

# Ebola Biosafety Training Initiative Awardee Meeting

---

National Institute of Environmental Health  
Sciences Worker Training Program

**June 2015**

This document summarizes discussions and conclusions from the National Institute of Environmental Health Sciences (NIEHS) Worker Training Program (WTP) Ebola Biosafety Training Initiative Awardee Meeting held on May 28, 2015, in Research Triangle Park, North Carolina. The meeting was prompted by supplemental funds provided for WTP awardees that will be performing Ebola and infectious disease biosafety training for workers.

## Contents

Background .....	2
Executive Meeting Summary .....	3
Introduction and Welcome .....	3
WTP Awardees that Received Supplemental Funding for Ebola Biosafety Training (2015) .....	4
Core Training Competencies: Basic Knowledge, Skills, and Abilities .....	4
Pre-meeting Exercise on Core Training Competencies .....	4
Discussion on Core Training Competencies .....	4
Awardee Presentations .....	7
Needs Assessment Survey .....	7
Evaluation .....	8
Remarks from Federal Partners .....	9
Conclusion and Next Steps .....	9
Appendix 1: Meeting Participants (in-person and webcast) .....	12
Appendix 2: Foundational Training Competencies .....	14
Appendix 3: Supplemental Tables with Information from Awardee Presentations .....	15
Table 1 .....	15
Table 2 .....	17
Appendix 4: Needs Assessment Survey .....	18
Ebola and Infectious Disease Preparedness Training Questionnaire .....	18
Appendix 5: Resources .....	23
Appendix 6: Potential Occupational Exposure and Risk Stratification .....	25

## Background

It is important to learn from national disasters. It was important to learn after September 11, 2001 that first responders, such as fire, police, and medical personnel needed the support of crane operators, carpenters, and electricians, and that these key support personnel breathed the same polluted air and stumbled over the same debris as their first responder brothers and sisters. It was important after the Gulf coast hurricanes - Katrina and Rita - to see that when they can, people evacuate and travel. Like it or not, they leave, move to safer homes and take with them what they can. And it should be no surprise that during an infectious disease disaster, we can expect that people will bring with them what they can carry and that those who work with the public will be at risk.

The good news is that there are networks and partnerships, public and private, federal, state and local that recognize these expectations and prepare for them. This report is dedicated to these networks and those workers who, with proper safety and health training and equipment, will continue to be the frontline of defense in controlling infectious disease outbreaks.

Ebola virus disease (EVD) is a severe, acute illness that causes symptoms such as fever, myalgia, malaise, vomiting, diarrhea, dehydration, and bleeding, and is often fatal. Federal agency investigations have not demonstrated human-to-human transmission of EVD in the absence of direct contact with a confirmed case. However, the record scale and geographic extent of the 2014-2015 EVD epidemic in West Africa provoked an extraordinary international response, resulting in a dynamic effort to contain the epidemic and deliver preventive infection control and biosafety preparedness training.

The Centers for Disease Control and Prevention (CDC) developed Rapid Ebola Preparedness (REP) teams to assess domestic readiness for the treatment of EVD patients and to help prepare hospitals for a possible Ebola threat. By January 2015, at the request of state and local health officials, REP teams had visited more than 80 facilities in 20 states that had been developing Ebola preparedness plans. CDC identified several issues, needs, and challenges during these visits, including:

- Issues of inadequate environmental infection control and waste management.
- Lack of standardized procedures in the use, donning (putting on), and doffing (removing) of personal protective equipment (PPE). This continues to be a moving target as clarifications on new techniques emerge.
- Unpredictable supplies of PPE and possibly inadequate laboratory safety procedures.
- The need for sustainable models for staffing and competency assessment.
- The need for safety training that is task-, hazard-, and site-specific since hospital facilities differ in available resources and equipment.

The NIEHS WTP Ebola Biosafety Training Initiative – developed in partnership with the U.S. Department of Health and Human Services (HHS), CDC, the Occupational Safety and Health Administration (OSHA), the National Institute for Occupational Safety and Health (NIOSH), and the HHS Office of the Assistant Secretary for Preparedness and Response (ASPR) – aims to develop evidence-based awareness- and operations-level Ebola biosafety training to protect a number of worker populations.

Awareness-level training is intended for workers without potential occupational exposure to Ebola, but whom need a basic awareness of Ebola health and safety issues because they work in industries that employ workers who have potential exposure. Operations-level training is intended for workers with potential occupational exposure to Ebola who need the knowledge and skills necessary to protect themselves from the virus.

## Executive Meeting Summary

The NIEHS WTP Ebola Biosafety Training Initiative Awardee Meeting, held on May 28, 2015 brought together WTP awardees, WTP Ebola administrative supplemental awardees, and other relevant stakeholders. More than 35 people attended the meeting, including NIEHS staff and contractors and representatives from various institutions, organizations, and federal offices (see Appendix 1).

Participants discussed the following topics:

- The identification of a standard set of core biosafety skills and knowledge that allied workers (such as airport terminal personnel, cabin and baggage crew, janitors) need to recognize and address health and safety risks.
- The challenges and best practices associated with current and proposed Ebola preparedness training projects.
- The need to investigate and analyze training needs and potential gaps in training.
- The standardization of training evaluation methods among awardees.
- The federal agency training resources currently available.

Overall, discussions at this meeting reinforced that, though it will be challenging, a standard set of core training competencies must address the needs of a diverse group of allied workers that may not be part of the first line of response.

## Introduction and Welcome

Joseph (Chip) Hughes, director of the NIEHS WTP, welcomed all participants to the meeting. This was followed by opening remarks from Gwen Collman, Ph.D., director of the NIEHS Division of Extramural Research and Training, who gave a brief synopsis of the recent Ebola outbreak and funding provided by CDC and the National Institutes of Health to support Ebola biosafety training efforts for workers.

Collman highlighted the Ebola Biosafety Training Initiative as a key opportunity for NIEHS to address the health and safety needs of workers involved in infectious disease response. Public concern about the Ebola virus remains strong. Collman assured meeting

### NIEHS WTP Highlight

The NIEHS WTP is well-suited to address preparedness efforts supported by the Ebola Biosafety Training Initiative. The program has more than 20 years of experience providing health and safety training to workers at risk for exposure to biological hazards while performing their job duties.

Many of the training courses provided by WTP awardees are based on OSHA's Bloodborne Pathogens standard (29 Code of Federal Regulations (CFR) 1910.1030); OSHA's Respiratory Protection standard (29 CFR 1910.134); OSHA's PPE standard (29 CFR 1910.132); Section 5(a)(1) of the Occupational Safety and Health Act of 1970, often referred to as the General Duty Clause; and OSHA Best Practices for Hospital-based First Receivers of Victims From Mass Casualty Incidents Involving the Release of Hazardous Substances.

participants that the NIEHS WTP has maintained its voice in the environmental public health community and has positioned itself to help the nation's workers and domestic facilities better prepare for outbreaks of highly infectious disease agents. She congratulated WTP awardees who received supplemental funding for Ebola biosafety training at their institutions (listed below), and expressed NIEHS' interest in having new organizations and partners be represented in ongoing efforts.

