SAND2012-3042P

Biorisk Mitigation Strategies

Instructor Guide – draft – August 2011

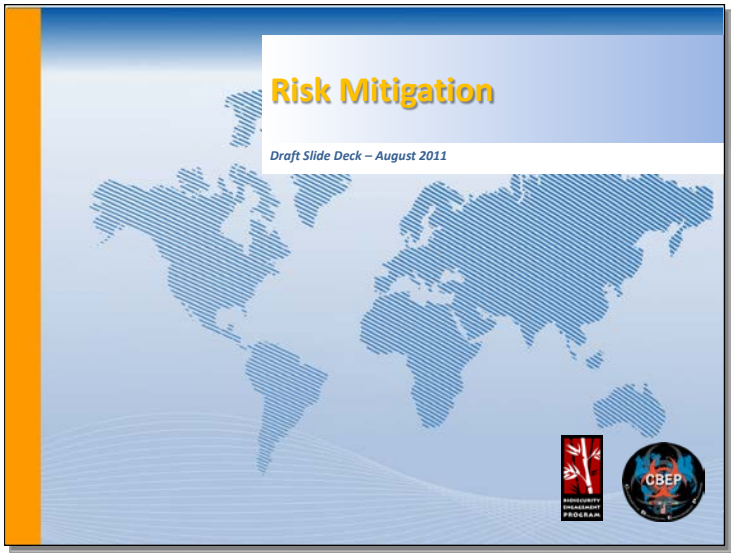
Sandia National Laboratories
International
BIOLOGICAL THREAT REDUCTION

BIOSECURITY ENGAGEMENT PROGRAM

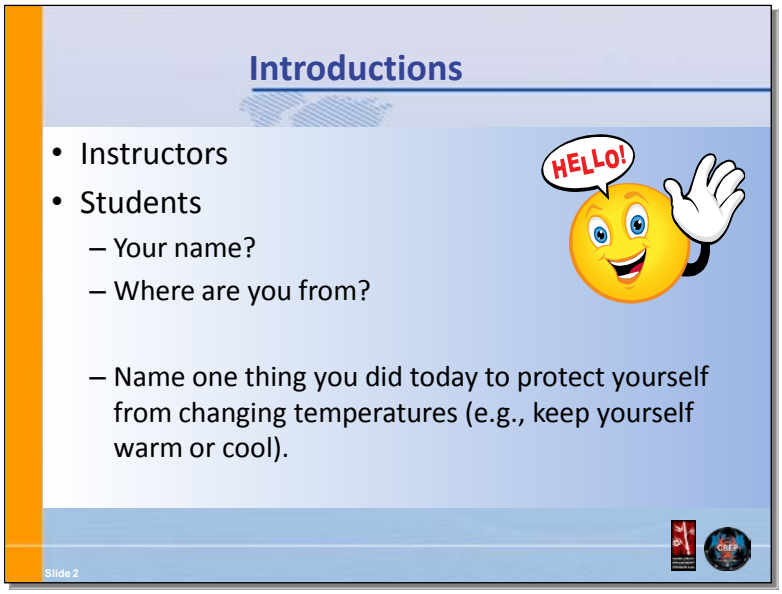
CBEP
Cooperative Biological Engagement Program

Welcome & Introductions

Slide 1



Slide 2



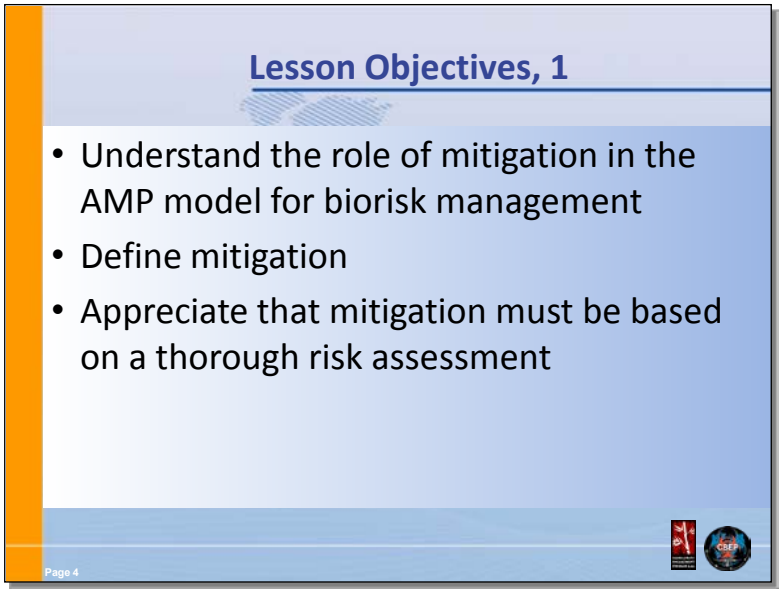
Welcome & Introductions

Introductions (15 minutes)

