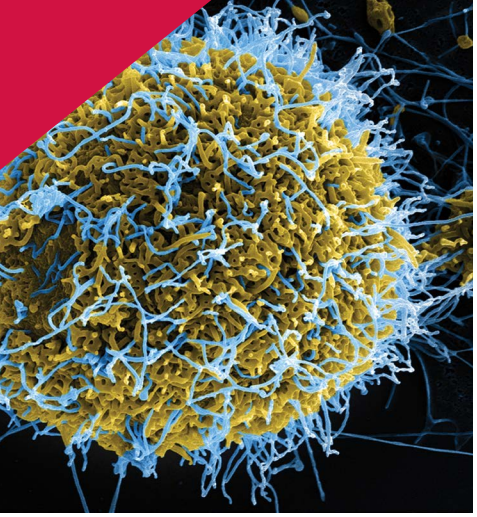
National Institute of Environmental Health Sciences
Worker Training Program

Ebola Biosafety and Infectious Disease Response Worker Training Program

A Multisector, All-Hazards Approach to Biosafety Preparedness

JUNE 2016 – MAY 2020



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Ebola Biosafety and Infectious Disease Response Worker Training Program

After the 2014 Ebola outbreak, the NIEHS Worker Training Program (WTP) implemented infectious disease response training for workers who could be exposed to infectious diseases on the job. This report provides an overview of accomplishments for the Ebola Biosafety and Infectious Disease Response (IDR) WTP. The IDR WTP was active from June 1, 2016 to May 31, 2020.*

Through the IDR WTP, NIEHS built federal capacity for occupational health and safety training and outreach in biosecurity, biopreparedness, and rapid response for emerging infectious diseases. This included developing content and training infrastructure for organizations responsible for training employers, workers, and community organizations who are a resource during public health emergencies.

NIEHS launched the program with the following federal agencies:

- Centers for Disease Control and Prevention (CDC)
- U.S. Department of Health and Human Services Office of the Assistant Secretary for Preparedness and Response
- National Institute for Occupational Safety and Health
- Occupational Safety and Health Administration

The IDR WTP was funded through a $10 million transfer to NIEHS via CDC using Ebola emergency supplemental appropriations. $9 million was used for grants under the IDR WTP.

NIEHS WTP aims to protect workers from exposures to harmful chemicals or pathogens. WTP funds nonprofit organizations, or grantees, to deliver nationwide health and safety training to workers who may be involved in handling hazardous materials or responding to emergencies.

Biosafety and infectious disease awareness training is essential for worker health and safety

Workers can be exposed to infectious disease by coming into direct content with an infected person, body fluids, pathogens on surfaces, or aerosol partilces in the environment. Workers who work closely with the public, such as health care workers and service industry workers, are likely to encounter infected individuals and transmit a pathogen or illness. Many infectious pathogens are transmissible without a person experiencing symptoms. Therefore, it is important to build training and awareness programs that apply an all-hazards approach to protect workers from exposure to infectious diseases.

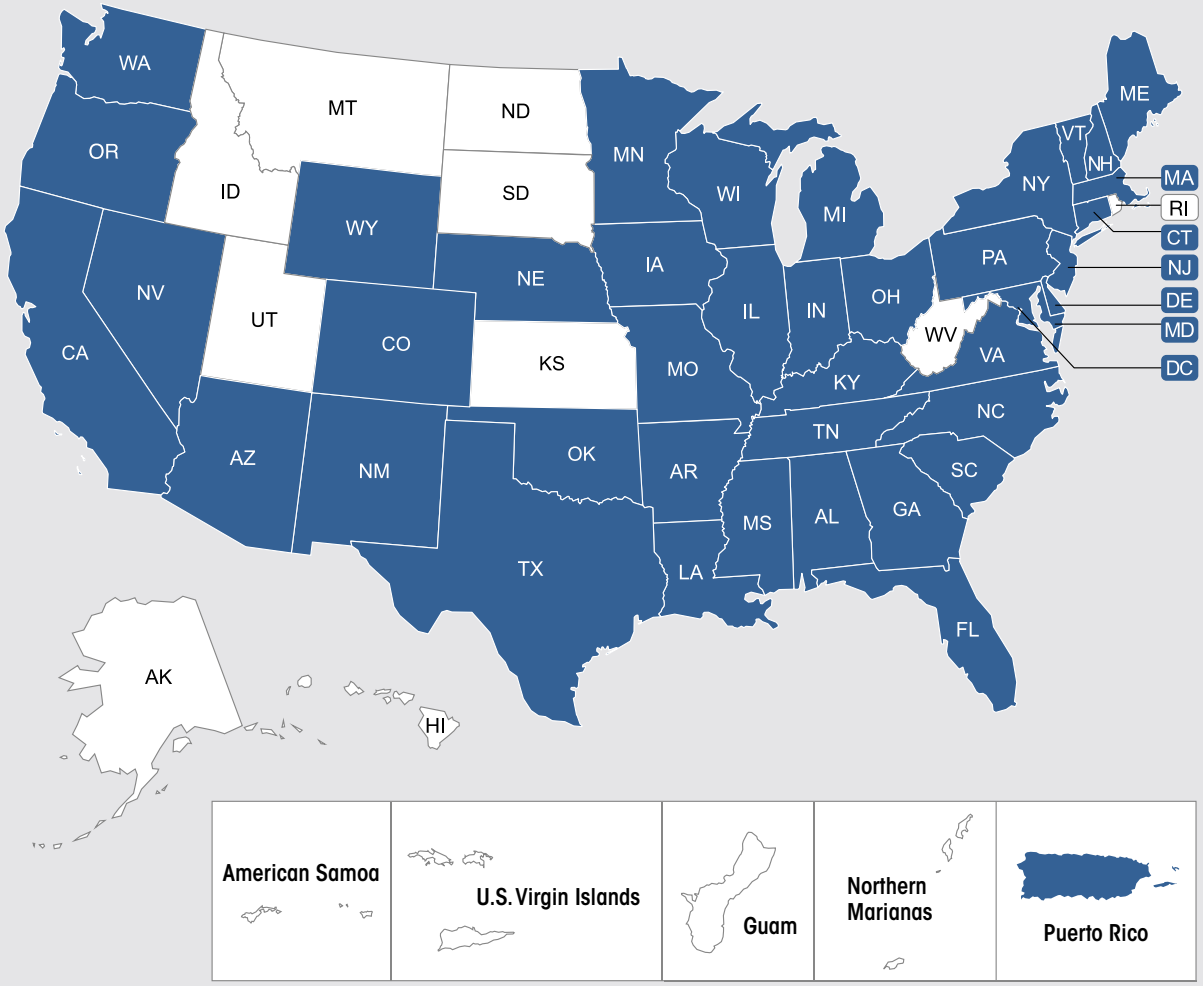
* The program was funded for three years, through May 31, 2019, and some organizations continued until May 31, 2020, through a no-cost extension on their grant.