### **WTP Awardees that Received Supplemental Funding for Ebola Biosafety Training (2015)**

- International Brotherhood of Teamsters (IBT)
- International Chemical Workers Union Council (ICWUC) Center for Worker Health and Safety Education
- Rutgers University School of Public Health
- Service Employees International Union (SEIU)
- United Steelworkers Union
- University of Texas School of Public Health – Houston

### **Core Training Competencies: Basic Knowledge, Skills, and Abilities**

The 2014-2015 EVD epidemic in West Africa showed that a breach in infection control practices facilitates a high risk of disease transmission from patients to health care workers, attendants, allied personnel (such as airport terminal personnel, cabin and baggage crew, janitors), and community members. In both health care and community settings, there is a need to identify core training competencies – the basic knowledge, skills, and abilities – that workers must have to recognize and address health and safety risks associated with Ebola and other infectious disease agents. However, implementing these core competencies will require capacity building among instructors, workers, and employers.

### **Pre-meeting Exercise on Core Training Competencies**

During a pre-meeting exercise, WTP awardees reviewed an inclusive competencies guideline that had previously been reviewed by several local, state, and federal agencies. This guideline was used to prioritize training competencies important to the awardees' respective target worker populations, and to identify training currently conducted at the awareness- and operations-levels for these workers. Prior to the May 28 meeting, WTP staff compiled feedback from the exercise to identify proficiencies critical to awareness- and operations-level training.

### **Discussion on Core Training Competencies**

Jim Remington, WTP program analyst, introduced the CDC Biosafety Laboratory Competencies framework as a guide for identifying common, measureable baseline training competencies. Kevin Yeskey, M.D., of MDB, Inc., led the session, emphasizing that agreement on these competencies is an essential first step in developing training modules. He outlined the objectives of the session:

- Begin identifying a comprehensive core competencies framework to incorporate Ebola biosafety training and preparedness efforts;

- Begin a structured process with input from subject matter experts and meeting attendees; and
- Outline common training objectives.

During the session, participants considered how to incorporate various aspects of infectious disease training, including the skills needed to perform hazard recognition, minimize risk and human error, and incorporate laboratory biosafety and safety culture concerns. The session was successful in providing a forum for sharing information on biosafety competencies. The group emphasized that these competencies may vary significantly depending on specific training audiences, standards and regulations, and awareness versus operational skills.

Some attendees suggested taking an all-hazards approach for emerging infectious diseases, an approach commonly utilized in natural disaster responses. This approach would incorporate key safety, health standards, and skills from a number of areas including infection control, hazard recognition, and risk assessment. It would also serve as a means to identify crosscutting competency areas - basics that all workers should understand. One attendee suggested that once core competencies have been identified, technical components applicable to specific occupations could be added. Some participants raised concerns about how to define final training objectives and the level of specificity required by end users.

Another attendee recommended that competency in decontamination and workplace waste management is required, and that a reviewing authority or process should be in place to validate protocols and mitigation plans involving inactivation, sterilization, and decontamination of hazardous materials. Others recommended and elaborated on sets of core competencies related to safety management. For example, identifying hazards in real time, as opposed to after an event, is important for effective safety management.

One attendee described lessons learned from a patient with Lassa fever, including disease identification, clinical manifestations, protective precautions, and the collection of reliable travel and exposure history. These lessons are very applicable in considering the core competencies that are needed to address Ebola-like infectious diseases.

Narrowing the set of elemental topics in order to develop final training objectives was recognized as a challenge but two approaches stood out: a risk-based or tiered approach, and a hazard recognition approach supplemented by a basic set of topic modules.

Yeskey and WTP contractor Nina Jaitly, M.D., steered the group's attention toward various aspects of hazard recognition. The group agreed that biosafety awareness- and operations-level training should include an understanding of disease science and control protocols. Participants noted that complacency among trained workers is an issue that can occur at many points including the implementation of infection control precautions, transportation of infected patients, use or need for PPE, waste disposal, decontamination, cleanup accountability, care of the deceased, and mortuary practices.

Others acknowledged that training on specific infectious diseases and the detection of their associated health events could occur at different points. For example, while it is important that allied worker

populations receive proper initial training, they may need to be updated on the progression of disease and incubation periods. They also need to be trained to: (1) ask about travel history, (2) understand the protocols required to inform relevant authorities, and (3) understand the importance of refraining from heroic acts or measures.

Attendees continued to express opinions on various issues related to decontamination; standard precautions (e.g., hand hygiene, PPE use, safe cleaning and disinfection of spills, environment and equipment); waste management; and training on safe disposal of bodies.

Attendees provided the following suggestions with respect to identifying a crosscutting core competencies framework:

- Add an incubation period to biological material training.
- Address the concern that familiarity breeds complacency.
- Define what is meant by infectious disease training.
- Identify competencies that may help lower risk.
- Identify competencies that may minimize human error.
- Identify whether safety culture at the specific site may need to be addressed.
- Provide material on post-training resources.
- Rewrite competencies in a manner that is more specific.

Foundational training topics covered during this discussion included, but were not limited to:

- Biological material
- Chemical material
- Decontamination and waste management
- Emergency and incident response
- Emergency response and exercise drills
- Engineering controls
- Exposure prevention and hazard mitigation
- Guidelines and regulations
- Hazard communication
- Occupational health-medical surveillance
- Physical environment
- PPE
- Risk management

While more research and strategic direction may be necessary, using these foundational training topics will facilitate the development of a standard set of training topics, which will thereby inform which training competencies are most effective or applicable (see Appendix 2). This is a pivotal period in which to explore windows of opportunity for change within infection control, biosafety, and biohazard training efforts for emerging biosafety threats.

## Awardee Presentations

In early May 2015, NIEHS awarded six Ebola administrative supplements to WTP awardees that have been conducting biosafety health and safety training to workers in support of the national Ebola response. The awardees were invited to share insights about their initial training which was targeted at those workers with potential risk of exposure to the Ebola virus. This session was moderated by NIEHS WTP industrial hygienist Sharon Beard.

