



# Biorisk Mitigation

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**Biorisk Management =  
Assessment, Mitigation, Performance**

# Review

-  **What did you learn yesterday? What was new?**
  
-  **What new insights do you have from yesterday's material? What are the implications of that learning?**
  
-  **What will you do with this information when you go home? What will you change at your institute?**



# Group Exercise 1, Step 1

Using your risk assessment for the HIV scenario, identify **several** different risk mitigation measures

☣ **for safety**

☣ **for security**

Use a **post-it note** for each mitigation measure you identify

Report on your answers to the class





## Group Exercise 1, Step 2

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How would you categorize these mitigation measures?

Report on your answers to the class



# 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
- ⚠ **Administrative Controls:** Policies, standards and guidelines used to control risks
- ⚠ **Practices and Procedures:** Processes and activities that have been shown in practice to be effective in reducing risks
- ⚠ **Personal Protective Equipment:** Devices worn by the worker to protect against hazards in the laboratory



## Group Exercise 1, Step 3

Place your *post-it notes* in the appropriate columns on the flip chart:

<b>Engineering Controls</b>	<b>Administrative Controls</b>	<b>Practices and Procedures</b>	<b>Personal Protective Equipment (PPE)</b>
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Report your results to the class



## Group Exercise 1, Step 4

Considering these **mitigation control measures**:

### ***Engineering/Administrative/Practices & Procedures/PPE***

- Identify their advantages and disadvantages

Report your findings to the class



# Advantages/Disadvantages

Control Measure	Advantages	Disadvantages
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

# Group Exercise 1, Step 5

Considering these **mitigation control measures**:

## ***Engineering/Administrative/Practices & Procedures/PPE***

- Prioritize the four types of controls from the perspective of effectiveness

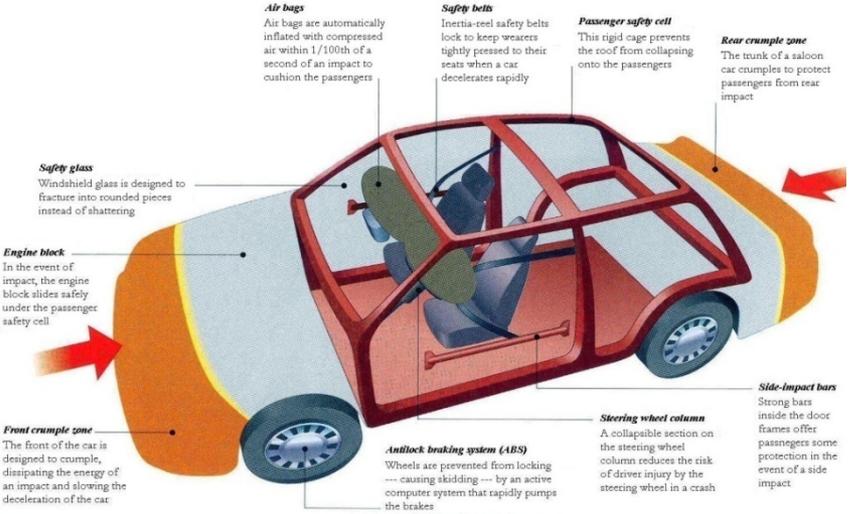
*Most Effective*    1    2    3    4    *Least Effective*

