	True	False	Correction
 The primary purpose of a negative air machine is to push clean air into the work area. 		1	The primary purpose of a negative air pressure unit is to prevent airborne pathogens from escaping outward past the work area to cont- aminate the rest of the building's air space.
2. A negative air machine only has one opening.		4	There are two openings. One opening where the contaminated air comes in and another opening where the clean air comes out.
 Two of the nicknames for a negative air machines are hog and red baron. 	4		
4. Final air filter must be a HEPA filter.	4		
5. The unit typically runs 24 hours/day, 7 days/week for the entire length of the project.	4		
 Pre-filters filter out the larger particles in the air after it goes through the HEPA filter. 		4	Pre-filters filter out the large particles in the air before it goes into the HEPA filter.
7. The first-stage pre-filter should be a low-efficiency type (i.e., for particles $10 \ \mu m$ and larger). The second-stage (or intermediate) filter should have a medium efficiency (i.e., effective for particles 5 μm and larger).	4		

Page 1 of 3



Chapter 6: Work Area Preparation, Decontamination, and Disinfection Handout 27: Negative Air Machines (continued)



Handout 27 Negative Air Machines

Part B: Calculate

Instructions: Use the formulas below and the guiding questions to calculate the amount of air volume in each room, and how many negative air machines would be needed.

Formula for figuring out how many CFM is required for given ACH:

ACH x Volume \div 60 minutes per hour = CFM

Formula for figuring out ACH produced by given CFM:

CFM x 60 minutes per hour \div volume = ACH

Scenario 1

Room A has the following dimensions: 80' x 40' x 20'

The capacity of the negative air machine we will be using is: 800 cfm

Guiding Questions	Calculations
How many cubic feet are in the room? (volume)	64,000 cubic feet (80 x 40 x 20 = 64,000)
To achieve 12 air changes an hour, what is the total amount of air that must be exhausted?	12 (ACH) x 64,000 (volume) ÷ 60 (minutes) = 12,800 CFM
How much air will an 800 CFM negative air machine actually exhaust? (80%)	800 CFM x 0.80 = 640 CFM
How many negative air machines will be needed to obtain 12 air changes an hour?	12,800 ÷ 640 = 20 machines

Page 2 of 3

Handout 27: Negative Air Machines (continued)



Handout 27 Negative Air Machines

Part B: Calculate (continued)

Scenario 2

Room B has the following dimensions: 150' x 72' x 12' The capacity of the negative air machine we will be using is: 2,000 cfm

Guiding Questions	Calculations
How many cubic feet are in the room? (volume)	129,600 cubic feet (150 x 72 x 12 = 129,600)
To achieve 6 air changes an hour, what is the total amount of air that must be exhausted?	6 (ACH) x 129,600 (volume) ÷ 60 (minutes) = 12,960 CFM
How much air will a 2,000 CFM negative air machine actually exhaust? (80%)	2,000 CFM x 0.80 (80%) = 1,600 CFM
How many negative air machines will be needed to obtain 6 air changes an hour?	12,960 ÷ 1,600 = 8.1 machines (round up to 9 machines)

Scenario 3

Room C has the following dimensions: 60' x 120 ' x 20'

The capacity of the negative air machine we will be using is: 800 cfm

Guiding Questions	Calculations
How many cubic feet are in the room? (volume)	144,000 cubic feet (60 x 120 x 20 = 144,000)
To achieve 4 air changes an hour, what is the total amount of air that must be exhausted?	4 (ACH) x 144,000 (volume) ÷ 60 (minutes) = 9,600 CFM
How much air will an 800 CFM negative air machine actually exhaust? (80%)	800 CFM × 0.80 (80%) = 640 CFM
How many negative air machines will be needed to obtain 4 air changes an hour?	9,600 ÷ 640 = 15 machines

Page 3 of 3



Chapter 6: Work Area Preparation, Decontamination, and Disinfection

Exercise 3: Decontamination, Disinfection, and Leaving the Work Area



Objectives



SL 10



HO 28: Decontamination and Disinfection



PG: 6-21 to 6-29



Video: Decontamination and Disinfection



HO 29: Six-Stage Decon Process

- 9. Describe decontamination and disinfection procedures for infected areas.
- 10. Describe the process for passing through a six-stage decontamination unit to leave the work area.