In addition to describing their training audiences, expectations, operations, and methodologies (see Table 1, Appendix 3), awardees also elaborated on additional aspects such as barriers that impede training effectiveness and future considerations (see Table 2, Appendix 3). Awardees also elaborated on best practices that are relevant for target populations, such as open dialogues and use of Ebola training activities to prepare for other highly infectious or communicable diseases. Though the majority of awardees implement pre- and post-training assessments for evaluation purposes, some are taking it a step further by using module quizzes, practical examples, and self-reflection impact surveys (University of Texas – Houston). Awardees from the University of Texas – Houston are also making efforts toward continuing education courses in the medical and industrial hygiene disciplines. The International Chemical Workers Union Council described the modules they developed and piloted to train police and fire department personnel in Jackson, Mississippi affiliated with the Coalition Black Trade Unionists.

## Needs Assessment Survey

Yeskey presented a draft assessment survey that will be used to determine WTP awardee needs related to performing Ebola and infectious disease preparedness and biosafety training. The survey will be given to focus groups of individuals from businesses, state organizations, and others. Yeskey encouraged participants to think creatively about other individuals who could provide meaningful feedback in these focus groups. This led to a discussion on clarifying and identifying missing components in the survey.

Participants provided some general questions and comments on the survey, including:

- For what audience is the needs assessment survey intended?
- What is the intended purpose of the survey and what will it be used for?
- Make sure that individuals are represented who do not believe there is an imminent risk or threat related to Ebola and other infectious diseases for certain workers.
- Need to consider who will be doing the training for different organizations.
- Need to provide some context or explanation for what is considered training.

Participants' main comments and suggestions were related to reorganizing and rephrasing certain survey questions for clarity:

- Make sure questions flow together in an appropriate order (e.g., questions about level and length of training should be next to each other).
- Organize questions into sections based on worker environments (e.g., health care facilities versus others).

- Phrase questions to reflect exactly who has done or will perform the training (e.g., employer in-house, hired consultant, unions).

Others provided suggestions on additional questions or components to include in the survey:

- Add environmental services personnel as a separate category for intended training audiences.
- Include a question to determine contact organization or individuals who are primarily responsible for biosafety preparedness training.
- Include a question to determine if the Ebola or infectious disease training was received as part of a larger training curriculum, and if so, what type.
- Include a question to determine what types of outcomes have been achieved or documented from the training.
- Provide a definition for levels of training (awareness versus operations) and provide an explanation of what is being referred to by each.
- Provide a question or line for individuals to list the duration of training for each level (awareness versus operations).
- Provide an explanation for the difference between classroom and interactive activities.

An updated version of the needs assessment survey is available in Appendix 4.

## Evaluation

Sue Ann Sarpy, Ph.D., principal at Sarpy and Associates, discussed how to create an evaluation framework for the WTP in biosafety training. Sarpy noted that training core competencies can be used to evaluate the program and build a foundation of competence, making the WTP stronger and more adept at demonstrating public health impacts.

Sarpy suggested that the core competencies may be used to create final training objectives across all WTP areas. Though some competencies will be more or less relevant for different occupations, this would be an ideal first step toward program evaluation. These competencies may also be used to create a best practices curriculum for the program. Sarpy also pointed out that it is extremely important to create uniformity between competency measurements. The following components should be considered when measuring competency:

- **Immediate learning (pre- and post-):** Used to evaluate what is learned immediately prior to and after training.
- **Measures of satisfaction:** Used to evaluate relevance of training content, and if it was covered effectively. Training providers may face potential challenges when measuring satisfaction among different audiences (literacy or language barriers).
- **Use of newly learned material:** Used to determine if the training is transferred to a behavior (e.g., three to six months post-training). If so, how much is being used?
- **Safety culture and safety climate:** Sometimes issues within the work environment may impede an individual's transfer of learning to behavior. For example, a worker may refrain from applying

specific safety precautions if it slows his or her ability to complete a task on the job. In some instances, equipment or other resources may not be available to adequately carry out safer work behaviors.

Sarpy also mentioned the importance of developing evaluation tools to measure what changes (qualitative and quantitative) occurred at a work site as a result of training. What specific questions should be asked to measure these changes among trainees? It may be of interest to the WTP to develop common measures around training outcomes for evaluation.

A few participants acknowledged that the majority of WTP training is centered on awareness. In these cases, trainees answer pre- and post-evaluation questions. Some participants voiced concerns with honesty — how can evaluation questions be framed so that trainees are encouraged to provide honest answers? Sarpy mentioned that reverse scoring is a common technique used, where two questions that have similar meaning are asked in totally different ways. This usually helps evaluators arrive at a true answer.

Others mentioned some key qualitative questions to consider for trainee evaluation:

- What intended changes did you make?
- Over time, did you make these changes? Why or why not?
- If you were able to make the change, what helped you make the change?

## **Remarks from Federal Partners**

Through a variety of initiatives, plans, and strategic capacity building programs, federal agencies such as HHS, CDC, NIOSH, OSHA, and ASPR are working together on Ebola biosafety training and preparedness efforts. NIEHS was pleased to host these federal partners during the meeting, where they acknowledged their vested interest in preparedness trainings and support for the NIEHS WTP Ebola Biosafety Training Initiative. Committed to fortifying efforts, federal partners recommended efficient use of available resources as guidance for incorporating applicable components into Ebola training and preparedness efforts for various occupations and audiences (see Appendix 5). Furthermore, WTP awardees and WTP Ebola administrative supplemental awardees were encouraged to reach out to federal partners as needed if there is an interest in collaborative development and production of additional resources.

## **Conclusion and Next Steps**

Collaborative efforts between the NIEHS WTP and federal partners have enabled the identification of several priorities regarding national responses to infectious disease outbreaks. One major priority is developing a sustainable model for improved preparedness competencies and training for infection prevention and hazard control activities. The 2014-2015 EVD epidemic in West Africa has validated the need to enhance preparedness activities to ensure worker safety. These activities will undoubtedly assist in the prevention of and preparation for, unknown high-risk exposure scenarios for workers in various industries.

The CDC REP team assessments have identified various preparedness needs and challenges within U.S. Ebola treatment centers and among allied worker populations. Altogether, these suggest a critical need to increase awareness- and operations-level training efforts to bring change to the current safety culture of infection prevention and hazard control. CDC has suggested that improved infection control, PPE use, and knowledge of occupational safety and health guidance are equally important outcomes of the Ebola Biosafety Training Initiative. A vision of collaborative success would include both health care and other public facilities; workers knowing health hazard protocols; and workers having practical hazard and risk management experience before an infectious disease suspect or confirmed case is identified.

Precautionary measures for preventing exposure to EVD are dependent on the type of work and exposure or contamination potential within the work environment. It is evident that risk assessment, hazard recognition, and infection biosafety skills may need to be stratified by occupational exposure or target population (see Appendix 6) in order to facilitate sufficient safety skills among various worker groups.