IDR WTP Program Overview

Snapshot of Program Success

- Overall, grantees developed and delivered evidence-based infection control and hazard recognition training to over 40,000 individuals across the U.S.
- Grantees provided workers with the knowledge and skills to protect themselves, their families, and their communities from potential exposure to pathogens.
- The program built the capacity for infectious disease training across the country. Nearly 100 train-the-trainer and trainer development courses were provided to more than 1,200 workers who became trainers or increased their capacity to train others.
- The program allowed grantees to quickly mobilize and respond to the COVID-19 pandemic in early 2020. Many grantees offered a mixture of in-person and online courses, and as a result, a total of 79 COVID-19 related courses were delivered under the IDR WTP very early in the pandemic.

Training Delivery in 36 States and 1 Territory—IDR WTP, 2017-2020



- Airport/airline workers
- Construction workers
- Corrections workers
- Custodial/environmental service workers
- Death care workers
- EMS and first responders
- Health care workers
- Homeless outreach teams
- Military personnel
- Nail salon technicians
- Occupational health and safety professionals
- Public health workers
- Security and customs workers
- Volunteers/disaster workers
- Vulnerable populations

Program Accomplishments by the Numbers

Nearly 100 train-the-trainer courses were delivered across the country. These courses were used to share technical information and training methods for comprehensive trainer development. Train-the-trainer course topics included: Infectious Disease Awareness, Training Methods/Trainer Development, Infectious Disease Operations Train-the-Trainer, and Infectious Disease Trainer Refresher.

Other courses delivered were:

- Site Worker Refresher
- Resiliency
- PPE Awareness
- Drug Response Safety Awareness
- Blood Borne Pathogen Awareness
- Infection Control Risk Assessment
- Infection Disease Awareness
- Community-level Infectious Disease Awareness
- Infectious Disease Operations
- Infectious Disease Worker Refresher
- Pathogen Data Safety

Between June 1, 2016 and May 31, 2020, approximately 1,900 courses were delivered to 43,787 workers, with more than 165,000 contact hours in 40 states, the District of Columbia, and Puerto Rico. During the early months of the COVID-19 pandemic, grantees shifted to training via online platforms and workers were able to access courses from a wide variety of locations.

Building Capacity for Infectious Disease Response Across the Country:

Training Highlights

Below are training highlights from IDRTP grantees between June 1, 2016, and May 31, 2020. The highlights are organized by occupational sectors trained, grantees, and states where training was delivered.

Health Care Workers, Faculty, and Students

GRANTEE: **Deep South Biosafety WTP at the University of Alabama Birmingham (UAB), with consortium member The University of Mississippi Medical Center (UMMC)**

STATES: Alabama, Mississippi

This program offered awareness- and operations-level courses to a variety of sectors and occupations at hospital-based institutions in Alabama and Mississippi. The program also developed training resources, such as personal protective equipment (PPE) checklists and a train-the-trainer best practices guide. For refresher courses, UMMC and UAB offered simulation training, allowing participants to get further hands-on experience. UAB and UMMC also trained faculty and students from schools of nursing across Alabama and Mississippi.

GRANTEE: **Duke Infectious Disease Response Training Program (DIDRT), with consortium members University of Louisville and George Mason University (GMU)**

STATES: Kentucky, North Carolina

DIDRT training reached many in the health care and academic health care center sectors. For example, training was delivered to Duke University clinical microbiology lab workers, stem cell transplant lab workers, Duke Human Vaccine Institute lab workers, and Duke University Spill Response Team members. Under DIDRT, University of Louisville launched an operations-level training for third-year nursing students. This training has since been incorporated into the school's nursing curriculum for students preparing themselves for the clinical setting.

University of Louisville School of Nursing Training (Louisville, KY). Photo courtesy of DIDRT

GRANTEE: **United Steelworkers Tony Mazzocchi Center (USW TMC), with consortium member Communications Workers of America (CWA)**

STATES: California, Illinois, New York

USW TMC and CWA have both delivered training to health care union members through this consortium. USW TMC conducted a train-the-trainer program and awareness training for the USW health care sector. Additionally, infectious disease safety and health training sessions were conducted for CWA-represented employees at University of California medical centers (designated Ebola Treatment Centers). Student outcomes include advocating for safer workplaces, encouraging colleagues to take the courses, and changing safety policies at their place of work.

Emergency First Responders

GRANTEE: **Atlantic Center for Occupational Health and Safety, with consortium member Universidad Metropolitana (UMET)**

TERRITORY: Puerto Rico

UMET provided training to support first responders to disasters and outbreaks

in Puerto Rico. UMET provided 4-hour PPE for Infectious Diseases courses to responders, which facilitated knowledge and skills development in the selection, putting on, and removal of PPE.

