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Human Performance for Biorisk Management in the Laboratory

Student Guide

2014

GLOBAL BIORISK MANAGEMENT CURRICULUM


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2014
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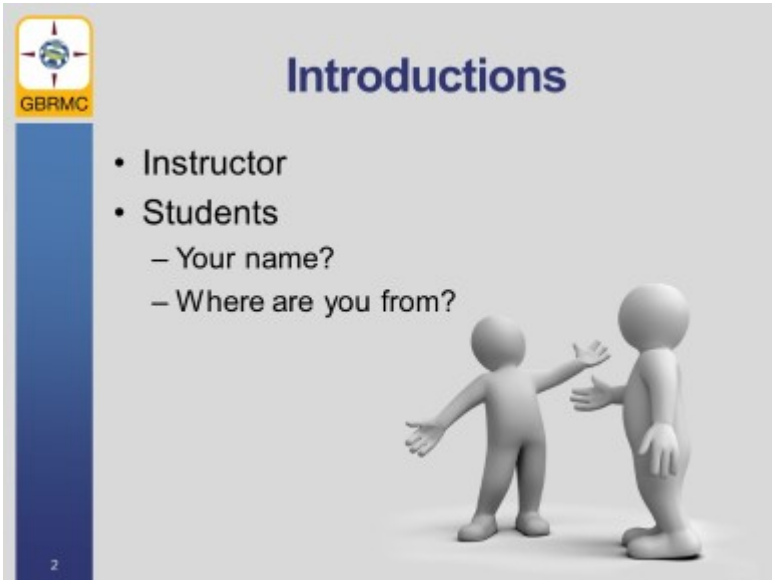
GLOBAL BIORISK MANAGEMENT CURRICULUM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Introductions
• Instructor
• Students
– Your name?
– Where are you from?
2

Action Plan

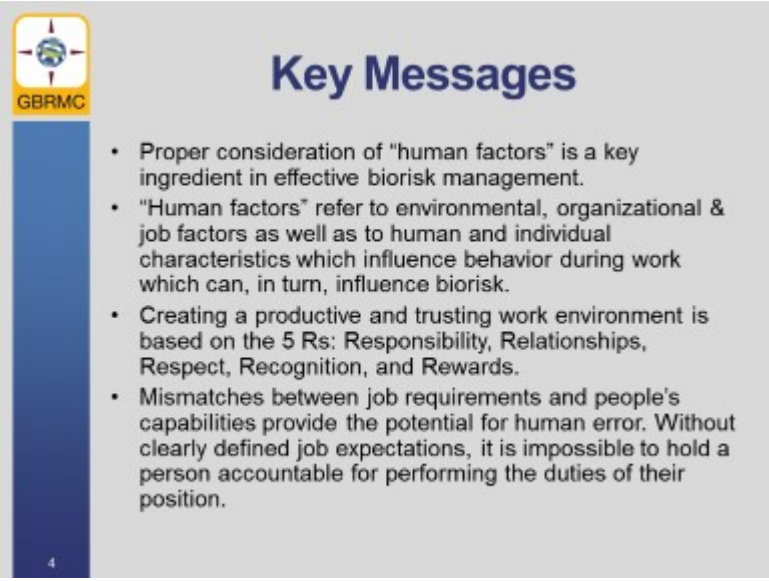
By the end of this lesson, I would like to:					
KNOW		FEEL		BE ABLE TO DO	

Your learning doesn't stop with this lesson. Use this space to think about what else you need to do or learn to put the information from this lesson into practice.

What more do I need to know or do?	How will I acquire the knowledge or skills?	How will I know that I've succeeded?	How will I use this new learning in my job?