Open the lesson by asking participants who have worked on remediation projects to describe their experience: What was the focus of that work? What materials did they use? How did they dispose of waste? Have participants share their answers with the class, and write their information on the board, or on a piece of flip chart paper.

Explain that remediation refers to remediating an environment. In the case of infectious diseases, we don't talk about remediation. Instead, we talk about decontamination and disinfection. Review that this entails reduction of contaminants (decontamination) and killing the contaminants with bleach (disinfection), and that they will be learning about the steps in more detail in the next activity.

Distribute Handout 28: Decontamination and Disinfection. Have participants answer the questions. Tell them to look at PG pages 6–21 to 6–29 as a reference.

Review the answers with the class and answer any questions participants have. (See the answer key on the page following this exercise.)

Display Slide 10. Explain that after working on the decontamination and disinfection of the work area, workers will then need to undergo a decon process of their own in order to exit the work area safely. Tell participants to look at the six stages indicated in the decon unit diagram and ask: What do you remember about the doffing process we discussed in Chapter 5? Why would different steps in the doffing process take place at different stages in the decon unit? (To reduce risk of contamination to the worker, and to reduce the risk of the worker carrying any pathogens as he or she exits the work area.)

Tell participants that they will watch a video that covers all of the steps in doffing PPE while moving through a six-stage decontamination process.

Distribute Handout 29: Six-Stage Decon Process. Tell participants that they are going to watch the video and take notes for each stage in the space provided. Explain that their notes will help them prepare for a hands-on activity related to exiting the work area.

Play the video and have participants watch and take notes. After they're done, tell participants to work in small groups to compare their notes, talking through each point, and adding to or correcting any of the information in their groups.

Discuss the answers to the handout with the class, and answer any questions participants may have about the topics listed.

Conclude by saying that decontamination and disinfection techniques for infectious diseases may depend on the type of pathogen and its routes of transmission. It is an employer's responsibility to make sure that workers understand the decontamination and disinfection techniques required, and have appropriate training and protection to complete the tasks safely and effectively.



Chapter 6: Work Area Preparation, Decontamination, and Disinfection Handout 28: Decontamination and Disinfection

TRAINING & Fui	Decontamination and Disinfection	
Instruct	i ons: Answer the questions.	
1.	What are the five steps in the decontamination and disinfection process? Step 1: All contaminated surfaces should be misted with a bleach solution. Step 2: Items with porous surfaces containing high levels of contamination should be disposed of when feasible. Step 3: Contaminated surfaces that remain after the bleaching process should be disinfected. Step 4: A final sanitation wash using a non-reactive detergent solution.	
_	Step 5: Any remaining contaminated debris should be bagged and disposed of.	
2.	Why do you need to wait after a bleach solution is applied?	
3.	What are OSHA guidelines for cleaning and disinfecting infectious agents on hard surfaces? Use an EPA-registered disinfectant suitable for non-enveloped viruses to treat contamination/spills, and to disinfect surfaces after bulk spill material has been removed. Always follow the manufacturer's instructions for the specific disinfectant being used.	
4.	What can be used for cleaning and disinfecting if an EPA-registered disinfectant isn't available? When EPA-registered disinfectants are unavailable, a 10 percent solution of common household bleach in water may be an effective alternative.	
5.	Why are contaminated objects with porous surfaces generally disposed of?	
	Contaminated objects with porous surfaces are generally disposed of because biological agents may well be released into the air during the process.	

Handout 28: Decontamination and Disinfection (continued)

LIU training & e fun	Handout 28 NA Decontamination and Disinfection
6.	What is involved in a post-decontamination and disinfection inspection?
	A visual inspection should be made after completion of the project to ensure the elimination of any organisms. Worksites should be part of the inspection process, including basements, lower rooms, crawl spaces, and rooms with water or flooding damage. Window frames, ceiling tiles, as well as any cellulose-based materials, should also be closely examined.
7.	 What are OSHA guidelines for safe handling and disposal of infected waste? OSHA provides guidelines for safe handling and disposal of infected waste: Place biohazard-labeled container to further reduce the risk of worker exposure. Use a puncture-proo container for sharps. It may be necessary to dispose of contaminated objects with porous surfaces that cannot be disinfe Dispose of waste from surface cleanup in accord with OSHA's Bloodborne Pathogens standard (29 C 1910.1030); CDC guidelines; and the U.S. Department of Transportation's (DOT) Hazardous Mater Regulations (HMR), and the multi-agency Interim Planning Guidance for the Handling of Solid Waste Contaminated with a Category A Infectious Substance.
8.	What is a waste load-out area, and what is it used for? The waste load-out area is an area to store infected waste before it is transported away from the worksite. It is used for short-term storage for bagged waste and a port for transferring waste to a truck or dumpster.
9.	When are waste materials transported off-site for disposal?
	Waste materials are transported off-site for disposal as work progresses to prevent exceeding available on-site storage capacity.