While OSHA's Bloodborne Pathogens standard (29 CFR 1910.1030) covers exposure to EVD and is offered as a four-hour awareness-level training, NIEHS WTP awardees and subject matter experts across various industries have found that this training alone may not be sufficient to effectively communicate the risk of occupational exposure to EVD, and have further suggested a combination of all-hazards and risk management awareness- and operations-level training skills. Use of a whole community approach and a train-the-trainer method is necessary to ensure that an instructor's competence is relevant to their target population and mission.

Taking into consideration many of the meeting attendees' concerns, the NIEHS WTP Ebola Biosafety Training Initiative team will address factors related to risk stratification, hazard recognition, infection control, hazard communication, and emergency response in an all-hazards risk management approach to develop a core competencies framework. Development of this framework is essential for Ebola biosafety training through the NIEHS WTP. Recognizing that this training will target various worker groups, the emphasis of specific competencies will vary and may require occupational exposure risk stratification.

The goal in developing this framework is to help WTP awardees build a standardized set of all-hazards and biosafety competencies to address specific end user or trainee needs, without micromanaging curricula development. This will help awardees identify varying responsibilities, as well as enhance educational goals, awareness- and operations- level training standards, hazard recognition, and safety assessments related to Ebola, thereby augmenting a broader infectious disease preparedness response. This framework will be a key part of the initiative and will lead to measureable indicators of training impacts. Furthermore, this framework can be used to identify a broad set of outcome skills that can be standardized, covered, and evaluated in all NIEHS WTP areas, which is a feasible next step for the Ebola Biosafety Training Initiative. NIEHS and federal partners are deeply committed to helping WTP awardees adapt these and new guidelines for use in training modules applicable to a large subset of worker populations. This joint effort will contribute significantly to fortifying infection control and enhancing biosafety practices nationwide.

WTP Ebola administrative supplemental awardees have initiated Ebola training and preparedness efforts among various target audiences. Though their efforts are facilitated by various training and interactive methods, some are hindered by factors such as limited resources, time, and space. Needs assessment surveys distributed among various agencies, state, and professional organizations can be used to identify and further define resources required for effective training programs. The needs assessment survey has been revised to incorporate suggestions received from participants during this meeting.

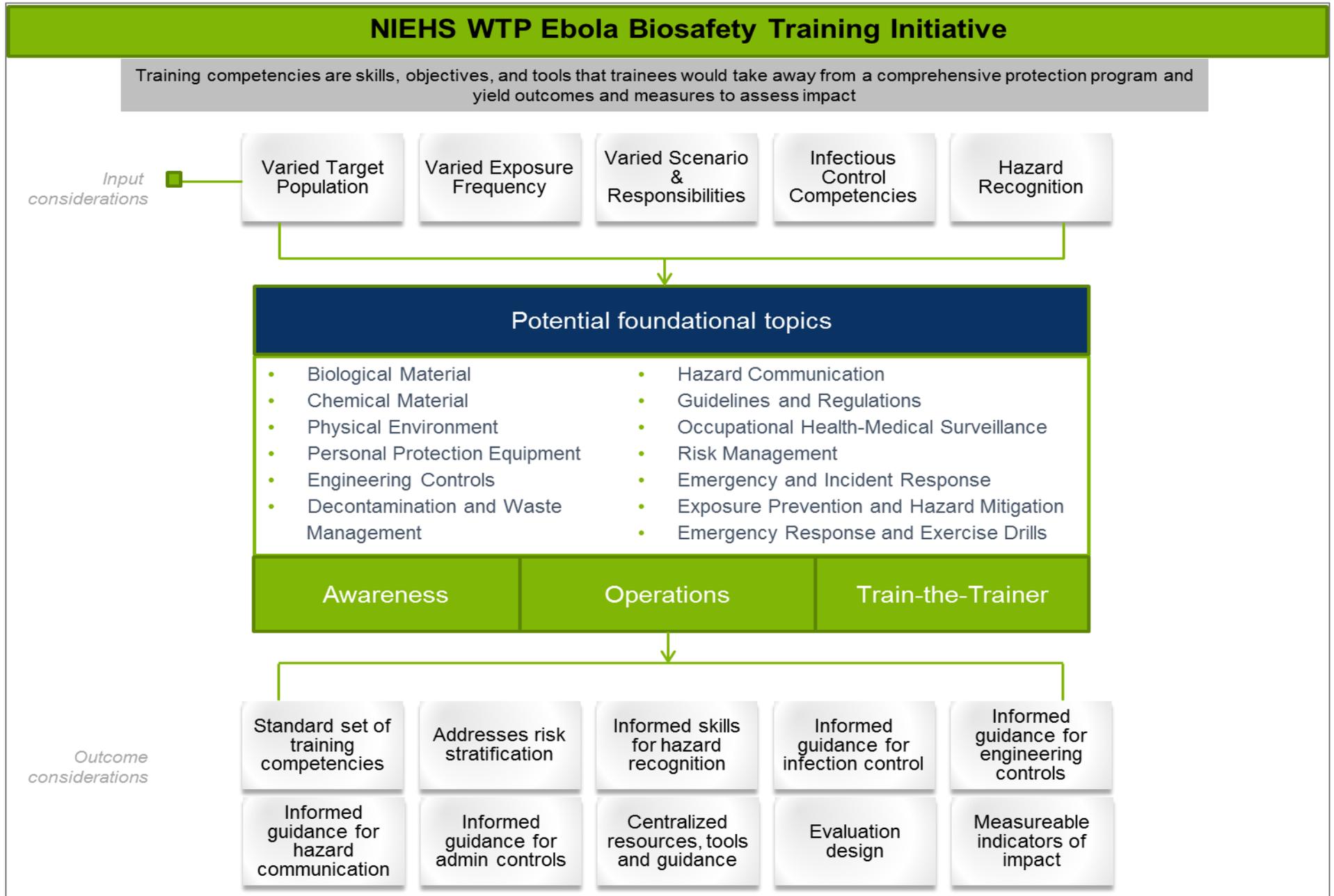
While no single regulation or set of guidelines can ensure safe practices, the next phase of the Ebola Biosafety Training Initiative will require digesting many of the suggestions, recommendations, and shared resources discussed at the May 28 meeting. This will lead to the development of a comprehensive approach to worker safety which NIEHS is confident will result in safer practices, including the willingness to report concerns, improvements in incident response, hazard recognition, awareness of biohazardous environments, and the operational skills needed to communicate risk and facilitate mitigation processes. This will in turn lead toward the development of a funding opportunity announcement that will focus on a broad infectious disease response training program.