3

Use space on back, if needed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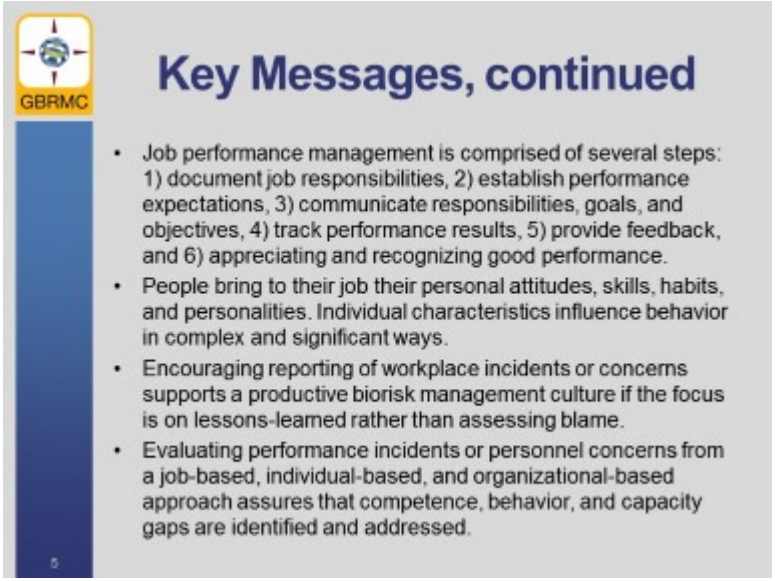
Key Messages
• Proper consideration of "human factors" is a key ingredient in effective biorisk management.
• "Human factors" refer to environmental, organizational & job factors as well as to human and individual characteristics which influence behavior during work which can, in turn, influence biorisk.
• Creating a productive and trusting work environment is based on the 5 Rs: Responsibility, Relationships, Respect, Recognition, and Rewards.
• Mismatches between job requirements and people's capabilities provide the potential for human error. Without clearly defined job expectations, it is impossible to hold a person accountable for performing the duties of their position.
4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Key Messages, continued
• Job performance management is comprised of several steps: 1) document job responsibilities, 2) establish performance expectations, 3) communicate responsibilities, goals, and objectives, 4) track performance results, 5) provide feedback, and 6) appreciating and recognizing good performance.
• People bring to their job their personal attitudes, skills, habits, and personalities. Individual characteristics influence behavior in complex and significant ways.
• Encouraging reporting of workplace incidents or concerns supports a productive biorisk management culture if the focus is on lessons-learned rather than assessing blame.
• Evaluating performance incidents or personnel concerns from a job-based, individual-based, and organizational-based approach assures that competence, behavior, and capacity gaps are identified and addressed.
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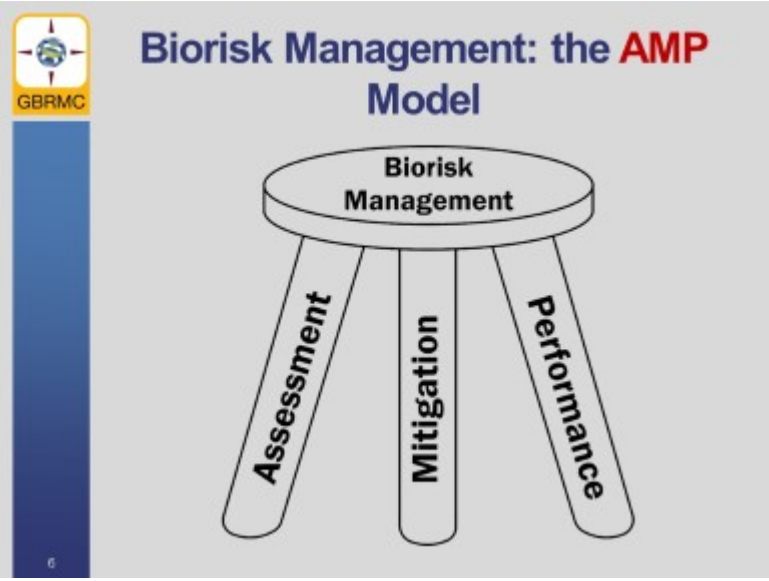
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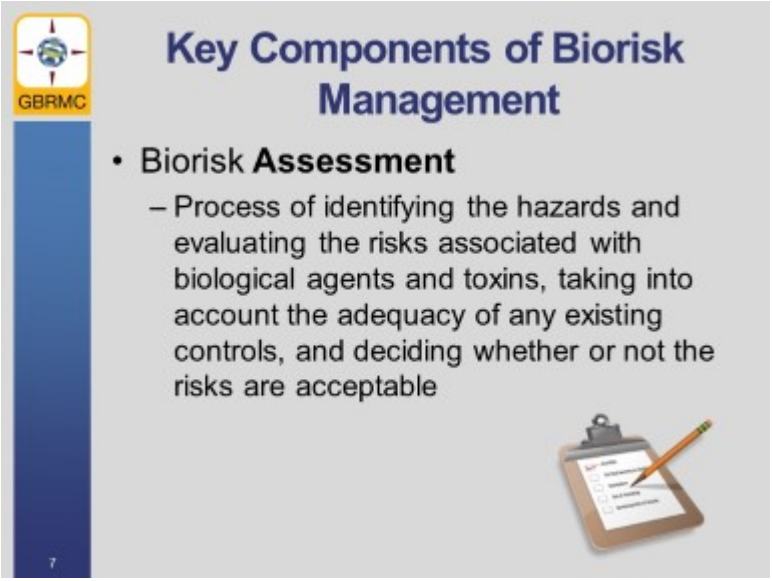
Biorisk Management: the AMP Model
Biorisk Management
Assessment
Mitigation
Performance
6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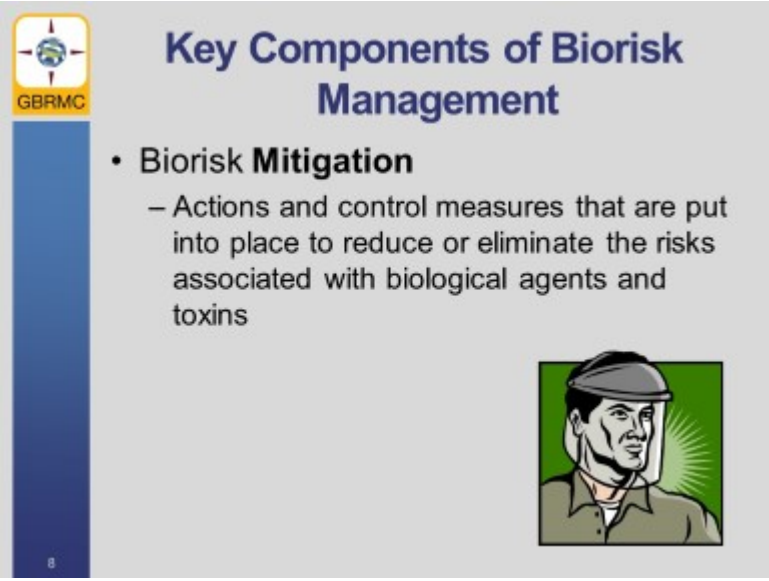
Key Components of Biorisk Management
• Biorisk **Assessment**
– Process of identifying the hazards and evaluating the risks associated with biological agents and toxins, taking into account the adequacy of any existing controls, and deciding whether or not the risks are acceptable
7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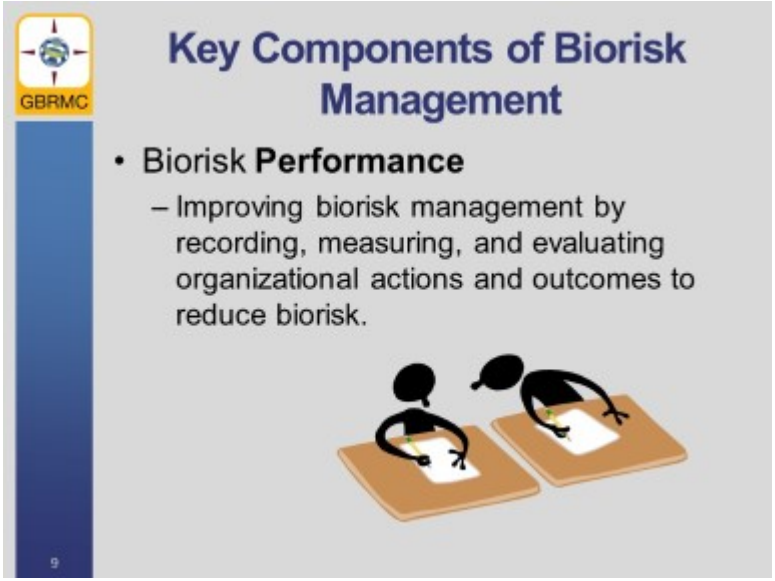
Key Components of Biorisk Management
• Biorisk **Mitigation**
– Actions and control measures that are put into place to reduce or eliminate the risks associated with biological agents and toxins
8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Key Components of Biorisk Management
• Biorisk **Performance**
– Improving biorisk management by recording, measuring, and evaluating organizational actions and outcomes to reduce biorisk.
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Case Study
THE CHRONICLE
of Higher Education
HOME
NEWS
OPINION & IDEAS
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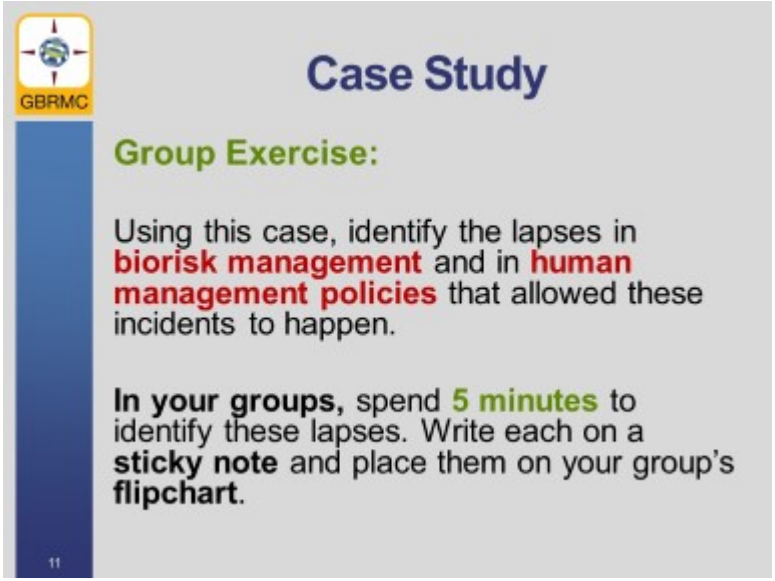
Former Research Assistant at Cornell U. Accused of Stealing Biological Materials to Take to China
By CATHERINE E. SHOICHET
Federal agents have charged a former postdoctoral researcher at Cornell University with stealing biological materials from a laboratory there and attempting to transport them to China.
According to a federal complaint, the scientist allegedly stole bacteria, yeasts, and vectors relating to the production of a commercially valuable enzyme known as "phytase."
Federal Bureau of Investigation officials detained Qingqiang Yin, 38, at
10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Case Study
Group Exercise:
Using this case, identify the lapses in biorisk management and in human management policies that allowed these incidents to happen.
In your groups, spend 5 minutes to identify these lapses. Write each on a sticky note and place them on your group's flipchart.
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Traditional Approach

Failures (or errors) are introduced to the biorisk management system **only** through the inherent unreliability of people.

Do you agree?

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Human Performance Improvement

- Error is not a cause of failure, alone, but rather the symptom of deeper trouble in the system.
- Human error is also not random - it is systematically connected to features of people's tools, the tasks they perform, and their work environment.
- Behavior and its causes are extremely valuable as signals for improving efforts to anticipate, prevent, catch, or recover from errors.