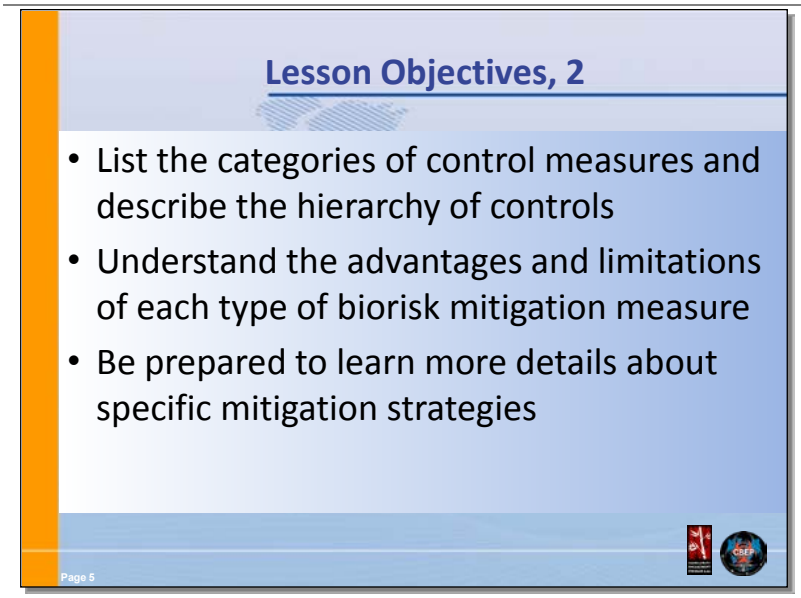
Instructor(s):

- Introduce yourselves briefly, including name, organization, and brief background.
  - Name
  - Affiliation
  - Representation (I'm here on behalf of…)
  - Quick Experience Glimpse
  - Relevancy of the Lesson to your experience
- Ask each student to introduce themselves, by giving their name and where they are from.
- As students to name one thing they did today to protect themselves from changing temperatures (this is to illustrate an everyday example of mitigation)

Slide 3



Welcome & Introductions



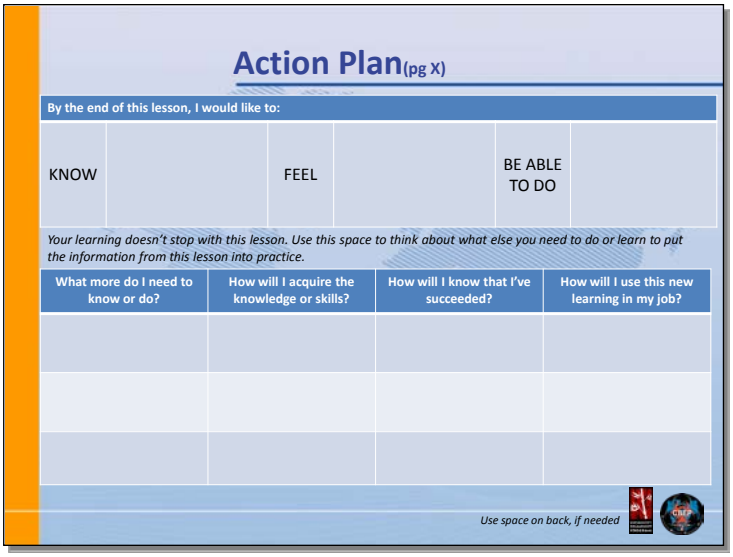
Lesson Objectives:

Topics covered in training include:

- Understand the role of mitigation in the AMP model for biorisk management
- Define Mitigation
- Appreciate that mitigation must be based on a thorough risk assessment
- List the categories of control measures and describe the hierarchy of controls
- Understand the advantages and limitations of each type of biorisk mitigation measure
- Be prepared to learn more details about specific mitigation strategies