GRANTEE: **Emory Ebola Biosafety and Infectious Disease Response WTP**

STATES: Florida, Georgia, Nebraska, South Carolina, national reach

Emory worked closely with large national emergency response partners American Medical Response and Air Methods Corporation. Through these partnerships, over 9,700 students across the country completed awareness courses. Additionally, operator and technician level courses were taught in Georgia, Florida, South Carolina, and Nebraska. Emory's training reached transport providers in critical places, such as the Hartsfield-Jackson Atlanta International Airport, which has an on-site quarantine station and was involved in transport to the Emory Ebola Treatment Center.

GRANTEE: **Duke Infectious Disease Response Training Program (DIDRT), with consortium member GMU**

STATES: Washington, D.C. Virginia, Washington State

DIDRT conducted trainings for both rural and urban firefighters to help them prepare for potential exposures to infectious pathogens. GMU conducted an exercise for the Fauquier County Fire Department in Warrenton, Virginia, where the firefighters had to respond to and transport a simulated sick patient from a residence during an epidemic. Under GMU's leadership, the entire DIDRT consortium provided infectious disease response training to over 960 fire and emergency medical services (EMS) personnel in Washington, D.C. and Virginia. In addition, GMU trained the Spokane Ebola Response Team with American Medical Response, which was facilitated by the Washington State Region 9 Healthcare Coalition. This first responder team is responsible for the medical transport of highly infectious patients.

GMU First Responder Training. Fauquier County Fire and Rescue (Warrenton, VA). Photo Courtesy of DIDRT

GRANTEE: **Deep South Biosafety WTP, with consortium member Alabama Fire College Workplace Safety Training (AFC WST)**

STATES: Alabama, Mississippi

AFC WST trained first responders in the Southeast, focusing on firefighters and EMS in Alabama and Mississippi. AFC WST delivered both infectious disease awareness and operations courses to fire department employees, such as the Vestavia and Pelham Fire Departments outside Birmingham, Alabama.

Construction Trades and Workforce Development

GRANTEE: **LIUNA Training and Education Fund**

STATES: Iowa, Louisiana, Michigan, New Jersey, New York, Pennsylvania

LIUNA trained construction craft laborers to work safely in hospital or other health care settings and to conduct cleanup, decontamination, and disinfection activities following an infectious disease incident. LIUNA also delivered Infection Control Risk Assessment (ICRA) training. ICRA is required by health care facilities and employers for on-site construction projects to help prevent the spread of airborne pathogens through construction dust and protect workers from encountering contaminated surfaces or airborne pathogens.

GRANTEE: **International Chemical Workers Union Council (ICWUC)**

STATE: California

In Oakland, trainers at the Cypress Mandela Training Center taught ten infectious disease awareness courses to over 220 students as part of the center's pre-apprenticeship program. Awareness courses covered bloodborne pathogens, waterborne diseases, Zika, and Ebola. These courses had an impact on a range of workers and many graduates gained employment in the skilled trades. The courses were supported through ICWUC's partnership with the Coalition of Black Trade Unionists.

Disaster Preparedness, Response, and Recovery

Many NIEHS grant recipients provided training to workers in response to the 2017 hurricane season and the infectious disease hazards posed during cleanup and recovery. Some delivered train-the-trainer courses, which allows for local dissemination of infectious disease safety information.

University of Puerto Rico students and AFSCME members in San Juan take part in a PPE exercise to protect themselves during disaster cleanup. (Photo courtesy of ICWUC)

GRANTEE: **International Chemical Workers Union Council (ICWUC), with consortium members American Federation of State, County, and Municipal Employees (AFSCME); National Nurses United (NNU); American Federation of Teachers (AFT); and National Council for Occupational Safety and Health (NCOSH)**

STATES/TERRITORY: Florida, Puerto Rico, Texas

ICWUC consortium members have many union members and local partners in hurricane-affected areas who need ongoing training and PPE to protect themselves during cleanup. AFSCME, NNU, and AFT delivered disaster and infectious disease training to Puerto Rico residents and volunteers. ICWUC also partnered with University of Puerto Rico to train graduate students. ICWUC conducted infectious disease train-the-trainer courses in Fort Lauderdale, Florida, for NNU and in Houston, Texas, for local partners affiliated with NCOSH.

GRANTEE: **Emory Ebola Biosafety and Infectious Disease Response WTP**

STATE/TERRITORY: Kentucky, Puerto Rico

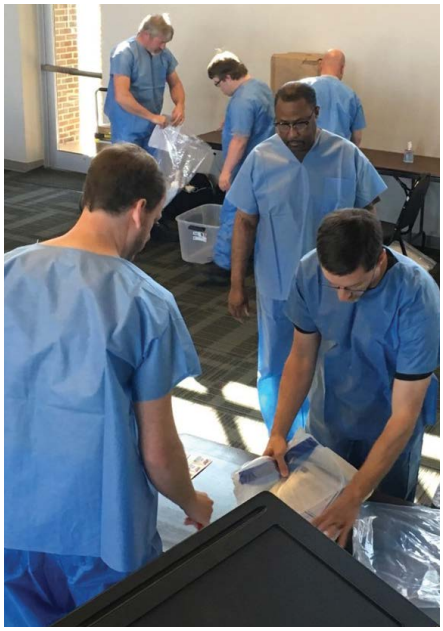
Through the Health Resources and Services Administration Region IV Public Health Training Center, Emory partnered with University of Louisville trainers to prepare electrical lineman working for Louisville Gas and Electric/Kentucky Utilities prior to disaster relief work in Puerto Rico. The group was chosen to restore power to remote areas of the island following the devastation of Hurricane Maria.

Death Care

GRANTEE: **Deep South Biosafety WTP**

STATE: Alabama

The program delivered awareness, operations, and train-the-trainer courses to the Alabama State Mortuary Operations Response Team (SMORT), a group of volunteers who met and trained annually to prepare for response to a potential mass casualty event. The occupations trained included a forensic pathology specialist, funeral directors and coroners, and representatives from emergency management agencies.