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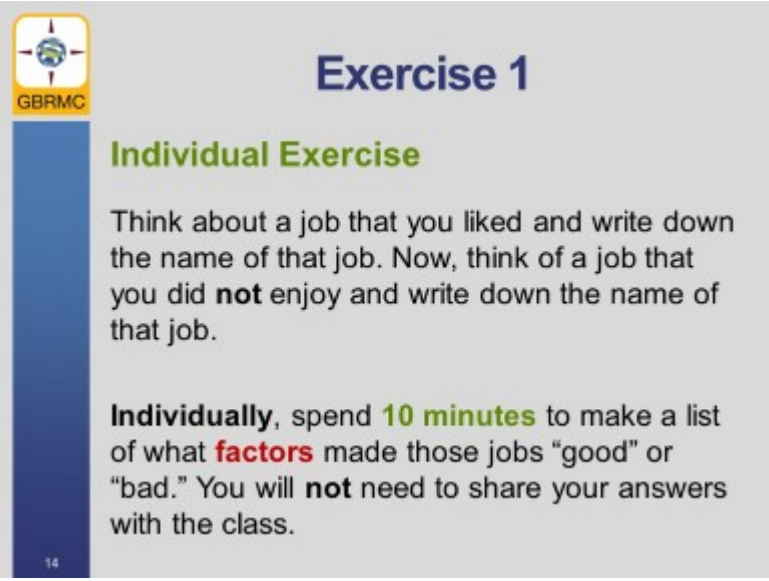


Good Job:

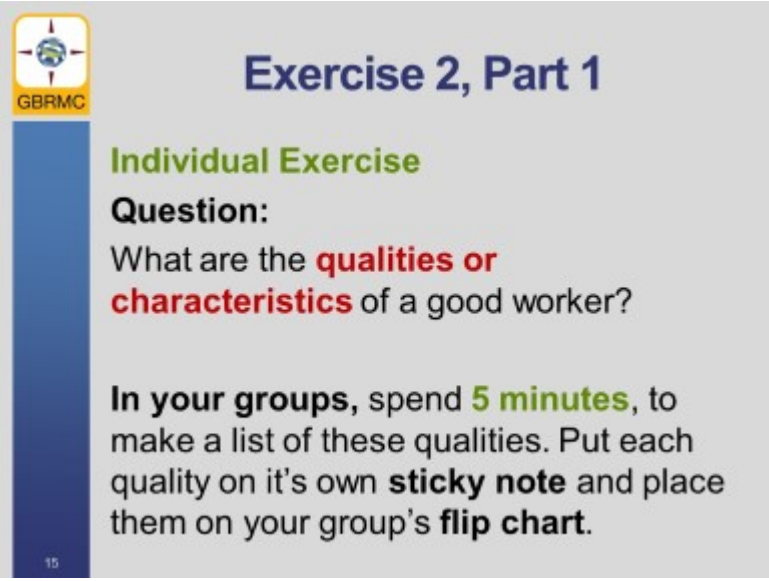
_____

- _____
- _____
- _____
- _____
- _____
- _____

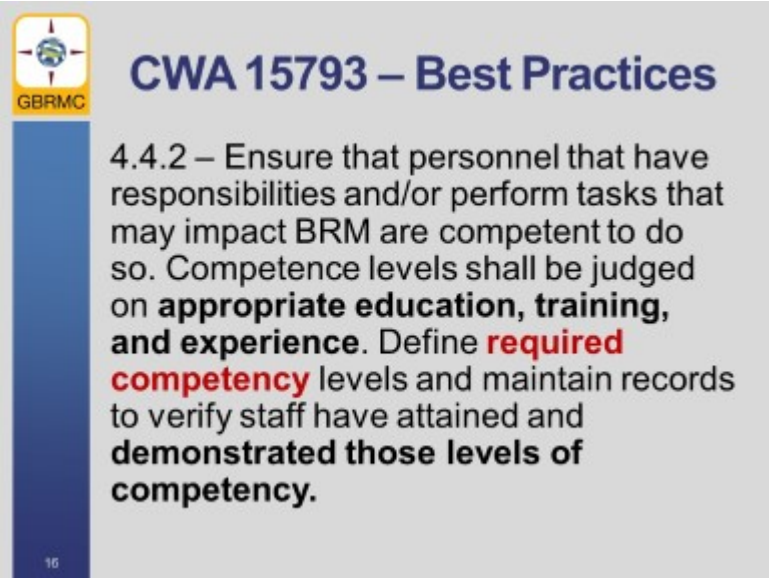
Bad Job:

_____

- _____
- _____
- _____
- _____
- _____
- _____



Characteristics of a good worker: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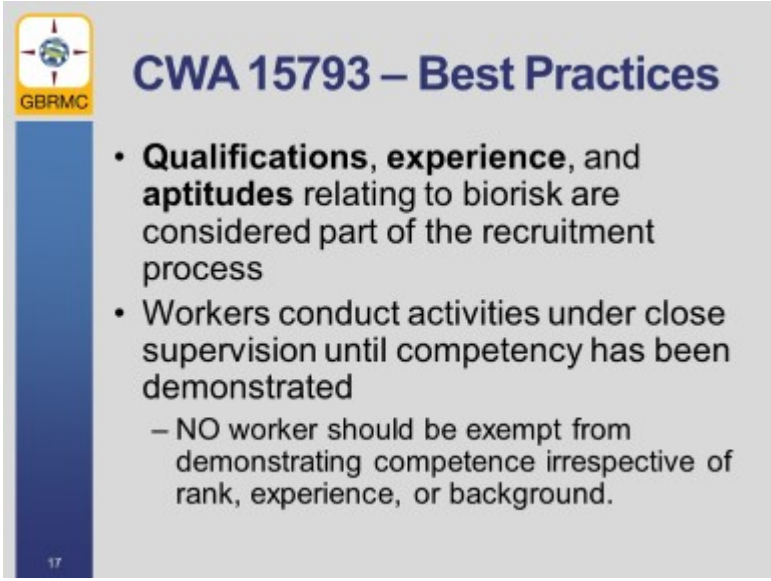
CWA 15793 – Best Practices
4.4.2 – Ensure that personnel that have responsibilities and/or perform tasks that may impact BRM are competent to do so. Competence levels shall be judged on **appropriate education, training, and experience**. Define **required competency** levels and maintain records to verify staff have attained and **demonstrated those levels of competency.**
16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CWA 15793 – Best Practices
• **Qualifications**, **experience**, and **aptitudes** relating to biorisk are considered part of the recruitment process
• Workers conduct activities under close supervision until competency has been demonstrated
– NO worker should be exempt from demonstrating competence irrespective of rank, experience, or background.
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Exercise 2, Part 2

Group Exercise

Question:

Which worker **qualities** are most important to assuring safe and secure handling of dangerous biological agents?

In your groups, spend **5 minutes,** to discuss which qualities are most important for biorisk management and place a star (★) on the **sticky notes**.

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Factors Influencing Human Performance

