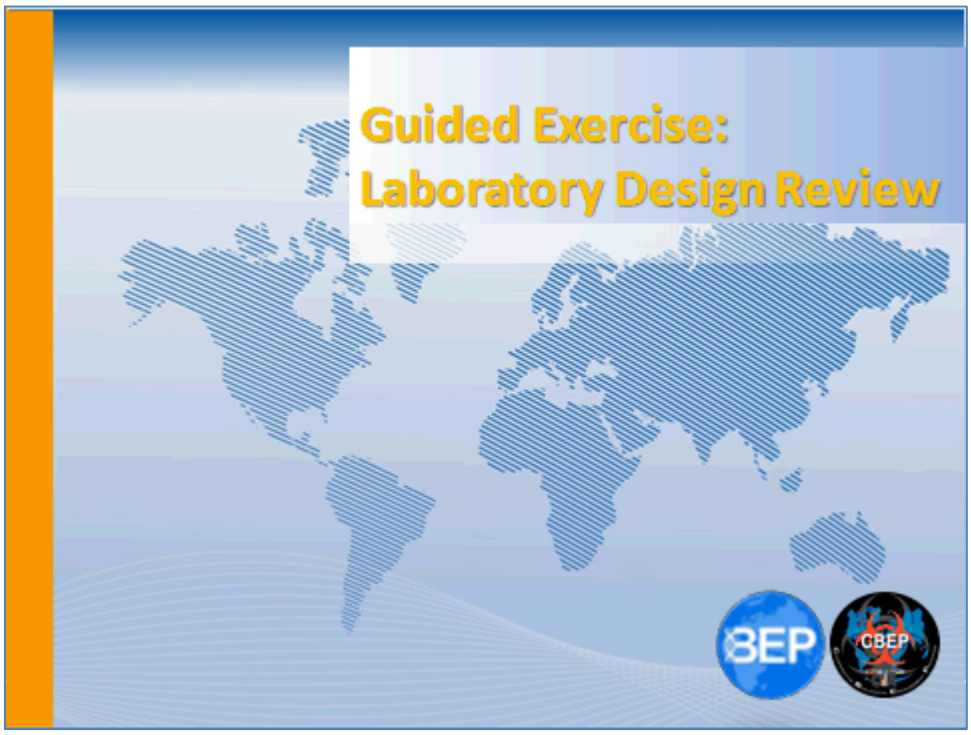
SAND2013-7562P

# Guided Exercise: Laboratory Design Review

## *Instructor Guide*

# Welcome & Introductions

**Slide 1**




### Ground rules

This will be a very interactive session and you will learn the most if you participate fully. We will not intentionally force any one to speak or to do an activity that embarrasses them – if you are uncomfortable, please speak to one of the instructors. For those of you who like to talk, please share your expertise but be aware of those around you who may be quieter and give them time to share their opinion as well. We ask that everyone respect the break times and report back promptly when asked to do so. But most of all, we want to make this a fun time to learn, so remember to smile and enjoy yourself!

