



# **Anthrax**

## **SURFACE SAMPLING**

# **Instructor Guide**

DEPARTMENT OF HEALTH AND HUMAN SERVICES  
Centers for Disease Control and Prevention  
National Institute for Occupational Safety and Health





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CDC INFO: [www.cdc.gov/info](http://www.cdc.gov/info)

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## Instructor Notes

This training provides instructions for the collection of environmental *Bacillus anthracis* spores, or anthrax, from nonporous surfaces using macrofoam swabs and cellulose sponges.

Read the entire Instructor Guide before facilitating Anthrax Surface Sampling training.

There are materials and supplies that must be included in the training, some of which require preparation in advance.

The training consists of a segment of lecture with demonstration, followed by guided practice (Exercise), where the instructor and an experienced sampler will observe and coach participants as they perform practice sampling. (Total time = 3 hours, 45 minutes)

15 Minutes: Introductions

60 Minutes: Lecture with Demonstration

15 Minutes: Break

90 Minutes: Guided Practice (Exercise)

30 Minutes: Quiz and Review of the Quiz

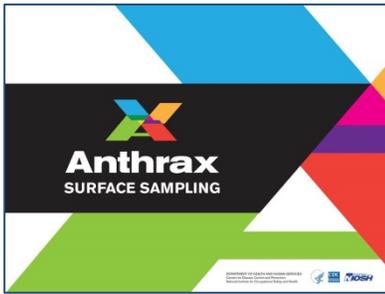
15 Minutes: Completion of Evaluation Form by Students

Quiz: Copies of the quiz are included in the Instructor Guide. The first copy has the correct answers in bold. It is the Instructor's Answer Key.

The second copy is the Student Quiz. Make enough copies of the Student Quiz so each student will have a copy to complete individually.

An evaluation form (2 pages) is printed separately for students to complete at the conclusion of training. It is required and should be collected before students leave.

1.



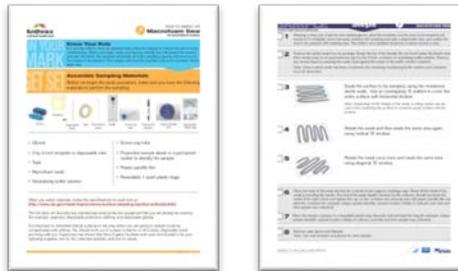
2.



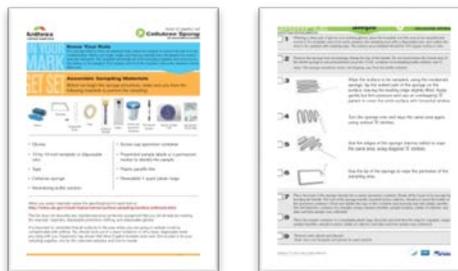
# Materials and Supplies

The following pages list Student Supplies, Instructor Supplies, and Room Setup information. Review the lists carefully and be certain you have what you need before you start. Supplies are also listed on the one-page checklists, which should be distributed to all students before you start. Students may use these “How to” sheets as they listen to the lecture and demonstration and as they practice sampling. They should be cautioned that the sheets may become contaminated when used in an actual response. If they are used in an actual response, a clean sheet should be used for each sample if handled by the sampler and assistant. Another option would be to post them where they will not be handled between samples. This will help minimize the chance of cross-contamination.

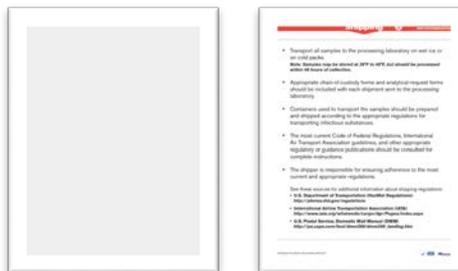
## Macrofoam Swab



## Cellulose Sponge



## Decontaminate



# Student Supplies

Each student will need the following supplies to perform the exercise:

- The one-page document *How to Sample with Macrofoam Swab on Nonporous Surfaces*
- The one-page document *How to Sample with Cellulose Sponge on Nonporous Surfaces*
- The one-page document *How to Decontaminate Samples*
- Two pairs of nitrile gloves  
Note: Gloves do not have to be sterile.
- One disposable sample template with a sample area of 4 square inches
- One disposable sample template with a sample area of 100 square inches  
Note: If templates are not available, masking tape can be used with a disposable ruler to outline a sample area of the same size.
- One roll of masking tape (a few rolls of masking tape may be shared by the class, depending on the class size and how the groups are distributed throughout the room)
- One sterile macrofoam swab that has a 3/16-inch-thick medical-grade polyurethane foam head with 100 pores per inch, thermally bonded to a polypropylene stick (such as the Sterile Foam-Tipped Applicators Scored with Thumb Stop [Puritan, Guilford, Maine; catalog number 25-1607 1PF SC] or equivalent)
- One dry sponge that is 1.5 by 3 inches of cellulose sponge folded over a handle (such as the 3M™ Sponge-Stick [3M, St. Paul, Minnesota; catalog number SSL-100] or equivalent)
- Two 10-milliliter (mL) tubes of sterile general neutralizing buffer that will inactivate halogen disinfectants and quaternary ammonium compounds (such as the Neutralizing Buffer [Hardy Diagnostics, Santa Maria, California; catalog number K105] or equivalent)  
Note: If a premoistened cellulose sponge is used, only one 10-mL tube of neutralizing buffer solution is required for the macrofoam swab. The premoistened sponge should be equivalent to a 1.5-by-3-inch cellulose sponge folded over a handle, premoistened with 10 mL of general neutralizing buffer that will inactivate halogen disinfectants and quaternary ammonium compounds (such as the 3M™ Sponge-Stick [3M, St. Paul, Minnesota; catalog number SSL-10NB]).
- One sterile 15-mL screw-cap centrifuge tube (such as a 15-mL High-Clarity Polypropylene Conical Centrifuge Tube [Becton Dickinson, Franklin Lakes, New Jersey; catalog number 352097] or equivalent)
- One sterile 4-ounce screw-cap specimen container, individually wrapped (such as a General Purpose Specimen Container [Kendall Healthcare, Mansfield, Massachusetts; catalog number 8889-207026] or equivalent)
- Two sample labels
- One permanent marker
- Two 6-inch strips of 2-inch-wide plastic paraffin film (such as 2-inch wide Parafilm M® All-Purpose Laboratory Film [Bemis Company, Neenah, Wisconsin; catalog number PM-992] or equivalent)
- Four resealable 1-quart or smaller plastic bags



## Instructor/Evaluator Supplies

The instructor will need the following classroom supplies: computer and projector for PowerPoint; flip chart and markers; paper; pens; sign-in sheet; evaluation forms; and quizzes.