Job
- Setting
- Values

Individual
- Personalities
- Values

Organization
- Expectations
- Assessments

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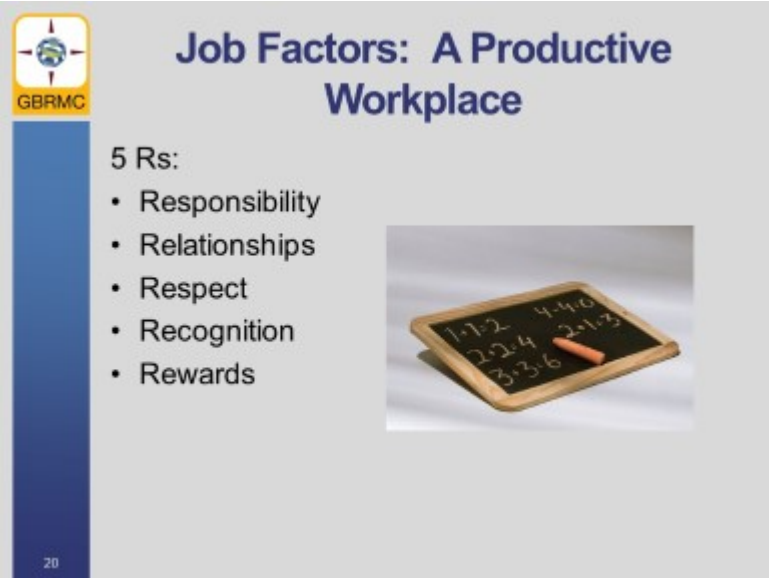
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Job Factors: A Productive Workplace
5 Rs:
• Responsibility
• Relationships
• Respect
• Recognition
• Rewards
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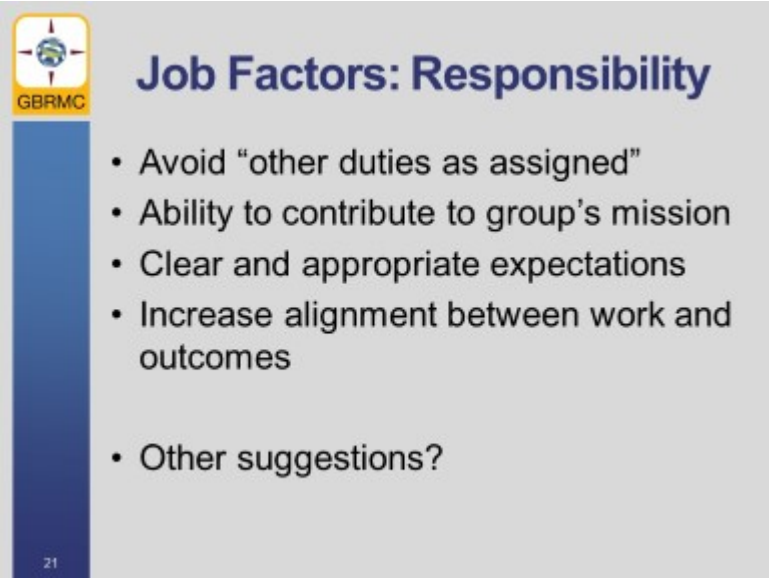


Do you have examples of when this might occur in a setting that involved biorisk management?

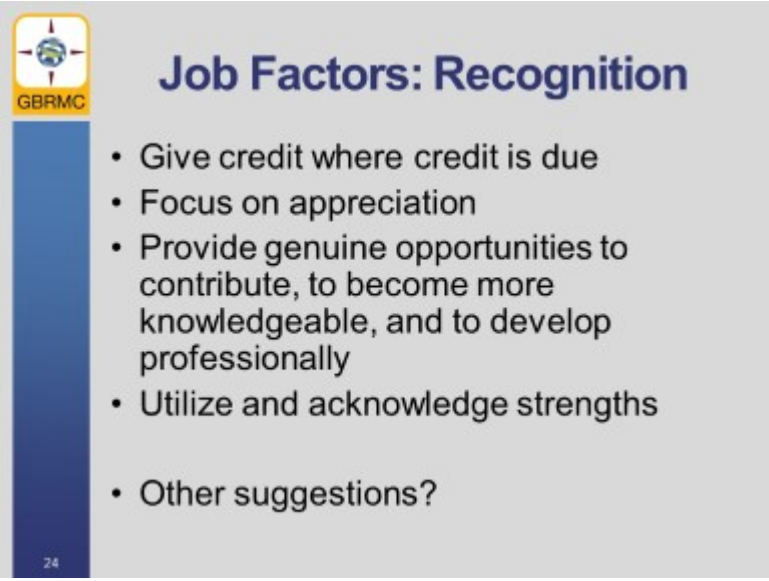
What are some other ways that team members can model authentic, honest and ethical behavior around biorisk management?

What are other ways that team members can establish relationships and build trust with their coworkers?

Can you think of an example where consulting with a team of workers provided a solution that you hadn't thought of?

Who are key members of a biorisk management team?

What kinds of different perspectives do they bring to them?



What are traditional ways in which workers are recognized for their efforts?

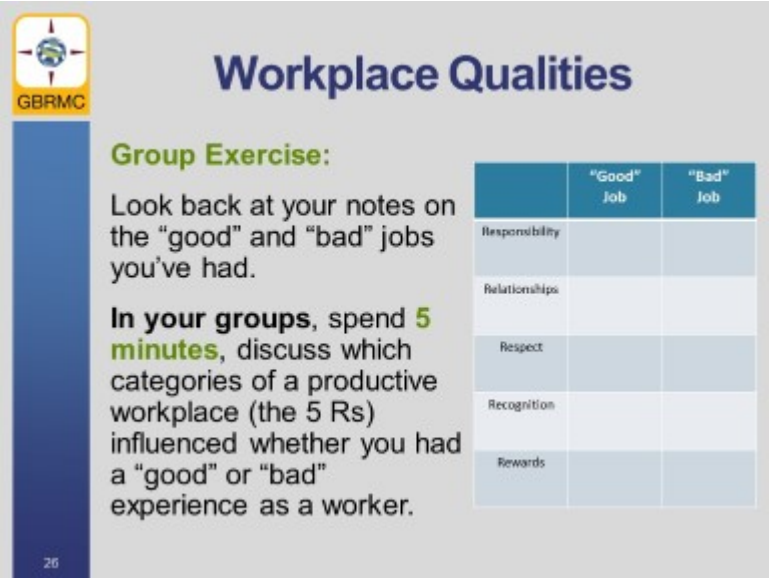
What are the advantages and disadvantages to these methods?

Are all workers in an organization included in these methods of recognition?

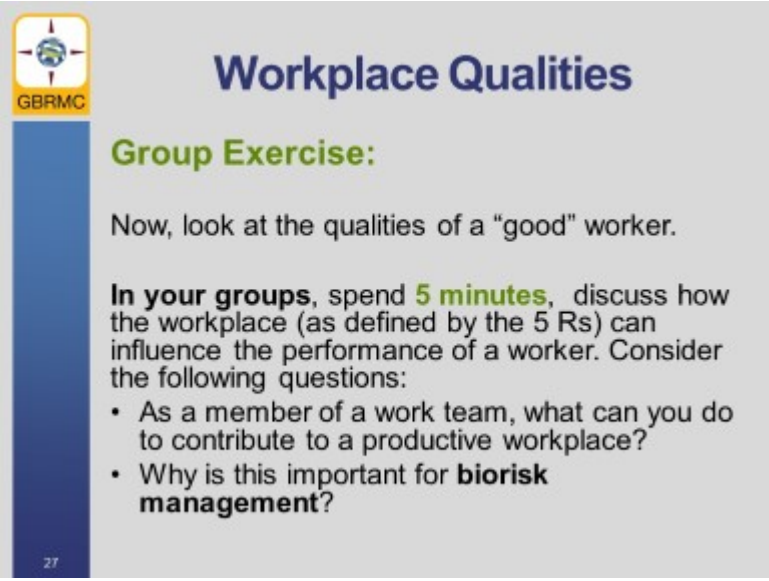
Can recognition (and all the other techniques we've discussed) be considered a biosecurity practice? A biosafety practice? Why or why not?

What is the advantage of team members showing appreciation towards their other team members? What are the disadvantages?

What are some ideas that you have about ways to reward workers without spending much money?



	"Good" Job	**"Bad" Job**
Responsibility		
Relationships		
Respect		
Recognition		
Rewards		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Workplace Qualities
Group Exercise:
Now, look at the qualities of a "good" worker.
In your groups, spend 5 minutes, discuss how the workplace (as defined by the 5 Rs) can influence the performance of a worker. Consider the following questions:
• As a member of a work team, what can you do to contribute to a productive workplace?
• Why is this important for biorisk management?
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Individual Factors: Personality

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Small Group Exercise

Group Exercise

Question:

What are different personality types and how do different personalities respond to different stimuli?

In your groups, please spend **5 minutes** discussing the different personality traits of your animal. Write each trait on a **sticky note** and place it on your group's flip chart. Consider the following questions during your discussion:

- Will the animal tend to scare or get angry?
- What are the consequences of your interactions with the animal?
- Will the animal ignore you?