Welcome & Introductions

Slide 4

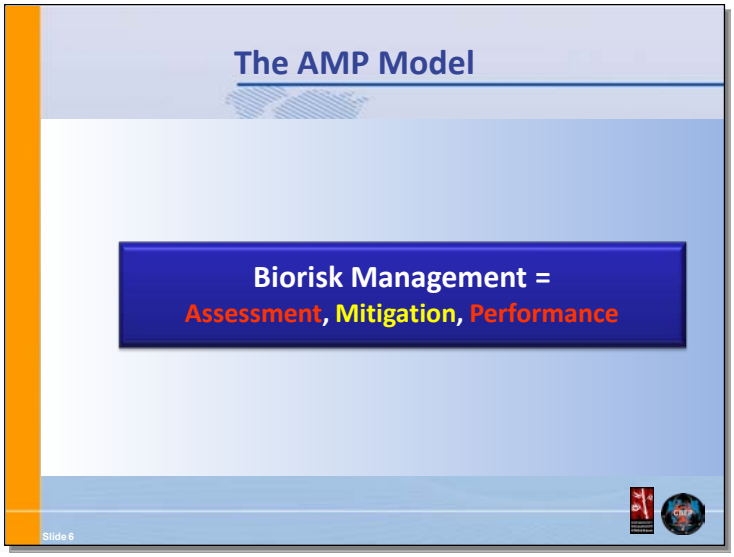


You have 10 minutes to complete this activity

1. In your workbooks, write down what you would like to **know, feel and be able to do** by the end of this lesson:
    - **I would like to:**
        - **Know**
        - **Feel**
        - **Be able to do**

Review of Biorisk Management

Slide 5



Plenary Discussion (10minutes)

- Ask students to describe:
  - "Assessment"
  - "Mitigation"
  - "Performance"
- Remind and verify that everyone remembers the AMP model.

What is biorisk mitigation?

Slide 6

Small group activity (5 minutes).

Activity Instructions (to students)

1. As a group develop a formal definition for "Biorisk Mitigation"
2. Choose a spokesperson from your group to report the definition to the class.

You have 5 minutes to complete this activity

Directions for Instructor:

- Divide participants into groups of 3 to 6 (depending on the total number of participants) if not already done.
- Ask the class to pick the best or create a new one with input from each group.

Capture on a flip chart:

- Place the consensus definition on a flip chart page and paste it to the wall.

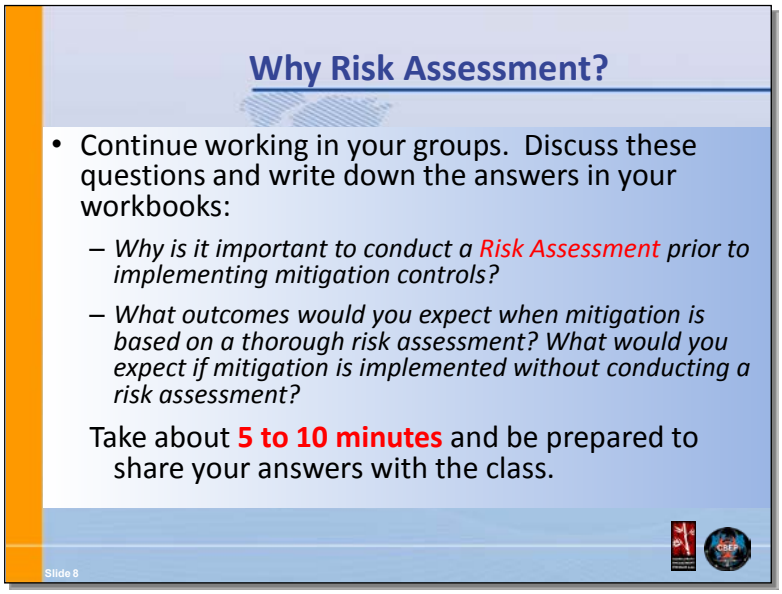
What is biorisk mitigation?

Expected Responses

One possible answer:

Biorisk mitigation: controlling or reducing the possibility of accidental exposure or unauthorized access to harmful biological organisms (specifically microbes) with the use of safety equipment, personal protective equipment, and behavioral practices.

New Responses from Students:



What is biorisk mitigation?

Lecture

Why Risk Assessment?

- Why is it important to conduct a risk assessment prior to implementing biorisk mitigation controls?
- What outcomes would you expect when mitigation is based on a thorough risk assessment? What would you expect if mitigation is implemented without conducting a risk assessment?

Small group activity (5 minutes).

Activity Instructions (to students)

- As a group discuss these questions:
  1. Why is Risk Assessment so important to do prior to Why is it important to conduct a risk assessment prior to implementing biorisk mitigation controls?
  2. What outcomes would you expect when mitigation is based on a thorough risk assessment? What would you expect if mitigation is implemented without conducting a risk assessment?
- Groups should write or record their answers in a notebook

You have 5 minutes to complete this activity

Directions for Instructor:

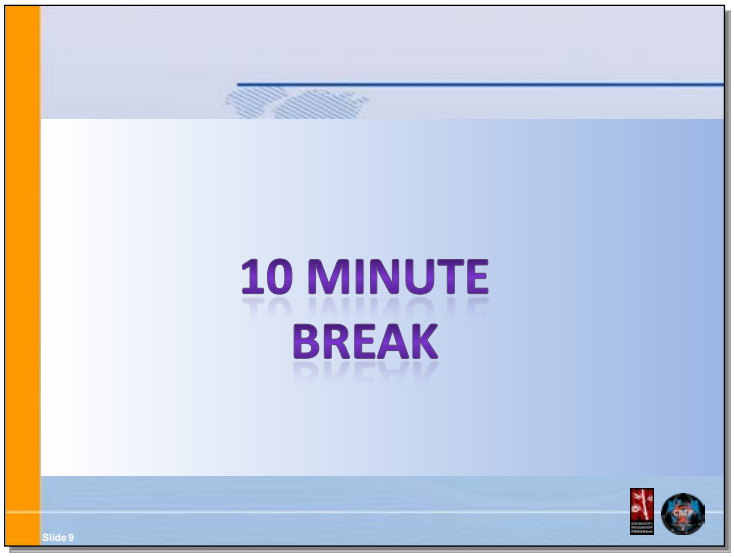
- Groups should write or record their answers in a notebook
- After five minutes ask each group to report one at a time Collect one unique answer from each group and capture these on a flip chart entitled "Why perform a Risk Assessment?" Continue to query each table until all the unique ideas are captured.

What is biorisk mitigation?

Expected Responses

New Responses from Students:

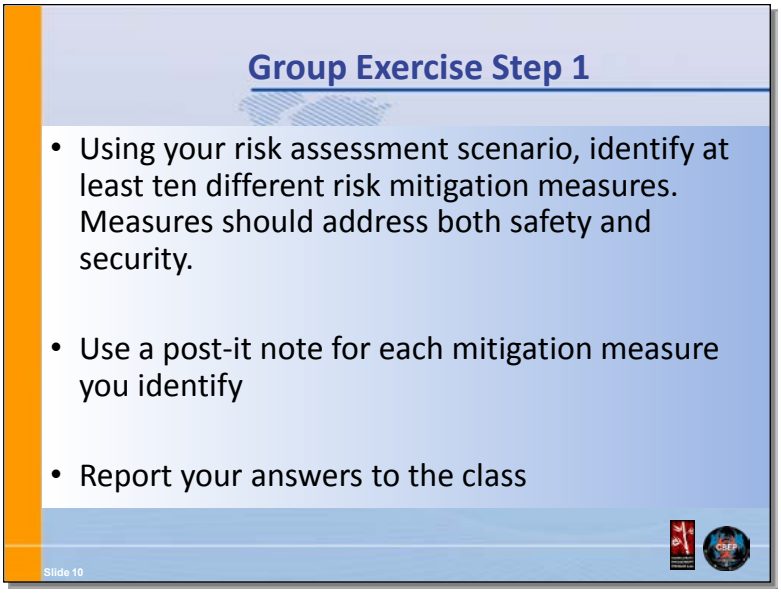
- Save money (not wasting resources on mitigating things that are not risks)
- Better safety when all hazards are identified in the assessment and addressed through mitigation
- Helps you select the right mitigation
- Risks may go unrecognized if you do not conduct a risk assessment. This process is meant to identify all risks that need to be addressed.
- 2. Mitigation should address all risks and also address them appropriately, according to the risk that the organism possess to human or animal health. Without a risk assessment some risks may go unaddressed while other mitigation controls may be inappropriately restrictive.



Take a Break (10 minutes)

What is biorisk mitigation?

Slide 7



Small group activity (5 minutes).

Activity Instructions (to students)

- Give each person a copy of the risk assessment scenario.
- Ask students to propose at least 10 mitigation measures and controls that would reduce risk. Measures should be specific. (e.g. “wear two pairs of gloves” rather than just writing “PPE”) and have them
- Write each response on a separate sticky note.
- Remind students that their proposed measures should cover both safety and security.

You have 5 minutes to complete this activity

Directions for Instructor:

- Ask each group to report out 2 or 3 of their mitigation measures that have not been previously reported. The sticky notes will be used in the next exercise. .

What is biorisk mitigation?