Chapter 6: Work Area Preparation, Decontamination, and Disinfection Handout 29: Six-Stage Decon Process



Handout 29 Six-Stage Decon Process

Instructions: Watch the video. Take notes about each of the topics below. This handout will serve as a guide to help you with the hands-on tasks that follow.

1	Stage 1 involves disinfecting the plastic apron, face shield, outer gloves, outer suit, boot covers (if used, and rubber boots if covers are not used) with an EPA-registered disinfectant spray. The trained observer's assistant may perform the disinfecting. Then the plastic apron, face shield, and boot covers (if used) are removed and disposed of in the appropriate receptacle.
	Next, the exposed surfaces of the respirator, the outer part of the suit that the apron was covering (if apron was used), the rubber boots (if boot covers were used), and all exposed tape are disinfected. Then all exposed tape and outer gloves are removed and placed in the appropriate receptacle. Be sure to take off outer gloves carefully so you do not contaminate the inner gloves. Be sure NOT to remove the respirator at this time.
	The last step in Stage 1 is to inspect the inner gloves' outer surfaces for visible contamination cuts, or tears. If inner glove is visibly soiled, cut, or torn, remove the inner gloves, perform hand hygiene on bare hands and don a clean pair of inner gloves. If no visible contamination, cuts, or tears are identified on the inner gloves, then disinfect the inner gloves.
2	Stage 2 may or may not be separated from Stage 1. If they are separated, it is usually done by a layer of plastic sheeting forming a barrier between the two stages and a zipper door or flaps are used to gain access.
	In Stage 2, the first step is to remove the rubber boots and outer suit and carefully place them in the appropriate receptacle. When removing the outer suit, slowly and carefully reach for the zipper or fasteners and unzip or unfasten the outer suit completely before rolling down and turning inside out if possible. Avoid contact of the outer surface of the outer suit with the outer surface of the inner suit during removal. Next, the inner suit is disinfected.
	The last step in Stage 2 is to disinfect the inner gloves again. Remove and discard inner gloves making sure not to contaminate bare hands during removal process. Perform hand hygiene with disinfectant and don a new pair of inner gloves.
	At this time, the trained observer's assistant will perform a final inspection of the worker for any indication of contamination of the inner suit, respirator, and respirator battery (if a PAPR is used). If contamination is identified, the trained observer's assistant will immediately inform the trained observer who will then inform the project supervisor, infectious disease specialist, or occupational safety and health coordinator before permitting the worker to exit the decontamination area.

Handout 29: Six-Stage Decon Process (continued)



Handout 29 Six-Stage Decon Process

Stage	Details
3	In Stage 3, remove the PAPR battery (if a PAPR is used), including the duct tape belt, and place the battery in a container or area designated for the collection of PAPR components. Place the tape in the appropriate receptacle.
	Next, the inner suit can be removed. Slowly and carefully reach for the zipper or fasteners and unzip or unfasten the inner suit completely before rolling down and turning inside out. Avoid contact of the outer surface of the disposable inner suit with skin, undergarments, or any other surface during removal. Pull inner suit away from the body, rolling inside out and touching only the inside of the suit. Carefully dispose of the suit in the appropriate receptacle.
	Next, inspect the inner gloves' outer surfaces for visible contamination, cuts, or tears. If inner glove is visibly soiled, cut, or torn, remove the inner gloves, perform hand hygiene on bare hands and don a clean pair of inner gloves. If no visible contamination, cuts, or tears are identified on the inner gloves, then disinfect the inner gloves.
	Workers can now remove their PAPR, being careful not to touch the inside of the respirator. Once the PAPR is removed, the workers can remove their inner gloves and their non-contaminated undergarments (if any are used) and place in the appropriate receptacle.
	They can then proceed to the shower. Also in this stage, workers can place their disinfected PAPR and battery in the Stage 5 area. The worker can bring this PPE into the clean room after they leave the shower. They can access Stage 5 from the clean room. There is typically a zipper door or flap door separating Stages 2 & 3 and a zipper door separating Stages 3 & 5. A zipper door or a flap door will typically separate Stages 3 & 4 as well. Whether a zipper door or flap is used will depend on what is required on the specific site plan.



