SAND2012-1172C

Field Biosecurity

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Day 3

Field Epidemiology Training Program
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Lab and Field Biosecurity

Question: What are some differences between biological work in the field and biological work in the lab?

Activity:

In your tables, please spend **10 minutes** to come up with as many differences as your group can think of, writing each on on a sticky note. Place them on a wall or flip chart.

How many did your group come up with?

Lab and Field Biosecurity

In the field…

- Organisms may or may not be well-characterized
- The work area may not have a well-defined perimeter
- Work procedures must be flexible to conform to very different and rapidly changing situations
- There may be no buildings or fixed equipment

Lab and Field Biosecurity

In the field…

- Work may be short-term, fast-paced, and disorganized
- There may be a higher likelihood of interactions with persons and animals unaccustomed to biological work
- Work (and samples) must be easily mobile

Lab and Field Biosecurity

Discussion:

How could these differences (and others you came up with) affect **biosecurity** in the field?

Lab and Field Biosecurity

So, let's think of biosecurity **in the field**…

Activity:

Please spend **5 minutes** to think about biosecurity in the field in your group. Report your thoughts out to the class. What might some of the challenges of securing biological materials in the field be?

Lab and Field Biosecurity

Discussion:

How would you apply these elements in the field?

- Physical Security
- Personnel Management
- Material Control and Accountability
- Transport Security
- Information Security

Lab and Field Biosecurity

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Lab and Field Biosecurity

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How would you apply these elements in the field?

- Physical Security
- Personnel Management
- Material Control and Accountability
- Transport Security
- **Information Security**

Lab and Field Biosecurity

Question:

Would all these Elements be as easy or hard to apply in the field as they are in the laboratory?

Lab and Field Biosecurity

Although we should attempt to apply all of the Elements of Laboratory Biosecurity to the field, the realities of the field mean some of the elements will tend to become more important than others.

Lab and Field Biosecurity

Later in the afternoon, we will be discussing the following elements more thoroughly…

- Physical Security
- Personnel Management
- **Material Control and Accountability**
- **Transport Security**
- Information Security

…as well as the related topic of **Security Awareness**

Field Risk Assessment

Discussion: Before we discuss the principal mitigation strategies for reducing biological risk in the field, let's talk a little about the nature of **risk assessments** outside the context of the laboratory

Field Risk Assessment

Review

In **Lab-Level Biosecurity**, we defined risk as…

Risk = ƒ(Likelihood, Consequences)

Considering this definition, we realize that to determine field biosecurity risk, we must *assess* both the **likelihood** of a biosecurity event in the field, and the magnitude of its **consequences**.

Biosecurity Risk Assessment

In the field, the microorganisms we are working with may or may not be well-characterized. Thus, the **consequences** of theft or diversion may not be entirely clear. This is different from many typical laboratory situations.

The **likelihood** of a theft or diversion is usually also difficult to discern.

Biosecurity Field Risk Assessment

Any **questions** so far?

Mitigation Strategies

Now we will be discussing biosecurity mitigation strategies of particular importance with regards to field biosecurity.

Material Control & Accountability (MC&A)
Transport Security
Security Awareness

Mitigation Strategies

First let's talk about Material Control & Accountability…

Material Control & Accountability (MC&A)

Transport Security

Security Awareness

Material Control & Accountability

Material Control & Accountability (MC&A)

What is it?

In the context of field biosecurity, **MC&A** is the assurance that there is an awareness of what exists in our area of operations, and who is responsible for it.

Question: Why might MC&A be *particularly* important for field biosecurity?

Material Control & Accountability

Why might MC&A be *particularly* important for field biosecurity?

One answer:

Because it can sometimes be difficult to physically secure our materials in the field, having personnel responsible for materials may be the best way of ensuring they are being watched over and protected.

Material Control & Accountability

Review

The Objective of **MC&A**, in the laboratory and the field, is to:

Ensure the complete and timely knowledge of:

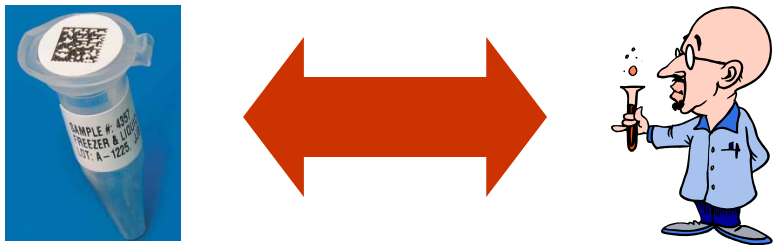
- What materials exist
- Where materials are
- Who is accountable for them

Objective is NOT to detect whether something is missing. This could be impossible. The objective is to create an environment that discourages theft and misuse by establishing oversight.

Material Control & Accountability

In the field, MC&A measures might involve assigning the organization and storage of materials to a particular individual, an **accountable** person.

- This person would be in the best position to answer questions about the associated material
- This person is not someone to blame!
- The person would ensure that no material is “orphaned”



Material Control & Accountability

The idea of "Accountability" in **MC&A** is NOT to assign blame in case something goes missing, or an incident occurs with a strain over which someone had specific responsibility.

Question: Why might assigning blame after an incident be a good idea? Why might it be a bad idea? How should you decide your policy?

Material Control & Accountability

The accountable person would ensure that **control** is maintained over the materials at all times.

Question:

How do we control samples in the field?

Material Control & Accountability

How do we control samples in the field? Implement:

1) **Physical Controls.** Keep items locked in a portable freezer. Keep trailers or vehicles locked. Label items clearly.

