



Biosecurity Principles

SNL Biosecurity Team
National Workshop on Biosecurity
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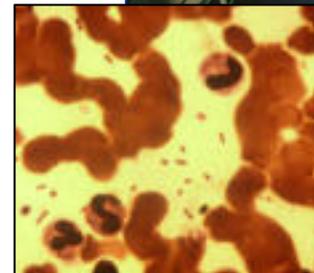
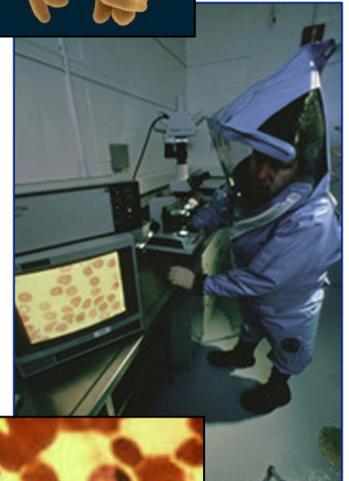


Biosafety and Biosecurity

- **Biosafety**
 - Objective: reduce or eliminate accidental exposure to or release of potentially hazardous agents
- **Biosecurity**
 - Objective: protect biological agents against theft and sabotage by those who intend to pursue bioterrorism or biological weapons proliferation
- **Common strategy**
 - Implement graded levels of protection based on a risk management methodology
- **Control of certain biological materials is necessary, but *how* that is achieved must be carefully considered**
 - Biosafety and biosecurity should be integrated systems that avoid compromising necessary infectious disease research and diagnostics



Francisella tularensis

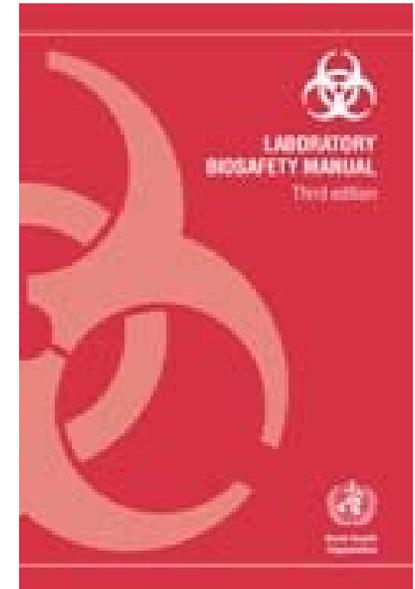


Yersinia pestis



Laboratory Biosecurity Supports Laboratory Biosafety

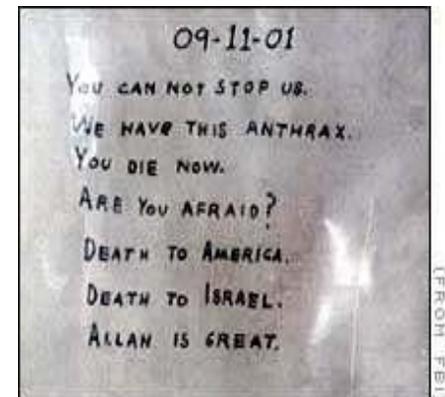
- **Laboratory biosecurity supports the laboratory biosafety agenda of preventing disease in people, animals, and plants and minimizing the risk of worker injury**
- **Safe and secure laboratories help**
 - **ensure the containment of hazardous infectious substances in laboratories**
 - **maintain citizens' confidence**
 - **increase transparency to investors in the biomedical and biotechnology industries**





Need to Secure Certain Pathogens and Toxins

- Aim of biosecurity is to mitigate biological weapons (BW) threat at the source
 - Prevent terrorists or proliferant states from acquiring biological agents from government, commercial, or academic facilities
- Biosecurity only addresses a small part of the BW threat
 - Biosecurity cannot prevent BW terrorism or proliferation, or even diversion
 - Biosecurity should be designed to deter and detect theft or sabotage
- Research community needs specific tools to achieve a balance between
 - Adequately protecting certain pathogens and toxins
 - Not jeopardizing research on those agents and toxins





