Biosafety and Infectious Disease Training Initiative (BIDTI)

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An Introduction to the Biosafety and Infectious Disease Training Initiative (BIDTI)

A National Institute of Environmental Health Sciences (NIEHS) Worker Training Program (WTP)
UH4 ES027055-01 (Ebola Biosafety and Infectious Disease Response)

A Consortium Of:

Funded by:
National Institute of Environmental Health Sciences
Session Objectives

1) To foster interdisciplinary work and relationships between various worker industries, public health, academic and research institutions, and governmental agencies.

2) To inform session attendees about the Biosafety and Infectious Disease Training Initiative (BIDTI) and the resources available in Indiana, and nationally, on training and education pertaining to highly infectious diseases.

3) To describe how the initiative can better prepare workers and communities for the actual risks associated with Ebola virus disease (EVD) and other infectious diseases of public health significance (IDPHS) using sound scientific methods.
The Problem
Ebola Virus

- Extremely infectious acute, viral hemorrhagic fever
  - Caused by single-stranded negative sense RNA Ebola virus (Filoviridae family)
  - Disease with high case fatality rate (~50%)
  - Infectious dose: 1-10 organisms

- 20 previous outbreaks of Ebola and Marburg virus
  - 2014-2015 epidemic was largest and most deadly
  - 2014 West Africa Ebola outbreak caused by Zaire ebolavirus species (five known Ebola virus species)

(CDC, 2016; Heymann, 2015)
Ebola is a Category A Agent

Definition

- Easily disseminated
- High mortality
- Can cause public panic and social disruption
- Require special public health action
- Cannot be transported without special permissions unless virus is inactivated

Sample Category A Agents

- Anthrax (Bacillus anthracis)
- Botulism (Clostridium botulinum toxin)
- Plague (Yersinia pestis)
- Smallpox (Variola major)
- Tularemia (Francisella tularensis)
- Viral hemorrhagic fevers

(CDC, 2016; PHAC, 2014)
## Ebola Cases and Deaths: April 16, 2016 Data

<table>
<thead>
<tr>
<th></th>
<th>Total Cases (Suspected, Probable, and Confirmed)</th>
<th>Confirmed Cases</th>
<th>Total Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guinea</td>
<td>3,814</td>
<td>3,358</td>
<td>2,544</td>
</tr>
<tr>
<td>Sierra Leone</td>
<td>14,124</td>
<td>8,706</td>
<td>3,956</td>
</tr>
<tr>
<td>Liberia**</td>
<td>10,678</td>
<td>3,163</td>
<td>4,810</td>
</tr>
<tr>
<td>Italy</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>United Kingdom**</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Nigeria**</td>
<td>20</td>
<td>19</td>
<td>8</td>
</tr>
<tr>
<td>Spain**</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Senegal**</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>United States**</td>
<td>4</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Mali**</td>
<td>8</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>TOTAL</td>
<td>28,652</td>
<td>15,261</td>
<td>11,325</td>
</tr>
</tbody>
</table>


* Total cases include probable, suspected, and confirmed cases. Reported by WHO using data from ministries of health (CDC, 2016)
Ebola Cases in the United States

Total cases: 11
- Cases contracted in the US: 2
- Cases first diagnosed in the US: 4
- Cases evacuated to US from other countries: 7
- Total recoveries from Ebola: 9
- Total deaths: 2

Information on U.S. Ebola cases available at

(CDC, 2016)
Why Was This U.S. Specific Program Funded?

Image credit: The Arizona Republic, 2014
The Public Health Problem

- Biological Hazards
- Emergency Preparedness and Response
- Economic Need
- Safe Work Environments
- Promote Health, Prevention Practice, Resiliency, and Financial Stability to communities

All industries deserve an equal opportunity access high-quality training and education
There are a Number of Infectious Diseases of Public Health Significance

- Anthrax
- Avian Influenza (H5N1)
- Botulism
- Ebola (EVD)
- Extensively Drug-Resistant Tuberculosis (XDR-TB)
- Lassa Fever
- Marburg Virus
- Middle East Respiratory Syndrome Coronavirus (MERS-CoV)
- Monkeypox
- Plague
- Q Fever
- Severe Acute Respiratory Syndrome (SARS)
- Smallpox
- Staphylococcal enterotoxin B (SEB)
- Tularemia
Safety Considerations in the Laboratory Testing of Specimens Suspected or Known to Contain Ebola Virus