Infectious Disease Operations and Train-the-Trainer Alabama State Mortuary Operations Response Team, Tuscaloosa, Alabama. Photo courtesy of Deep South Biosafety Worker Training Program - The University of Alabama at Birmingham

GRANTEE: **Biosafety and Infectious Disease Training Initiative (BIDTI) at Indiana University Bloomington**

STATES: Illinois, Ohio

BIDTI trained senior students at Worsham College of Mortuary Science in Wheeling, Illinois, to provide infection control information specific to the mortuary industry. The training was for those who might handle highly infectious deceased bodies, instilling good practices before graduates enter the workforce. BIDTI also provided a session at the Ohio Embalmers Association professional embalmer seminar.

Environmental Service (EVS) Workers, Sanitation Workers, and Domestic Cleaners

GRANTEE: **LIUNA Training and Education Fund**

STATES: District of Columbia, Texas

LIUNA instructors trained service employees who are primarily janitorial, housekeeping, and food service workers in large government facilities, often Veterans Affairs hospitals. These EVS workers in hospitals or other settings generally do not have the opportunity for infection control education and PPE trainings. The joint labor-management Service Contract Education and Training Trust Fund facilitated the training.

GRANTEE: **USW TMC, with consortium members National Day Laborer Organizing Network (NDLON) and Make the Road New York (MRNY)**

STATE: New York

NDLON affiliate Wind of the Spirit conducted 51 classes reaching more than 1,300 people engaged in a wide range of work, including cleaning, sanitation, highway cleaning, and portable sanitary relief maintenance. MRNY conducted additional classes for participants primarily from Latino immigrant communities. These workers came from a variety of jobs, including domestic and commercial cleaning workers, private trash collectors, and laundry workers. These training sessions help participants maintain their job or obtain jobs that require infectious disease training and understand their rights as workers and the responsibilities of employers.

Homeless Outreach and Substance Abuse Prevention Workers

GRANTEE: **Biosafety and Infectious Disease Training Initiative (BIDTI) at Indiana University Bloomington**

STATES: Indiana

BIDTI trained staff at Shalom Community Center, an all-inclusive resource center for people experiencing hunger and homelessness in Bloomington, Indiana. As a community-based organization, Shalom's PPE came from donations and therefore workers and volunteers did not have uniform sets of PPE. This posed a challenge for BIDTI's trainers. Trainers met the challenge by delivering PPE awareness training and the basic principles underlying donning and doffing, maintenance, and decontamination.

Nail Salon Technicians

GRANTEE: **Atlantic Center for Occupational Health and Safety Training, with consortium member New York Committee for Occupational Safety and Health (NYCOSH)**

STATE: New York

NYCOSH delivered five-day infectious disease training courses for over 600 nail salon technicians. The courses covered the multiple infectious hazards faced on the job, such as fungal infections, bacterial infections, and other bloodborne pathogens. The courses also addressed methods of infection control and demonstrated the use of PPE with hands-on activities. The training was delivered in Spanish and Nepalese in New York City. Overall, the trainings provided important support for workers' access to jobs, built worker leadership, and made important progress towards creating a health and safety culture in the nail salon industry.

Nail Salon Technicians participating in an exercise where they use red balloons to learn about the transmission of bloodborne pathogens. Courtesy of NYCOSH

Military

GRANTEE: LIUNA Training and Education Fund

STATES: California, Michigan, national outreach

LIUNA provided three infectious disease awareness courses for 43 National Guard Reserve members of LIUNA Local 1776. These reserve members gained skills for potentially hazardous situations, such as being deployed to areas with inadequate sanitation or to disaster sites. Ten members were trained at the Michigan Laborers Training and Apprenticeship Institute, and the rest were trained at a National Guard conference in southern California.

Airline and Airport Workers

GRANTEE: ICWUC, with consortium member University of Minnesota

STATE: Minnesota

University of Minnesota delivered infectious agents training to cabin cleaners, flight attendants, and maintenance personnel from two airline companies, Sun Country Airlines and Global Aviation Services. The workers learned about infectious agents, biological hazards, and PPE that can be used for a biological response in a workplace setting.

Training for Sun Country Airlines cabin crew by University of Minnesota (UMN). (Photo courtesy of UMN)

GRANTEE: USW TMC, with consortium member CWA

STATES: Illinois, Texas

CWA trained passenger agents and flight attendants on infectious disease health and safety. Passenger agents, worked with American Airlines, Envoy Air, and Piedmont Airlines. The CWA Occupational Safety and Health Department worked with the Association of Flight Attendants (AFA)-CWA trainers to conduct training sessions for flight attendants. AFA-CWA represents 50,000 flight attendants employed by over 25 airline companies.

Public Health Workers

GRANTEE: Emory Ebola Biosafety and Infectious Disease Response WTP

STATES: Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee Emory partnered with the Health Resources and Services Administration Region IV Public Health Training Center to provide training for public health personnel at or associated with state or local health departments, as well as health care workers who practice in rural areas of the U.S. and are supported by Area Health Education Centers. The Public Health Training Center offers serious contagious disease awareness and hands-on education and training.

GRANTEE: Duke Infectious Disease Response Training Program (DIDRT)

STATES: North Carolina, Tennessee

DIDRT trained both county and state health department employees at the operations and train-the-trainer level. Various workers at the Stokes County, North Carolina, health department were trained, such as nurses, custodial, and maintenance workers, and six workers completed a train-the-trainer course. Twenty workers at the Tennessee State Department of Health completed operations-level training.

GRANTEE: Atlantic Center for Occupational Health and Safety Training

STATE: New Jersey

Rutgers collaborated with the New Jersey Department of Health to develop five videos and corresponding resource materials to help train the public health workforce on infectious disease investigations. The videos and resources enable public health professionals to increase their knowledge of the basic investigation protocols and understand essential actions that need to take place during an infectious disease outbreak. The goal of the project was to provide an overview of infectious disease investigation basics to ensure consistent disease investigation across New Jersey.