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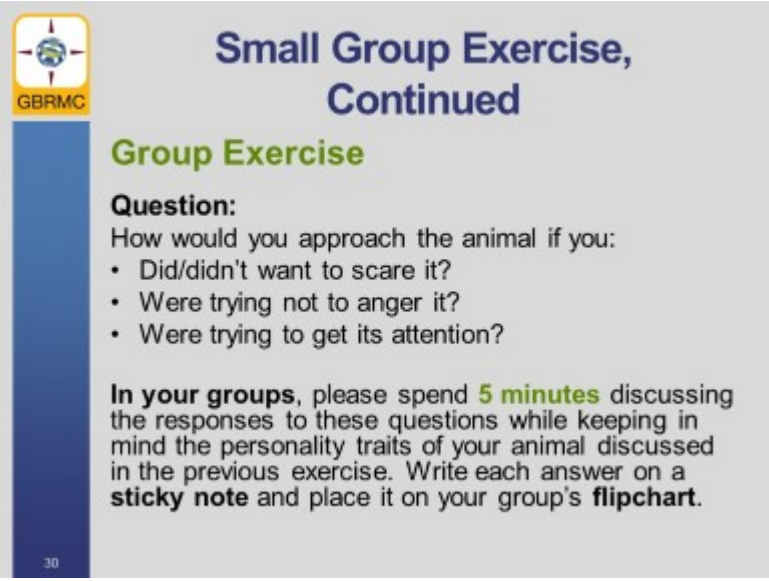
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Small Group Exercise, Continued
Group Exercise
Question:
How would you approach the animal if you:
• Did/didn't want to scare it?
• Were trying not to anger it?
• Were trying to get its attention?
In your groups, please spend 5 minutes discussing the responses to these questions while keeping in mind the personality traits of your animal discussed in the previous exercise. Write each answer on a sticky note and place it on your group's flipchart.
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The "Big Five" - OCEAN
Openness
• imaginative/curious vs. consistent/guarded
Conscientiousness
• efficient/organized vs. easy-going/thoughtless
Extraversion
• gregarious/energetic vs. introverted/quiet
Agreeableness
• friendly vs. hostile
Neuroticism
• nervous/emotionally unstable vs. confident/emotionally stable
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OCEAN - Openness
High openness
• Imaginative/inventive people.
• Searches for new and different experiences.
• Open to experience, intellectually curious and appreciative of art.
• More aware of their feelings, hold unconventional beliefs, liberal and comfortable with theory.
• Get bored easily.
Low openness
• Down to earth, efficient.
• Hold more conventional, traditional interests, practical.
• Prefer straightforward, and obvious over the complex, ambiguous, and subtle.
• Comfortable with repetitive activity.
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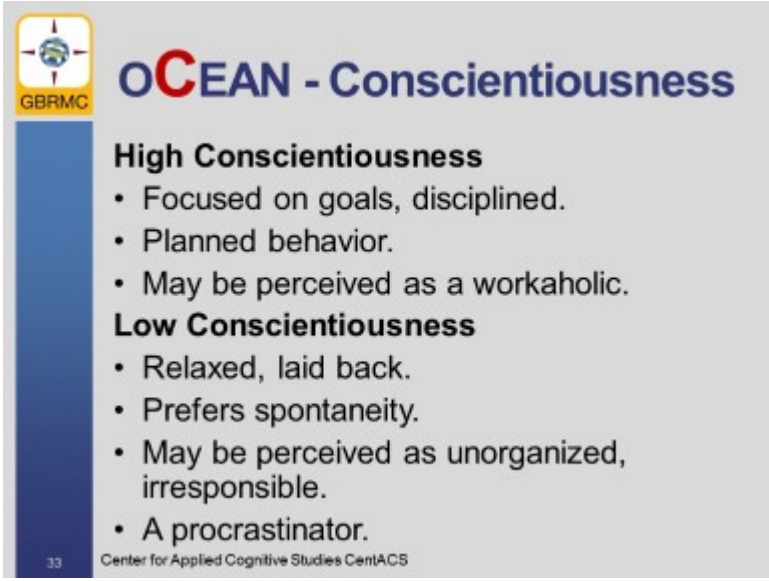
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oCEAN - Conscientiousness
High Conscientiousness
• Focused on goals, disciplined.
• Planned behavior.
• May be perceived as a workaholic.
Low Conscientiousness
• Relaxed, laid back.
• Prefers spontaneity.
• May be perceived as unorganized, irresponsible.
• A procrastinator.
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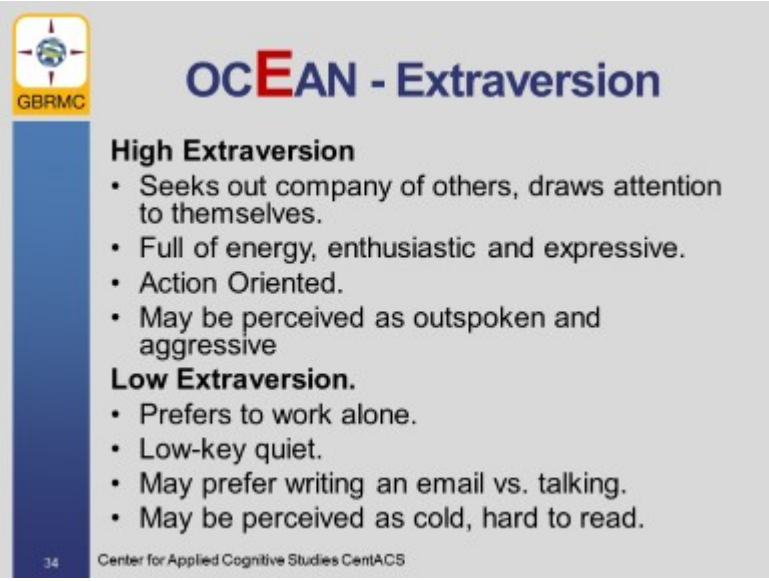
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OCEAN - Extraversion
High Extraversion
• Seeks out company of others, draws attention to themselves.
• Full of energy, enthusiastic and expressive.
• Action Oriented.
• May be perceived as outspoken and aggressive
Low Extraversion.
• Prefers to work alone.
• Low-key quiet.
• May prefer writing an email vs. talking.
• May be perceived as cold, hard to read.
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OCEAN -Agreeableness
High Agreeableness
• Tolerant, honest and accepting.
• Defers to others, values getting along with others
• Friendly considerate, team player.
• May come across as naïve, submissive, gullible, non-confrontational.
Low Agreeableness
• Skeptical of authority.
• Self-interest above getting along with others.
• Competitive.
• May be perceived as hostile rude, unfriendly and suspicious.
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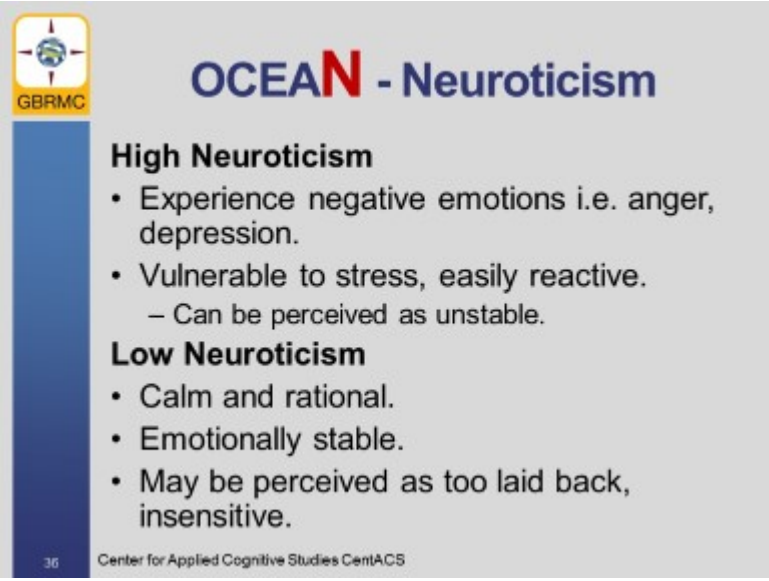
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OCEAN - Neuroticism
High Neuroticism
• Experience negative emotions i.e. anger, depression.
• Vulnerable to stress, easily reactive.
– Can be perceived as unstable.
Low Neuroticism
• Calm and rational.
• Emotionally stable.
• May be perceived as too laid back, insensitive.
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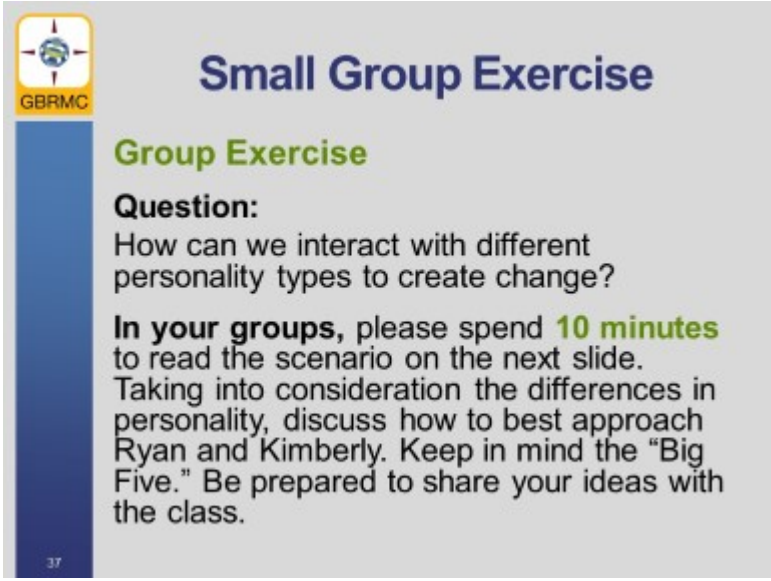
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Small Group Exercise
Group Exercise
Question:
How can we interact with different personality types to create change?
In your groups, please spend 10 minutes to read the scenario on the next slide. Taking into consideration the differences in personality, discuss how to best approach Ryan and Kimberly. Keep in mind the "Big Five." Be prepared to share your ideas with the class.
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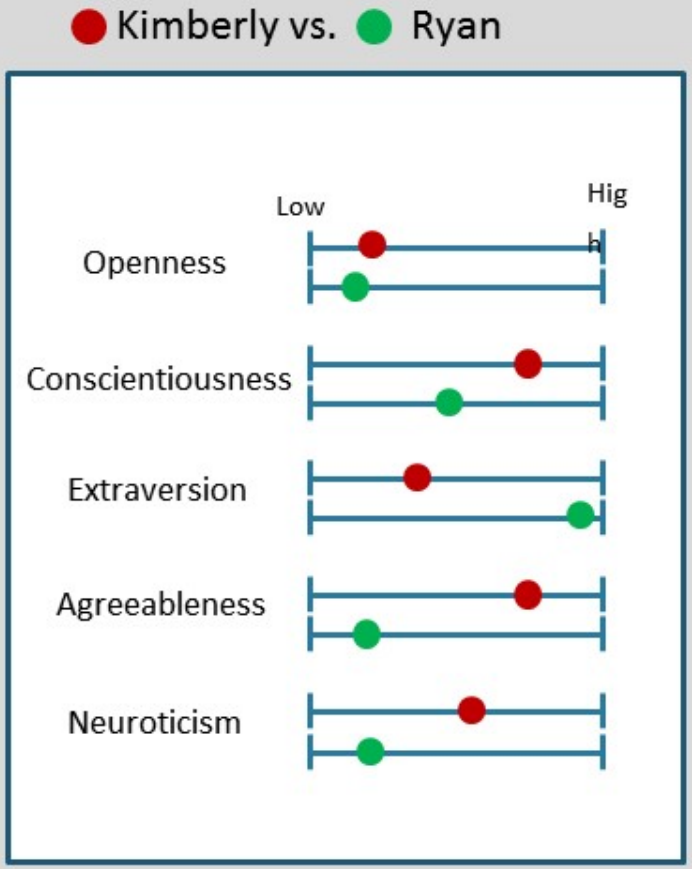
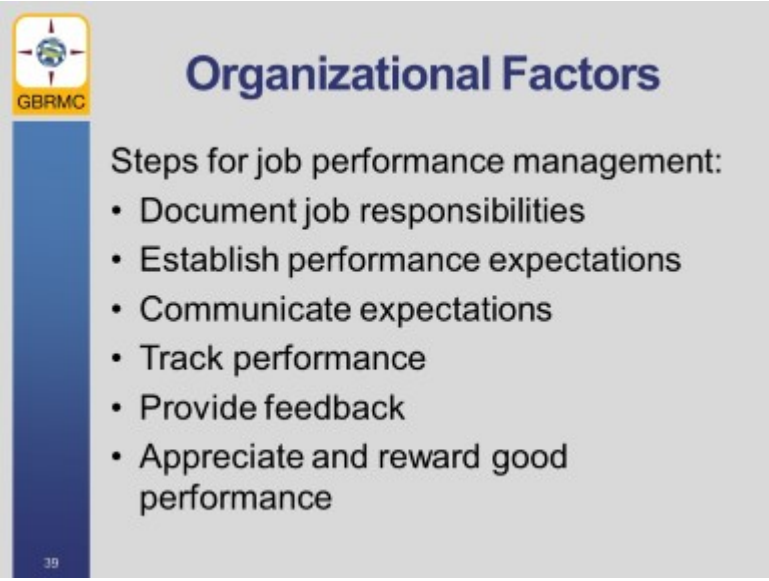
Scenario