Record your findings on ***post-it notes***

Report your findings to the class

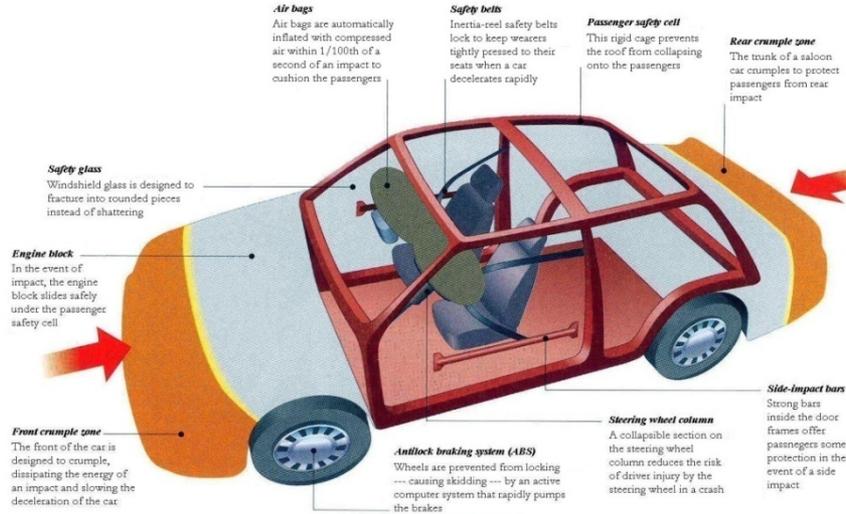


# Car Safety vs. Motorcycle Safety





# Car Safety vs. Motorcycle Safety



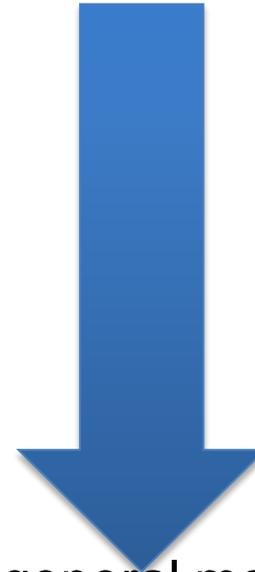
 Car safety is all about engineering systems

 Motorcycle safety is all about PPE



# Hierarchy of Controls (HOC)

- ④ Elimination or Substitution
- ④ Engineering Controls
- ④ Administrative Controls
- ④ Practices and Procedures
- ④ Personal Protective Equipment



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



## Group Exercise 2

In your groups, using risk the HIV scenario, reassess the risks by implementing the mitigation measures identified in Exercise 1

☠ **Biosafety**

☠ **Biosecurity**

Use the BioRam software to do the new assessments.

Document the new results on your charts

Report to the class on risk reduction and mitigation effectiveness





Mitigation measures most affect which side of the risk assessment equation?





**Substitution**  
(using different materials)  
affects what side of the  
risk assessment equation?





**Elimination**  
(not doing the intended work)  
does what to the risk?



# Implementing Mitigation Measures

Ideally, you should first consider elimination or substitution

A combination of control measures should be used based on their effectiveness and your ability to implement them

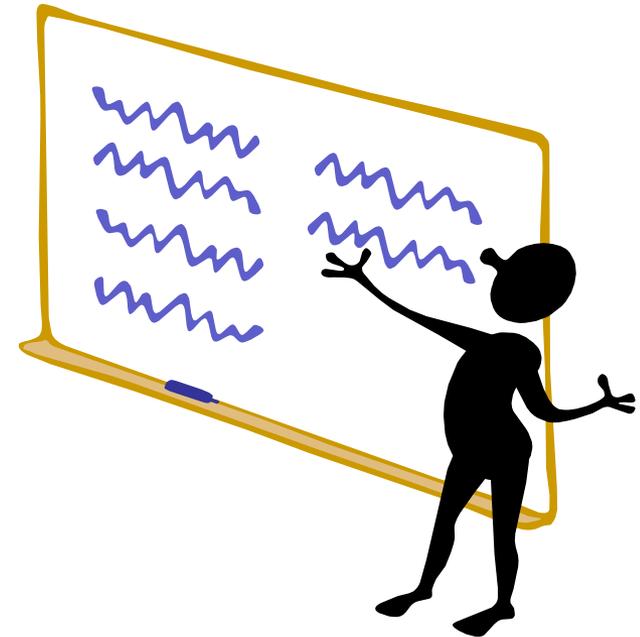
☣ 'acceptable risk'



# The "Wow" Effect

A robust methodological approach to risk mitigation gives you the ability to:

- ☣ Justify decisions
- ☣ Evaluate the impact of certain risk mitigation decisions
- ☣ Compare the cost effectiveness of various risk mitigation decisions