## Appendix 1: Meeting Participants (in-person and webcast)

Name	Organization	Email
Darryl Alexander	American Federation of Teachers (AFT)	<a href="mailto:dalexand@aft.org">dalexand@aft.org</a>
Clifton Baldwin	NIEHS WTP	
Anthony Barone	HHS	<a href="mailto:Anthony.Barone@hhs.gov">Anthony.Barone@hhs.gov</a>
Sharon Beard	NIEHS WTP	<a href="mailto:beard1@niehs.nih.gov">beard1@niehs.nih.gov</a>
Pat Berntsen	National Partnership for Environmental Technology Education (PETE)	<a href="mailto:pbernts@gmail.com">pbernts@gmail.com</a>
Christopher Brown	OSHA	<a href="mailto:Brown.Christopher.K@dol.gov">Brown.Christopher.K@dol.gov</a>
Mark Catlin	Service Employees International Union (SEIU)	<a href="mailto:mark.catlin@seiu.org">mark.catlin@seiu.org</a>
Chee Chang	International Brotherhood of Teamsters (IBT)	<a href="mailto:CChang@teamster.org">CChang@teamster.org</a>
David Coffey	The New England Consortium – UMass Lowell	<a href="mailto:david_coffey@uml.edu">david_coffey@uml.edu</a>
Donald Elisburg	MDB, Inc. (NIEHS Contractor)	<a href="mailto:donald.elisburg@gmail.com">donald.elisburg@gmail.com</a>
Bob Emery	University of Texas – Houston	<a href="mailto:Robert.J.Emery@uth.tmc.edu">Robert.J.Emery@uth.tmc.edu</a>
Doug Feil	National Partnership for Environmental Technology Education (PETE)	<a href="mailto:dougfeil@mchsi.com">dougfeil@mchsi.com</a>
Whitney Freberg	MDB, Inc. (NIEHS Contractor)	
Kenda Freeman	MDB, Inc. (NIEHS Contractor)	<a href="mailto:kfreeman@michaeldbaker.com">kfreeman@michaeldbaker.com</a>
Renee Funk	NIOSH	<a href="mailto:RFunk@cdc.gov">RFunk@cdc.gov</a>
Shawn Gibbs	University of Texas – Houston	<a href="mailto:sgibbs@unmc.edu">sgibbs@unmc.edu</a>
Steve Grant	Nova Southeastern University	
Elizabeth Harman	International Association of Fire Fighters (IAFF)	<a href="mailto:eharman@iaff.org">eharman@iaff.org</a>
Melissa Harvey	HHS	<a href="mailto:Melissa.Harvey@hhs.gov">Melissa.Harvey@hhs.gov</a>
Chip Hughes	NIEHS WTP	<a href="mailto:hughes3@niehs.nih.gov">hughes3@niehs.nih.gov</a>
Nina Jaitly	NIEHS WTP Contractor	<a href="mailto:nina.jaitly@nih.gov">nina.jaitly@nih.gov</a>
Kathy Kirkland	Association of Occupational and Environmental Clinics (AEOC)	<a href="mailto:kkirkland@aoec.org">kkirkland@aoec.org</a>
Denise Matthews	U.S. Department of Labor	<a href="mailto:Matthews.Denise@dol.gov">Matthews.Denise@dol.gov</a>
John Morawetz	International Chemical Workers Union Council (ICWUC) Center for Worker Health and Safety Education	<a href="mailto:jmorawetz@icwuc.org">jmorawetz@icwuc.org</a>
Larry Petrick	International Association of Fire Fighters (IAFF)	<a href="mailto:lpetrick@iaff.org">lpetrick@iaff.org</a>
Jim Remington	NIEHS WTP	<a href="mailto:remingtonj@niehs.nih.gov">remingtonj@niehs.nih.gov</a>
Janelle Rios	University of Texas – Houston	<a href="mailto:Janelle.Rios@uth.tmc.edu">Janelle.Rios@uth.tmc.edu</a>

<b>Name</b>	<b>Organization</b>	<b>Email</b>
<b>Johnathan Rosen</b>	MDB, Inc. (NIEHS Contractor)	<a href="mailto:jrosen396@gmail.com">jrosen396@gmail.com</a>
<b>Mitch Rosen</b>	Rutgers School of Public Health	<a href="mailto:mrosen@rutgers.edu">mrosen@rutgers.edu</a>
<b>Sue Ann Sarpy</b>	Sarpy and Associates	<a href="mailto:ssarpy@sarpyassoc.com">ssarpy@sarpyassoc.com</a>
<b>Rodrigo Toscano</b>	United Steelworkers Union/Tony Mazzocchi Center	<a href="mailto:rt5le9@aol.com">rt5le9@aol.com</a>
<b>Luis Vazquez</b>	International Chemical Workers Union Council (ICWUC) Center for Worker Health and Safety Education	<a href="mailto:lvazquez@icwuc.org">lvazquez@icwuc.org</a>
<b>Kerri Voelker</b>	MDB, Inc. (NIEHS Contractor)	<a href="mailto:kmoran@michaeldbaker.com">kmoran@michaeldbaker.com</a>
<b>Beverly Wright</b>	Dillard University	
<b>Marcienne Wright</b>	U.S. Public Health Service; ASPR	
<b>Kevin Yeskey</b>	MDB, Inc. (NIEHS Contractor)	<a href="mailto:kyeskey@michaeldbaker.com">kyeskey@michaeldbaker.com</a>