Ryan and Kimberly are not cleaning up their laboratory research benches to an acceptable lever after performing their experiments. Other researchers are complaining and feel its dangerous to have research by-products that are not disposed of properly. You are friends with both of them. How would you approach each individual to instill a behavioral change so that they begin to clean their work benches?

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Organizational Factors
Steps for job performance management:
• Document job responsibilities
• Establish performance expectations
• Communicate expectations
• Track performance
• Provide feedback
• Appreciate and reward good performance
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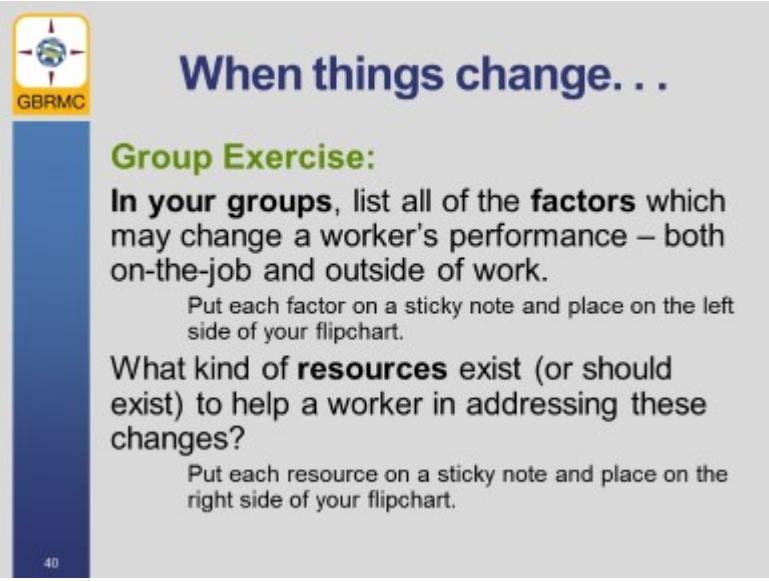
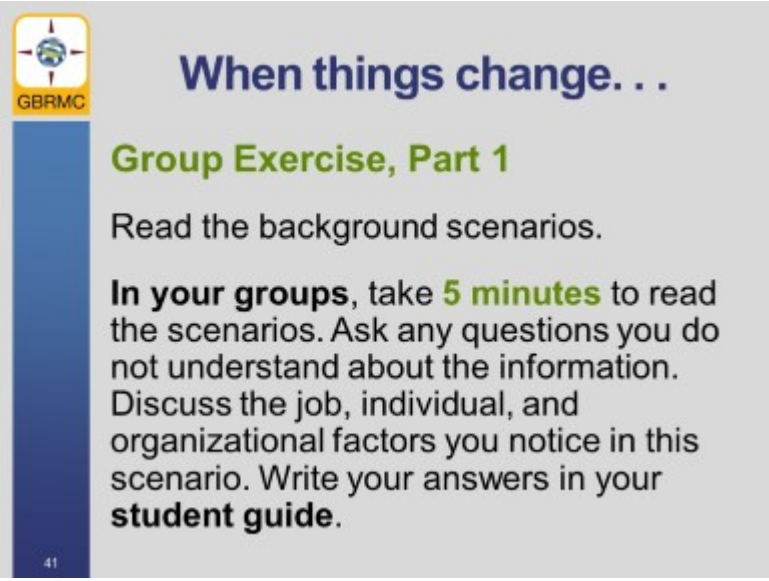