Screen shot of video training series. Courtesy of Rutgers University School of Public Health

Occupational Health and Safety Professionals

GRANTEE: Biosafety and Infectious Disease Training Initiative (BIDTI), with consortium member The University of Texas Health Sciences Center at Houston (UTHealth)

STATES: Texas, national reach

UTHealth delivered a webinar on tuberculosis to over 100 occupational professionals and physicians at ExxonMobil campuses nationwide. UTHealth also delivered a full-day, operations-level training at the American Bio Recovery Association national conference, a gathering of professionals who mitigate and cleanup conditions resulting from the release of biological hazards.

provide an overview of infectious disease investigation basics to ensure consistent disease investigation across New Jersey.

Photo Courtesy of Deep South Biosafety WTP – VR training Ebola Doffing module updated for COVID-19 pandemic

COVID-19 Pandemic

The infrastructure that was built under the IDR WTP allowed grantees to rapidly respond to worker health and safety needs during the early months of the COVID-19 pandemic. This program model improved awareness of infectious disease risks beyond those working in health care and into a broad array of work environments.

Many of the grantees adapted and advanced their work on Ebola and occupational infectious disease training to expand it and address COVID-19 workplace risks. From January to May 2020, (during the no-cost extension period), over 8,000 workers were trained under the IDR WTP. The trainings and courses were adapted to meet the evolving demands of the pandemic.

Biosafety and Infectious Disease Training Initiative (BIDTI)

In March 2020, BIDTI opened a virtual training for Cincinnati College of Mortuary Sciences CCMS to local funeral directors and mortuary workers in Ohio and Indiana. During this training, trainers advised these funeral directors and mortuary workers about changes to exposure control plans due to the COVID-19 pandemic and advocated for appropriate protections in their field.

The trainers also connected workers to resources through the National Funeral Directors Association and encouraged them to share their knowledge and skills with co-workers and supervisors who were not able to attend the virtual training.

Deep South Biosafety WTP

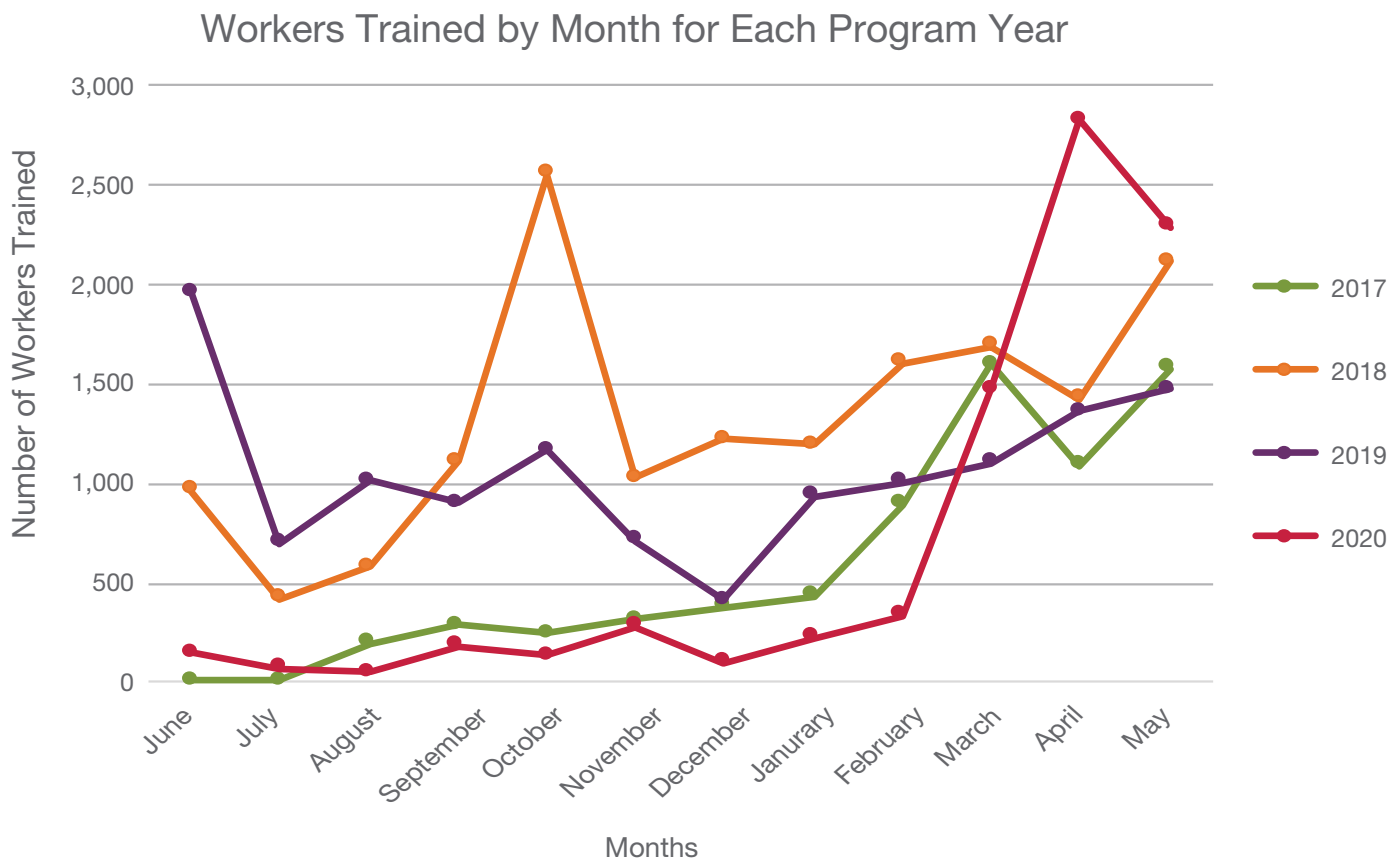
Deep South Biosafety WTP was able to add COVID-19 specific courses, including procedural donning and doffing videos. Improvements were made to the virtual reality (VR) training originally made for Ebola-focused trainings. Also, some trainings were conducted in-person on infectious disease awareness and operations. In total, 1,061 participants were trained in 45 trainings and 1,744 contact hours during the no-cost extension.