## Appendix 2: Foundational Training Competencies



## Appendix 3: Supplemental Tables with Information from Awardee Presentations

Table 1

Organization	Target Audience	Training Goals	Awareness, Operations, and Expected Duration of Programs	Training and Teaching Methods	Interaction
SEIU	<ul style="list-style-type: none"> <li>▪ Allied health care workers</li> <li>▪ Acute care hospital workers</li> <li>▪ Airport workers (contractors)</li> <li>▪ Low skilled workers (minimum wage)</li> <li>▪ Cabin cleaning crew</li> <li>▪ Environmental Services (EVS); Janitors</li> <li>▪ Wheelchair assistants</li> <li>▪ Baggage crew</li> </ul>	<ul style="list-style-type: none"> <li>▪ Provide skills to allied workers who are not traditionally part of the initial response</li> <li>▪ Provide global understanding of the various roles in the response process in order to establish clarification of expectations and what they do not have to worry about</li> <li>▪ Develop a core set of primary trainers (inclusive of staff and specific Ebola awareness trainers)</li> <li>▪ Develop a plan for operation level training specific for Ebola</li> </ul>	<ul style="list-style-type: none"> <li>▪ Awareness (4 hours)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Modified Train-the-Trainer model</li> <li>▪ AEOC assistance with development of training curriculum</li> </ul>	<ul style="list-style-type: none"> <li>▪ Small group activity (6-8)</li> <li>▪ Problem-solving and aptitude development based on experience and class materials</li> </ul>
ICWUC	<ul style="list-style-type: none"> <li>▪ Nurses (American Federation of Teachers (AFT) Nurses and Health care professionals, National Nurses United (NNU))</li> <li>▪ Police (Coalition Black Trade Unionist (CBTU)</li> <li>▪ Firefighters (CBTU)</li> <li>▪ Emergency medical technicians (CBTU)</li> <li>▪ Public Health Workers (American Federation of Governmental Employees (AFGE)</li> <li>▪ VA hospital cleaning crew (AFGE)</li> <li>▪ VA hospital decontamination department (AFGE)</li> <li>▪ TSA workers (AFGE)</li> <li>▪ Worker groups not previously trained by National Council for Occupational Safety and Health (NCOSH)</li> <li>▪ Machinists (International Association of Machinists and Aerospace Workers Union (IAMAW))</li> </ul>	<ul style="list-style-type: none"> <li>▪ Help members become active in bringing change to infection control environment</li> <li>▪ Build competencies of the trainers for effective delivery</li> </ul>	<ul style="list-style-type: none"> <li>▪ Awareness (2, 4, 8 hours)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Train-the-Trainer (partnership with SEIU, United Auto Workers and University of Cincinnati)</li> <li>▪ AEOC assistance with development of training curriculum, conducting physicals, and obtain guidance as infection control experts</li> <li>▪ MDB Clearinghouse partnership for Mental Resiliency</li> </ul>	<ul style="list-style-type: none"> <li>▪ Small group activity (20)</li> <li>▪ Tiered process</li> </ul>

Organization	Target Audience	Training Goals	Awareness, Operations, and Expected Duration of Programs	Training and Teaching Methods	Interaction
University of Texas School of Public Health – Houston	<ul style="list-style-type: none"> <li>▪ First Responders</li> <li>▪ Law enforcement</li> <li>▪ Emergency medical technicians</li> <li>▪ Public health officials</li> <li>▪ Waste transporters and processors</li> <li>▪ Hospital employees</li> </ul>	<ul style="list-style-type: none"> <li>▪ Communications: Operations course will include a module on effective communication with the media</li> <li>▪ Information sharing: Course materials will be made available electronically at no cost</li> </ul>	<ul style="list-style-type: none"> <li>▪ Awareness (6 hours) for police officers, hospital workers, waste transporters, public health workers</li> <li>▪ Operations (32 hours) for EMTs, hospital waste processors, public health workers</li> </ul>	<ul style="list-style-type: none"> <li>▪ Community training (&lt; 1 hour)</li> <li>▪ Teaching methods developed in collaboration with CDC, Emory University, University of Nebraska Medical Center, infectious disease experts, and medical professionals</li> </ul>	<ul style="list-style-type: none"> <li>▪ Teaching techniques with didactic, hands-on activities and real world scenarios</li> </ul>
Rutgers University School of Public Health	<ul style="list-style-type: none"> <li>▪ Ambulance cleaning crew</li> <li>▪ Waste handlers</li> <li>▪ Transport workers</li> <li>▪ Airport workers</li> <li>▪ Environmental surface workers</li> <li>▪ Trade school workers</li> <li>▪ Emergency medical technicians (EMT)</li> <li>▪ Paramedics</li> </ul>	<ul style="list-style-type: none"> <li>▪ Understand and assess hazards in a general all-hazards approach and build decision-making capacity</li> <li>▪ Transmission of disease specific to Ebola</li> <li>▪ Exposure scenarios and exposure management for appropriate hierarchy of controls</li> <li>▪ Infection control measures</li> <li>▪ Worker protection, donning and doffing and decontamination</li> </ul>	<ul style="list-style-type: none"> <li>▪ Awareness</li> </ul>	<ul style="list-style-type: none"> <li>▪ Train-the-Trainer modules for EMS, police officers, firefighters, HAZMAT, public health workers</li> <li>▪ Teaching methods will be performed in partnership with University Hospital, (EMT, paramedics and hospital personnel), NCOSH (transport workers, airport workers), environment surface workers, trade schools, World Care Center (trade school workers)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Small group activity</li> <li>▪ Discussion and on-hands on instruction</li> </ul>
International Brotherhood of Teamsters	<ul style="list-style-type: none"> <li>▪ Airline workers “go team”</li> <li>▪ Solid waste workers, including transport workers of medical and household wastes</li> </ul>	<ul style="list-style-type: none"> <li>▪ Using standard guidelines (Bloodborne Pathogen, Respiratory guidelines, PPE) to improve protection training</li> </ul>	<ul style="list-style-type: none"> <li>▪ Awareness (4, 8 hours)</li> <li>▪ Operations (32 hours)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Train-the-trainer modules for union leaders workers</li> <li>▪ 12 modules for hazard recognition</li> </ul>	<ul style="list-style-type: none"> <li>▪ Small group activity</li> </ul>
United Steelworkers Union	<ul style="list-style-type: none"> <li>▪ Ebola treatment center (55; nationwide)</li> <li>▪ Immigrant center workers (5; NY), Baggage handlers, cleaning crews , community health workers</li> <li>▪ University campus medical center workers, treatment center workers (Communication workers of America)</li> <li>▪ United steelworker represented nurses (TX)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Pilot 4 hours awareness training;</li> <li>▪ Integrate HAZWOPER training into Ebola awareness</li> <li>▪ Goal to develop operations training</li> </ul>	<ul style="list-style-type: none"> <li>▪ Awareness (4 hour)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Train-the-Trainer (2 days)</li> <li>▪ HAZWOPER training (40 hours)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Small group activity</li> </ul>