Biosecurity Based on Risk Management

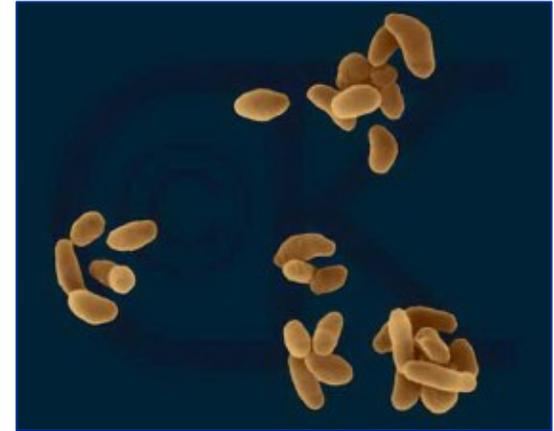
- **Biosecurity fundamentals**
 - **Critical not to unduly compromise legitimate bioscience operations**
 - **Most biological materials can be isolated from nature**
 - **A security system cannot protect every asset against every conceivable threat**
 - **Security resources are not infinite**
 - **Security systems should be based on the asset or material that requires protection**
 - **Security systems should be designed to address unique situations**
 - **Impact operations only to the level required**
 - **Use limited resources efficiently**





Challenges to Securing Biological Agents

- **Dual-use characteristics**
 - Valuable for many legitimate, defensive, and peaceful commercial, medical, and research applications
- **Nature of the material**
 - Living and self-replicating organisms
 - Used in very small quantities
 - Cannot be reliably quantified
 - Exist in many different process streams in facilities
 - Contained biological samples are virtually undetectable
- **Laboratory culture**
 - Biological research communities not accustomed to operating in a security conscious environment





Biosecurity Cost-Benefit Considerations

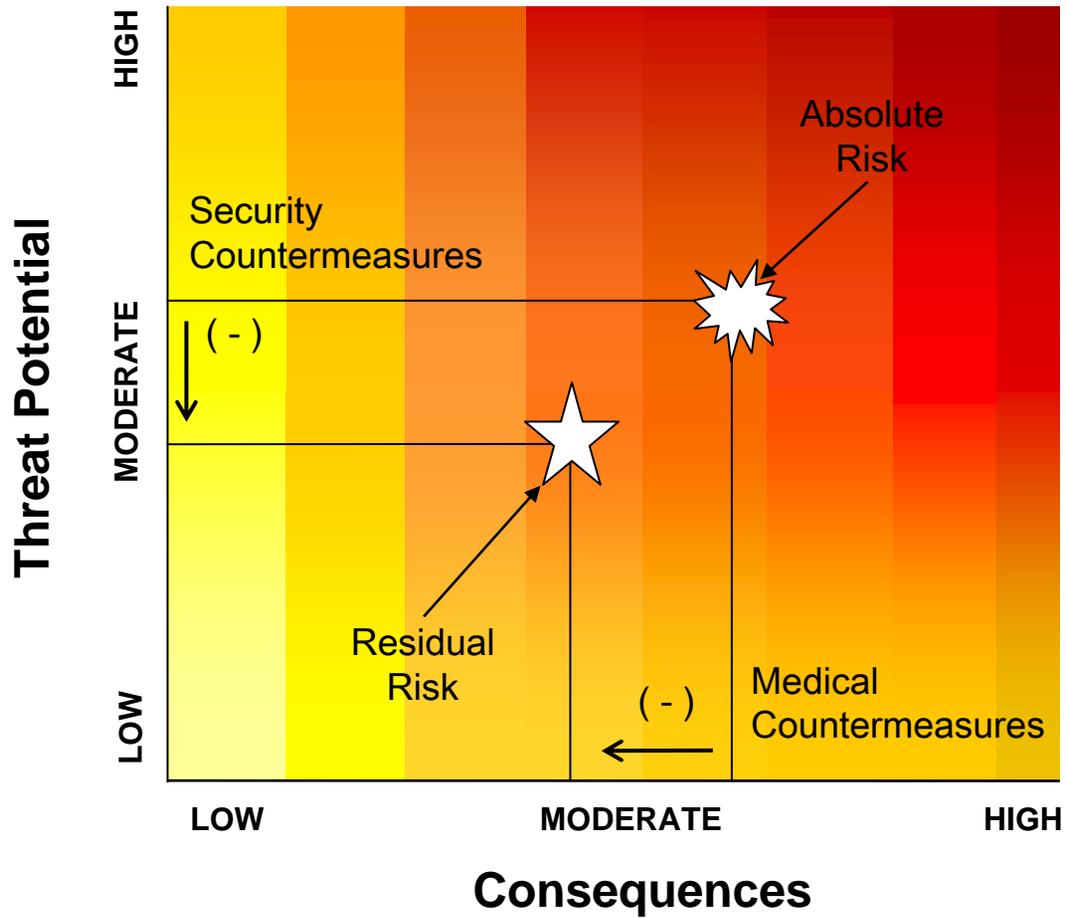
- **Bioscience facilities are not unique repositories**
 - Most agents can be isolated from nature
 - Many similar collections of agents exist worldwide
- **Relatively few agents can be easily grown, processed, weaponized, and successfully deployed while maintaining virulence/toxicity**
 - Very few agents used as a weapon could cause mass human, animal, or plant casualties
- **Need a methodology to make informed decisions about how to design an effective and efficient biosecurity system**