The instructor will need the following supplies to demonstrate sample decontamination:

- One 1-gallon bleach bottle (rinsed out and filled with water only)
- One 1-gallon white vinegar bottle (rinsed out and filled with water only)
- One 5-gallon bucket of water (half filled)
- One 1-gallon graduated measuring device
- One 5-gallon bucket or container to hold the decontamination solution
- One roll of disposable paper towels

Note that the demonstration of sample decontamination is optional.

The instructors and evaluators will need the following supplies to facilitate evaluation of students as they collect samples during the exercise:

- Bottle of lotion-base or powder simulated germs that are visible under ultraviolet/blacklight
- One ultraviolet/blacklight flashlight
- One cotton swab or small brush
- One trash bag/container



# Room Setup

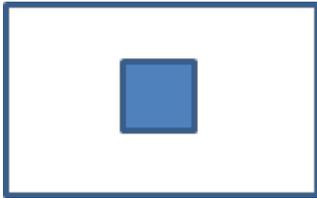
To facilitate the exercise at the end of the class, arrange the tables so that Macrofoam Swab Sampling and Cellulose Sponge Sampling can be done separately.

Set up one table with a 4-square-inch template for Macrofoam Swab Sampling so a team (sampler and assistant) from the class can practice.

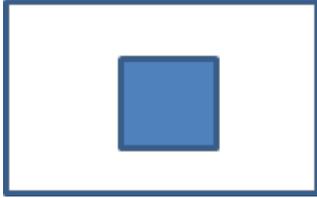
Set up the other table with a 100-square-inch template for Cellulose Sponge Sampling so a second team of participants can practice at the same time.

Samplers and Assistants should work from one side of each table while the instructor or an experienced person observes and guides from the other side.

## Swab Table

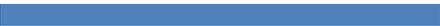


## Foam Table



# Introductions

Introduce yourself, and allow approximately 60 seconds each for participants to introduce themselves (name, position, goal for the course). Present the agenda for today's training.



3.

ANTHRAX SURFACE SAMPLING

### Why Do Anthrax Surface Sampling?

- Confirm or identify contamination
- Assess extent of contamination
- Determine risk for human exposure
- Inform medical treatment
- Guide decontamination



4.

ANTHRAX SURFACE SAMPLING

### Background

These sampling procedures were prepared by the Centers for Disease Control and Prevention (CDC) to

- Standardize collection procedures
- Ensure samples can be analyzed
- Obtain comparable results



5.

ANTHRAX SURFACE SAMPLING

### Background

These procedures are meant to be used on smooth, nonporous surfaces:

- Stainless steel
- Painted wallboard
- Floor tiles
- Wood laminate



## Why Do Anthrax Sampling?

- Confirm or identify contamination
- Assess the extent of contamination
- Determine the risk for human exposure
- Inform medical treatment
- Guide decontamination

## Background

These sampling procedures were prepared by the Centers for Disease Control and Prevention (CDC) in collaboration with other agencies to

- Standardize collection procedures
- Ensure samples can be analyzed
- Obtain comparable results

These procedures are meant to be used on smooth, nonporous surfaces, including

- Stainless steel
- Painted wallboard
- Floor tile
- Wood laminate

Other sampling methods are available for sampling porous surfaces (for example, carpet or cloth). These methods are available on the CDC/NIOSH website at [www.cdc.gov/niosh/topics/emres/surface-sampling-bacillus-anthraxis.html](http://www.cdc.gov/niosh/topics/emres/surface-sampling-bacillus-anthraxis.html). These methods are not included in this training.

6.

ANTHRAX SURFACE SAMPLING

### Sampling Plan

- Collection should be part of a sampling plan including
  - Objectives
  - Approach
  - Analytical and laboratory coordination
  - Handling, packaging, and transport
  - Interpretation of results



## Sampling Plan

- Collection of anthrax samples should be done as part of a sampling plan that includes
  - Objectives
  - Approach
  - Analytical and laboratory coordination
  - Handling, packaging, and transport of samples
  - Interpretation of results

The sampling plan is often developed by a certified industrial hygienist or other professional with experience in understanding how anthrax spores may be distributed. You should review the plan with the individual who developed it so you understand where and how to collect samples.

**Note: Discuss with students how the sampling plan can help them determine the appropriate amount of supplies to take into the contaminated area. Remind them that supplies entering cannot be removed and reused later.**

7.

ANTHRAX SURFACE SAMPLING

### Health and Safety Plan

- Follow a health and safety plan for protection during sampling:
  - Personal protective equipment (PPE)
  - Medical countermeasures (antibiotics and vaccinations)
  - Decontamination procedures for both responders and samples



8.

ANTHRAX SURFACE SAMPLING

### Health and Safety Plan

- Recommendations on protecting yourself from getting sick can be found on the NIOSH website at [www.cdc.gov/niosh/topics/anthrax/workers.html](http://www.cdc.gov/niosh/topics/anthrax/workers.html)



## Health and Safety Plan

- Collection should always be done under a health and safety plan that will explain the details to protect you while you sample, including
  - Personal protective equipment
  - Medical countermeasures (such as antibiotics and vaccinations)
  - Decontamination procedures for responders and for the samples
- This course does not cover how to develop a Health and Safety Plan. This will be done by the incident commander, a site safety officer, or a delegate. It is important that you understand this plan and the steps you are required to take in order to protect your health before you enter any potentially contaminated areas.
- This course instructs you to use new, clean gloves when collecting each sample. These sampling gloves are meant to prevent cross-contamination and not to protect you from exposure to anthrax or other hazards. These sampling gloves are worn on top of your required personal protective equipment that should include gloves to protect you from exposure to anthrax or other hazards.
- NIOSH has developed recommendations on how to protect yourself from getting sick. These recommendations are at [www.cdc.gov/niosh/topics/anthrax/workers.html](http://www.cdc.gov/niosh/topics/anthrax/workers.html).