Peter C. Iwen, PhD, D(ABMM), Philip W. Smith, MD, Angela L. Hewlett, MD, Christopher J. Kratochvil, MD, Steven J. Lisco, MD, James N. Sullivan, MD, Shawn G. Gibbs, PhD, CIH, John J. Lowe, PhD, Paul D. Fey, PhD, D(ABMM), Vicki L. Herrera, MS, Anthony R. Sambol, MA, James L. Wisecarver, MD, and Steven H. Himrichs, MD

From the 1Department of Pathology and Microbiology, College of Medicine, University of Nebraska Medical Center, Omaha; 2Nebraska Public Health Laboratory, Omaha; 3Department of Internal Medicine, Division of Infectious Diseases, University of Nebraska Medical Center, Omaha; 4Department of Psychiatry, College of Medicine, University of Nebraska Medical Center, Omaha; 5Department of Anesthesiology, Division of Critical Care, University of Nebraska Medical Center, Omaha; and 6Department of Environmental, Agricultural, and Occupational Health, College of Public Health, University of Nebraska Medical Center, Omaha.


Nebraska Biocontainment Unit perspective on disposal of medical waste

John J. Lowe PhD, Shawn G. Gibbs PhD, Shelly Schwedhelm RN, MS, John Nguyen BS, Philip W. Smith MD

Nebraska Biocontainment Unit patient discharge and environmental decontamination after Ebola care

Katelyn C. Jelden BS, Shawn G. Gibbs PhD, Philip W. Smith MD, Michelle M. Schwedhelm MSN, Peter C. Iwen PhD, Elizabeth L. Beam MSN, A. Kim Hayes RN, Christopher J. Kratochvil MD, Kathleen C. Boulter BA, Angela L. Hewlett MD, John J. Lowe PhD

Environmental infection control considerations for Ebola

John J. Lowe PhD, Patricia L. Olinger BS, RBP, Shawn G. Gibbs PhD, CIH, Kalpana Rengarajan PhD, RBP, Elizabeth L. Beam RN, Kathleen C. Boulter BAN, Michelle M. Schwedhelm MSN, A. Kim Hayes RN, Christopher J. Kratochvil MD, Sharon Vanairsdale MS, APRN, Brian Frislie CEH, Jerry Lewis, Angela L. Hewlett MD, Philip W. Smith MD, Bryce Gartland MD, Bruce S. Riber MD

Surrogate Testing Suggests That Chlorine Dioxide Gas Exposure Would Not Inactivate Ebola Virus Contained in Environmental Blood Contamination

John J. Lowe, Angela L. Hewlett, Peter C. Iwen, Philip W. Smith & Shawn G. Gibbs
The Roadmap & The Method
National Institutes of Environmental Health Sciences (NIEHS)

U.S. Department of Health and Human Services (HHS) Agencies & Offices

- National Institutes of Health (NIH)
  - National Institute of Environmental Health Sciences (NIEHS)
  - National Human Genome Research Institute
  - National Cancer Institute
  - Etc. (27 Operating Divisions)
- Assistant Secretary for Preparedness and Response (ASPR)
- Agency for Healthcare Research and Quality (AHRQ)
- Centers for Disease Control and Prevention (CDC)
- Etc. (11 Operating Divisions)

All programming & activities

(NIEHS, 2016)
NIEHS WTP Organizational Structure

National Institute of Environmental Health Sciences Worker Training Program

- Hazardous Waste WTP
- NIEHS/DOE Nuclear WTP
- The Environmental Career WTP
- Hazmat Disaster Preparedness Training Program
- Ebola Biosafety & Infectious Disease Response Training Program
- Small Business Innovation Research (SBIR) E-Learning for HAZMAT Program

(NIEHS, 2016)
Program Awardees

- Indiana University – Bloomington
- Duke University
- Emory University
- International Chemical Workers Union Council Center for Worker Health and Safety Education
- LIUNA Training and Education Fund
- New Jersey/New York Hazardous Materials Worker Training Center
- The Steelworkers Charitable and Educational Organization
- University of Alabama at Birmingham

(NIEHS, 2016)
Biosafety and Infectious Disease Training Initiative (BIDTI) Background

• Built upon pilot project from Summer 2015
  • Original partnership of Nebraska Biocontainment Unit and Southwest Center for Occupational and Environmental Health (UTSPH)
  • Delivered 37 training events in 7 states and 3 countries
  • 12,594 participants for a total of 1,360,152 person-hours of training
Dr. Lowe conducting training of Omaha Fire Department Personnel who would later go on to conduct actual transportation of a patient with Ebola virus disease

Individuals trained by BIDTI personnel, Dr. Lowe, and personnel from Phoenix Air Group conducting an actual transport of a patient with Ebola virus disease
contingency, reassurance
ensure proper fastening
when endurance is waning
new providers
(teaching theory) vs. step-wise (actual practice)
the last person out?
levels of contamination
own PPE
BIDTI Background cont.