### Transition to Key Messages

# Welcome & Introductions

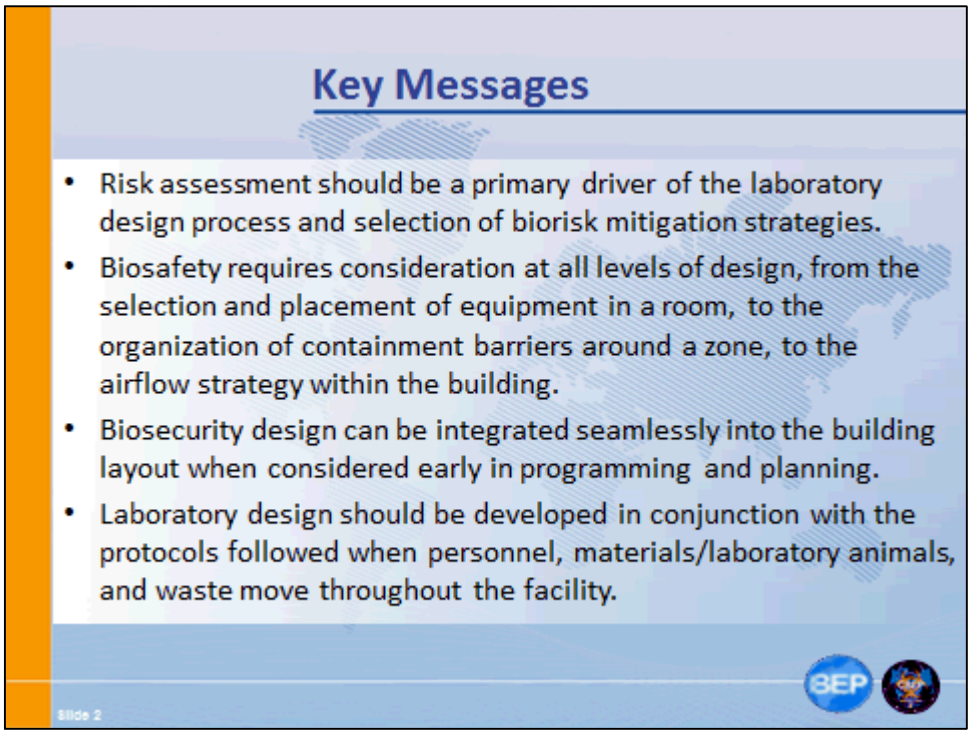
### Goal

To review the Key Messages for the Guided Exercise and to solicit any additional learning goals from the participants.

### Time

5 minutes

**Slide 2**



# Welcome & Introductions

### Review Key Messages

- Risk assessment should be a primary driver of the laboratory design process and selection of biorisk mitigation strategies.
- Biosafety requires consideration at all levels of design, from the seletion and placement of equipment in a room, to the organization of containment barriers around a zone, to the airflow strategy within the building.
- Biosecurity design can be integrated seamlessly into the building layout when considered early in programming and planning.
- Laboratory design should be developed in conjunction with the protocols followed when personnel, materials/laboratory animals, and waste move throughout the facility.

### Lecture

There are numerous aspects to the laboratory design process that will lead to a successful laboratory facility project. Laboratory design requires the input of many stakeholders, providing guidance throughout every phase of the process to include space programming, pre-design criteria, layout analysis, and design approvals. This guided exercise will provide students with the opportunity to apply the knowledge they have gained from various Laboratory Design courses by reviewing a laboratory plan and identifying and discussing areas where design can enhance biosafety and biosecurity.

# Welcome & Introductions

### Background information for Instructor

The goal of this exercise is to strengthen the student's confidence and ability to review laboratory design documents from a risk based perspective, including:

- Demonstrating comfort and familiarity with laboratory design documents
- Demonstrating comfort and familiarity with laboratory design best practices
- Identifying issues that may affect biosafety and biosecurity
- Providing critical analysis and recommend mitigation strategies

The exercise is intended for those who have taken previous GBRMC Laboratory Design courses and want to be able to lead or aid in the creation of safe and efficient laboratory designs.