9.

ANTHRAX SURFACE SAMPLING

### Sampling Team



- At least 2 people
- At least 1 sampler and 1 assistant
- Minimizes chance of cross-contamination

10.

ANTHRAX SURFACE SAMPLING

### Sampling Team

- Decide who will sample, who will assist
- *Do not change roles during sampling*
- Assistant handles all supplies
- Sampler touches supplies only as assistant hands them over
- Minimize contact with potentially contaminated surfaces

11.

ANTHRAX SURFACE SAMPLING

### Sampling Team

- Remember that all surfaces in the sampling area could be contaminated
- Bring a clean working surface such as
  - Disposable towel
  - Portable cart
  - 5-gallon buckets
- Take only the supplies that you need



## Sampling Team

- Samples should be collected by a team of two or more persons:
  - At least one sampler and one assistant
  - These directions were written for a team of two. Adding additional persons may require modification to the directions to ensure cross contamination does not occur and team members understand their roles.
- This minimizes the chance for cross-contamination when collecting samples.
- Before you begin collecting samples, identify who will sample and who will assist.
- Your roles should not change as you collect multiple samples.
- The assistant handles all sampling supplies and never touches potentially contaminated surfaces.
- The sampler touches the sampling supplies only as they are handed over by the assistant.
- The sampler and assistant should minimize contact with potentially contaminated surfaces.
- Remember that all surfaces in the area to be sampled could be contaminated.
- You should bring a clean working surface with you, such as these examples:
  - Disposable towel
  - Portable cart
  - 5-gallon buckets
- Take only the supplies that you need as they cannot be brought back out.

12.

ANTHRAX SURFACE SAMPLING

### Training Outcomes

**You will...**

- Observe macrofoam swab and cellulose sponge sampling
- Observe decontamination of samples
- Learn what material is required for sampling and decontamination
- Access sampling and decontamination procedures, as well as dangerous-goods regulations
- Demonstrate knowledge of sample collection, decontamination, and methods to limiting cross-contamination

## Outcomes of Anthrax Sampling Training

The learner will...

- Observe collecting a sample from a nonporous surface using a macrofoam swab and a cellulose sponge
- Observe sample decontamination by the recommended procedures
- List the materials required to collect and decontaminate samples
- Access the sample collection procedures, sample decontamination procedures, and dangerous goods regulations
- Demonstrate comprehension and application of sample collection, sample decontamination, and methods for limiting cross-contamination

## Questions?

As each section is finished, the instructor should pause and ask if participants have any questions before starting the next section. Be careful to leave enough time to complete the lecture portion of the class in the allotted hour.

13.



## How to Sample with Macrofoam Swab on Nonporous Surfaces

**Note:** Supplies should be on table for use in the demonstration. The instructor will demonstrate the sampling process.

### Appropriate Circumstances

Swabs are appropriate for sampling small surfaces equal to or less than 4 square inches:

- Supply air diffusers
- Air return grills
- Keyboards/computer fans
- Hard-to-reach places
- Crevices
- Corners

14.



If you need to sample an area that is not square, use tape to outline an area that does not exceed 4 square inches. You can sample an area less than 4 square inches, but you should not sample an area that is larger. Be sure to make a note on the sampling sheet when you use an area other than 4 square inches; this information is needed to help analyze the sample and interpret the results.

15.



### Supplies Needed

Display each supply on the slide and identify it for all participants.

- |                  |                        |
|------------------|------------------------|
| Gloves           | Buffer                 |
| Template         | Screw-cap Tube         |
| Disposable Ruler | Paraffin Film          |
| Tape             | Resealable Plastic Bag |
| Macrofoam Swab   | Permanent Marker       |

16.

ANTHRAX SURFACE SAMPLING Macrofoam Swab

### Step 1

- Sampler and assistant put on new gloves
- Gloves go on top of normal PPE to prevent contamination of sample



16

17.

ANTHRAX SURFACE SAMPLING Macrofoam Swab

### Step 1, continued

- Sampler puts 2 x 2-inch template over sampling area
- Or measures out an area 4 square inches or less



17

18.

ANTHRAX SURFACE SAMPLING Macrofoam Swab

### Step 2

- The assistant opens the swab package without touching the swab or its handle
- The sampler removes the swab from the package by grasping only the swab handle
- When handling the swab, do not touch below the thumb stop



18

19.

ANTHRAX SURFACE SAMPLING Macrofoam Swab

### Step 2, continued

- Sampler dips swab (if not premoistened) into tube of neutralizing buffer solution
- Assistant opens and holds tube for sampler
- Sampler presses swab against inside of container to remove excess
- Throw away any leftover buffer and tube; do not use for next sample



19

## STEP 1

- Both the sampler and assistant should put on new, clean sampling gloves.

**Note: Stress to the students how important it is that the sampler and assistant both wear a clean pair of gloves for each sample. This is done to prevent cross contamination between samples.**

- These gloves go on top of your normal PPE to ensure you do not contaminate the sample.
- The sampler should secure the 2-by-2-inch template over the area to be sampled.
- If you do not have a template, measure out an area that is equal to or less than 2 by 2 inches.

## STEP 2

- The assistant opens the swab package without touching the swab or its handle.
- The sampler removes the swab from the package by grasping only the swab handle.
- When handling the swab, do not touch below the thumb stop.
- If the swab is not premoistened, the sampler will dip the swab into the tube of neutralizing buffer solution.
- The assistant opens and holds the tube for the sampler.
- The sampler will press the swab against the inside of the container to remove any excess.
- The unused buffer solution and tube should be thrown away. Do not use the leftover solution for the next sample.
- The sampler makes three passes over the surface to be sampled, using three patterns: horizontal, vertical, and diagonal.
- A rolling motion may be used to maximize swab contact with the surface.

**Note: Demonstrate the different stroke patterns to the students as you progress through the next three slides. Stress the importance of covering the entire surface area with each pattern.**

20.

