
Risk Assessment as a Foundation for Physical Security

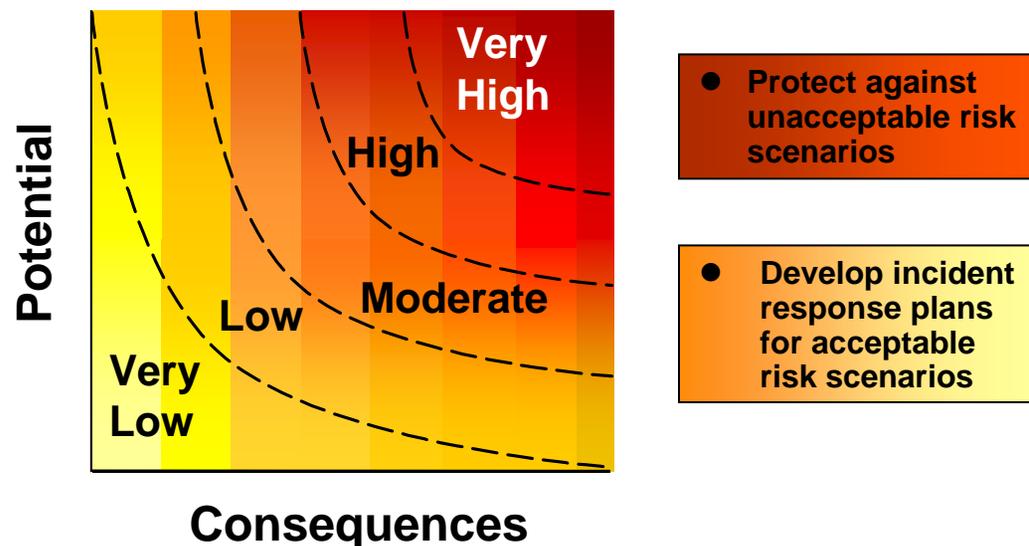
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**Physical Security for Bioscience Laboratories
ABSA pre-conference course**

Biosecurity Based on Risk Management



- Is a function of the likelihood an adverse event will occur
 - $\text{Biosecurity Risk} = \text{Threat Potential} * \text{Consequences}$
- Cannot eliminate risk
 - Management must determine which risks are unacceptable (risk decision)
- Risk assessment is key to resource allocation
 - Graded protection
 - Existing resources should be used efficiently
 - Ensure that protection and the cost is proportional to the risk



Laboratory Biosecurity

- **Biosecurity System**
 - Not limited to theft and deliberate misuse of biological agents
 - Assessment based methodology
 - Can be applied to other important laboratory assets
 - Computers
 - Laboratory notebooks and notes
 - Can be applied to other malicious actions
 - Sabotage
 - Theft of other assets

- **As a minimum, every laboratory biosecurity system should consider strategies to minimize the risk**
 - Theft and deliberate misuse of dangerous biological agents

Biosecurity Risk Assessment

- 1. Characterize assets (pathogens and toxins) and threats**
 - a. Evaluate pathogens and toxins at facility (asset assessment)**
 - b. Evaluate adversaries who might attempt to steal those pathogens or toxins (threat assessment)**

- 2. Evaluate scenarios**
 - a. Create scenarios consisting of specific adversary attempting to steal and misuse a specific biological agent**
 - b. Determine how the various scenarios could be perpetrated (vulnerability assessment)**

- 3. Characterize the risk**
 - a. Evaluate threat potential and consequences of each scenario**
 - b. Determine acceptable and unacceptable risks; develop risk statement**



Asset Assessment

- **Assess value of the agents from an adversary's perspective**
 - **Consequences**
 - **Population**
 - Transmissibility
 - Mortality
 - Morbidity
 - **Economic**
 - **Psychological**
 - **Task Complexity**
 - **Acquisition**
 - Natural
 - Laboratory
 - Synthetic biology
 - **Production**
 - R&D
 - Covert production
 - Ease of storage
 - **Dissemination**
 - Route of infection (e.g. aerosol, ingestion)
 - Environmental hardiness



Assessment result:

Nonpathogenic

Malicious Use Risk:

Low, Moderate,
High, Extreme

Threat Assessment

- **Adversary Classes**
 - Terrorist
 - Extremist
 - Criminal
- **Insiders**
 - Authorized access to the facility, dangerous pathogens, and/or restricted information
 - Distinguish Insiders by level of authorized access
 - Site
 - Building
 - Asset
 - Facility management, site security, and local law enforcement interviews
- **Outsiders**
 - No authorized access
 - Local law enforcement, site security, and intelligence community interviews



Evaluate Scenarios

- **Scenarios of specific adversaries attempting to steal and misuse specific pathogens or toxins**
 - **Can screen assets that do not present sufficient risk**
 - **Nonpathogenic and LMUR**
 - **Can screen adversaries for certain scenarios because they have no interest in biological agents or have insufficient means**