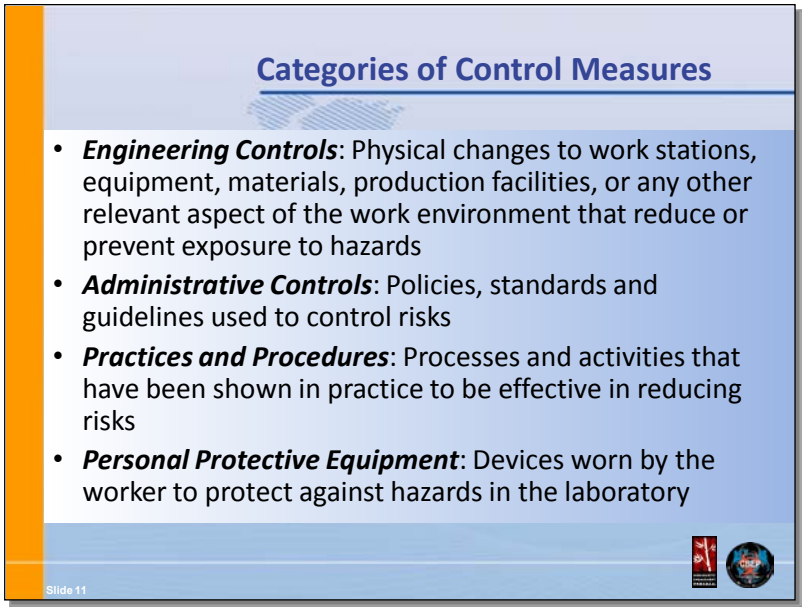
Expected response

- Treat culture supernatant with bleach before disposal (or autoclave before disposal).
- Wear appropriate PPE: gloves, lab coat.
- Work with virus or infected mice only in the BSC.
- Immunize laboratory personnel before they conduct work with virus.
- Autoclave animal waste, bedding, carcasses, and organs before
    - disposal.
- Daily (or more frequently) clean lab surfaces with bleach.
- Controlled access.
- Inventory mice (including carcasses) and virus stocks in fridge.
- Appropriate disposal of sharps (sharps container) and autoclave before discarding.
- Have equipment serviced annually.
- Safety training for employees old & new. All personnel should practice good and safe lab practices and speak up if they feel that an activity violates either good or safe practices.
- Personnel are encouraged to wash hands frequently and especially before leaving laboratory.
- No eating or drinking in the laboratory.
- Prevent accidental jabbing w/ sharps during autopsy or when infecting mice (how to prevent bites by mice as well)? Thick gloves? Sedate animals?

New Responses from Students:

Biorisk Control Measures

Slide 8



Categories of Control Measures

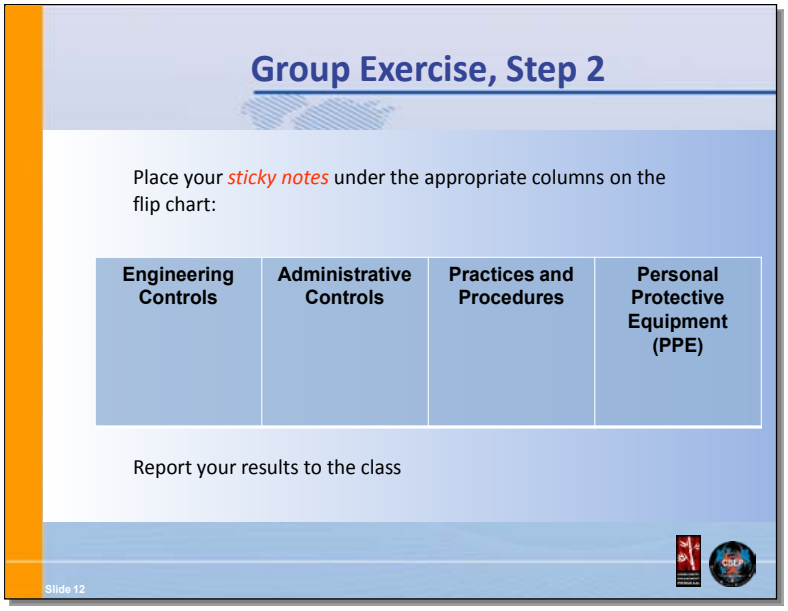
- Engineering Controls
- Administrative Controls
- Practices and Procedures
- Personal Protective Equipment

Describe and define these “categories”.

Do not use the term “hierarchy of controls” at this point in the course .

Biorisk Control Measures

Slide 9



Biorisk Control Measures

Small group activity (5 minutes).

Instructor:
Create 4 columns on a flip chart or, alternatively, use separate four flip charts labeled with the appropriate title for each of the following categories of control measures: Engineering Controls, Administrative Controls, Practices and Procedures, and Personal Protective Equipment (PPE).

Activity Instructions (to students)

- Have students place their post-it notes under the appropriate heading on the flip chart.