ANTHRAX SURFACE SAMPLING Macrofoam Swab

### Steps 3, 4, and 5

- Sampler makes 3 passes over sampling surface: horizontal, vertical, and diagonal



- A rolling motion will maximize swab contact with surface

21.

ANTHRAX SURFACE SAMPLING Macrofoam Swab

### Step 3: Horizontal Pass



- Place side of swab on surface with gentle but firm pressure to ensure direct contact
- Use an overlapping 'S' pattern to cover entire surface with *horizontal* strokes

22.

ANTHRAX SURFACE SAMPLING Macrofoam Swab

### Step 4: Vertical Pass

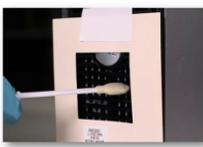


- Rotate swab and cover area again, with *vertical* 'S' strokes
- Strokes will be at 90° angle to first ones

23.

ANTHRAX SURFACE SAMPLING Macrofoam Swab

### Step 5: Diagonal Pass



- Rotate swab once more and cover area again, with *diagonal* 'S' strokes
- Strokes will be at 45° angle to first ones

## STEP 3

### Horizontal Pass

- Place the side of the swab on the surface and use a gentle but firm pressure so the entire side of the swab has direct contact with the surface.
- Use an overlapping 'S' pattern to cover the entire surface with horizontal strokes.

## STEP 4

### Vertical Pass

- Rotate the swab, and swab the same area again, using vertical 'S' strokes.
- These strokes should be at a 90° angle to the first ones you made.

## STEP 5

### Diagonal Pass

- Rotate the swab once more, this time swabbing the same area with diagonal 'S' strokes.
- These strokes should be at a 45° angle to the first ones you made.

24.

ANTHRAX SURFACE SAMPLING Macrofoam Swab

### Step 6

- Place swab into screw-cap tube
  - Assistant opens and holds tube
  - Sampler breaks off head of swab by bending handle at scoring
  - Do not insert handle beyond thumb stop



25.

ANTHRAX SURFACE SAMPLING Macrofoam Swab

### Step 6, continued



- Assistant caps and labels tube:
  - unique identifier
  - sample location
  - initials of collector
  - date and time

26.

ANTHRAX SURFACE SAMPLING Macrofoam Swab

### Step 6, continued



- Assistant wraps tube with paraffin film to prevent leakage during shipment

## STEP 6

**Note:** Be sure to practice this step before teaching it to the students. This can be difficult to perform without practice.

- Place the swab into the screw-cap tube, following these steps:
  - The assistant should open and hold the tube.
  - The sampler will break off the head of the swab by bending the handle where it is scored.
  - Do not insert the swab handle beyond the thumb stop.
- The **assistant** should securely tighten the cap and label the tube as follows:
  - unique sample identifier
  - sample location
  - initials of the collector
  - date and time the sample was collected
- After labeling, the assistant should wrap the tube with paraffin film to prevent the cap from loosening and leaking during shipping.

**Note:** At this point, demonstrate how to apply plastic paraffin film. The film is not sticky but it must be stretched to get a good seal. Use a thumb to hold the end in place while you use the other hand to stretch it around the lid. As you stretch it, continue approximately halfway past the point where you started, and the film will stick to itself. The film should be tight enough to prevent the lid from opening during shipping. A good video demonstration is available at [www.youtube.com/watch?v=sDKPqHgF\\_Gw](http://www.youtube.com/watch?v=sDKPqHgF_Gw).

27.

ANTHRAX SURFACE SAMPLING Macrofoam Swab

### Step 7

- Assistant places sample into resealable bag
- Assistant seals and labels the bag with same information as on tube
- Check that the bag is watertight for decontamination



27

28.

ANTHRAX SURFACE SAMPLING Macrofoam Swab

### Steps 8

- Leave template in place after sampling
- Sampler and assistant remove outer gloves and discard
- Use new template and gloves for each sample



28

## STEP 7

- The assistant should place the sample into a resealable plastic bag.
- Securely seal and label the bag with the same information as the tube.
- The bag should be watertight to prevent leaking during decontamination.

## STEPS 8

- The template should be left in place after the sample is collected.
- Both the sampler and the assistant should remove their outer gloves and discard them.
- A new template and clean gloves should be used to collect the next sample.

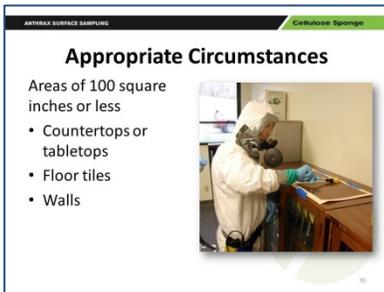
## Questions?

As each section is concluded, the instructor should pause and ask if participants have any questions before starting the next section. Be careful to leave sufficient time to complete the lecture.

29.



30.



31.



## How to Sample with a Cellulose Sponge on Nonporous Surfaces

**Note:** Supplies should be on table for use in the demonstration. The instructor will demonstrate the sampling process.

### Appropriate Circumstances

Sponges are appropriate for sampling surfaces equal to or less than 100 square inches:

- Countertops/tabletops
- Floor tiles
- Walls

If you need to sample an area that is not square, use tape to outline an area that does not exceed 10 by 10 inches. You can sample a smaller area by this method, but you should not sample an area that is larger. Be sure to make a note on the sampling sheet when you use an area other than 100 square inches. This information is needed to help analyze the sample and interpret the results. If the area to be sampled is around 4 square inches, consider using the macrofoam swab procedure instead of the cellulose sponge procedure.

### Supplies Needed

- |                  |                              |
|------------------|------------------------------|
| Gloves           | Buffer                       |
| Template         | Screw-cap Specimen Container |
| Disposable Ruler | Paraffin Film                |
| Tape             | Resealable Plastic Bag       |
| Cellulose Sponge | Permanent Marker             |

32.

ANTHRAZ SURFACE SAMPLING Cellulose Sponge

### Step 1

- Sampler and assistant put on new gloves
- Gloves go on top of normal PPE to prevent contamination of sample



32

33.

