



# Biorisk Mitigation Strategies

## Student Guide

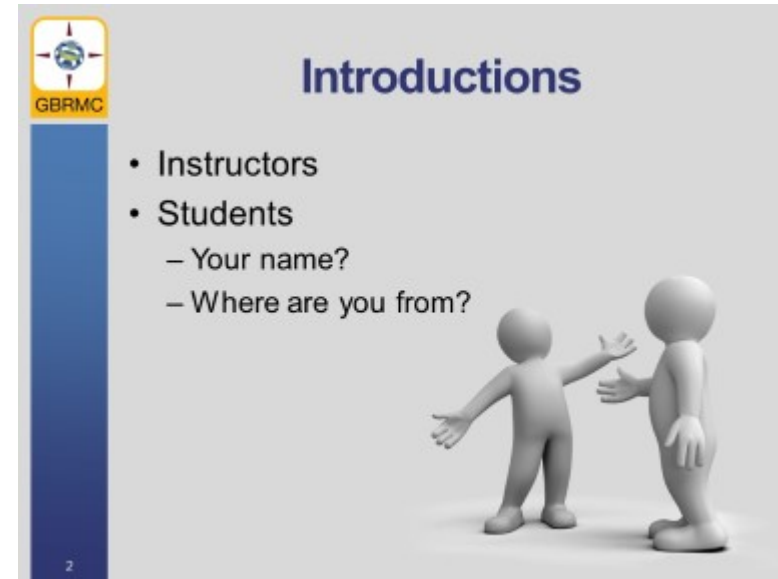
2016

GLOBAL BIORISK MANAGEMENT CURRICULUM

## Biorisk Mitigation Strategies



## Welcome & Introductions



---

---

---

---

---

---

---

---

---

---

---

---

# Action Plan

By the end of this lesson, I would like to:

KNOW		FEEL		BE ABLE TO DO	
<i>Your learning doesn't stop with this lesson. Use this space to think about what else you need to do or learn to put the information from this lesson into practice.</i>					
What more do I need to know or do?	How will I acquire the knowledge or skills?	How will I know that I've succeeded?	How will I use this new learning in my job?		

## Biorisk Mitigation Strategies



### Key Messages

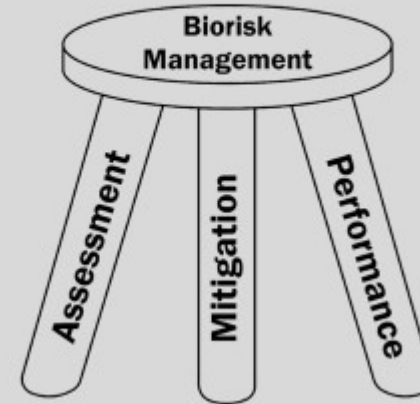
- Understand the value of effective mitigation and its role in the AMP model
- Mitigation is most effective when based on a thorough risk assessment
- There are five generally recognized categories of control measures; each with various advantages and disadvantages
- Risk is most effectively reduced through elimination or substitution; followed by engineering controls, administrative controls, practice and procedures, and lastly by PPE
- Different combinations of mitigation measures will typically be needed to reduce risk; the combination used will depend on your ability to implement them

4

## Biorisk Management




### Biorisk Management: the AMP Model




5

## Biorisk Mitigation Strategies



### Key Components of Biorisk Management

- **Biorisk Assessment**
  - Process of identifying the hazards and evaluating the risks associated with biological agents and toxins, taking into account the adequacy of any existing controls, and deciding whether or not the risks are acceptable



6

---


---

---

---


---

## Biorisk Management



### Key Components of Biorisk Management

- **Biorisk Mitigation**
  - Actions and control measures that are put into place to reduce or eliminate the risks associated with biological agents and toxins



7

---

---

---

---

---

## ***Biorisk Mitigation Strategies***

## ***Biorisk Management***



### **Key Components of Biorisk Management**

- **Biorisk Performance**
  - Improving biorisk management by recording, measuring, and evaluating organizational actions and outcomes to reduce biorisk.



