



Biorisk Assessment

High Containment Workshop

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Risk Assessment

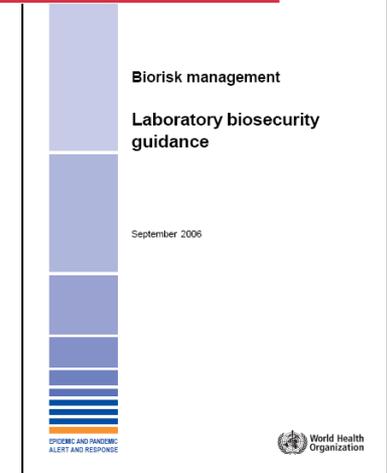
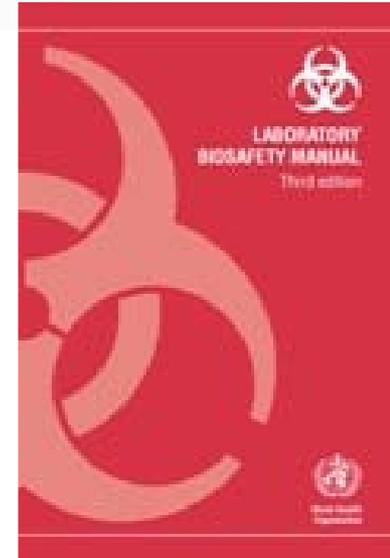
- **Why is risk assessment so important?**

- **Think about this question:**
 - *Is conducting a risk assessment simple? Why or why not?*



Why Risk Assessment?

- **Laboratory Biosafety**
 - A set of preventive measures designed to reduce the risk of accidental exposure to or release of a biological agent
- **Laboratory Biosecurity**
 - A set of preventive measures designed to reduce the risk of intentional removal (theft) and misuse of a biological agent – intent to cause harm
- **Identification of preventive measures is determined by the RISK ASSESSMENT**





- **What about the following agents makes the risk of working with them in a laboratory different?**
 - Work in your group to identify some of the factors that define these differences.
 - **Rhinovirus**
 - **HIV**
 - **MDR-TB**
 - ***B. Anthracis***
 - **Hantavirus (e.g. *Sin Nombre*)**
 - Can you group or characterize the factors you defined?
 - Based on these characterizations, how would you define risk?



Risk

- Is a function of Likelihood and Consequence





Risk Assessment Principles

- **Define the problem**
 - Think about how the factors would change if you were assessing the risk of someone stealing a tiger vs. being attacked by a tiger?
- **The risk assessment method should be as simple as possible**
 - Elaborate when needed
- **Those conducting risk assessments should be explicit about uncertainties**
- **Risk assessment methods can incorporate one or more approaches**



Laboratory Biorisk Assessment (I)

- **Example 1: A researcher is working to create a new animal model for HIV studies. Using mice, he plans on injecting HIV using 1ml needles. A technician will hold the animals for the researcher during inoculation. They are using a biosafety cabinet, nitrile gloves, goggles, and lab coats. The researcher recently has been distracted with personal issues and appears stressed. All details of this research are kept in the researcher's log book which he keeps to himself.**
- **Work in your group to determine:**
 - What is/are the risk(s) you need to assess?
 - Write down the risk(s) you are going to assess
 - What are the key factors needed to conduct a risk assessment?
 - For each factor, identify if it is low, medium, or high for this example



Laboratory Biosafety Risk Assessment Methodology (Biosafety RAM)

$$\text{Risk} = f(\text{Likelihood, Consequence})$$

- **Likelihood**
 - The likelihood of infection by the agent and the likelihood of exposure through an infectious route based on the procedures and work practices
- **Consequences**
 - Of disease from accidental exposure
- **Risks**
 - To laboratory workers
 - Researchers
 - Animal care workers
 - Technicians
 - Engineers
 - Risk of accidental exposure to community
 - Risk of accidental exposure to animal community
 - Risks of secondary exposure to human and animal community

