Laboratory Practices

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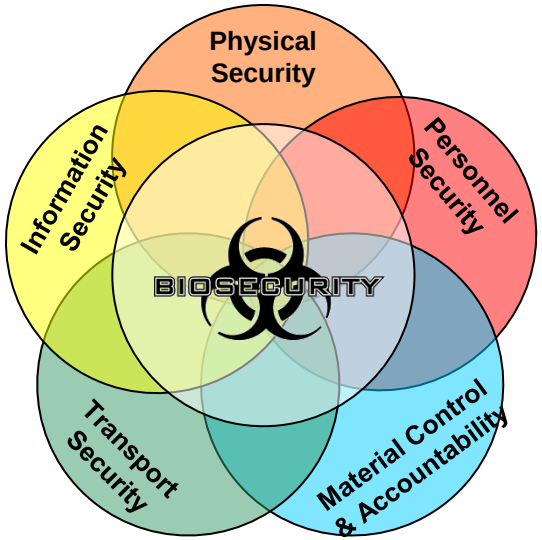

Controlling Laboratory Biorisks Training Course 2012

International Biological Threat Reduction Program

Global Security Programs

Sandia National Laboratories

Albuquerque, NM USA

Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

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Biorisk Mitigation

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

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Learning Objectives

By the end of the course, participants should be able to meet the following objectives:

- Be able to discuss Good Laboratory Practices, and explain why they are "good".
- Be able to explain the importance of following proper procedure. (ex. Regular Handwashing versus Proper Handwashing)
- Identify ways to encourage adoption of good laboratory practices

Basic Safety Practices

- **Imagine that you are the supervisor in a basic clinical research laboratory.**
- **Work with your group to discuss basic safety rules for your laboratory.**
- **Make a list of the top 10 rules that you would institute to protect workers in your laboratory**

Good Laboratory Practices

Formal Definition of Good laboratory practice (GLP):

A set of practices; techniques or procedures that, when followed in the laboratory, have been demonstrated to protect lab workers and the environment and to reduce the risk of exposure to hazardous agents.

Looking at the master good lab practices list we developed, answer the following questions on the assigned practices

- Why are they good practices?
- Why do them?
- Who/what are these practices protecting and from what?
- How can you ensure people are following them?

Processes of Control

What good laboratory practices can be enforced though

- Elimination / substitution?
- Administrative controls?
- Engineering controls?

Bad Laboratory Practices?

The following are examples of a lack of good laboratory practices

- What is the practice that is lacking?

Army: 3 vials of virus samples missing from Maryland facility

April 22, 2009 | From Larry Shaughnessy CNN Pentagon Producer

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Missing vials of a potentially dangerous virus have prompted an Army investigation into the disappearance from a lab in Maryland.

The Army's Criminal Investigation Command agents have been visiting Fort Detrick in Frederick, Maryland, to investigate the disappearance of the vials. Christopher Grey, spokesman for the command, said this latest investigation has found "no evidence of criminal activity."

Fort Detrick is the home of the Army's top biological research facility.

The vials contained samples of Venezuelan Equine Encephalitis, a virus that sickens horses and can be spread to humans by mosquitoes. In 97 percent of cases, humans with the virus suffer flu-like symptoms, but it can be deadly in about 1 out of 100 cases, according to Caree Vander Linden, a spokeswoman for the Army's Medical Research Institute of Infectious Diseases. There is an effective vaccine for the disease and there hasn't been an outbreak in the United States since 1971.

The vials had been at the research institute's facility at Fort Detrick, home of the Army's top biological research facility, for more than a decade. The three missing vials were among thousands of vials that were under the control of a senior scientist who retired in 2004. When another Fort Detrick scientist recently inventoried the retired scientist's biological samples, he discovered that the three vials of the virus were missing. The original scientist's records about his vials dated back to the days of paper-and-pen inventories.