# Biorisk Management

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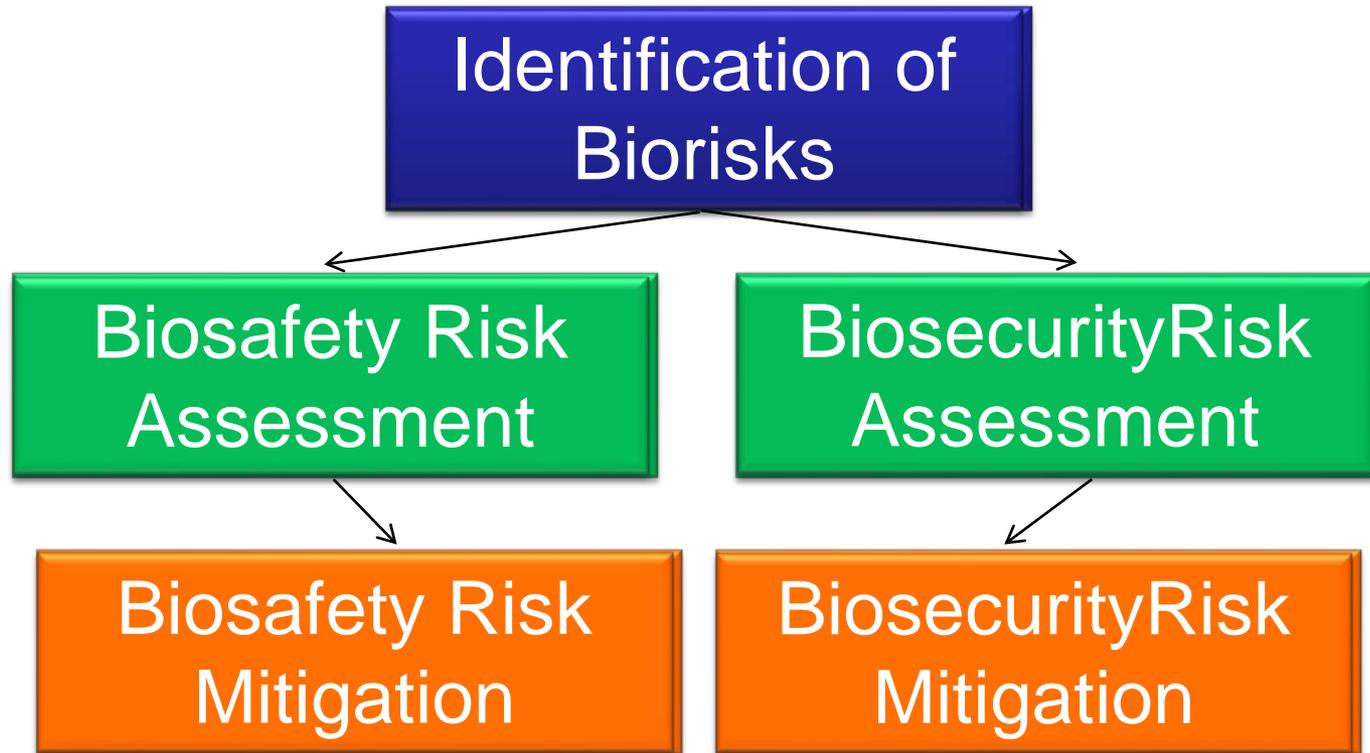


Risk identification  
Hazard/threat identification  
Likelihood evaluation  
Consequences evaluation



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

# Identification of Biorisks





# Summary

- ❖ **Four categories of mitigation control measures**
  - ❖ Engineering Controls
  - ❖ Administrative Controls
  - ❖ Practices and Procedures
  - ❖ Personal Protective Equipment
  
- ❖ **Implementing mitigation controls**
  - ❖ Should first consider elimination or substitution
  - ❖ A combination of control measures should be used based on their effectiveness and your ability to implement them
  - ❖ Should be based on the results of the risk assessment, and should give a “wow” effect