ANTHRAZ SURFACE SAMPLING Cellulose Sponge

### Step 1, continued

- Sampler puts 10 x 10-inch template over sampling area
- Or measures out an area 100 square inches or less



33

## STEP 1

- Both the sampler and assistant should put on new, clean gloves.

**Note: Stress to the students how important it is that the sampler and assistant both wear a clean pair of gloves for each sample. This is done to prevent cross contamination between samples.**

- These gloves go on top of your normal PPE to ensure you do not contaminate the sample.
- The sampler should secure the 10-by-10-inch template over the area to be sampled
- If you do not have a template or you are sampling an odd-shaped area, measure out an area that is equal to or less than 100 square inches.

34.

ANTHRAZYL SURFACE SAMPLING Cellulose Sponge

### Step 2

- Assistant opens sponge package without touching sponge or handle
- Sampler removes sponge by grasping only handle
- Never touch below thumb stop



35.

ANTHRAZYL SURFACE SAMPLING Cellulose Sponge

### Step 2, continued

- Sampler holds sponge by handle, and assistant pours neutralizing buffer solution over it (if not premoistened)
- All 10 mL must be absorbed by sponge
- Discard solution container



## STEP 2

- The assistant should open the sponge package without touching the sponge or its handle.
- The sampler will remove the sponge from the package by grasping only the sponge handle.
- When handling the sponge, do not touch below the thumb stop.
- If the sponge is not premoistened, the sampler should hold the sponge by its handle and the assistant should pour the neutralizing buffer solution over the sponge.
- All of the 10-mL portion should be absorbed by the sponge.
- The container that held the solution should be thrown away.

Use the sterile specimen cup to catch any of the buffer solution that may run off. Then place the sponge in the specimen cup to absorb it. All 10 mL should be used for the sampling procedure.

36.

ANTHRAX SURFACE SAMPLING Cellulose Sponge

### Steps 3, 4, 5, and 6

- Sampler makes 4 passes over sampling surface: horizontal, vertical, diagonal, and perimeter of template



37.

ANTHRAX SURFACE SAMPLING Cellulose Sponge

### Step 3: Horizontal Pass

- Place sponge flat on surface with gentle but firm pressure to ensure full, direct contact
- Using overlapping 'S' pattern, cover entire surface with horizontal strokes



38.

ANTHRAX SURFACE SAMPLING Cellulose Sponge

### Step 4: Vertical Pass



- Turn sponge over and use wide part to wipe area again, with vertical 'S' strokes
- Strokes will be at 90° angle to first ones

39.

ANTHRAX SURFACE SAMPLING Cellulose Sponge

### Step 5: Diagonal Pass

- Using narrow side of sponge, wipe once more, with diagonal 'S' strokes
- Strokes will be at 45° angle to first ones



## STEPS 3, 4, and 5

- The sampler makes four passes over the surface to be sampled, using four patterns: horizontal, vertical, diagonal, and once around the perimeter of the template.

**Note:** Demonstrate the different stroke patterns as you present the next four slides. Stress the importance of covering the entire surface area with each pattern.

## STEP 3

### Horizontal Pass

- Place the sponge flat on the surface and use a gentle but firm pressure so that the entire face of the sponge has direct contact with the surface.
- Using an overlapping 'S' pattern, cover the entire surface with horizontal strokes.

## STEP 4

### Vertical Pass

- Turn the sponge over, and using the widest part of the sponge, wipe the same area again by using vertical 'S' strokes.
- The strokes should be at a 90° angle to the first ones you made.

## STEP 5

### Diagonal Pass

- Using the narrow side of the sponge, wipe the surface once more, using diagonal 'S' strokes.
- The strokes should be at a 45° angle to the first ones you made.

40.

ANTHRAZ SURFACE SAMPLING Cellulose Sponge

### Step 6: Perimeter Pass

- Using full width of sponge tip, wipe perimeter of sampling area once



41.

ANTHRAZ SURFACE SAMPLING Cellulose Sponge

### Step 7

Place sponge into specimen container:

- Assistant opens and holds container
- Sampler breaks off head of sponge by bending handle at scoring



42.

ANTHRAZ SURFACE SAMPLING Cellulose Sponge

### Step 7, continued

- Assistant caps and labels container:
  - unique identifier
  - sample location
  - initials of collector
  - date and time



43.

ANTHRAZ SURFACE SAMPLING Cellulose Sponge

### Step 7, continued

- Assistant wraps container with paraffin film to prevent leakage during shipment



## STEP 6

### Perimeter Pass

- Using the full width of the sponge's tip, wipe the perimeter of the sampling area once in a circle pattern.

## STEP 7

**Note:** Be sure to practice this step before teaching it to the students. This can be difficult to perform without practice.

- Place the sponge into the specimen container, using these steps:
  - The assistant should open and hold the container.
  - The sampler will break off the head of the sponge by bending the handle where it is scored.
- The assistant should securely tighten the screw cap and label the container as follows:
  - unique sample identifier
  - sample location
  - initials of the collector
  - date and time the sample was collected
- After labeling, wrap the tube with paraffin film to prevent leakage during shipment.

**Note:** Students often ask how hard they should press the sponge onto the surface. The answer is gentle but firm. The amount of pressure used should be enough to bend the handle so that the sponge comes into full contact with the surface but your hand does not touch the surface. This is demonstrated in the picture of steps 3 and 4. The stick should not bend so much that it breaks at the score mark during sample collection.

44.

ANTHRAX SURFACE SAMPLING Cellulose Sponge

**Step 8**

- Assistant places sample into resealable bag
- Assistant seals and labels the bag with same information as on container
- Ensures bag is watertight for decontamination



45.

ANTHRAX SURFACE SAMPLING Cellulose Sponge

**Steps 9 and 10**



- Sampler discards template
- Sampler and assistant remove outer gloves and discard
- Use new template and gloves for each sample

## STEP 8

- Place the sample into a resealable plastic bag.
- Securely seal and label the bag with the same information as on the container.
- This bag should be watertight to prevent leaking during decontamination.