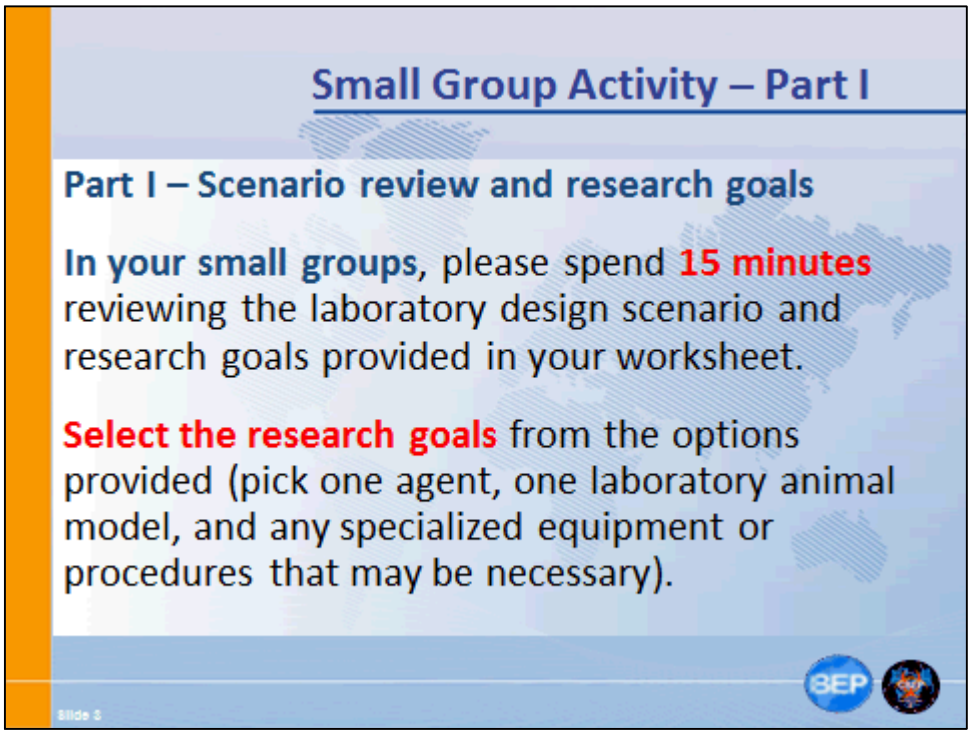
**Transition to Small Group Activity – Part I**

**Time**

**15 minutes**

# Small Group Activity – Part I

**Slide 3**



**Small group activity (15 minutes).**

**Activity Instructions (to students)**

1. Inform students they will be working in groups according to the tables at which they are seated. If during introductions you find that students of one 'type' are all seated together (ie all biosafety at one table, managers at another, designers at another etc) ask a few to move to create a mix of backgrounds at each table.
2. Hand out the Guided Exercise: Laboratory Design Review student worksheets and copies of the laboratory design.
3. In your groups, please spend 15 minutes reviewing the laboratory design scenario and research goals provided in your worksheet.
4. Select the research goals from the options provided in the workseet (i.e. pick one pathogen, one laboratory animal model, and any specialized equipment or procedures that may be necessary).

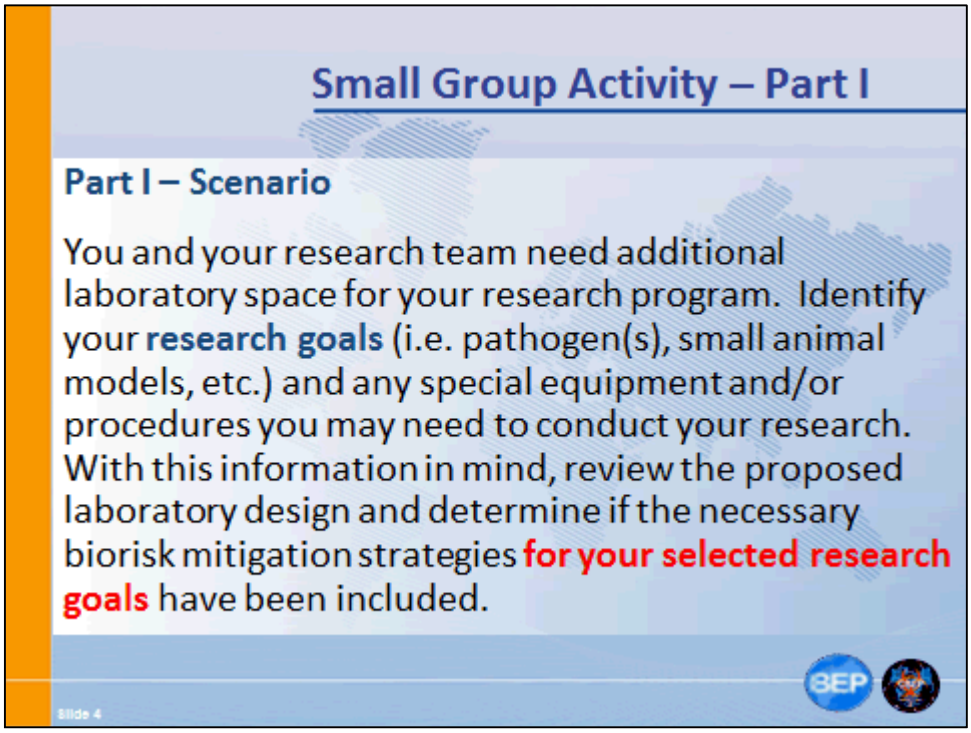
**You have 15 minutes to complete this activity**