2) **Administrative / Procedural Controls.** Provide chains of custody. Never leave repositories unattended. Use inventories. Determine who should or should not have access.

Material Control & Accountability

And finally, the project's management should determine what **materials** should be controlled and accounted for in the first place.

Question:

Take 5 minutes and discuss: What kinds of materials should be controlled and accounted for in the field?

Material Control & Accountability

What kinds of materials should be controlled and accounted for in the field?

1) **Samples.** Blood and tissue. Environmental. Only positives? All untested?
2) **Supplies.** Positive and Negative Controls. Reagents. Media. PPE.
3) **Valuable Equipment.** Vehicles. Computers. PCR Machines. Freezers. Pipette Aids.

Any others?

Material Control & Accountability

Activity: Your team of 3 researchers and 12 assistants is in the field collecting fleas, ticks and dead rodents at the site of a suspected outbreak of *Yersinia pestis*.

You are working in a remote area of Africa, where petty crime is endemic and there has been some civil unrest involving separatist groups with ties to international terrorist organizations. Your work site is located in an isolated wooded area, however. Your work area is very large and you have several vehicles and tents in one clearing where you will keep your equipment and plan to store samples. You expect to be in the field 5 days.

Material Control & Accountability

Activity (continued):

Spend **10 minutes** with your table and develop a Material Control & Accountability plan for your work site. Take whatever issues you believe to be important into account, but be prepared to discuss and defend your choices in class.

What elements did everyone's plans have in common?

What was different in each plan?

Material Control & Accountability

Any **questions** so far?

Break

Mitigation Strategies

Let's talk next about Transport Security…

Material Control & Accountability (MC&A)

Transport Security

Security Awareness

Transport Security

Transport Security

What is it?

The assurance that the same rigorous processes that protect biological materials in the laboratory and the field site follow those materials when they are transported outside these areas.

We don't want to spend so much effort protecting biological materials in place only to have an incident occur when they're on the move!

Transport Security

Question: Why might **Transport Security** be *particularly* important for Field Biosecurity?

Spend **5 minutes** discussing in your table and report to class.

Transport Security

One answer:

By definition, samples collected and materials used in the field will face a high likelihood of being transported from the field site to a more permanent location.

Transport Security

Review: One important concept in Transport Security is the **Chain of Custody (CoC)**

Questions:

- Why is it important for Field Biosecurity?
- When does a CoC start?
- What does a CoC document?
- What does this documentation include?

Transport Security

How might samples be transported from a field site?

Either:

1) Through an external carrier
2) By field personnel themselves

Transport Security

External Carrier

If using an external carrier, the same procedures used for securing materials for transport out of a laboratory should be employed in the field, whenever possible.

Field Personnel

If field personnel will be transporting samples, internal guidelines for doing so, in many ways similar to the requirements for MC&A in the field, should be developed to ensure samples are moved securely.

Transport Security

How do we keep our high-risk samples secure during transport?

- Require a responsible authority to pre-approve all transport
- Document transport in field records
- Ensure only trustworthy people handle the samples
- Physically secure samples in transit with special packaging and/or locks
- Control movements and document in delivery records
- Use timely shipping methods
- Maintain a Chain of Custody
- Request notification of receipt

Other ideas?

Transport Security

Activity: Your team must send 10 sample vials suspected of containing infectious *Burkholderia mallei* to the area's state diagnostic laboratory

What's your team's procedure? Who will take the samples? What instructions will apply to them? How would responsibility be assigned? Who will you contact in the event of an incident?

Spend **10 minutes** to develop a procedure.

Transport Security

Any **questions**?

Mitigation Strategies

Let's talk next about Security Awareness…

Material Control & Accountability (MC&A)
Transport Security
Security Awareness

Security Awareness

Questions:

- What is security awareness and why is it important for the field?
- How might security awareness tie into **Material Control & Accountability** and **Transport Security**?

Work for **10 minutes** with your table and share your ideas with the class.

Security Awareness

If the people in your project and work area are **aware** of **the true biosecurity risks** they face, they will be more likely to:

1) Report if someone strange is walking around
2) Keep an eye on sample storage areas and assign security responsibilities to each other
3) Keep sensitive information safe
4) Provide suggestions for improving security
5) Take training more seriously
6) Etc…

Security Awareness

Security Awareness will be easier to achieve if personnel trust that a **biosecurity risk assessment** is **accurate**.

Therefore, increasing Security Awareness requires **transparency** with employees over how a particular security posture is reached. A properly aligned state of Security Awareness will make the implementation of a biosecurity mitigation policy much easier.

Security Awareness

Discussion: 10 minutes. How do you increase Security Awareness? How do you integrate a Security Awareness program into an overall biosecurity system?

How should you train? When should you train?

What are the trade-offs between transparency about risks and increasing a possible adversary's awareness about sensitive biological materials and vulnerabilities in your field project?

Security Awareness

Security awareness must be aligned with a **reliable risk assessment**.

If Security Awareness is higher than the actual risk, false alarms and anxiety may detract from day to day work.

If Security Awareness is lower than the actual risk, biosecurity incidents can become more likely.

Management must understand how to bring Security Awareness into balance. This is also true of all biosecurity mitigation efforts.

Security Awareness

Any **questions**?

Final Review

Discussion

Field Biosecurity:

For **5 minutes**, let's discuss what we've learned about biosecurity in the field.

What did we learn?	What does it mean?	Where do we go from here?

Final Review

Please summarize the following:

1. What are the major differences between field biosecurity and lab biosecurity?
2. What's so important about MC&A in the field?
3. What's so important about transport security in the field?
4. What's so important about security awareness in the field?

Final Review

Any final **questions** or **thoughts**?