International Chemical Workers Union Council (ICWUC)

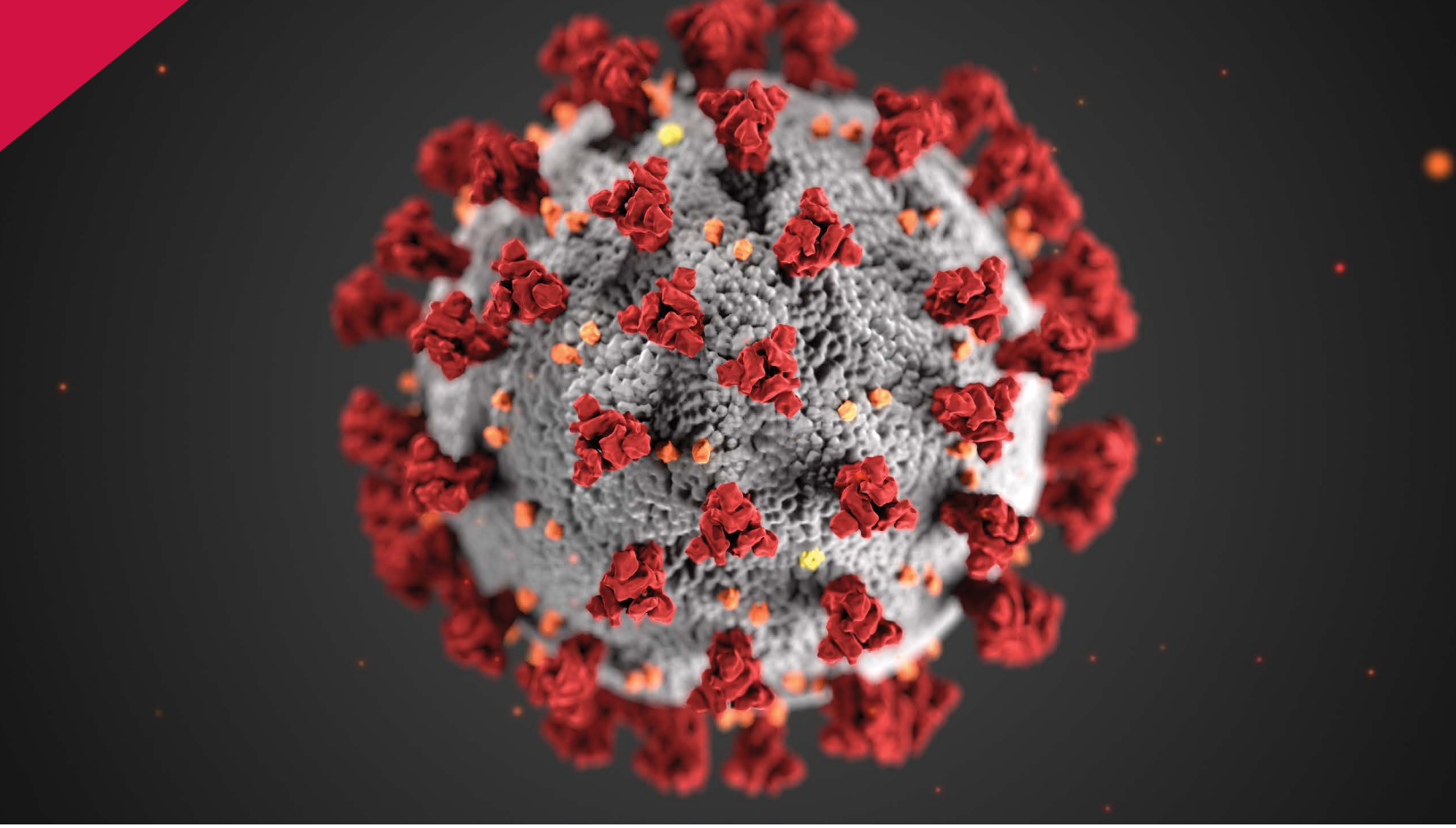
From March 2020 to May 2020, ICWUC delivered 37 courses to over 3,350 students. ICWUC became a hub for communications and trainings on COVID-19 for their consortium organizations. Developed factsheets and a weekly bulletin, conducted assistance webinars, and had a team dedicated to COVID-19 updates.

LIUNA

LIUNA was able to quickly update their Infectious Disease Operations and Infectious Disease Awareness curricula before closing their offices. In doing this, LIUNA members had access to updated quality curricula and training at a crucial time. In March 2020, the LIUNA Training Infectious Disease app was launched and was then downloaded 1,765 times in the first 2 months. The app features games, training videos, vital safety information, and more.



The graph above shows the workers trained by month for each program year from 2017-2020. This includes the 2020 no-cost extension year, which ran from June 2019-May 2020. The drastic increase in workers trained in early 2020 compared to other program years was due to the early phase/response to the COVID-19 pandemic.



Usefulness of the IDR WTP for COVID-19 Health and Safety Training

An evaluation report was published by NIEHS in 2021 for WTP's COVID-19 biosafety training and infectious disease response training activities. The evaluation highlights grantee perspectives, training activities, and recommendations for future responses.

One section of the findings concentrates on participant descriptions of how the Ebola Biosafety Infectious Disease Response Training Program helped prepare grantee organizations and consortiums in their response to COVID-19. Positive feedback came from the IDR WTP grantees and non-grantees. Participants also discussed the need for sustained funding.