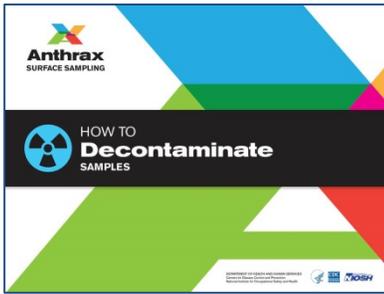
## STEP 9

- The template should be left in place after the sample is collected.
- Both the sampler and the assistant should remove their outer gloves and discard them.
- A new template and clean gloves should be used to collect the next sample.

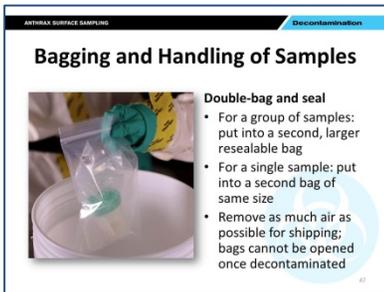
## Questions?

As each section is concluded, the instructor should pause and ask if participants have any questions before starting the next section. Be careful to leave sufficient time to complete the lecture.

46.



47.



## How to Decontaminate Samples

**Note:** This topic should be covered in the lecture but not practiced by class participants. However, the Instructor may choose to demonstrate this process to the class to be sure it is understood.

## Sample Preparation for Decontamination

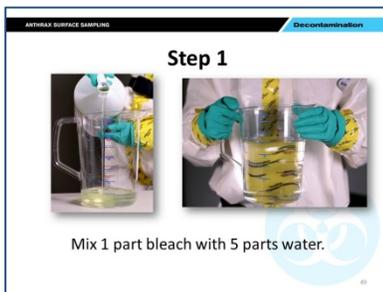
- Samples can be decontaminated individually or as a group
  - If done as a group, place the samples into a second, larger resealable plastic bag.
  - If done individually, place the sample into a second resealable bag of the same size.
- Always remove as much air as possible from the bags to help prepare them for shipping, as bag cannot be opened once decontaminated and removed from the containment area. This is important to help facilitate packaging multiple samples in small shipping containers.
- At this point the samples should be double-bagged and sealed to prevent leakage.

**Note:** Instruct student to leave trash (e.g. sample templates, supply packaging) in place while collecting samples to limit the potential for cross contamination. Trash can be safely disposed of after sample results are determined to be negative or by the decontamination team if sample results are positive.

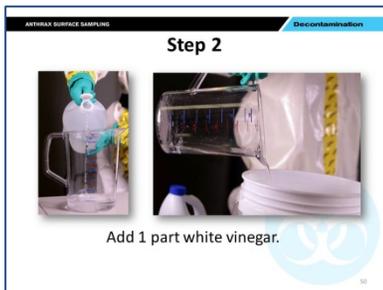
48.



49.



50.



## Decontamination Supplies

**CAUTION:** During the training, instructors should demonstrate by using only water in the bleach and vinegar containers.

Household Bleach

White Vinegar

Water

Measuring Device

Container

Disposable paper towels

When planning sample decontamination, it is important to judge the amount of samples you will have. The appropriate volume of decontamination solution should be prepared to ensure the samples can be fully submerged for the full 10 minutes. Whatever volume is prepared should include the same portions as indicated here.

Stress to the students that the decontamination solution should be made with new bleach and each time it is needed. It should not be prepared ahead of time and stored. Bleach and decontamination solution that has been stored can quickly degrade.

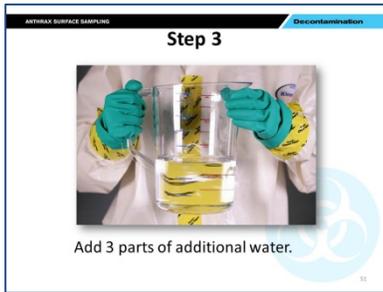
### STEP 1

In the container, mix one part household bleach with five parts water.

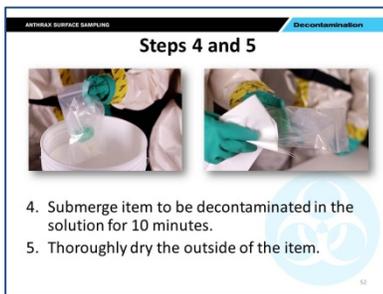
### STEP 2

Add one part white vinegar.

51.



52.



## STEP 3

Add three parts of additional water.

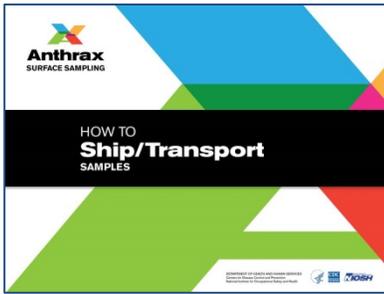
## STEPS 4 and 5

4. Submerge item to be decontaminated in the solution for 10 minutes.
5. Thoroughly dry the outside of the item.

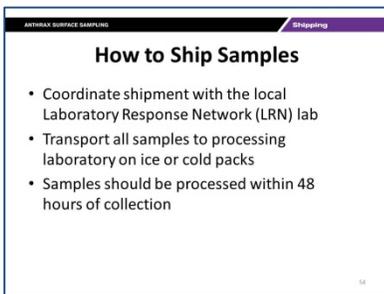
## Questions?

As each section is concluded, the instructor should pause and ask if participants have any questions before starting the next section. Be careful to leave enough time to complete the lecture.

53.



54.



55.



## How to Ship Samples

- Coordinate shipment with the local Laboratory Response Network (LRN) lab.
- Transport all samples to the processing laboratory on water ice (not dry ice) or cold packs.
- Samples should be processed within 48 hours of collection.

## Shipping Dangerous Goods

- Containers used to transport the samples and accompanying documentation should be prepared and shipped according to the appropriate regulations (Division 6.2, Infectious substance).