- Indiana University School of Public Health – Bloomington
  - University of Nebraska Medical Center & Nebraska Biocontainment
  - University of Texas Health Sciences Center at Houston School of Public Health
    - Dillard University Deep South Center for Environmental Justice
    - Harvard T.H. Chan School of Public Health

- Deliver training events in hazard planning, mitigation, response and recovery activities, while enhancing biosafety and infection control within a broad array of occupational settings
- Supplemental program funded for 2016-2019
- Trainings are offered at no cost to organizations
BIDTI Specific Aims

Primary Purpose:
Positively and meaningfully impact the health of communities by providing well-designed, well-delivered and practical hands-on environmental infection control and safety training to mitigate exposures to EVD and other serious infectious diseases by workers who may, during the course of their work activities, have potential exposure to these organisms.
• Less focus on healthcare and allied healthcare professionals
• Achieve this through direct worker training and train-the-trainer (TTT) programs
• *Long-term:* Prepare workers and communities for the actual risks associated with EVD and other serious infectious disease, and to protect themselves, their colleagues, and their environment from exposures to the Ebola virus using sound scientific methods and to promote health, resiliency and financial stability of workers most likely to come into contact with infectious disease of public health significance
# Program Target Populations

## Target Population Category by Applicant

<table>
<thead>
<tr>
<th>Population Category</th>
<th>ICWU</th>
<th>SCEO</th>
<th>DUKE</th>
<th>IUB</th>
<th>EMORY</th>
<th>LIUNA</th>
<th>UAB</th>
<th>RUTGERS</th>
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<tbody>
<tr>
<td></td>
<td>Cyphers</td>
<td>Frederick</td>
<td>Frothingham</td>
<td>Gibbs</td>
<td>Isakov</td>
<td>LeConche</td>
<td>McCormack</td>
<td>Rosen</td>
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<tr>
<td>Airline/Airport Workers</td>
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<td>X</td>
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<td>Border Control Workers</td>
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<td>X</td>
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<tr>
<td>Cleaning Professional (excluding airline)</td>
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<tr>
<td>Community Volunteers/Workers</td>
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<td>X</td>
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<td>Construction Workers</td>
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<td>Correctional Officers</td>
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<tr>
<td>Custodial/Environmental Service Workers</td>
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<tr>
<td>Daycare Workers</td>
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<td>X</td>
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<tr>
<td>First Responders</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Handling Dead Bodies</td>
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<tr>
<td>Healthcare Facility Workers (clinical)</td>
<td>X</td>
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<td>Healthcare Facility Workers (non-clinical)</td>
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<tr>
<td>Healthcare Laboratory Workers</td>
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<tr>
<td>Healthcare Professionals</td>
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<td>X</td>
<td></td>
<td></td>
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<tr>
<td>Maintenance Professional</td>
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<td>X</td>
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<tr>
<td>Nail Salon Workers</td>
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<tr>
<td>Public Health Professionals</td>
<td>X</td>
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<tr>
<td>Occupational Health &amp; Safety Activists</td>
<td>X</td>
<td></td>
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<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<td>Security Workers</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Teachers/Students</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td>X</td>
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<tr>
<td>Transport Workers</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
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<tr>
<td>Vulnerable Populations</td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Waste Handlers</td>
<td></td>
<td>X</td>
<td>X</td>
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<td></td>
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<td></td>
<td>X</td>
</tr>
<tr>
<td><strong>Total high risk categories, grouped</strong></td>
<td><strong>12</strong></td>
<td><strong>13</strong></td>
<td><strong>13</strong></td>
<td><strong>7</strong></td>
<td><strong>9</strong></td>
<td><strong>8</strong></td>
<td><strong>6</strong></td>
<td><strong>10</strong></td>
</tr>
</tbody>
</table>

(NIEHS Council, 2016)
BIDTI Target Populations

- Custodial/Environmental Service Workers
- First Responders, EMS, EMT, ARFF
- Law enforcement
- Death care sector
- Occupational health & safety activists
- Transport workers
- Waste handlers
- Vulnerable populations
## Examples of Encounters by Select Occupations