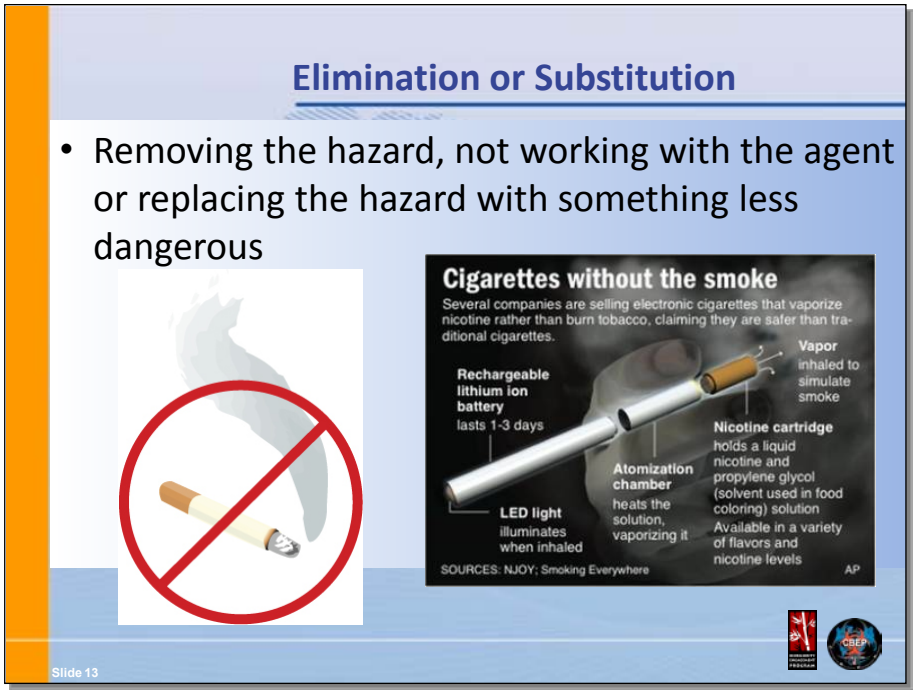
You have 5 minutes to complete this activity

Directions for Instructor:

- Verify that post-its are being placed appropriately.
- Some measures could be classified under more than one category of control measures. For example, if a post-it reads "Use a BSC", a biological safety cabinet (BSC) is obviously an engineering control, however, how you use the BSC could fall under practices and procedures. Also, the requirement to "Use a BSC" could be classified as an administrative policy. Another example: "Sharps container" is another obvious engineering control, but placing un-capped needles in the container is good practice.
- As long as students can appropriately defend their placements, don't ask them to move the post-it to another column.
-

Biorisk Control Measures

Slide 10



Biological examples:

Substitution:

- Work with a less pathogenic strain of the organism.
- Work with a less pathogenic organism that behaves similarly to the organism in question.

Elimination:

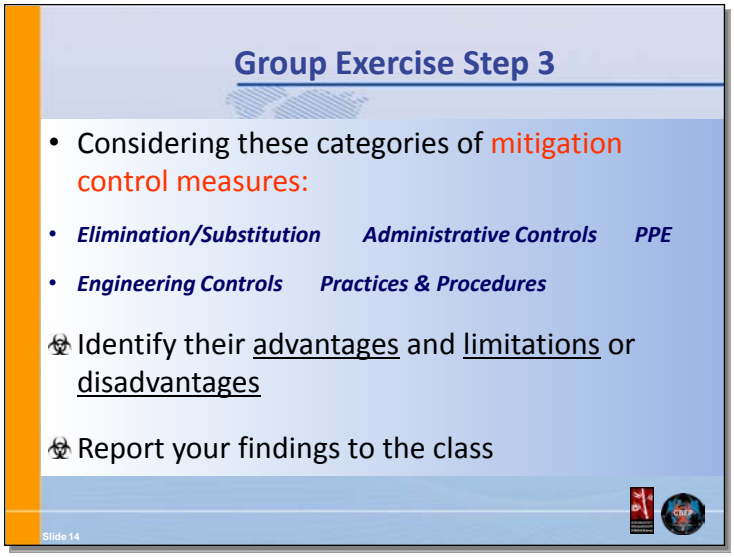
- Restrict work with the pathogenic organism to certain specially designed facilities.
- Work with a non-pathogenic strain of the organism.
- Work with a non-pathogenic organism that behaves similarly to the organism in question.

This slide introduces another (or fifth category) of mitigation measures.

Define this and provide several examples.

Biorisk Control Measures

Slide 11



Small group activity (10 minutes).

Activity Instructions (to students)

1. Discuss in your small groups the advantages and limitations of for each category of mitigation control measures.
2. Record advantages on one color of post-it, and disadvantages on another color post-it.

You have 10 minutes to complete this activity

Directions for Instructor:

- Using the same columns/charts from the previous step, students should post their answers under the appropriate column
- Expected answers are included on the the next slide

Biorisk Control Measures

Expected Responses

New Responses from Students:

- Advantages:

  Elimination/substitution: Not working with as dangerous an organism or limiting the use of the dangerous organism. Risk I greatly reduced.