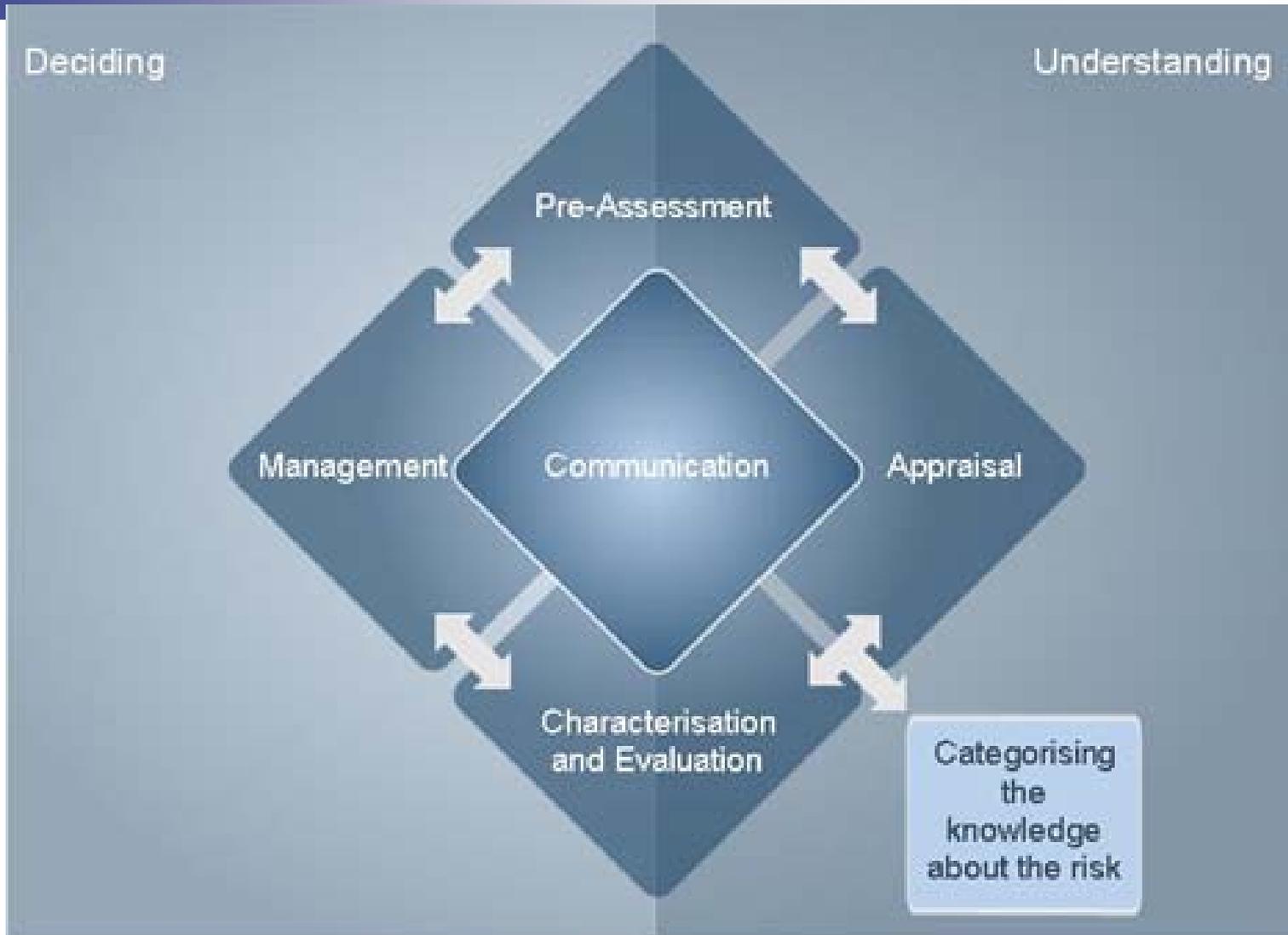


Laboratory Biorisk Assessment (II)