**Table 2**

Organization	Limitations and Challenges	Future Considerations
<b>SEIU</b>	<ul style="list-style-type: none"> <li>▪ To do awareness versus operations level training within a short time frame</li> </ul>	<ul style="list-style-type: none"> <li>▪ Will explore how to expand operational level training</li> </ul>
<b>ICWUC</b>	<ul style="list-style-type: none"> <li>▪ Moving target as needs and guidelines evolve</li> <li>▪ Broad target population</li> <li>▪ Different PPE standards</li> <li>▪ Inconsistent site specific operational training</li> </ul>	<ul style="list-style-type: none"> <li>▪ Desire to add packaging and shipping for Ebola waste</li> </ul>
<b>University of Texas – Houston</b>	<ul style="list-style-type: none"> <li>▪ Conflicting local, state and federal guidelines</li> <li>▪ Resources to deliver training are limited</li> <li>▪ Non-standardized PPE</li> <li>▪ Great variability in industries, facilities, and situations</li> <li>▪ Time crunch</li> <li>▪ Addressing knowledge gaps</li> <li>▪ Risk communication and assessments</li> <li>▪ Address perception versus reality</li> <li>▪ Deliver science-based strategies for correcting misinformation</li> <li>▪ Focus on Ebola but prepare for highly infectious diseases (MERS COV, SARS)</li> <li>▪ Finding balance to protect while maintaining ability to do job/tasks</li> </ul>	<ul style="list-style-type: none"> <li>▪ Will explore how to improve operational level training</li> </ul>
<b>Rutgers University</b>	<ul style="list-style-type: none"> <li>▪ Lack of PPE standards</li> <li>▪ Moving target for guidelines</li> <li>▪ Inability to provide training during paid work time</li> <li>▪ Lack of interest from workers</li> <li>▪ Address fear and risk communication</li> </ul>	<ul style="list-style-type: none"> <li>▪ Closely following NIOSH lab in Pittsburg, PA who is testing materials for blood penetration, looking at pore size for fluid permeability and other novel approaches to address adequate PPE</li> </ul>
<b>International Brotherhood of Teamsters</b>	<ul style="list-style-type: none"> <li>▪ 4 hour training for blood borne pathogen and donning and doffing is not sufficient</li> <li>▪ Funding time is short</li> <li>▪ Ebola-exposed patients who get sick at home may expel bodily fluids into household waste (vomit) and garbage which workers are currently not trained to address</li> </ul>	<ul style="list-style-type: none"> <li>▪ Consider opportunity to develop program with TTT and community and union leaders; hope is to use current 4hr training to develop 8hr awareness and eventually 32hr operation level training</li> </ul>
<b>United Steelworkers Union</b>	<ul style="list-style-type: none"> <li>▪ Funding time is short</li> <li>▪ None of the immigrant workers have received any Ebola preparedness training – this is identified as a major gap</li> <li>▪ Reaching airport workers will be challenging</li> <li>▪ Partners may be needed to facilitate outreach</li> <li>▪ Spanish curriculum translation in short timeframe</li> </ul>	<ul style="list-style-type: none"> <li>▪ Eventually develop operations training</li> </ul>

## Appendix 4: Needs Assessment Survey

### Ebola and Infectious Disease Preparedness Training Questionnaire

The National Institute of Environmental Health Sciences (NIEHS) is working to assess the needs of populations that need various levels of Ebola and infectious disease health and safety training. We appreciate you taking the time to complete this questionnaire.

**All responses to this questionnaire will remain anonymous and summaries will include only aggregated results.**

Definitions:

- Training – instruction that is provided to increase knowledge, understanding, and skill sets that lead to changes in behavior that reduce or prevent the risk of health impact of a hazard.
- Awareness training – usually didactic (video or face-to-face) and textbook presentations that increase one’s knowledge about a particular topic.
- Operations training – training that develops skill sets and competencies in performing procedures, working with equipment, or following protocols.

### Background

B1. Please identify the type of organization or agency you represent:

- a. Federal government agency
- b. State or local government agency
- c. Labor union or worker support organization
- d. Training organization
- e. Clinical health care facility
- f. Humanitarian relief organization
- g. Other – please describe
- h. Choose not to respond

### Survey questions

1. What was your experience with the response to the recent Ebola outbreak?
  - a. What did you learn?
  - b. What did you need to be successful?
  - c. What did you need for training?
2. What worker related issues did you encounter?
  - a. Which ones were critical?
3. What employer related issues did you encounter?
  - a. Which ones were critical?

4. Use of personal protective equipment (PPE) is associated with heat stress, limited ability to perform medical procedures, and other functional limitations. How did the various guidance on PPE impact the performance of patient care and supportive care responsibilities? What, if any, modifications to PPE or work procedures did you make to accommodate or ease these limitations?
  
5. Have your employees or members been provided with Ebola training?
  - a. Yes – developed by staff from within my organization
  - b. Yes – developed by contractors or consultants hired by my organization
  - c. No – please go to Question 20
  
6. Who was the intended primary audience(s) for this training? (Multiple options)
  - a. Health care providers
    - i. Persons with potential direct contact with confirmed Ebola virus disease patients
    - ii. Persons with potential direct contact with suspected patients
  - b. Environmental services workers – persons with potential direct contact with Ebola virus-contaminated materials, including patient body fluids or waste
  - c. Laboratory personnel – persons handling body fluids or human tissue
  - d. Humanitarian response workers
  - d. Facility and business administrators
  - e. All staff
  - f. Others – specify \_\_\_\_\_
  
7. What level was the training? Please refer to the definitions noted above.
  - a. Awareness
  - b. Operations
  - c. Several levels were provided – describe \_\_\_\_\_
  
8. Did you conduct any Train-the-Trainer courses?
  - a. Yes
  - b. No
  
9. Please complete the following table regarding the duration of each of your training courses. Leave blank any areas that do not apply.

	<b>Awareness</b>	<b>Operations</b>	<b>Train-the-Trainer</b>
<b>Duration</b>			
Less than 2 hours			
Between 2 and 4 hours			
Between 4 and 8 hours			
Greater than 8 hours (specify)			

10. For any didactic instruction, please provide the approximate hours for each of the topics noted in the following table.

<b>Topic</b>	<b>Duration (in hours)</b>
West Africa outbreak/U.S. cases	
Clinical signs and symptoms	
Treatment	
Transmission/occupational exposure	
Risk assessment	
Prevention/worker protection/hazard controls	
PPE and respiratory protection	
Decontamination	
Use of the buddy system	
Post-exposure procedures	
Site-specific procedures	
Other – specify	

11. For any hands-on training, please provide the number of hours devoted to each of the topics noted in the following table.

<b>Topic</b>	<b>Duration (in hours)</b>
Donning and doffing of PPE	
Decontamination procedures	
Respiratory protection	
Hand washing	
Waste handling	
Sharps handling	
Performing job duties while in PPE	

Other – specify	
-----------------	--

12. How was the training delivered?

Format	Check All That Apply
Classroom	
Web/computer-based video	
Webinar	
Other	

13. Was this training part of another training program?

- a. Yes
- b. If yes, which one?
  - i. Health and safety
  - ii. Infection control
  - iii. Hazardous waste operations and emergency response (HAZWOPER)
  - iv. Bloodborne pathogens
  - v. NIEHS Worker Training Program
  - vi. Other
- c. No

14. Is your training ongoing?

- a. Yes – indicate the frequency
  - i. Weekly
  - ii. Monthly
  - iii. Quarterly
  - iv. Annually
- b. No

15. Has your training curriculum been revised since it started?

- a. Yes – please explain \_\_\_\_\_
- b. No

16. Do you offer continuing education credits for your training?

- a. Yes
- b. No

17. Did you identify any gaps in the training your constituents received?

- a. Yes – please specify \_\_\_\_\_

b. No

18. Did you identify any best practices in your training program?

a. Yes – please specify \_\_\_\_\_

b. No

19. Did you identify any challenges in delivering the training?

a. Yes – select all that apply

i. Funding

ii. Time off for workers to participate in training

iii. Ensuring any new workers get training

iv. Logistics – classrooms, equipment, materials, planning

v. Finding appropriate curricula

vi. Finding qualified trainers

vii. Other – please specify \_\_\_\_\_

b. No

If you answered **No** to Question 5, please complete the following question:

20. What were the reasons that you did not provide training?

a. Staff was at very low risk for exposure

b. No funding for this type of training

c. Could not identify appropriate training courses or trainers

d. Other – please specify \_\_\_\_\_

Thank you!