6–22

Chapter 6: Work Area Preparation, Decontamination, and Disinfection Handout 29: Six-Stage Decon Process (continued)

Stage	Details
4	Stage 4 is the shower room. Every worker is required to take a full, thorough shower using antibacterial soap after going through Stages 1–3. This includes the trained observers, occupational safety and healthcare professionals, infectious disease specialists, and supervisors. Disposable towels must be provided for drying off and placed in the appropriate receptacles after use. A zipper door or a flap door will typically separate Stages 4 & 5 as well as Stages 4 & 6. Whether a zipper door or flap is used will depend on what is required on the specific site plan.
5	Stage 5 is where the disinfected PPE is stored while workers are in the shower. This stage is also accessible from the clean room. Once the worker enters the clean room from the shower, they can retrieve their PPE in Stage 5 from the clean room. Stage 5 may also be used to bring out waste barrels, bags, and containers that have been properly disinfected. Lastly, workers may go through Stage 5 when entering the work area, rather than cutting through the shower room, Stage 4.
6	Stage 6 is the clean room, sometimes called the support area. This is where anyone coming out of the work area and has been properly decontaminated can redress in their street clothes. Typically, there are benches for workers to sit on to redress and hooks for them to hang their street clothes on while they are in the work area. Some sites may use an adjacent room as the clean room if available.

Exercise 4: Work Area Preparation, Decontamination, and Disinfection: Hands-On

Exercise 4: Work Area Preparation, Decontamination, and Disinfection: Hands-On

Objectives

- 11. Demonstrate setting up a six-stage decontamination unit to enclose a work area.
- 12. Demonstrate proper techniques for eliminating contaminants on surfaces.
- 13. Demonstrate the proper inspection and donning of PPE.
- 14. Demonstrate the proper disinfection and doffing of PPE through the stages of the decontamination process.

Ask participants if they feel prepared to begin the hands-on performance assessment, which will cover everything they learned about preparing the work area, decontamination facilities, disinfecting surfaces, and donning/doffing PPE. Review any areas that participants still need help with.

Instructor Note: There are four separate performance checklists that cover the tasks in the

order that they should occur:

- Handout 30: Work Area Preparation Performance Checklist (participants prepare their work area and construct a decon unit that can be used for a six-stage decon process)
- Handout 31: Donning PPE Performance Checklist (participants follow the sequence for donning PPE, with the help of a trained observer)
- *Handout 32:* Decontamination and Disinfection Performance Checklist (participants perform decontamination and disinfection on a contained area, cleaning surfaces and bagging waste)
- Handout 33: Doffing PPE Performance Checklist (participants follow the sequence for doffing PPE, with the help of a trained observer's assistant)

The decontamination and disinfection portion of the hands-on activity may include disassembly of the decontamination unit, or you may wish to have participants tear down the decontamination unit as a separate task on the last day of the course.

The recommended participant/instructor ratio is 5:1. You will need to evaluate participants individually. To save time, be sure that there are multiple instructors available to conduct the evaluations.

Depending on the number of additional instructors available to assist in evaluating participants, what type of materials will be used to construct the decon unit, and how large the space is, you will have to figure out the best way to have all participants take part in all parts of the processes in a way that they can be assessed.



360

Minutes

HO 30: Work Area Preparation Performance Checklist

HO 31: Donning PPE Performance Checklist

HO 32: Decontamination and Disinfection Performance Checklist

HO 33: Doffing PPE Performance Checklist

HO 25: PPE Donning/ Doffing Procedures (to post in the decon unit and use as checklists during the hands-on activity)







Flip Chart



PG: 6-21 to 6-29





Chapter 6: Work Area Preparation, Decontamination, and Disinfection Exercise 4: Work Area Preparation, Decontamination, and Disinfection: Hands-On

Distribute Handouts 30, 31, 32, and 33 to participants. Give them some time to read through each handout. Pause and answer questions about each handout to ensure that participants feel prepared to begin the tasks. Remind participants to look at PG Chapters 5 and 6, as well as the handouts they completed for Chapters 5 and 6, for more information.