Factors:

Resources: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When things change. . .
Group Exercise, Part 1
Read the background scenarios.
In your groups, take 5 minutes to read the scenarios. Ask any questions you do not understand about the information. Discuss the job, individual, and organizational factors you notice in this scenario. Write your answers in your student guide.
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Background, 1

Kimberly, Jon, Ryan and Anthony are research technicians that work in a BSL-3 research laboratory at Cataract University developing vaccines for *Francisella tularensis* under the direction of Dr. Smith. *Francisella tularensis* has a very low infectious dose and can be lethal if inhaled or swallowed. It is listed as an agent that could be potentially used as a biological weapon and requires increased security efforts. All employees in the laboratory have undergone a general security clearance and resumes were verified prior to working in the laboratory.

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Background, 2

Kimberly has a Masters degree in Biology. She has been working in the laboratory since its inception almost 15 years ago. She has had a long standing working relationship with Dr. Smith and often feels that her seniority enables her to choose to work on the projects she likes and pass along the projects she doesn't want. Kimberly is typically a good research technician, produces good results, and arrives at work on time. She is also very social and often gossips about other colleagues in the laboratory. As a result, the other technicians do not trust her and often view her as bossy and lazy.

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Background, 3

Jon has a Bachelors degree in Microbiology and was hired 5 years after Kimberly. Jon is very hard worker, arrives at work early, and produces great work. He is very meticulous and rarely makes a mistake. Dr. Smith appreciates Jon on a professional as well as a personal level, as their two daughters play soccer on the same team. Jon is not very sociable with his peers and tends to avoid interacting with others in the laboratory.

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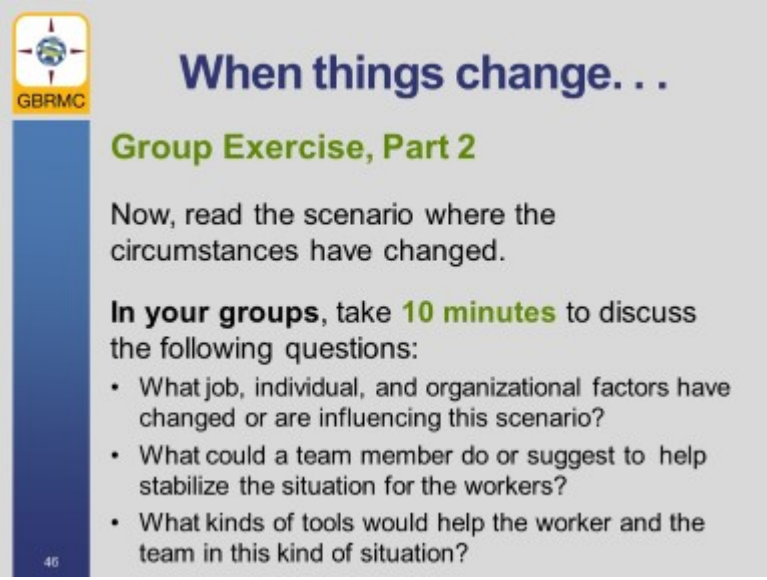
Background, 4

