Biosafety Training
Because it Matters
Dana L. Swenson, Ph.D.
Emerging and Re-Emerging Infectious Diseases
Global BSL-4 Laboratories
## Expansion of BSL-4 Laboratories in the United States

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*Source: GAO analysis*
What Do We Need Now?

Highly Competent Workers

How Do We Get There?

Training
For those of you who don’t think we need training, I’ll explain why it is important
Why Is Training Important?

Instill confidence in the public and counterbalance fear of BSL-4 operations
  i.e. NEIDL – 5 years and still not open

Instill confidence in policy makers
  i.e. fewer regulations that hinder the ability of scientists to cope with emerging diseases and threats

Instill confidence in scientific staff
  i.e. BSL-4 laboratory is an environment where they will be protected and can do their work safely
Training

Past

Small group (Hundreds)
- Laboratory Directors
  - Research
  - Training

Large group (Thousands)
- Laboratory Directors
  - Research
  - Training

Scientists
- Research Laboratories

Present

Diverse
- Clinical Laboratories
- Hospitals
- Outbreak Areas
- Research Laboratories
Elements of Training

Theoretical Training

Practical Hands-on Training

Mentored On-the-Job Training
Theoretical Principles

What?

Principles of Biocontainment

BSL-4 Engineering

BMBL 5th Edition (~400 pages)
Additional Information

Facility Specific Documents

Standard Operating Procedures (~100 pages)

Emergency Operating Procedures (~100 pages)

Animal Care Operating Procedures (~100 pages)
Theoretical Principles

How?

Total: 300-400 pages of documents

Time: 1 – 2 weeks
Elements of Training

Theoretical Training

Practical Hands-on Training

Mentored On-the-Job Training
Practical Hands On Training

Where?

BSL-4 Laboratory
   When the facility is down for maintenance
   Pro: Specific facility where they will do their work
       Low risk environment
   Con: May be difficult to plan for “new hires”
       Full functionality may not be available

   When the facility is “hot”
   Pro: Specific facility where they will do their work
       Interact with co-workers and see work flow
   Con: All training is done in “hot” lab
       Consequences of mistakes could be high

Training Laboratory
   Pro: Low risk environment
       Dedicated facility
   Con: May not have facility specific equipment or same work flow
Practical Hands-On Training

What?

- Engineering aspects of facility
- Care and use of protective suit
- How to enter and exit the suite
- How to use the chemical decontamination shower
- How to manage air supply
- How to work in a biosafety cabinet
- Waste management
- Use of autoclaves or other equipment
- General decontamination procedures
- Emergency response
Practical Hands-On Training

How?

Situations which are practical

- Care and use of positive pressure suit
- How to use the chemical decontamination shower
- How to manage air supply
- Entry and exit of suite
Practical Hands-On Training

How?

Situations which integrate new ideas with existing knowledge

- How to work in a BSC
- Waste management
- General decontamination
Practical Hands-On Training

How?

Alternate activities to fit specific needs

- How to work in a BSC
- Waste management
- General decontamination
- Use of other equipment
Practical Hands-On Training

How?

Situations which are problem centered

- Emergency response

Time: 1 day to 3 weeks
Elements of Training

Theoretical Training

Practical Hands-on Training

Mentored On-the-Job Training
Mentored Training

• A mentor is assigned

• Introduced to working with live pathogens

• Defined parameters must be achieved and documented

• Extensive experience working in the facility

• The length of time for this stage is undetermined and based upon several factors including the skills of the person and the ability to master procedures necessary for work

Time: 4 – 12 weeks
Elements of Training

Theoretical Training
Time: 1 – 2 weeks

Practical Hands-on Training
Time: 1 day to 3 weeks

Mentored On-the-Job Training
Time: 4 – 12 weeks
Why Is Training Important?

Ebola Researcher in Germany Is Isolated After Needle Puncture
March 17th, 2009, 10:05 AM

Researcher in isolation appears healthy despite possible Ebola exposure
February 21, 2004 | By Scott Shane | Scott Shane, SUN STAFF

Russian scientist dies of Ebola after lab accident
Filed Under: Ebola; VHF
May 25, 2004
C.D.C. Closes Anthrax and Flu Labs After Accidents
By DONALD G. McNEIL Jr. JULY 11, 2014

White House orders biosafety review at federal labs
By Jocelyn Kaiser | Aug. 28, 2014, 5:00 PM
Why Do We Do All of This?

To protect the worker
To protect the environment
To protect the public

The very definition of biosafety

Because it Matters