---

---

---

---

---

---

---

---

---

---

## Biorisk Mitigation Strategies

## Biorisk Mitigation



### Biorisk Mitigation

#### Group Exercise:

In your groups, please spend **5 minutes** identifying **5 examples** of **Mitigation measures** and discuss how each mitigates the risk.


Based on your discussion, write your examples on sticky notes and **place** on your **flip-chart**.

9

<hr/> <hr/> <hr/> <hr/> <hr/>	<hr/> <hr/> <hr/> <hr/> <hr/>
-------------------------------	-------------------------------

## Biorisk Mitigation Strategies

## Biorisk Mitigation



### Why Risk Assessment?

**Group Exercise:**

**In your groups**, please spend **5 more minutes** to discuss the following questions:

1. Why is it important to conduct a **Risk Assessment** prior to implementing **mitigation controls**?
2. What outcomes would you expect when **mitigation** is based on a thorough **risk assessment**?
3. What would you expect if **mitigation** is implemented without conducting a **risk assessment**?

**Write down** your answers in your **student guide** and be prepared to report out to the class.

10

Why is it important to conduct a Risk Assessment prior to implementing 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?

---

---

---

---

---

---


---

---

---

---

## Biorisk Mitigation Strategies



### Biorisk Mitigation Scenario

**Group Exercise:**

In your groups, please spend **5 minutes** to read the scenario and **identify** at least ten different risk **mitigation measures**.

**Hint:** Remember that mitigation measures should address **safety** and **security**.

Write down each mitigation measure on a **sticky-note** and place them on your **flip-chart**. Be ready to report your answers out to the class.

11

## Biorisk Mitigation

List risk mitigation measures:

Safety mitigation measures:

Security mitigation measures:

---

---

---

---

---

---

---

---

---

---

## ***Biorisk Mitigation Strategies***

## ***Mitigation Control Measures***



### **Mitigation Control Measures**

There are five major categories of measures for controlling biological risks in the laboratory.

- 1. Elimination or Substitution**
- 2. Engineering Controls**
- 3. Administrative Controls**
- 4. Practices and Procedures**
- 5. Personal Protective Equipment**

12

Think about how the risk mitigation strategies you just identified fit into these categories of control measures.

---

---

---

---

---

---

---


---

---


---

## Biorisk Mitigation Strategies

## Mitigation Control Measures

 **Mitigation Control Measures**

**Elimination or Substitution:**  
Removing the hazard, not working with the agent or replacing the hazard with something less dangerous



**Cigarettes without the smoke**  
Several companies are selling electronic cigarettes that vaporize nicotine rather than burn tobacco, claiming they are safer than traditional cigarettes.

**Rechargeable lithium ion battery**  
lasts 1-3 days

**LED light**  
illuminates when inhaled

**Absorption chamber**  
heats the solution, vaporizing it

**Nicotine cartridge**  
holds a liquid nicotine and propylene glycol (solvent used in food coloring) solution. Available in a variety of flavors and nicotine levels.

**Vapor**  
released by structure smokes

SOURCES: NDTV, Smoking Everywhere 47

Examples of Elimination or Substitution:

---

---

---

---

---

---

---

---

## Biorisk Mitigation Strategies

## Mitigation Control Measures



### Mitigation Control Measures

**Engineering Controls:** Physical changes to work stations, equipment, materials, production facilities, or any other relevant aspect of the work environment that reduce or prevent exposure to hazards



Examples of Engineering Controls:

---

---

---

---

---

---

---

---

---

---

## Biorisk Mitigation Strategies

## Mitigation Control Measures



### Mitigation Control Measures

**Administrative Controls:** Policies, standards and guidelines used to control risks



15

Examples of Administrative Controls:

<hr/>	<hr/>
<hr/>	<hr/>
<hr/>	<hr/>
<hr/>	<hr/>
<hr/>	<hr/>


## Biorisk Mitigation Strategies

## Mitigation Control Measures



### Mitigation Control Measures

**Practices and Procedures:** Processes and activities that have been shown in practice to be effective in reducing risks



16

Examples of Practices and Procedures:

---

---

---

---

---

---

---

---

## Biorisk Mitigation Strategies

## Mitigation Control Measures



### Mitigation Control Measures

**Personal Protective Equipment:**  
Devices worn by the worker to protect against hazards in the laboratory



17

Examples of Personal Protective Equipment:

---

---

---

---

---


---

---

---

## Biorisk Mitigation Strategies

## Mitigation Control Measures



### Mitigation Control Measures

**Group Exercise:**

Considering these categories of **mitigation control measures**:

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

Please spend **5 minutes** to categorize your mitigation measures from the previous activity. Place your **sticky-notes** under each category.