If you would like to provide additional information, share course materials, or discuss lessons learned in further detail, please email [wetpclear@niehs.nih.gov](mailto:wetpclear@niehs.nih.gov).

A staff member will be in touch to arrange further discussions within a week.

If you choose to identify yourself via email, your specific answers will not be used as examples, case studies, or in quotations without your permission.

## Appendix 5: Resources

NIOSH	
<b>Representative:</b>	Renee Funk, D.V.M., Deputy Associate Director for Emergency Preparedness, NIOSH
<b>Target Population:</b>	Non-health care workers
<b>Main Website</b>	<a href="http://www.cdc.gov/niosh/topics/ebola/">http://www.cdc.gov/niosh/topics/ebola/</a>
<b>Non-health Care Workers</b>	<a href="http://www.cdc.gov/niosh/topics/ebola/nonhealthcare.html">http://www.cdc.gov/niosh/topics/ebola/nonhealthcare.html</a>
<b>Guidance for Safe Handling of Human Remains of Ebola Patient in U.S. Hospitals and Mortuaries</b>	<a href="http://www.cdc.gov/vhf/ebola/healthcare-us/hospitals/handling-human-remains.html">http://www.cdc.gov/vhf/ebola/healthcare-us/hospitals/handling-human-remains.html</a>
<b>Video for Safe Handling of Human Remains of Ebola Patients in U.S. Hospitals and Mortuaries</b>	<i>Under production</i>
<b>Fatigue Management Online Training Joint with NIOSH-OSHA</b>	<a href="http://www.cdc.gov/niosh/topics/ebola/pdfs/preventingworkerfatigueamongebolahcw122914.pdf">http://www.cdc.gov/niosh/topics/ebola/pdfs/preventingworkerfatigueamongebolahcw122914.pdf</a>
<b>PPE Clarification</b>	<i>Expected for release in near future (TBD)</i>
<b>Health Hazard Evaluation</b>	<a href="http://www.cdc.gov/niosh/hhe/">http://www.cdc.gov/niosh/hhe/</a>

OSHA	
<b>Representative:</b>	Chris Brown, Ph.D., Specialist, Public Health Emergency Preparedness, OSHA
<b>Target Population:</b>	Health care workers with appropriate engineering controls, PPE, and different types of settings
<b>Main Website</b>	<a href="https://www.osha.gov/SLTC/ebola/">https://www.osha.gov/SLTC/ebola/</a>
<b>Cleaning and Decontamination of Ebola on Surfaces Fact Sheet</b>	<a href="https://www.osha.gov/Publications/OSHA_FS-3756.pdf">https://www.osha.gov/Publications/OSHA_FS-3756.pdf</a>
<b>Safe Handling, Treatment, Transport and Disposal of Ebola-Contaminated Waste Fact Sheet</b>	<a href="https://www.osha.gov/Publications/OSHA_FS-3766.pdf">https://www.osha.gov/Publications/OSHA_FS-3766.pdf</a>
<b>PPE Selection Matrix for Occupational Exposure to Ebola Virus Fact Sheet</b>	<a href="https://www.osha.gov/Publications/OSHA3761.pdf">https://www.osha.gov/Publications/OSHA3761.pdf</a>

OSHA	
<b>Fatigue Management Online Training Joint with NIOSH-OSHA</b>	<a href="http://www.cdc.gov/niosh/topics/ebola/pdfs/preventingworkerfatigueamongebolahcw122914.pdf">http://www.cdc.gov/niosh/topics/ebola/pdfs/preventingworkerfatigueamongebolahcw122914.pdf</a>
<b>OSHA Standards That May Be Applicable to Worker Exposure to the Ebola Virus</b>	<a href="https://www.osha.gov/SLTC/ebola/standards.html">https://www.osha.gov/SLTC/ebola/standards.html</a>
<b>HAZWOPER</b>	<p><a href="https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=standards&amp;p_id=9765">https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=standards&amp;p_id=9765</a></p> <p>Please be advised, standard itself does not apply to exposure to Ebola on its own. HAZWOPER would only apply under a certain number of specific circumstances (e.g., medical waste transport truck or laboratory released Ebola-contaminated waste into the environment). HAZWOPER does offer good models of programmatic standards and exposure assessments.</p>

ASPR	
<b>Representative:</b>	Marienne Wright, Ph.D., Biosafety and Biosecurity Program Analyst, ASPR
<b>Target Population:</b>	Biosafety and biosecurity targets
<b>Main Website</b>	<a href="http://www.phe.gov/Preparedness/responders/ebola/Pages/default.aspx">http://www.phe.gov/Preparedness/responders/ebola/Pages/default.aspx</a>
<b>Biosafety in Microbiological and Biomedical Laboratories</b>	<a href="http://www.cdc.gov/biosafety/publications/bmbL5/BMBL.pdf">http://www.cdc.gov/biosafety/publications/bmbL5/BMBL.pdf</a>
<b>Public Health Agency of Canada</b>	<a href="http://www.phac-aspc.gc.ca/lab-bio/res/psds-ftss/ebola-eng.php">http://www.phac-aspc.gc.ca/lab-bio/res/psds-ftss/ebola-eng.php</a>
<b>International Laboratory Biorisk Management Standard CWA 15793</b>	<a href="http://www.biosecurity.sandia.gov/ibtr/subpages/pastConf/20082009/dubai/daythree/cwa.pdf">http://www.biosecurity.sandia.gov/ibtr/subpages/pastConf/20082009/dubai/daythree/cwa.pdf</a>
<b>Science Safety Security: Biosecurity, Biosafety, Biocontamination and Biorisk Management</b>	<a href="http://www.phe.gov/s3/Pages/default.aspx">http://www.phe.gov/s3/Pages/default.aspx</a>
<b>CDC Laboratory Safety</b>	<a href="http://www.cdc.gov/about/lab-safety/">http://www.cdc.gov/about/lab-safety/</a>

## Appendix 6: Potential Occupational Exposure and Risk Stratification

Contact Level Adopted from OSHA PPE Selection Matrix Guidance