- **Example 1: A researcher is working to create a new animal model for HIV studies. Using mice, he plans on injecting HIV using 1ml needles. A technician will hold the animals for the researcher during inoculation. They are using a biosafety cabinet, nitrile gloves, goggles, and lab coats. The researcher recently has been distracted with personal issues and appears stressed. All details of this research are kept in the researcher's log book which he keeps to himself.**
- **As a group, we will use the Biosafety Risk Assessment Training Model (BioRAM Lite) to conduct a risk assessment of the same example**



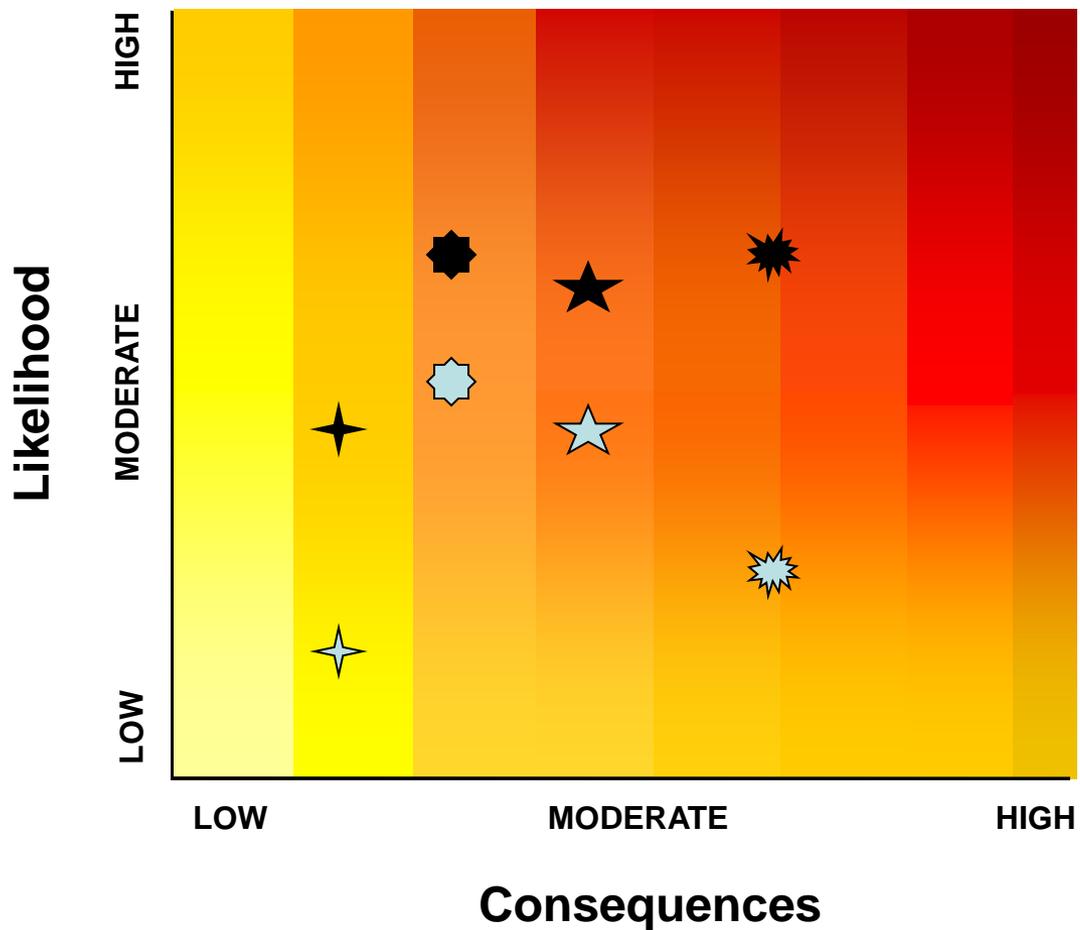
Risk Analysis Process





Risk Characterization

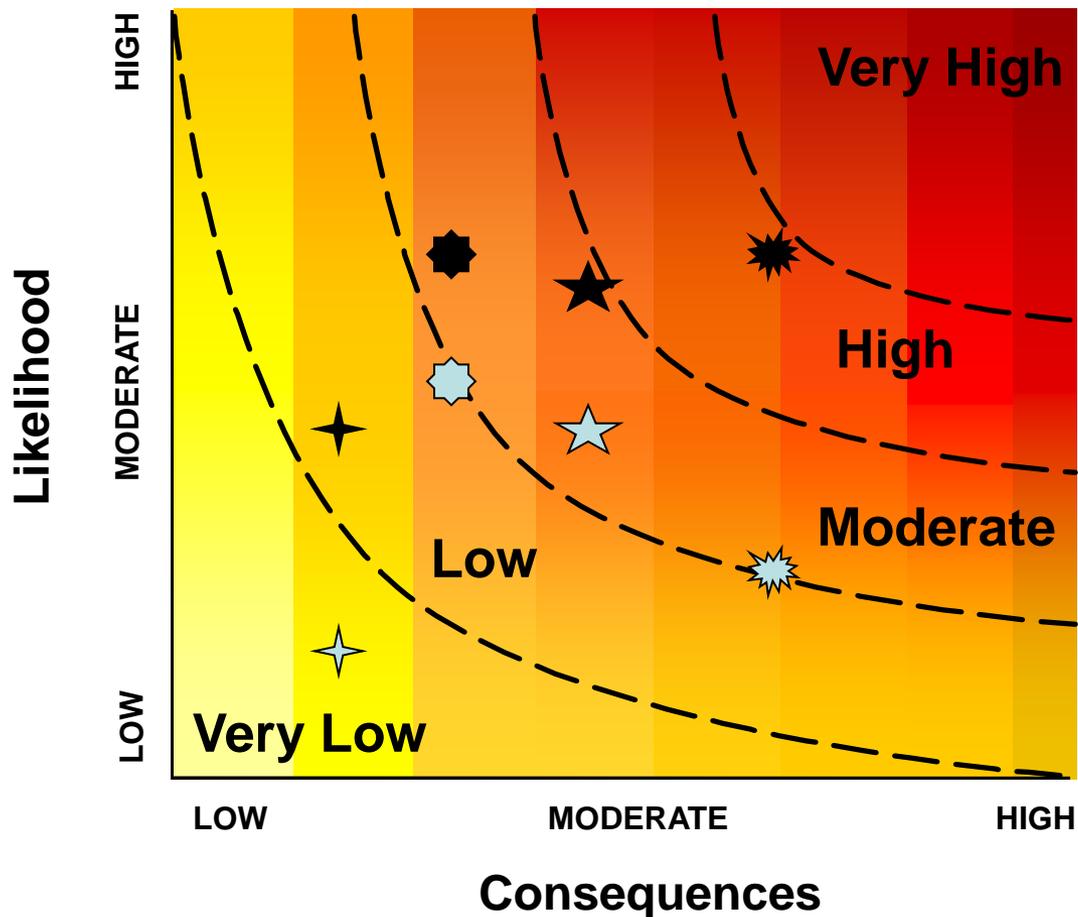
- Evidence-based



Risk Evaluation

- **Value-based**

- What is acceptable, tolerable, and intolerable?



- Protect against unacceptable risk scenarios

- Develop incident response plans for acceptable risk scenarios



- **In your group, conduct a biosafety risk assessment based upon the example(s) provided.**
- **Use the board to characterize this risk (plot the likelihood and the consequences)**
- **Is this risk acceptable?**
 - Why or why not?
 - If not, redo the assessment after “implementing” one or more biosafety measures?
 - **Did this make the risk acceptable? Why or why not?**
 - **How did the risk assessment help you make this determination?**



- **Is conducting a risk assessment simple?**

- **What are some of the benefits to a structured process for conducting a biorisk assessment?**