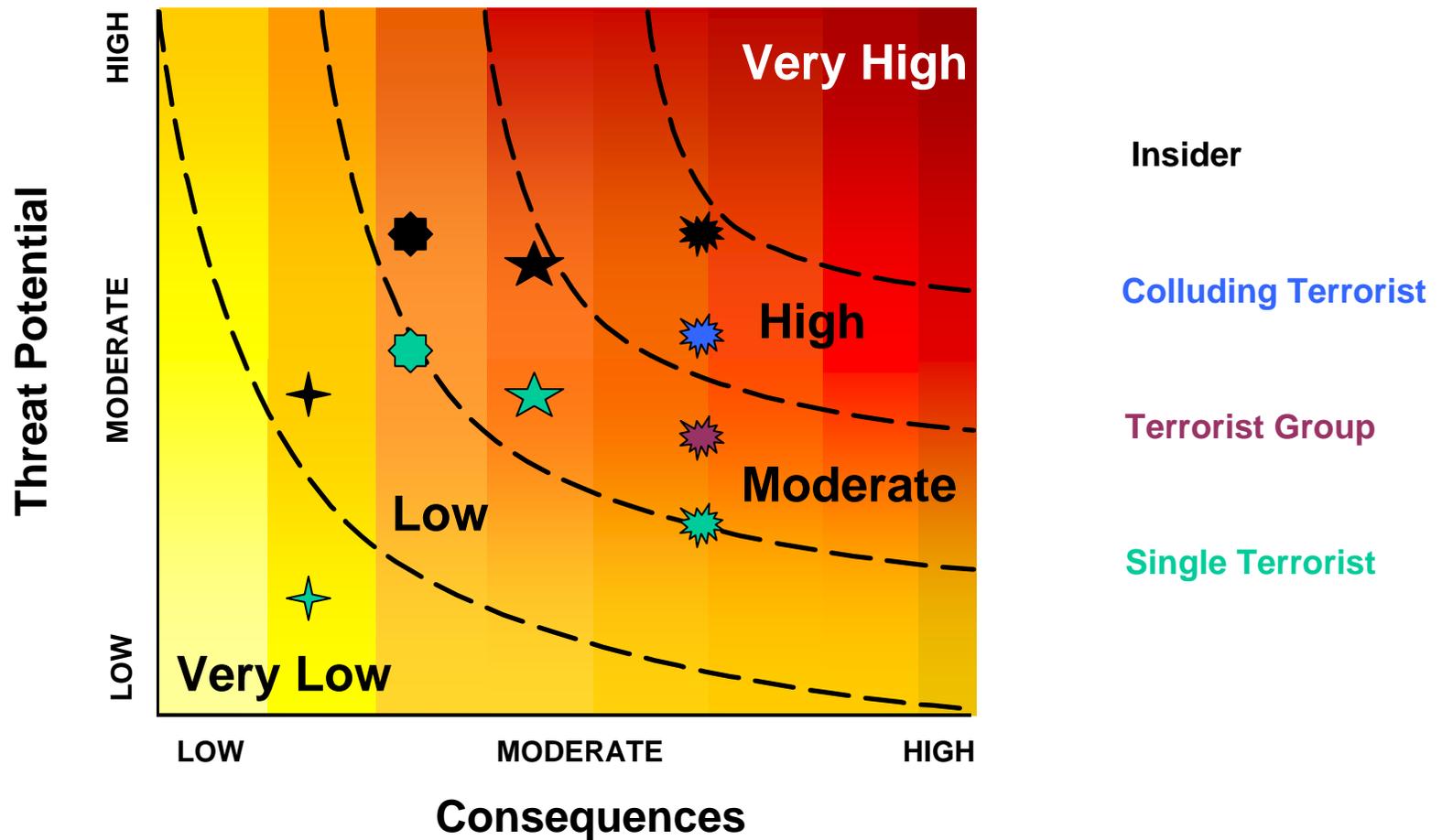
Asset	Adversary	Action
EMUR	Insider	Theft of biological agent
EMUR	Terrorist group	Theft of biological agent
EMUR	Colluding terrorist group	Theft of biological agent
HMUR	Insider	Theft of biological agent
HMUR	Terrorist group	Theft of biological agent
HMUR	Colluding terrorist group	Theft of biological agent
HMUR	Single terrorist	Theft of biological agent
MMUR	Insider	Theft of biological agent
MMUR	Single terrorist	Theft of biological agent

Vulnerability Assessment

- Do vulnerabilities exist that allow defined scenarios to occur?
- For biosecurity risk assessment, evaluate existing laboratory biosecurity system
 - Physical security, Personnel security, Material control & accountability, Transport security, Information security, Program Management
- Physical security vulnerability assessment
 - Are access controls in place to buildings and laboratories where the biological agents in the scenarios are stored and used?
 - For scenarios with outsiders, evaluate
 - Intrusion detection systems
 - Site perimeter
 - Response force

Characterize the Biosecurity Risk

Hypothetical Risk Results



Conclusions

- **Not all pathogens and toxins warrant the same level of laboratory biosecurity**
- **Risk assessment is the fundamental resource allocation tool**
 - **For making decisions about which risks need to be protected against**
- **Risk assessment and risk decision are the critical foundation for the design of a physical security system**