Anyone offering packages for transport containing infectious goods must be trained according to the regulations of the mode of transport to be used (often samples are transported by airlines because of the need for next-day delivery). The Pipeline and Hazardous Safety Administration has guidelines for transporting anthrax and anthrax-contaminated objects and materials on the web at

<http://www.phmsa.dot.gov/portal/site/PHMSA/menuitem.6f23687cf7b00b0f22e4c6962d9c8789/?vgnextoid=77695f29a45b3110VgnVCM1000009ed07898RCRD&vgnnextchannel=4f347fd9b896b110VgnVCM1000009ed07898RCRD&vgnnextfmt=print>

- See these sources for regulations on transporting infectious substances:
  - U.S. Department of Transportation  
<http://phmsa.dot.gov/regulations>
  - International Airline Transportation  
<http://www.iata.org/whatwedo/cargo/dgr/Pages/index.aspx>
  - U.S. Postal Service, Domestic Mail Manual  
[http://pe.usps.com/text/dmm300/dmm300\\_landing.htm](http://pe.usps.com/text/dmm300/dmm300_landing.htm)
- It is the shipper's responsibility to ensure adherence to the most current and appropriate regulations.

56.

ANTHRAX SURFACE SAMPLING Shipping

### Chain of Custody

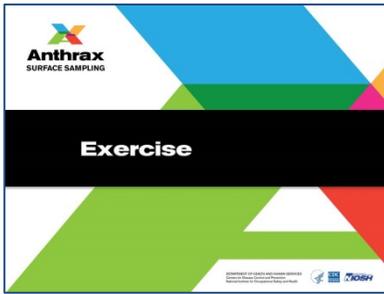
- Follow chain-of-custody guidelines set by law enforcement and laboratory
- Place the chain-of-custody forms between the outer packaging and inner packaging
- Do not put chain-of-custody forms inside the inner packaging



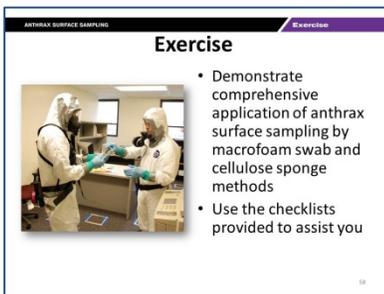
## Chain of Custody

- Appropriate chain of custody must be followed when shipping samples.
  - Confirm with the receiving laboratory and law enforcement the requirements for chain of custody.
  - Place the chain-of-custody forms between the outer ridged packaging and inner packaging.
  - Do not put the chain-of-custody forms inside the inner packaging; the laboratory must be able to receive an uncontaminated copy outside of containment.

57.



58.



## Exercise

At the beginning of the exercise, the instructor should demonstrate how to properly collect Macrofoam Swab and Cellulose Sponge samples, if this was not done during the lecture.

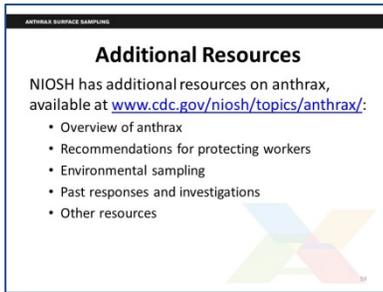
Following the demonstration, group the students into pairs. The students should identify who will be the sampler and who will be the assistant. Instruct the students that they are to collect one of each type of sample in this role and then switch roles to collect an additional set of samples.

The students should collect the samples in front of the instructor or an experienced individual to demonstrate comprehension of the sampling technique. If the students use improper technique, they should be corrected at that time and allowed to practice the method the correct way.

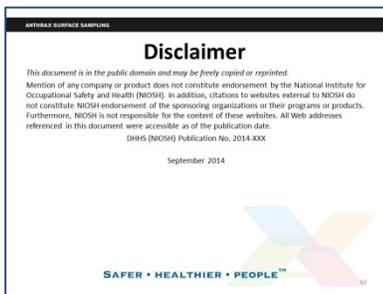
The instructor will use simulated germs to evaluate the student. Before the student arrives at the sampling location the instructor should apply a pea-sized drop of simulated germ gel or powder to the surface. The gel or powder should be spread out (over an area the size of a silver dollar) so it is not visible to the student. Tell the student the general location of where to collect the sample but not the exact location of the simulated germs. After the student collects the sample, the swab or sponge should be exposed to the ultraviolet light to see whether a portion of the simulated germs were successfully collected from the surface. It is important to note that not all of the simulated germs has to be removed for the sampling to be successful. It is important that the instructor observe students to ensure that the entire surface is covered with each set of passes and that the team practices proper techniques to limit cross-contamination.

Demonstration of sample decontamination and packaging does not need to be performed as part of the class. However, there should be a good discussion of the steps required to decontaminate samples and the training an individual must have in order to package and ship infectious goods.

59.



60.



NIOSH has additional resources about anthrax available at [www.cdc.gov/niosh/topics/anthrax/](http://www.cdc.gov/niosh/topics/anthrax/):

- Overview of anthrax
- Recommendations for protecting workers
- Environmental sampling
- Past responses and investigations
- Other resources

## Questions?

As each section is concluded, the instructor should pause and ask if participants have any questions before starting the next section. Be careful to leave enough time for completing the lecture.



# Anthrax

## SURFACE SAMPLING

### Instructor Copy with Answers in Bold

#### CDC Anthrax Surface Sampling Quiz

1. We do anthrax sampling to
  - A. Confirm or identify contamination
  - B. Assess the extent of contamination
  - C. Determine the risk for human exposure
  - D. **All of the above**
  
2. Sampling procedures were prepared by the Centers for Disease Control and Prevention (CDC) to
  - A. Standardize collection procedures
  - B. Ensure samples can be analyzed
  - C. Obtain best results possible
  - D. **All of the above**
  
3. These procedures are meant to be used on smooth, nonporous surfaces, including
  - A. **Stainless steel**
  - B. Cork board
  - C. Fabric chair cushion
  - D. Carpeted flooring
  
4. Collection of anthrax samples should be conducted as part of a sampling plan including
  - A. Specific sampling objectives
  - B. Analytical considerations and laboratory coordination
  - C. Handling, packaging, and transport of samples
  - D. **All of the above**
  
5. Collection should always be conducted under a health and safety plan that will explain the details to protect you while you sample, including:
  - A. Personal protective equipment
  - B. Medical countermeasures (such as antibiotics and vaccinations)
  - C. Decontamination procedures for responders and the samples
  - D. **All of the above**