Explain how the class will be divided and how they will move from one area/set of tasks to another. Ask question to check understanding of the instructions.

Review the list of materials and equipment necessary for each of the tasks and distribute as necessary. Model any tasks that participants may still have questions about.

Display Slide 10. Review the plan of the six-stage decontamination unit, and draw up a plan on a piece of flip chart paper that outlines how the decontamination unit will be set up for your situation.

Instructor Note: Many participants taking this course may have experience in environmental projects that have provided them with experience in using negative air machines. However, if time allows or you feel that participants would benefit from additional practice, have them calculate the NAMs needed for the area of the decon unit used in this exercise, where to exhaust the NAM(s), and proceed with setting up a negative-pressure system for that area, as part of their preparation of the work area.

Distribute one full set of PPE (Recommended: hooded Tyvek suit, disposable mid-calf foot covers, washable footwear, double-nitrile inner gloves, extended-cuff nitrile outer gloves, painters' tape, and a full-face or half-face APR) to each participant. Materials and equipment for work area preparation, decontamination, and disinfection tasks can be accessed on site.

Have participants refer to Handout 25: *PPE Donning/Doffing Procedures*, and to use the Trained Observer Donning Checklist or Trained Observer's Assistant Doffing Checklist if they are going to ask them to act as trained observers or trained observer's assistants during the PPE donning/doffing assessment.

Instructor Note: It is recommended that training sites have enough sets of PPE on hand for each participant to have one to use several times during the course. Sites can cut down on the cost of providing PPE to each participant by having participants reuse the same set of PPE for the rest of the course. Use wide painter's tape for ankles and wrists instead of duct tape to prevent ripping of the Tyvek suits and to allow for reuse.

Lead the class to the simulated containment area. Conduct a walkthrough of the area and discuss what will need to be done to construct the containment and what material will be needed. Discuss the lockout/tagout procedures that would need to be taken and signage that would need to be posted.



Materials for Hands-On Activity:

1 FFAPR and set of PPE per participant

Alcohol-based hand rub and disinfectant wipes

Materials to perform decontamination and disinfection, including spray bottles and rags

Sticky mats (if used)

ZipWall barrier system materials

Materials and equipment to construct a decon unit, including poly sheets, chairs, signage, covered disposal containers, infectious waste bags **Have** the participants perform the tasks, in groups and/or individually, depending on the type of task, while the instructor watches and completes the performance checklist. Enlist the help of other instructors to help manage the operations through the completion of the four checklists as needed.

At the end of the assessment, instructors should go over any steps missed with individuals and address the class and review if there were any common issues or problems.

Instructor Note: Only 100% satisfactory performance is acceptable for the Performance

Checklist. If a participant misses steps or performs them incorrectly, he or she must try the full set of procedures again.

Conclude by pointing out that all of the tasks that participants performed in this exercise were designed to help them understand the concepts of isolating and containing pathogens, to minimize or prevent exposure both to workers and others. On an actual worksite, some of the procedures may differ based on the type of pathogens present, the type of space that needs decontamination and disinfection, and state and local regulations. Employers are responsible for ensuring that a site-specific plan is in place and that workers are trained before beginning these tasks.



Chapter 6: Work Area Preparation, Decontamination, and Disinfection Handout 30: Work Area Preparation Performance Checklist

pe of task: Ite of assessn	Individual Exercise Group Exercise Other: Can be done in small classes as an exerci nent://	se that combines grou	p and individual assessment
ime(s) of part	ticipant(s):		
Task		Performance	
		Satisfactory	Unsatisfactory
Understand	d the directions of the task.		
Prepare the	e work area in the proper order.		
Set up the	decontamination unit in the proper order.		
Show initia	tive and do his/her fair share of the work.		
Work well v	vith others in the group.		
Comments	:	<u>'</u>	

Handout 31: Donning PPE Performance Checklist

FUND Donning PPE Performance Ch	necklist	
e of task: Individual Exercise		
Group Exercise Other: Can be done in small classes as an exercise	e that combines grou	n and individual assessment
e of assessment://	that combines grou	
ne(s) of participant(s):		
Tack	Performance	
1058	Satisfactory	Unsatisfactory
Inspect all PPE that will be used.		
Remove clothing and personal items.		
Put on disposable boxers or cotton underwear (optional).		
Don inner suit (Tyvek® for example).		
Using duct tape, prepare and put on disposable belt and attach the PAPR battery to the disposable belt (if a PAPR is being used).		
Put on inner gloves.		
Put on outer suit (chemical suit), do not zip suit up at this time.		
Put on rubber boots. The outer suit should be placed over the rubber boot and should be taped. If being used, put on boot covers at this time.		
Connect PAPR battery and put on respirator face-piece and		