***Directions for Instructor:***

- Ensure students have laboratory design and student worksheet.
- Observe the student's discussions and ensure they are discussing the scenario and reviewing the options for their research goals.
- Allow groups 15 minutes to discuss and choose their research goals

# Small Group Activity – Part I

**Slide 4**



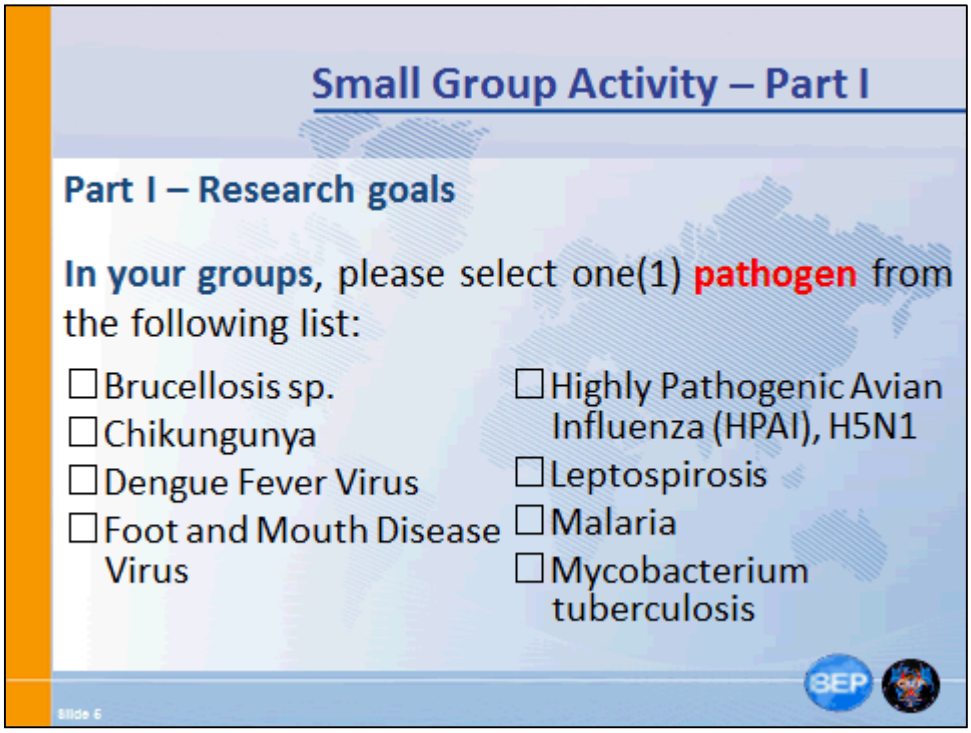

**Small group activity.**

**Activity Instructions (to students)**

1. Read the Scenario.

# Small Group Activity – Part I

**Slide 5**




**Small group activity.**

**Activity Instructions (to students)**

1. Research Goals:
    a. Read the pathogen options
    b. Ask the student to select one option.

# Small Group Activity – Part I

**Slide 6**


**Small group activity.**

**Activity Instructions (to students)**

1. Research Goals:
    a. Read the laboratory animal model options.
    b. Ask the students to select one option.

# Small Group Activity – Part I

**Slide 7**


**Small group activity.**

**Activity Instructions (to students)**

1. Research Goals:
    a. Read the options for special equipment and procedures.
    b. Ask the students to select option(s) appropriate for their research goals.