6. To minimize the chance for cross-contamination, samples should be collected by
- A. A team of at least three: a minimum of three trained samplers
  - B. A team of at least two: a minimum of one sampler and one assistant**
  - C. Only one person, working safely but alone
  - D. All of the above
7. Before you begin, identify who will sample and who will assist. In addition,
- A. Your roles should not change as you collect multiple samples
  - B. The assistant handles all sampling supplies and never touches potentially contaminated surfaces
  - C. The sampler touches the sampling supplies only as they are handed over by the assistant
  - D. All of the above**
8. You should bring a clean working surface with you, such as a disposable towel, a portable cart, or 5-gallon buckets, because
- A. They can't be delivered by untrained personnel
  - B. Only the identified surfaces might be contaminated
  - C. All surfaces in the area to be sampled could be contaminated**
  - D. A and B
9. For sampling with a macrofoam swab, the sample area should be
- A. 10 inches by 10 inches
  - B. The size of any available template
  - C. Equal to or less than 4 square inches**
  - D. As big as needed
10. In macrofoam swab sampling, when handling the swab, do **not** touch
- A. The handle of the swab
  - B. The foam swab head
  - C. Below the thumb stop on the swab handle
  - D. B and C**
11. Any unused buffer solution and its container should be
- A. Thrown away**
  - B. Used for the next sample
  - C. Used to rinse your hands
  - D. Handled only by the sampler, not the assistant
12. Making three passes with the macrofoam swab across the sampling surface includes all but which of the following patterns?
- A. Horizontal
  - B. Circular**
  - C. Vertical
  - D. Diagonal

13. After sampling with a macrofoam swab,
- A. Place the swab into the screw-cap tube
  - B. The assistant should open and hold the screw-cap tube
  - C. The sampler will break off the head of the swab by bending the handle where it is scored
  - D. **All of the above**
14. Cellulose sponges are appropriate for sampling surfaces such as all but which one of the following?
- A. **Bedspreads**
  - B. Countertops/tabletops
  - C. Floor tiles
  - D. Walls
15. After you place the swab or sponge in the screw-cap container, you should
- A. Seal the container with plastic paraffin film to prevent leakage
  - B. Label the screw-cap container with the sample information
  - C. Add extra buffer solution to the container
  - D. **A and B**
16. Once you are done collecting a sample, you should
- A. **Remove and discard your outer gloves**
  - B. Keep your outer gloves on for the next sample
  - C. Wipe your gloves off on your hazmat suit
  - D. Sample your glove for contamination
17. When using dry cellulose sponges, you should wet the sponge with
- A. 10 mL of sterile water
  - B. **10 mL of neutralizing buffer solution**
  - C. 5 mL of neutralizing buffer solution
  - D. 5 mL of sterile water
18. The last pass you take when collecting a sample with cellulose sponge is
- A. Overlapping 'S' strokes
  - B. Vertical 'S' strokes
  - C. Diagonal 'S' strokes
  - D. **Perimeter pass**
19. When labeling samples, it is important to include
- A. Unique sample identifier
  - B. Sample location
  - C. Date and time the sample was collected
  - D. **All of the above**

20. Once a sample is decontaminated and removed from the containment area, the bag that holds the sample can be opened anywhere.
- A. True
  - B. **False**
21. To decontaminate samples you need
- A. Household bleach
  - B. White vinegar
  - C. Water
  - D. **All of the above**
22. Samples should be processed within
- A. 24 hours of collection
  - B. 36 hours of collection
  - C. **48 hours of collection**
  - D. 60 hours of collection
23. Chain-of-custody forms should
- A. **Be coordinated with the lab and law enforcement**
  - B. Be placed inside the inner container of the dangerous-goods shipping container
  - C. Be filled out only if you have enough time
  - D. Be retained at the site where the sample was collected



## Participant Quiz

### CDC Anthrax Surface Sampling Quiz

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Evaluation  
Anthrax Surface Sampling Training

Instructions:

The attached evaluation form is designed to provide feedback and constructive input to our training team on the Anthrax Surface Sampling Training you attended. Your comments will be used to validate and improve future training programs.

Please take a few moments to share your thoughts on your training experience by completing this form.

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**Anthrax**  
**SURFACE SAMPLING**

**Evaluation**

**Anthrax Surface Sampling Training**

*Sponsored by:* CDC/NIOSH

*Delivered at:* \_\_\_\_\_ (add your location)

**Training:**

Anthrax Surface Sampling

Date: \_\_\_\_\_ (mm/dd/year)

**Participant Name (optional):** \_\_\_\_\_

**Title:** \_\_\_\_\_

**Duty Location:** \_\_\_\_\_

**Group:** \_\_\_\_\_

**Part I—Adequacy of the Training**

1. Did the training prepare you adequately to sample?

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2. Is there further training or practice you might require or recommend?

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3. Do you have or do you know where to obtain appropriate PPE and sampling supplies?

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4. Did you find the single-sheet checklists helpful?

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5. Additional comments:

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**Part II—Exercise Design and Conduct**

1. What is your assessment of the seminar design and conduct?

Please rate, on a scale of 1 to 5, your overall assessment of the training relative to the statements below, with **1** indicating **strong disagreement** and **5** indicating **strong agreement**.

Assessment Factor	Ratings of Satisfaction with Training				
	Strongly Disagree				Strongly Agree
a. The training was structured and organized well.	1	2	3	4	5
b. The training was on target for the audience.	1	2	3	4	5
c. The PowerPoint helped participants understand and become engaged in the training.	1	2	3	4	5
d. The facilitator(s) were knowledgeable about the material, kept the training on target, and were sensitive to group dynamics.	1	2	3	4	5
e. There was adequate time for Q&A, and questions were handled appropriately.	1	2	3	4	5
f. Participation in the training was appropriate for someone in my position.	1	2	3	4	5
g. After taking this training, I feel I could explain how to do this sampling to a co-worker.	1	2	3	4	5
h. The training provided a good foundation of knowledge/skills for performance of sampling	1	2	3	4	5
i. The Anthrax Surface Sampling Training course(s) will enhance my performance of sampling.	1	2	3	4	5

2. What changes would you make to improve this training?

*Please provide any recommendations on how the training could be improved or enhanced to better prepare Anthrax Surface Sampling personnel.*

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