FMD outbreak, U.K.



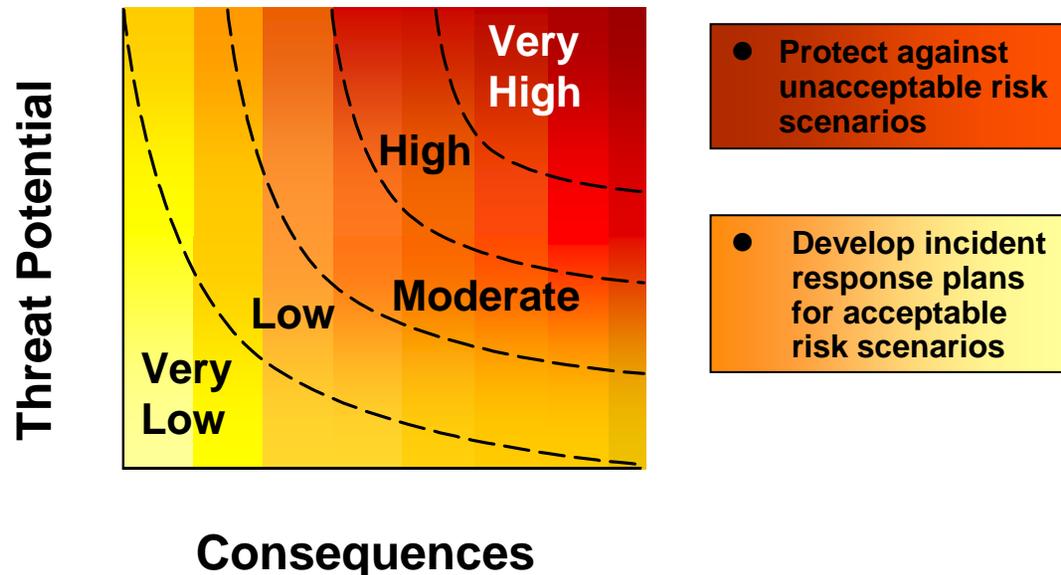
Biosecurity Risk Assessment and Mitigation





Biosecurity Based on Risk Management

- Security in a biological environment will never be perfect
- Most biological materials can be isolated from nature
- Critical not to compromise legitimate bioscience operations
- Management must distinguish between “acceptable” and “unacceptable” risks
 - Ensure that protection for an asset, and the cost, is proportional to the risk of theft or sabotage of that asset





Conclusions

- **Necessary to take steps to reduce the likelihood that the *high risk agents* could be stolen from bioscience facilities**
- **Critical that these steps are designed specifically for biological materials and research so that the resulting system will balance science and security concerns**
- **Biological facility risk mitigation may be accomplished through an integrated biosecurity system that incorporates policies, procedures and equipment**