During the investigation, the retired scientist and another former Fort Detrick researcher cooperated with investigating agents and, according to Vander Linden, they came back to the facility to help look for the vials.

Vander Linden said the investigators know that several years ago an entire freezer full of biological samples broke down and all the samples had to be safely destroyed. But a complete inventory of what was in the freezer was not done before the samples were destroyed. Vander Linden said there's a "strong possibility" the vials were in that freezer and destroyed, but that isn't known for sure.

This investigation comes two months after all research at the research institute facility at Fort Detrick was halted for a complete computer-based inventory of all disease samples at the fort. That inventory is expected to be complete before summer and may help solve the mystery of the three missing vials, officials said.

The Army investigation is in its final stages and is expected to be closed soon.

What went wrong?

"…a freezer full of biological samples broke down…***a complete inventory*** of what was in the freezer ***was not done***…a strong possibility the vials were…destroyed, but that isn't known for sure."

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Biosafety Cabinet !?!

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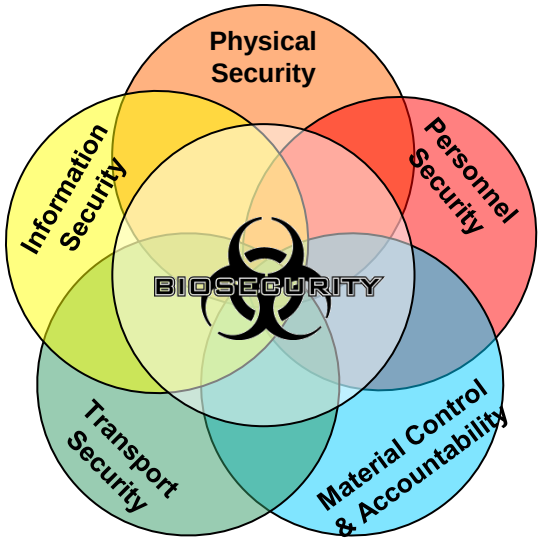
Summary

- **What are some of the key considerations of good laboratory practices?**
  - Why are they good?
  - How can we ensure they are being implemented as intended?

Personal Protective Equipment



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AMP Model

Biorisk Management

Assessment Mitigation Performance

Learning Objectives

By the end of the course, participants should be able to meet the following objectives:

- Be able to describe the differences between various routes of exposure.
- Be able to compare and contrast the utility of different articles of PPE.
- Be able to explain the principles of donning and doffing.

Why use Personal Protective Equipment?