  Administrative controls: Ensures safety across an institution. "Big picture" rather than "lab specific" issues are addressed.

  PPE: cheap, easy to use, various levels of protection available.

  Engineering controls: Effective!

  Practices & Procedures: Address needs of individual labs or departments.

- Disadvantages

  Elimination/substitution: Details of system will be different

  Administrative control: Instituted by people who are not and may never have conducted research. May be cumbersome and because of that labs may choose not to follow controls unless there are penalties and controls/inspections to make sure that they do.

  PPE: people choose not to use it if it is uncomfortable or a hassel or perceived as unnecessary. Lack of knowledge about what situation requires what PPE (untrained personnel, personnel who have never worked with the system before – lack of knowledge of dangers).

  Engineering controls: Expensive. Need to be maintained regularly

  Practices & Procedures: Can be violated. Need to be developed specifically for each lab. PIs need to make sure this happens.

Biorisk Control Measures

Slide 12

Advantages and Limitations

Control Measure	Advantages	Disadvantages
Elimination or Substitution	Immediate reduction of risk	Not always available or possible
Engineering	Efficient, eliminates hazard	Cost, complexity
Administrative	Authority approach	Indirect approach, primarily addresses the human factor
Practices & Procedures	SOP based (standardized approach)	Training and supervision requirements
PPE	Ease of use, relative cost	Does not eliminate hazard, PPE fails exposure happens, uncomfortable, limits ability, only protects the user

You can use this slide or not if you have developed a comprehensive list that covers at least the ones above. It is included in the student guide.

Slide 13

Group Exercise Step 4

- Considering these categories of mitigation control measures:
  - ***Elimination/Substitution*** ***Administrative Controls*** ***PPE***
  - ***Engineering Controls*** ***Practices & Procedures***
- Prioritize the four types of controls from the perspective of effectiveness

Most Effective 1 2 3 4 5 *Least Effective*

- Report your findings to the class

Slide 16

Biorisk Control Measures

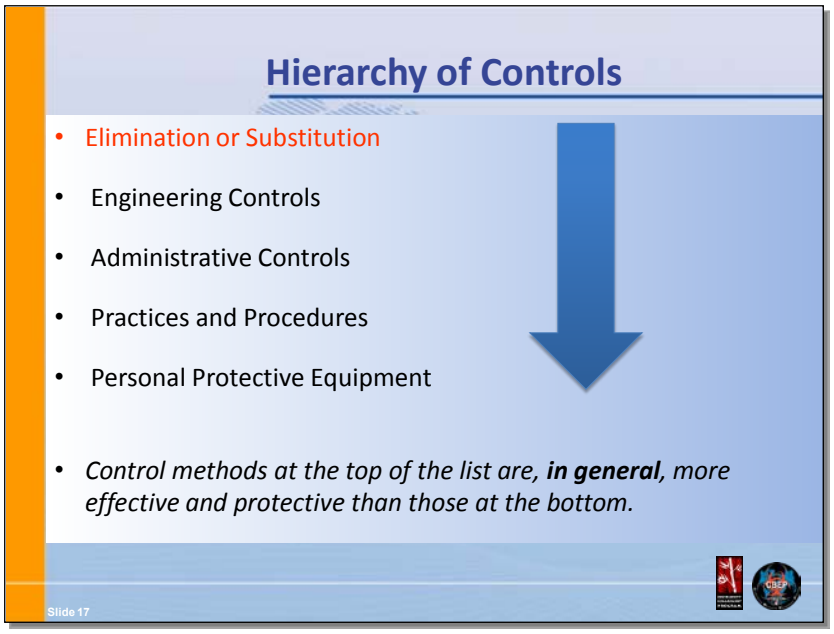
Small group activity (15 minutes).

Activity Instructions (to students)

- Working in small groups have students number five post-it notes 1, 2, 3, 4, 5.
- Next consider the general effectiveness of each category of control measure.
- As a group have students rank the categories according to the general effectiveness of each type control measure ,. Have students place the appropriate number on the chart/column associated with their chosen rank.

You have 5 minutes to complete this activity

Slide 14



Biorisk Control Measures

Hierarchy of Controls

- Elimination or Substitution
- Engineering Controls
- Administrative Controls
- Practices and Procedures
- Personal Protective Equipment

Control methods at the top of the list are in general more effective and protective than those at the bottom.