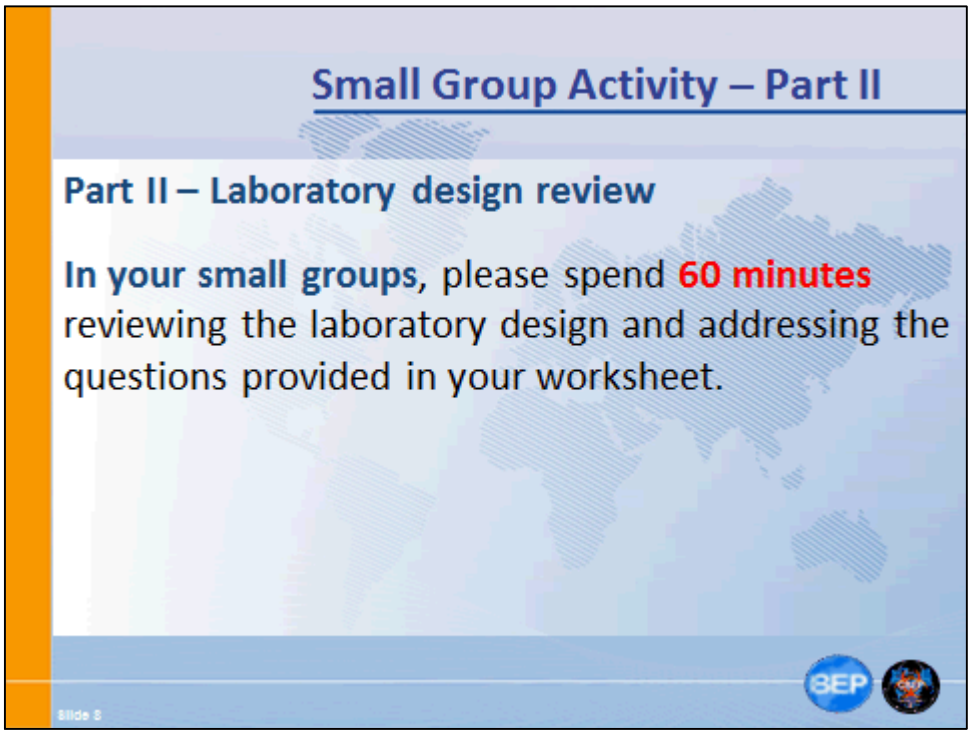
**Transition to Small Group Activity – Part II**

**Time**

**60 minutes**

# Small Group Activity – Part II

**Slide 8**



**Small group activity (60 minutes).**

**Activity Instructions (to students)**

1. Read slide.

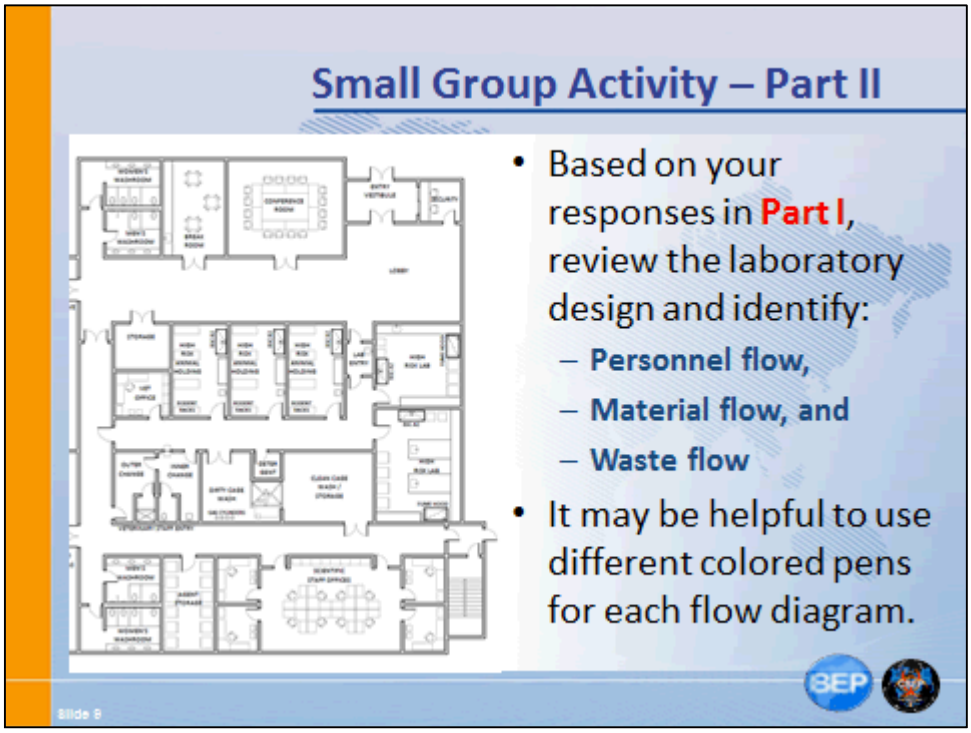
**You have 60 minutes to complete this activity**