Ryan and **Anthony** both have Bachelor's degrees and were hired immediately after graduating from school approximately 1 year ago. Ryan and Anthony share similar degrees, research backgrounds and experiences, although Ryan is 10 years older in age than Anthony. Ryan and Anthony work very well together and have become friends outside of work.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When things change. . .
Group Exercise, Part 2
Now, read the scenario where the circumstances have changed.
In your groups, take 10 minutes to discuss the following questions:
• What job, individual, and organizational factors have changed or are influencing this scenario?
• What could a team member do or suggest to help stabilize the situation for the workers?
• What kinds of tools would help the worker and the team in this kind of situation?
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Case Study - Review
THE CHRONICLE
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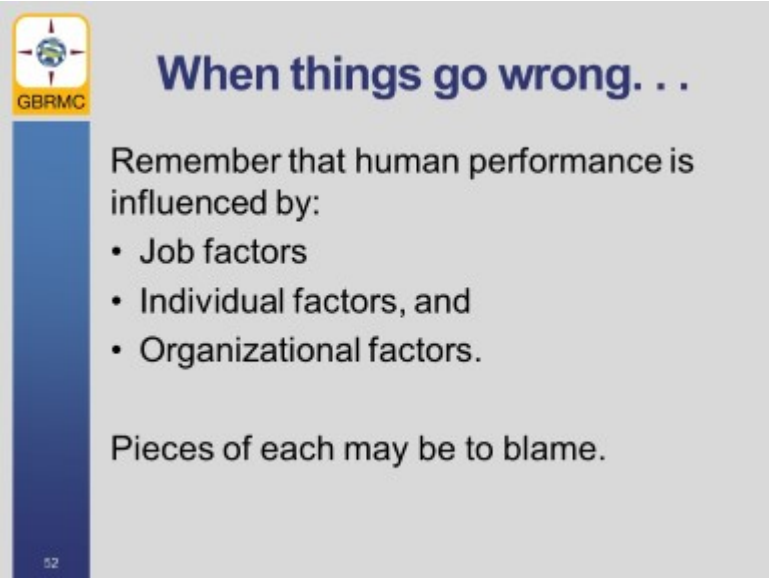
Former Research Assistant at Cornell U. Accused of Stealing Biological Materials to Take to China
By CATHERINE E. SHOICHET
Federal agents have charged a former postdoctoral researcher at Cornell University with stealing biological materials from a laboratory there and attempting to transport them to China.
According to a federal complaint, the scientist allegedly stole bacteria, yeasts, and vectors relating to the production of a commercially valuable enzyme known as "phytase."
Federal Bureau of Investigation officials detained Qingqiang Yin, 38, at
51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When things go wrong. . .
Remember that human performance is influenced by:
• Job factors
• Individual factors, and
• Organizational factors.
Pieces of each may be to blame.
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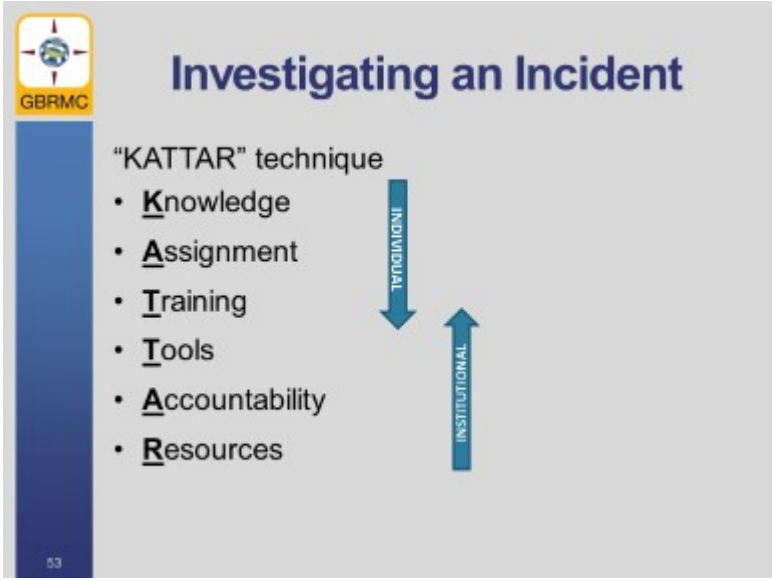
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Investigating an Incident
"KATTAR" technique
• Knowledge
• Assignment
• Training
• Tools
• Accountability
• Resources
INDIVIDUAL
INSTITUTIONAL
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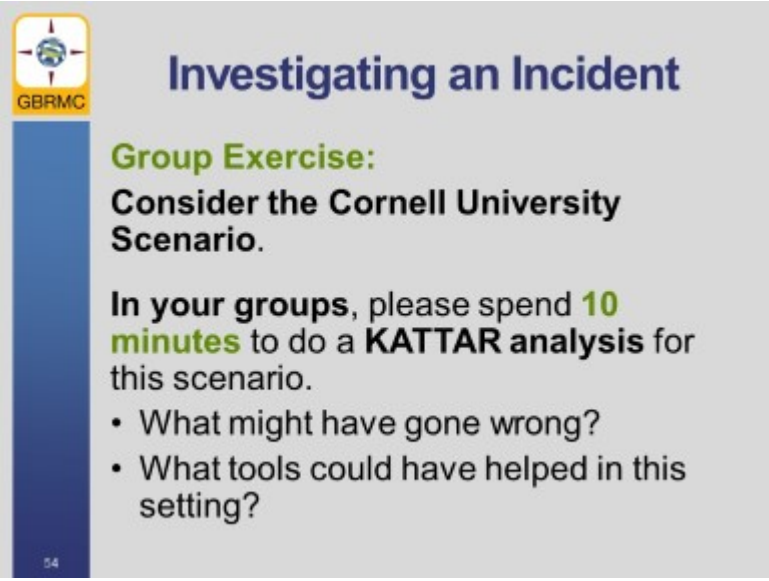
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Investigating an Incident
Group Exercise:
Consider the Cornell University Scenario.
In your groups, please spend 10 minutes to do a KATTAR analysis for this scenario.
• What might have gone wrong?
• What tools could have helped in this setting?
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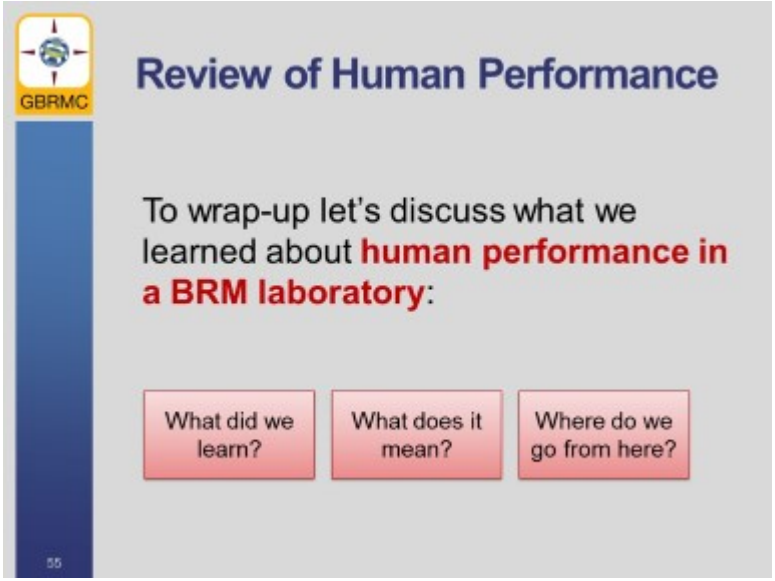
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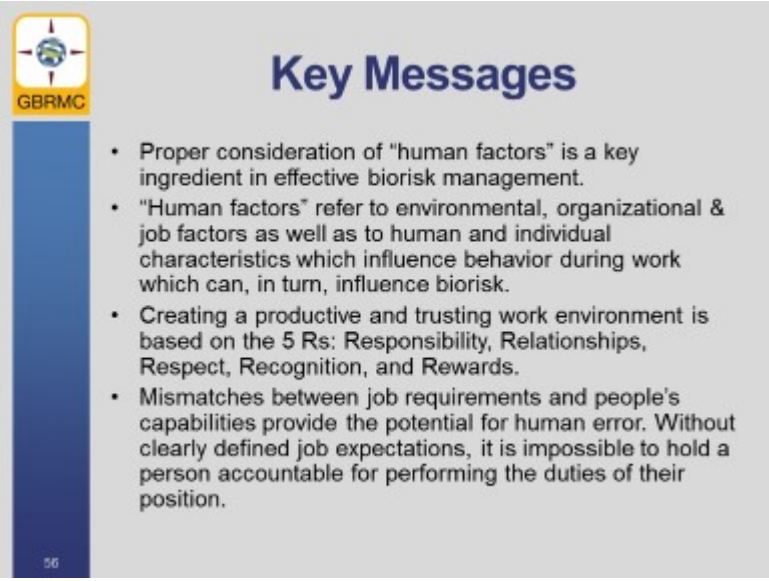
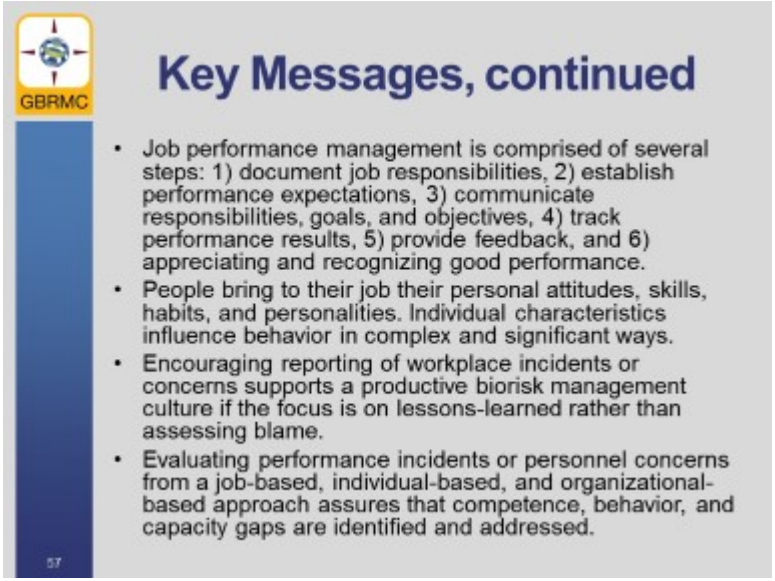
Review of Human Performance
To wrap-up let's discuss what we learned about human performance in a BRM laboratory:
What did we learn?
What does it mean?
Where do we go from here?
55


GBRMC
Key Messages
• Proper consideration of "human factors" is a key ingredient in effective biorisk management.
• "Human factors" refer to environmental, organizational & job factors as well as to human and individual characteristics which influence behavior during work which can, in turn, influence biorisk.
• Creating a productive and trusting work environment is based on the 5 Rs: Responsibility, Relationships, Respect, Recognition, and Rewards.
• Mismatches between job requirements and people's capabilities provide the potential for human error. Without clearly defined job expectations, it is impossible to hold a person accountable for performing the duties of their position.
56


GBRMC
Key Messages, continued
• Job performance management is comprised of several steps: 1) document job responsibilities, 2) establish performance expectations, 3) communicate responsibilities, goals, and objectives, 4) track performance results, 5) provide feedback, and 6) appreciating and recognizing good performance.
• People bring to their job their personal attitudes, skills, habits, and personalities. Individual characteristics influence behavior in complex and significant ways.
• Encouraging reporting of workplace incidents or concerns supports a productive biorisk management culture if the focus is on lessons-learned rather than assessing blame.
• Evaluating performance incidents or personnel concerns from a job-based, individual-based, and organizational-based approach assures that competence, behavior, and capacity gaps are identified and addressed.
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Action Plan

By the end of this lesson, I would like to:					
KNOW		FEEL		BE ABLE TO DO	

Your learning doesn't stop with this lesson. Use this space to think about what else you need to do or learn to put the information from this lesson into practice.

What more do I need to know or do?	How will I acquire the knowledge or skills?	How will I know that I've succeeded?	How will I use this new learning in my job?

Use space on back, if needed