Ebola Grantees

> "We were able to go in and do a lot of this personal protective training, the donning and doffing, able to take that Ebola checklist we had created for donning and doffing, and able to adjust that and train on that and really helped increase worker confidence in healthcare at that time."

> "Over the years the funding we received has been able to develop a cadre of instructors, and the different types of disasters over the years has enabled us to come up with core curricula that could be customized to different types of disasters. And the other infectious disease training developed over the years has been the framework for what we developed this year, including the previous Ebola training. As you develop training it scaffolds, and that has been an important lesson over the years."
> Biosafety Training and Infectious Disease Response Evaluation Report

> We had a framework from our disaster response program, to have gone through Ebola, it appears with the COVID-19 awareness it helped us be proactive rather than reactive.

> It was hard to get hold of good information and resources that were oriented towards protecting the workers from infectious diseases. That funding set the standard for us doing this work, and secondly its interesting how one grant or supplemental can end up helping another one.

> We received the Ebola grant, and that helped prepare us for an infectious disease perspective. Just the fact that NIEHS funding had enabled us to create a cadre of trainers. We did not have to do any training on how to deliver materials, because they already knew that. We did not get caught up as badly as some may have in terms of needing to order equipment during the pandemic. We kind of had the infrastructure established that enabled us to kind of move forward a lot quicker, had the NIEHS funding not been available.

> We also had one of the biosafety grants, and because we had that expertise in place, we were able to quickly gear up to increase training in the area of infectious disease, in particular COVID-19 and in the health and safety requirements due to COVID-19. I also think having this existing consortium in place gave us quick access to subject matter expertise.

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Non-IDR WTP Grantees

> Our group did not have those funds. Even as a grantee not directly in that program, to have the resources coming out of those groups available to us was really key.

> The fact that this infrastructure was in place was amazingly helpful. If that had not been there, there was no way to pull it that quickly. We were able to pull it together quickly. Not because we were ready, but because the larger picture of grantees was ready.

Sustained Funding as Ebola Grants Ended

> We used what was funded for the Ebola training to use that as a steppingstone for COVID… we will be including it into our other trainings.

> With the Ebola money that came out and other programs, as we go further away from the event the money starts goes away, and we have no way of keeping this expertise in our worker populations. This is an example of the biosafety funding with NIEHS, it happened to end right before this pandemic so we still had some resources that were up to date that we could take very quickly, but if it had happened 5-years down the road I am not so sure the same could have been said...

> Some of you had the Ebola grants, and I think it was a godsend it happened after that program had existed, but it was limited by the fact the program went away. It would be good if there was some way for the program to maintain something active in areas.

> The particular funding that we participated in from WTP for Ebola set us up and going forward. We got the infrastructure in place to address what comes next. We have experts who can take the information process and apply it. We are in a better place… to move forward onto the next one.

The report included lessons learned that can contribute to infectious disease response in the future. The lessons learned as well as recommendations can be found in the full report.

Challenges and Future Needs

Challenges and future needs were found from the beginning of the Ebola epidemic and through implementation of the IDR WTP.

Findings from the Ebola Needs Assessment and Gap Analysis

In 2015, NIEHS published "Ebola Biosafety and Infectious Disease Response Training: Needs Assessment and Gap Analysis for the NIEHS Worker Training Program."

The report discusses gaps in integration between public health, medical, occupational health, and worker safety activities; minimal protective guidance informing the full spectrum of workers; and the difficulty of sustaining a high level of readiness and worker competency. Although the training and partnerships developed in the program addressed areas of integration and built capacity across the country, there are continued unmet needs and challenges for worker training in the field.

Perspectives on Training Delivery from Grantees

During the IDR WTP, grant recipients reported two common challenges:

There is less motivation from organizations when highly infectious pathogens are not in the news.

> "The threat of high consequence infectious disease exposure is always present, but public and employer interest in providing dedicated education and training can wane absent a high visibility public health emergency."

> "…both the general worker who may casually come into contact with pathogens and the worker who may respond to a disaster or highly hazardous situation tend to disregard opportunities for training until it becomes necessary…"

It is difficult for organizations and workers to commit to the longer courses that are needed for operations-level training. In some cases, it is even difficult for them to commit to the shorter awareness level training.

> "Feedback from many organizations that did accept our trainings last year stated they thought the topic of biosafety and infectious disease was important, but they could not afford for their workers to attend a full-day or multi-day training."

> "Some populations strongly desire training and yet can't access it even when it is available. This cannot easily be solved, as work obligations limit opportunities."

Challenges Reported in Published Literature

Hospital, Medical, and Emergency Response Training Needs

Hospital staff and EMS have an ongoing need for continued capacity building through operations-level training, refresher training, and drills.

In a 2017 article authored by BIDTI, acknowledges a reduced a capacity to fully address an infectious pathogen outbreak. Gaps in funding and lack of adequate, coordinated training contribute to this issue of limited capacity.

Training Needs for Non-health Care Sectors

Certain non-health care occupations, such as environmental cleaners and construction workers, have few options for obtaining knowledge about highly infectious pathogens, especially in more vulnerable populations such as immigrant workers.

Using a separate funding source, authors from BIDTI surveyed individuals from several sectors to assess training needs around potential exposure to highly infectious agents. Their gap analyses found industry-specific education, training, and policy needs in all the populations surveyed: medical waste, death care, EMS, and U.S. Aircraft Rescue and Fire Fighting members.

The Fauquier County Fire Department participates in a GMU training in Warrenton, Virginia. Trainees are responding to a simulated sick patient with a mock ambulance. (Photo courtesy of DIDRT)

Efforts at Sustainability

The program's training efforts have resulted in several outcomes that address sustainability of infectious disease training, including:

- Permanent integration of curriculum into health care or EMS training program requirements or options.
- Certification of training courses by various continuing education organizations.
- Integration and availability of modules and content under other hazardous waste worker and emergency response training programs.
- Adaptation of Ebola program trainings, tools, and curricula for new and emerging infectious disease trainings, such as COVID-19 trainings.
- Partnerships with subject matter experts and organizations across various NIEHS WTP training programs, such as the IDR WTP, Hazardous Waste Worker Training Program, and HAZMAT Disaster Preparedness Training Program, were essential to the continual support and sharing of expertise during the COVID-19 pandemic.