***Directions for Instructor:***

- Ensure students have laboratory design and student worksheet.
- Observe the student's discussions and ensure they are discussing the laboratory design and risk-based mitigation strategies.
- Allow groups 60 minutes to review the laboratory design.

# Small Group Activity – Part II

Slide 9



**Small group activity.**

**Activity Instructions (to students)**

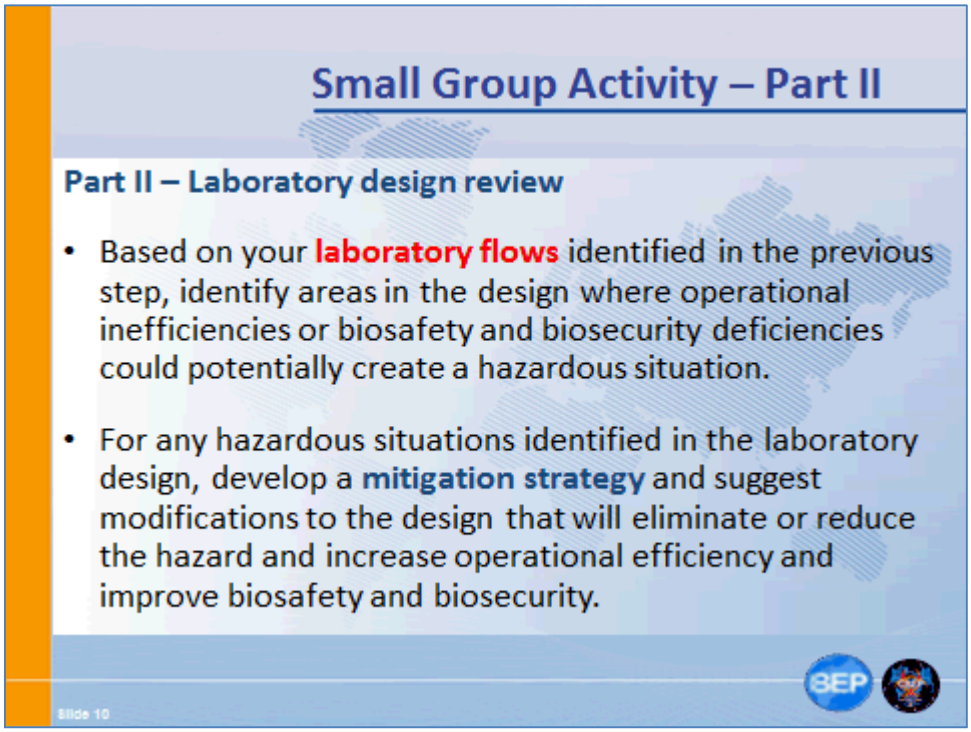
1. Discuss the laboratory design layout, pointing out various features (i.e. high risk lab space, high risk animal holding, cage wash areas, etc.).
2. Ask the students if they have any questions regarding the layout.
    a. Record any student responses.
3. Based on their responses to Part I, instruct the students to identify (on their laboratory design layouts):
    a. Personnel flow,
    b. Material flow, and
    c. Waste flow

**Expected Responses**

- Personnel flow should identify how laboratorians enter, move throughout, and exit the facility. For additional discussion points, appropriate access controls may also be considered.
- Material flow should identify how laboratory material (i.e. supplies, reagents, animals, etc.) enter and move throughout the facility, and how they are brought out if applicable.
- Waste flow should identify where waste is generated and how it is removed from the facility.