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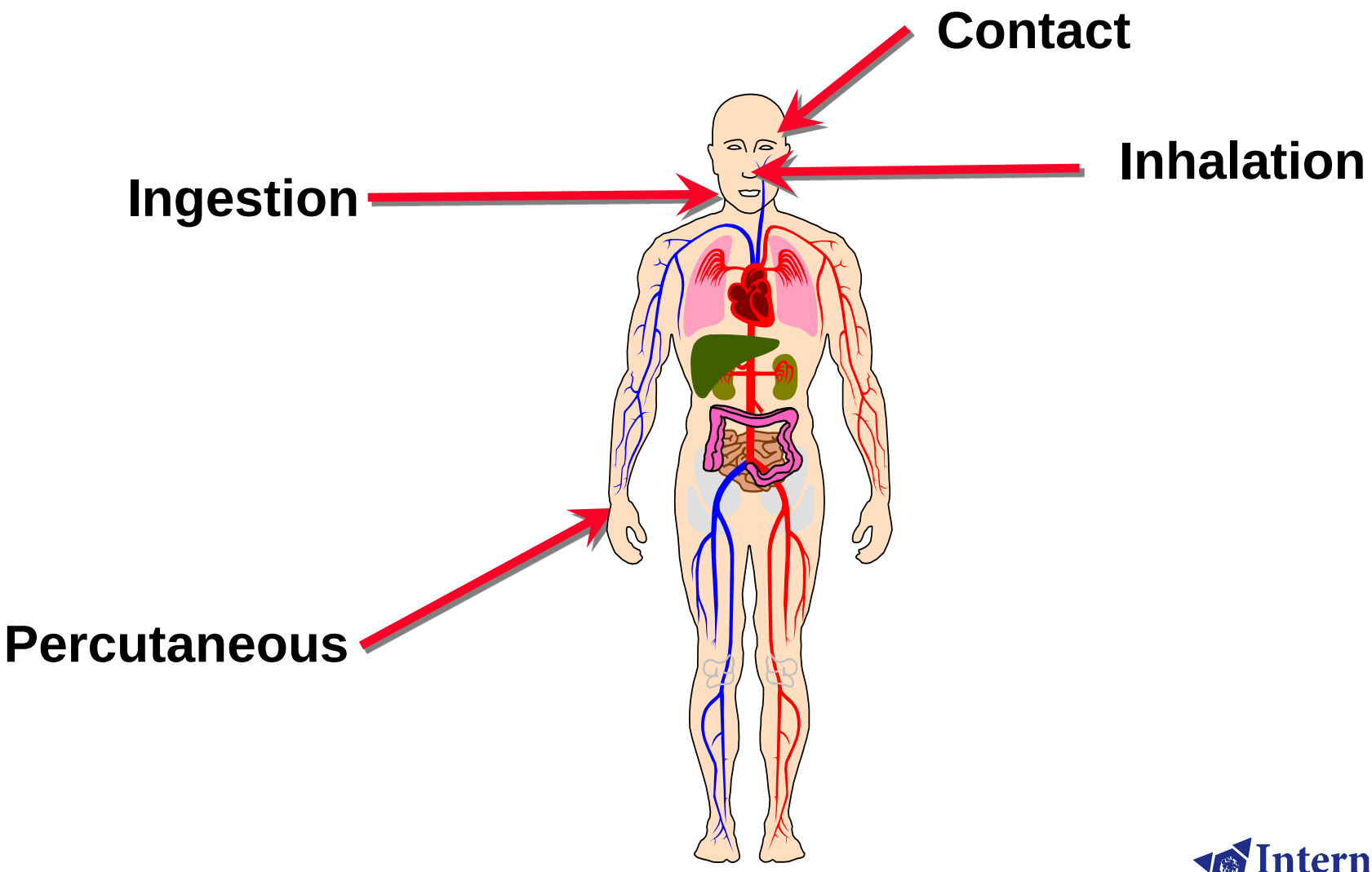
What are the possible routes of exposure?



PPE selection

As a group, look at the PPE examples you have

- What routes of exposure do they protect?
- What are the advantages of using it?
- What are some of the limitations?
- Are there other considerations?
  - **Storage, maintenance, fit, cost, comfort, training etc**

Donning and Doffing

- **Is the order you put on your PPE important? Why?**
- **Is the order you remove your PPE important? Why**
- **What are the key considerations in creating an order for donning and doffing?**

Case Activity

- **Based upon the agent and activity in your case study, determine what PPE is the most appropriate and why**

- **Create a donning and doffing order for the PPE you have determined**
  - Where is the PPE stored?
  - Where is the PPE disposed of or cleaned?
  - Are there any other considerations?

- **For this activity please design based upon the following laboratory outline**

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- **Test your donning and doffing order**
  - Have one member of your group don the PPE and enter the “Lab” as you determined in your discussions
  - The same member will exit the laboratory (post “contamination”) and doff the PPE

- **Did your order work?**

Case Activity

Redesign your donning and doffing order based upon this new laboratory design

- Where is the PPE stored?
- Where is the PPE disposed of or cleaned?
- Are there any other considerations?

Summary

What are some of the key considerations when thinking about what PPE?

- Consider routes of infection and routes of exposure
- Consider what the PPE is protecting
- Consider the limitations for use of the types of PPE
  - **Fit, Availability, Cost, Storage, etc**
- Consider how and where the PPE should be donned and doffed