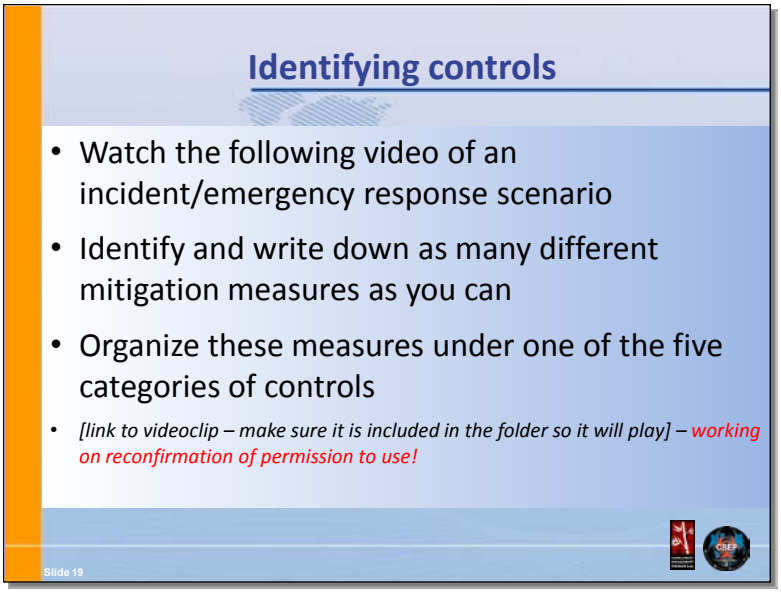
Slide 15

Car Safety vs. Motorcycle Safety

- Car Safety is all about engineering systems – protecting multiple persons
- Motorcycle safety is all about PPE –protecting one person
- Engineering controls are more effective, but they are largely inappropriate for a motorcycle, and that this is why riding a motorcycle is more dangerous than riding in a car. Could ask students to consider laboratory situations where a less effective control measure might be chosen over a more effective control measure. Tie this back to the idea of risk assessment – what risk is acceptable?

Identifying Mitigation Strategies

Slide 16



Small group activity (15 minutes).

Activity Instructions (to students)

- Ask students to watch the video clip
- While they watch (it might be useful to play the clip twice), ask them to write in their workbooks as many different mitigation measures as they see.
- Once the video clip has been played, ask the students to organize the mitigation measures under the five categories.

You have 15 minutes to complete this activity

Instructor: Make sure that the file for the video clip is included in the folder with the PowerPoint – test that it works BEFORE you begin the class!!

Identifying Mitigation Strategies

Expected Responses

Administrative controls: personnel watching for contaminating material, doorways are in a controlled access area

PPE: responders wear PPE

Policies and procedures: personnel watching for contaminating material, doorways are in a controlled access area

Other responses from students:

_____

_____

_____

_____

Wrap-Up & Summary

Slide 17

Slide is incomplete.

Plenary Discussion (10 minutes)

Question(s) to consider :

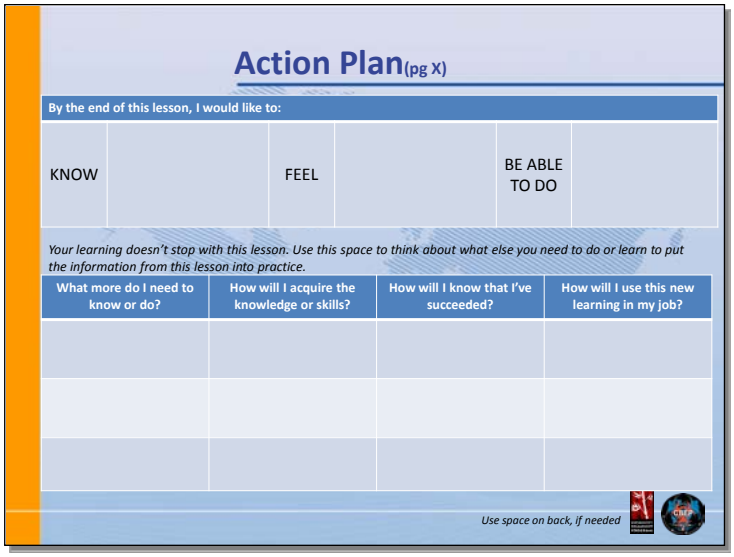
- What are the categories of risk mitigation strategies? How does risk assessment inform your choice of which categories to use?
- Why is it important to know the advantages and disadvantages of each category?
- What is one thing you will add or do differently in your work, based on this information on risk mitigation strategies.

Directions for Instructor:

- This debrief can be done in a variety of modes. You can ask each table to consider a different question and report out and then ask the other groups to add to the answer.

Wrap-Up & Summary

Slide 18



Directions for Instructor:

- Remind students to update their action plan, especially with answers to the last question in the plenary discussion above. Remind students that it is helpful to associate a date with an action they hope to accomplish. Remind them that no one will be checking up on them, but that this is their contract with themselves.

Slide 19