# Small Group Activity – Part II

**Slide 10**




**Small group activity.**

**Activity Instructions (to students)**

1. Based on your **laboratory flows** identified in the previous step, identify areas in the design where operational inefficiencies or biosafety and biosecurity deficiencies could potentially create a hazardous situation.
2. For any hazardous situations identified in the laboratory design, develop a **mitigation strategy** and suggest modifications to the design that will eliminate or reduce the hazard and increase operational efficiency and improve biosafety and biosecurity.

## Expected Responses

**Hazard Identification:**

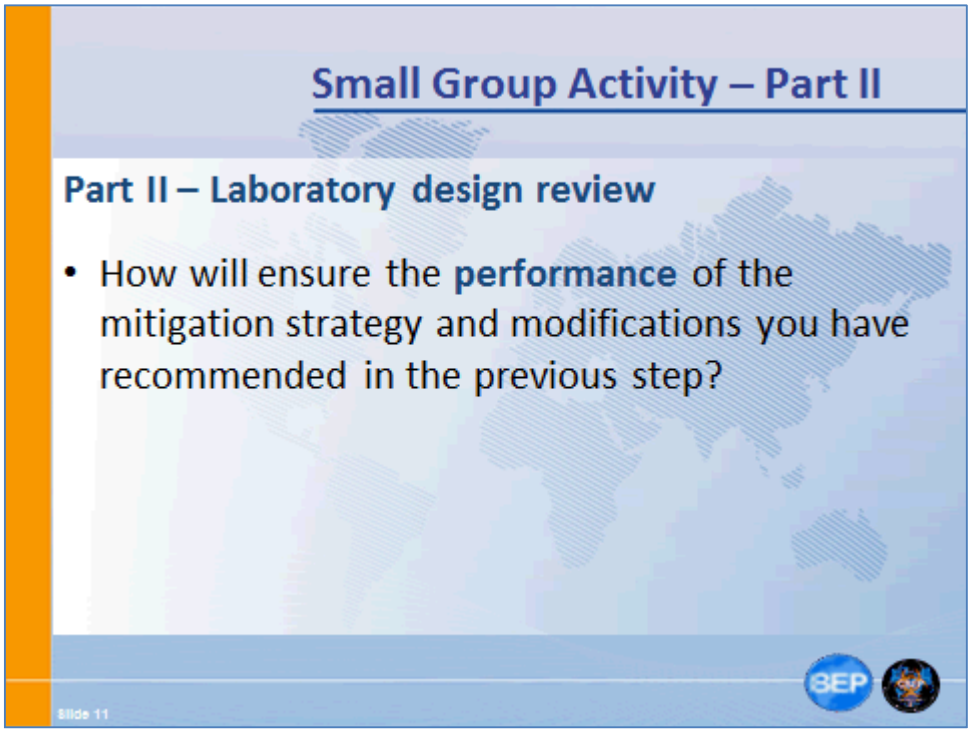
- Improper material or waste handling (i.e. no autoclave)
- Inadequate material storage (i.e. agent storage outside containment)
- Incorrect equipment selection and/or placement (i.e. BSC type and/or location, dunk tank from containment into inner change)
- Inefficient movement of materials/personnel (i.e. cage washer, personnel shower in outer change area, gas cylinders on dirty cage side,)
- Other (i.e. vet office inside containment, no separate animal procedure space, very large high risk lab, fume hoods inside high risk labs, cage wash maintenance on dirty side, etc.)

**Hazard Mitigation:**

- Install autoclave
- Reconfigure entry/exit
- Reduce/consolidate lab space
- Relocate BSCs, remove fume hoods
- Relocate to dunk tank
- Move gas cylinders outside containment, pipe gas through walls
- Provide access to cage wash components from outside containment barrier
- Add space for animal procedures
- Create pathway for clean materials (i.e. cages, cage racks)
- Relocate agent storage inside containment

# Small Group Activity – Part II

**Slide 11**




**Small group activity.**

**Activity Instructions (to students)**

1. How will ensure the **performance** of the mitigation strategy and modifications you have recommended in the previous step?