Chapter 6: Work Area Preparation, Decontamination, and Disinfection Handout 31: Donning PPE Performance Checklist (continued)



Handout 31 Donning PPE Performance Checklist

Tak (antinual)	Performance		
Task (continued)	Satisfactory	Unsatisfactory	
Put on double hoods over respirator head harness (straps) and zip up (seal) outer coverall. Be sure to tape outer hood to the respirator face-piece brim to gain proper seal.			
Put on the face shield.			
Put on outer gloves (heavy duty nitrile) and apply tape. Be sure to put the sleeve of the outer suit over the outer glove.			
Put on plastic apron (if used).			
Proceed through the decontamination unit to the work area.			

Handout 32: Decontamination and Disinfection Performance Checklist

e of task:	Individual Exercise Group Exercise Other: Can be done in small classes as an exercise	that combines grou	p and individual assessme
e of assessn ne(s) of part	nent:// icipant(s):		
		Performance	
Task		Satisfactory	Unsatisfactory
Mist all con the formati 15 minutes	taminated surfaces with a bleach solution to reduce on of dust aerosols. (Leave bleach solution on for 5 to .)		
Properly dispose of items with porous surfaces containing high levels of contamination.			
Disinfect co process.	ontaminated surfaces that remain after the bleaching		
Perform a f	nal sanitation wash using a non-reactive detergent.		
Rinse the siccleaning.	urface with water, dry, and HEPA-vacuum for final		
Bag, sanitiz	e, and dispose of any remaining contaminated debris.		
Comments	:	1	



Chapter 6: Work Area Preparation, Decontamination, and Disinfection Handout 33: Doffing PPE Performance Checklist

LIUNA INING & EDUCATION FUND	Doffing PPE Performance Che	cklist	
be of task: te of assessm	Individual Exercise Group Exercise Other: Can be done in small classes as an exercise ent://	that combines grou	ıp and individual assessmen
me(s) of part	icipant(s):		
		Performance	
lask		Satisfactory	Unsatisfactory
Stage 1 of t Disinfect th boot covers an EPA-regi	he Decon: e plastic apron, face shield, outer gloves, outer suit, (if used, and rubber boots if covers are not used) with stered disinfectant spray.		
Doff plastic dispose in t	Doff plastic apron, face shield, and boot covers (if used) and dispose in the appropriate receptacle.		
Disinfect th of the suit t rubber boo Then remov appropriate so you do n	e exposed surfaces of the respirator, the outer part hat the apron was covering (if apron was used), the ts (if boot covers were used), and all exposed tape. re exposed tape and outer gloves and place in the receptacle. (Be sure to take off outer gloves carefully ot contaminate the inner gloves.)		
Inspect the cuts, or tear the inner gl a clean pair tears are ide inner glove	inner gloves' outer surfaces for visible contamination, s. If inner glove is visibly soiled, cut, or torn, remove oves, perform hand hygiene on bare hands and don of inner gloves. If no visible contamination, cuts, or entified on the inner gloves, then disinfect the s.		
Enter Stage	2 of the Decon:		
Carefully do appropriate	off rubber boots and outer suit and place in the receptacle.		

Handout 33: Doffing PPE Performance Checklist (continued)



Handout 33 Doffing PPE Performance Checklist

in all i comprimited i	Performance	
Task (continued)	Satisfactory	Unsatisfactory
Disinfect the inner gloves again. Remove and discard inner gloves making sure not to contaminate bare hands during removal process. Perform hand hygiene with disinfectant and don a new pair of inner gloves.		
Enter Stage 3 of the Decon: Remove the PAPR battery (if a PAPR is used), including the duct tape belt, and place the battery in a container or area designated for the collection of PAPR components. Place the tape in the appropriate receptacle.		
Carefully remove inner suit and place in the appopriate receptacle.		
Inspect the inner gloves' outer surfaces for visible contamination, cuts, or tears. If inner glove is visibly soiled, cut, or torn, remove the inner gloves, perform hand hygiene on bare hands and don a clean pair of inner gloves. If no visible contamination, cuts, or tears are identified on the inner gloves, then disinfect the inner gloves.		
Remove PAPR, being careful not to touch the inside of the respirator. Then remove inner gloves and non-contaminated undergarments (if any are used) and place in the appropriate receptacle. Place the disinfected PAPR and battery (if applicable) in the Stage 5 area.		
Enter Stage 4 of the Decon: Shower.		
Enter Stage 6 of the Decon: Redress. Retrieve any disinfected PPE (if applicable) and any decontaminated waste containers (if applicable) from Stage 5 place in Stage 6. Exit the Decon.		
Comments:		