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Encounter Scenario</th>
</tr>
</thead>
<tbody>
<tr>
<td>Law Enforcement</td>
<td>Enforcing a quarantine order</td>
</tr>
<tr>
<td>EMS/EMT/First Responder</td>
<td>Responding to a Potential EVD patient</td>
</tr>
<tr>
<td>Regulated Medical Waste Handlers</td>
<td>Handling suspected or confirmed EVD waste</td>
</tr>
<tr>
<td>Funeral Directors, Morticians</td>
<td>Participation in the cremation of patient remains</td>
</tr>
<tr>
<td>Custodial, Environmental service workers</td>
<td>Cleaning and decontaminating a space</td>
</tr>
<tr>
<td>Public Health Worker</td>
<td>Monitoring those under investigation</td>
</tr>
<tr>
<td>Mass transit/transportion worker, airport security</td>
<td>Screening for potential exposure or illness</td>
</tr>
<tr>
<td>Occupational health and safety activists</td>
<td>Identification of workplace safety and health needs</td>
</tr>
</tbody>
</table>
BIDTI Timeline & Goals

Aim to train approximately 2,000 individuals annually at the following levels:

• 1,400 community level
• 500 awareness level
• 100 operations level
Training Levels

BIDTI Trainings

- Community Level (~1 hr.)
- Awareness level (~2 hrs.)
- Operational Level (~4-6 hrs.)

Train-the-trainer (TTT)

Train-the-trainer (TTT)
Community Level Training

Curriculum Highlights:

- Overview and definition of Infectious Diseases of Public Health Significance (IDPHS)
- Background on the 2014-2015 Ebola outbreak
  - Lessons learned
- Ebola facts and IDPHS facts (i.e. Zika, MERS-CoV)
- Industry-specific occupational exposure scenarios
- Industry-specific worker protection & infection control measures
Awareness Level Training

Curriculum Highlights:

• Overview and definition of Infectious Diseases of Public Health Significance (IDPHS)
• Background on the 2014-2015 Ebola outbreak
  • Lessons learned
• Ebola facts and IDPHS facts (i.e. Zika, MERS-CoV)
• Basic tools for identifying potential routes of exposure
• Industry-specific occupational exposure scenarios
• Industry-specific worker protection & infection control measures
• Drills and PPE demonstration donning and doffing
Operational Level Training

Curriculum Highlights:

• Overview and definition of Infectious Diseases of Public Health Significance (IDPHS)
• Background on the 2014-2015 Ebola outbreak
  • Lessons learned
• Ebola facts and IDPHS facts (i.e. Zika virus, MERS-Cov)
• Basic tools for identifying potential routes of exposure
• Industry-specific occupational exposure scenarios
• Industry-specific worker protection & infection control measures
• Donning, Doffing, and Limitations of Personal Protective Equipment
• Risk Communication Strategies & Global Health Security
Course & Program Evaluation

• Course Evaluations
  • On content and delivery immediately following course
  • Consider responses carefully and incorporate adjustments where appropriate

• Formal Program Evaluation
  • Annual progress report due to NIEHS (process evaluation)
  • Outcome evaluation of the entire program upon completion
References


Thank you!

For Further Questions or to Schedule a Training:

<table>
<thead>
<tr>
<th>Aurora Le, MPH, CPH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic Specialist</td>
</tr>
<tr>
<td>Biosafety and Infectious Disease Training Initiative (BIDTI)</td>
</tr>
<tr>
<td>Department of Environmental Health</td>
</tr>
<tr>
<td>Indiana University School of Public Health – Bloomington</td>
</tr>
<tr>
<td>1025 E. 7th Street, PH ENVR C022</td>
</tr>
<tr>
<td>Bloomington, IN 47405</td>
</tr>
<tr>
<td>Office: (812)-855-4756</td>
</tr>
<tr>
<td>Fax: (812)-8552488</td>
</tr>
<tr>
<td><a href="mailto:able@indiana.edu">able@indiana.edu</a></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Shawn Gibbs, PhD, MBA, CIH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Executive Associate Dean</td>
</tr>
<tr>
<td>Interim Associate Dean of Research</td>
</tr>
<tr>
<td>Professor, Department of Environmental Health</td>
</tr>
<tr>
<td>Indiana University School of Public Health – Bloomington</td>
</tr>
</tbody>
</table>