**Expected Responses**

- Identify relevant legal and/or reporting requirements
- Pre- and post-design risk assessment
- SOP design and verification
- Testing and quality control
- Staff performance
- Audits and inspections (Instructor can connect this to CWA 15792 Section 4.5.5)
- Incident response assessment
- Benchmarking with peer institutions
- Dry-runs and mock exercises with laboratory staff
- Other?
    - Document unique responses from students

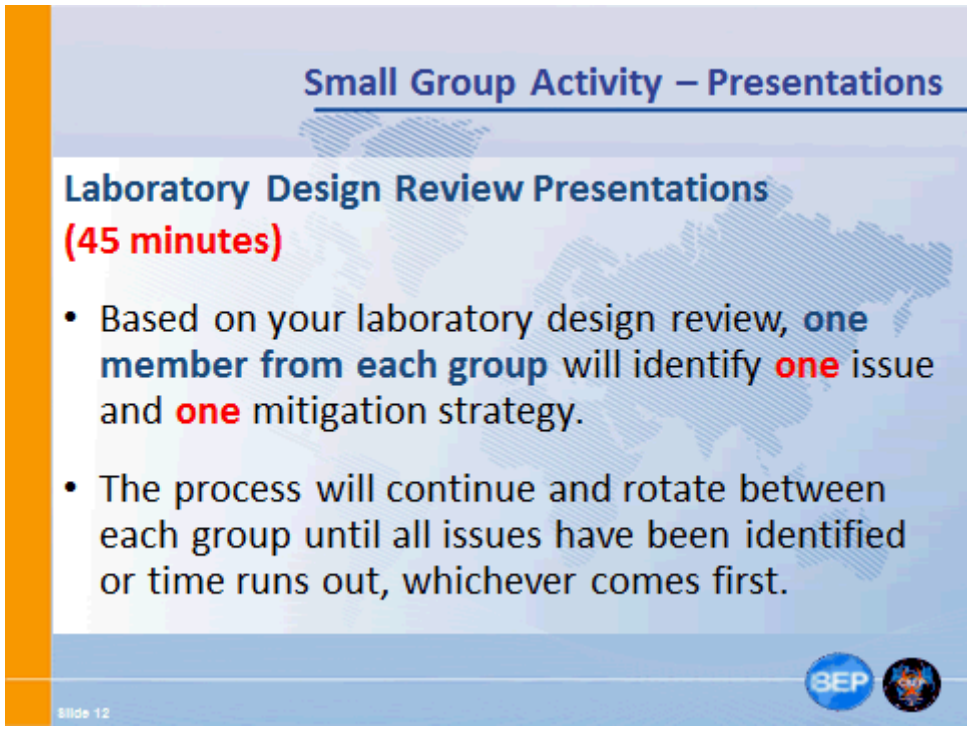
**Transition to Small Group Activity – Presentations**

**Time**

**45 minutes**

# Small Group Activity – Presentations

**Slide 11**



**Small group activity.**

**Activity Instructions (to students)**

1. Based on your laboratory design review, **one member from each group** will identify **one** issue and **one** mitigation strategy.
2. The process will continue and rotate between each group until all issues have been identified or time runs out, whichever comes first.
3. Encourage students to discuss the strengths and weaknesses of the laboratory design.
4. Encourage students to define the risk-based criteria that were used to develop their biorisk mitigation strategies.

**Expected Responses**

- Please refer to Expected Responses associated with Slides 9 through 11.

**Transition to Review and Wrap up**

**Time**

**15 minutes**

**Slide 13**

## Final Review

### Review

For **15 minutes**, let's discuss what we have learned about **Laboratory Design Review**.

| What did we learn? | What does it mean? | Where do we go from here? |
|---|---|---|

Slide 13

**Slide 14**

## Key Messages

- Risk assessment should be a primary driver of the laboratory design process and selection of biorisk mitigation strategies.
- Biosafety requires consideration at all levels of design, from the selection and placement of equipment in a room, to the organization of containment barriers around a zone, to the airflow strategy within the building.
- Biosecurity design can be integrated seamlessly into the building layout when considered early in programming and planning.
- Laboratory design should be developed in conjunction with the protocols followed when personnel, materials/laboratory animals, and waste move throughout the facility.

Slide 14

## Review Key Messages

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**Slide 15**