18

Categorize your risk mitigation measures. Did you cover each category?

---

---

---

---

---


---

---

---

## Biorisk Mitigation Strategies

## Mitigation Control Measures



### Mitigation Control Measures

**Group Exercise:**

Considering these categories of **mitigation control measures**:

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

Please spend **5 minutes** to categorize your mitigation measures from the previous activity. Place your **sticky-notes** under each category.

18

Use the worksheet on the next page to record your answers.

---

---

---

---

---

---

---

---

# Advantages and Disadvantages

Control Measure	Advantages	Disadvantages
Elimination or Substitution		
Engineering		
Administrative		
Practices & Procedures		
PPE		

# Advantages and Disadvantages

Control Measure	Advantages	Disadvantages
Elimination or Substitution	Immediate reduction of risk	Not always available or possible
Engineering	Efficient, contains hazard	Cost, Complexity, training, maintenance
Administrative	Management communication of expectations	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, training

## Biorisk Mitigation Strategies

## Mitigation Control Measures



### Mitigation Control Measures

**Exercise:**

Considering these categories of **mitigation control measures**:

Most Effective 1 2 3 4 5 Least Effective

Please spend **5 minutes** to prioritize the five types of controls from the perspective of effectiveness.

22

Prioritize the mitigation control categories from most effective to least effective:

Elimination or Substitution

Engineering Controls

Administrative Controls

Practices and Procedures

Personal Protective Equipment

---

---

---

---

---


---

---

---

## Biorisk Mitigation Strategies


## Hierarchy of Controls



### 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.



23

Notes:

---

---

---

---

---


---

---


---

## Biorisk Mitigation Strategies

## Hierarchy of Controls

 **Car Safety vs. Motorcycle Safety**

Car safety is all about engineering systems



Motorcycle safety is all about PPE



24

In this example, a car would provide more protection than PPE. Is there an example where PPE would provide more protection?

---

---

---

---

---

---

---

---

## Biorisk Mitigation Strategies

## Identifying Controls



### Identifying Controls

**Exercise**

Please **watch** the following video of an incident/emergency response scenario

**Identify** and **write down** as many different mitigation measures as you can

**Assign** the mitigation measures to one of the five categories of controls

Video Clip

25

List all the mitigation measures. Assign them to one of the five categories of controls.

---

---

---

---

---


---

---

---

## Biorisk Mitigation Strategies

## Review



### Final Review

For **10 minutes**, let's discuss what we have learned about **Biorisk Mitigation Strategies**.

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

26

What did we learn?

What does it mean?

Where do we go from here?

---

---

---

---

---

---

---

---

---

---

## Biorisk Mitigation Strategies

## Review



### Key Messages

- Understand the value of effective mitigation and its role in the AMP model
- Mitigation is most effective when based on a thorough risk assessment
- There are five generally recognized categories of control measures; each with various advantages and disadvantages
- Risk is most effectively reduced through elimination or substitution; followed by engineering controls, administrative controls, practice and procedures, and lastly by PPE
- Different combinations of mitigation measures will typically be needed to reduce risk; the combination used will depend on your ability to implement them

27

Notes:

---

---

---

---

---

---

---

---

# Action Plan

By the end of this lesson, I would like to:

KNOW		FEEL		BE ABLE TO DO	
------	--	------	--	---------------	--

*Your learning doesn't stop with this lesson. Use this space to think about what else you need to do or learn to put the information from this lesson into practice.*

What more do I need to know or do?	How will I acquire the knowledge or skills?	How will I know that I've succeeded?	How will I use this new learning in my job?

*Use space on back, if needed*