Chapter 6: Work Area Preparation, Decontamination, and Disinfection

Summary



Summary



Explain that the *Things to Remember* document is a take-home list of information that can be used for reference or self-study. Note that this document provides information about the chapter's learning objectives and may be used as a study guide for the end-of-course assessment.

Chapter 6: Things to Remember

SL 2 to 5



PG: 6-30 to 6-32

Display Slides 2 to 5 and briefly review the chapter objectives with the class. Review the information on the *Things to Remember* handout for each objective. Ask participants if they are comfortable with their knowledge about, or ability to do, each of the objectives, or if they need review or additional support on any of the items listed.

Ask the participants if they have any questions regarding any other topics of the chapter.

Address any questions or concerns.

Distribute *Chapter 6: Things to Remember.*

Chapter 6: Things to Remember



Chapter 6: Work Area Preparation, Decontamination, and Disinfection Chapter 6: Things to Remember (continued)

Chapter 6: Things to Remember (continued)

Chapter 6: Work Area Preparation, Decontamination, and Disinfection Things to Remember

14. One scenario for safely doffing PPE, passing through a multi-stage decon unit and leaving the work area includes the following steps:

Enter Stage 1 of the Decon:

- Disinfect the plastic apron, face shield, outer gloves, outer suit, boot covers (if used, and rubber boots if covers are not used) with an EPA-registered disinfectant spray.
- Doff plastic apron, face shield, and boot covers (if used) and dispose in the appropriate receptacle.
- Disinfect the exposed surfaces of the respirator, the outer part of the suit that the apron was covering (if apron was used), the rubber boots (if boot covers were used), and all exposed tape. Then remove exposed tape and outer gloves and place in the appropriate receptacle. (Be sure to take off outer gloves carefully so you do not contaminate the inner gloves.)
- Inspect the inner gloves' outer surfaces for visible contamination, cuts, or tears. If inner glove is visibly soiled, cut, or torn, remove the inner gloves, perform hand hygiene on bare hands and don a clean pair of inner gloves. If no visible contamination, cuts, or tears are identified on the inner gloves, then disinfect the inner gloves.

Enter Stage 2 of the Decon:

- Doff rubber boots and outer suit and place in the appropriate receptacle. When removing the outer suit, slowly and
 carefully reach for the zipper or fasteners and unzip or unfasten the outer suit completely before rolling down and
 turning inside out if possible. Avoid contact of the outer surface of the outer suit with the outer surface of the inner
 suit during removal.
- Disinfect the inner suit.
- Disinfect the inner gloves again. Remove and discard inner gloves making sure not to contaminate bare hands during removal process. Perform hand hygiene with disinfectant and don a new pair of inner gloves.

Enter Stage 3 of the Decon:

- Remove the PAPR battery (if a PAPR is used), including the duct tape belt, and place the battery in a container or area designated for the collection of PAPR components. Place the tape in the appropriate receptacle.
- Carefully remove inner suit and place in the appopriate receptacle.
- Inspect the inner gloves' outer surfaces for visible contamination, cuts, or tears. If inner glove is visibly soiled, cut, or torn, remove the inner gloves, perform hand hygiene on bare hands and don a clean pair of inner gloves. If no visible contamination, cuts, or tears are identified on the inner gloves, then disinfect the inner gloves.
- Remove PAPR, being careful not to touch the inside of the respirator. Then remove inner gloves and noncontaminated undergarments (if any are used) and place in the appropriate receptacle. Place the disinfected PAPR and battery (if applicable) in the Stage 5 area.

Enter Stage 4 of the Decon:

Shower

Enter Stage 6 of the Decon:

 Redress. Retrieve any disinfected PPE (if applicable) and any decontaminated waste containers (if applicable) from Stage 5 and place in Stage 6. Exit the Decon.

Page 3 of 3