Construction craft laborers learn how to protect themselves against exposure to infectious pathogens. (Photo courtesy of LIUNA Training)

Curricula, Media, and Publications

The following curricula, media, and publications were developed by or feature NIEHS WTP and grantees.

Curricula

Curricula are available in the Curricula Catalog, which is part of the NIEHS National Clearinghouse for Worker Safety and Health Training (Clearinghouse). More than 40 new curricula were added during the program training years.

A Pathogen Safety Data (PSD) Guide and a PSD Training Module are available from the NIEHS WTP and the Clearinghouse. These materials clarify the use of PSD resources currently available for development of infectious disease occupational exposure control plans in a broad spectrum of industries. The PSD Guide reviews existing PSD resources and their strengths and limitations and explains how to access them. The training module was developed to train workers who face potential exposure to infectious pathogens on how to use the PSD Guide and related resources.

Also, NIEHS WTP, using a separate funding source, supported the Western Region Universities Consortium (WRUC) in the development of a curriculum that trains nurses on the California ATD Standard. The 8-hour course is designed to provide an introduction to aerosol transmissible disease hazards in direct healthcare settings and requirements under the Cal/OSHA ATD Standard in California. The curriculum is available for dissemination and could be expanded or tailored to other states to help address the lack of national regulation or guidance on protections against diseases transmitted by fine particles suspended in the air.

More resources on Ebola, COVID-19, and other infectious diseases can be found in the Material Upload and Search Tool for Infectious Disease (MUSTID).

Newsletter Articles and Media Coverage

"UAB doctors to develop and implement infectious disease training across the South," ABC News Affiliate in Birmingham, June 1, 2016

"UAB doctors to develop and implement infectious disease training across the South," ABC News Affiliate in Birmingham, June 1, 2016

"New Fronts in the Battle Against Emerging Infectious Diseases," DukeMed Alumni News, Fall 2016, pp. 24-29

"Biosafety and Infectious Disease Training Initiative Team to Present at National Public Health Conference", P2R Academy News, October 1, 2016

"Up Close with Dr. Shawn Gibbs and Ms. Aurora Le," Mesh Coalition, December 12, 2016

University of Louisville Today radio interview with Paul McKinney, Feb. 20, 2017

"Whooping Cough Cases Double in Indiana in a Year, Prompting a Call to Vaccinate," New York Times, July 27, 2017

"Public Health Minute with Dr. William Latimer feature of Dr. Shawn Gibbs and BIDTI Consortium," December 2017

"After the Ebola Outbreak: Lessons Learned," Emory Medicine, Winter 2018

"Health Care Workers Receive Biosafety Training," Alabama's Health, Vol 51(2), July 2018, p. 4

NIEHS Highlights

"Learning from the past, training for the future," highlighting BIDTI, Environmental Factor, November 2017

"NIEHS staff honored with NIH Director's Awards," Environmental Factor, October 2017

"Infectious disease training improves airport worker preparedness," highlighting DIDRT, Environmental Factor, July 2017

"Shawn Gibbs, Ph.D. – Advancing Infectious Disease Preparedness Beyond Healthcare," Grantee Highlight, August 8, 2018

"Helping Workers Respond to Infectious Diseases Safely," Stories of Success, March 19, 2019

"Expanding Infectious Disease Response Training to Diverse Worker Populations," Stories of Success, June 18, 2019

"Protecting workers during the COVID-19 outbreak," highlighting Emory University, Environmental Factor, April 2020

Spring 2020 Workshop, "Using Best Practices to Sustain Training Programs During COVID-19 and Other Disasters", April 2021

Evaluation of WTP COVID-19 Activities: Summary Report and Full Report, December 2021

More resources on Ebola, COVID-19 and other Infectious diseases can be found through the Material Upload and Search Tool for Infectious Disease (MUSTID). This tool was funded through the COVID-19 response and contains a variety of resources related to infectious diseases.

Video Training Highlights

Video summary from Lee County, Florida, EMS of an Emory University training and exercise of a transport from one of their local hospitals to an airfield

Rutgers University webinars led by the university biosafety officer:

- H7N9 Influenza Webinar
- Influenza Webinar
- Measles Webinar

Journal Articles and Commentaries

Yeskey K, Hughes J, Galluzzo B, Jaitly N, Remington J, Weinstock D, Lee Pearson J, Rosen JD. 2017. Ebola virus training: a needs assessment and gap analysis. Health Security 15(3):225-229.

The following articles and commentary, written by authors from BIDTI, were completed under separate funding. The papers contributed to the development of NIEHS-funded training courses, discussed the national role of the IDR WTP, or acknowledged the support of NIEHS funding in highlighting the need to understand training gaps in specific worker populations.

Le AB, Hoboy S, Germain A, Miller H, Thompson R, Herstein JJ, Jelden KC, Beam EL, Gibbs SG, Lowe JJ. 2018. A pilot survey of the U.S. medical waste industry to determine training needs for safely handling highly infectious waste. Am J Infect Control 46(2):133-138.

Emery RJ, Rios J, Patlovich SJ. 2018. Biosafety program analytics initiative for the advancement of the profession. Appl Biosaf 23(2): 67-69.

Le, A.B, Brooks, EG, McNulty, LA, Gill, JR, Herstein, JJ, Rios, J, Patlovich, SJ, Jelden, KC, Schmid, KK, Lowe, JJ, Gibbs, SG. 2018. U.S. Medical Examiner/Coroner Capabilities to Handle Highly Infectious Decedents. Forensic Sci, Med and Pathol 15(1):31-40.

Le AB, Buehler S, Maniscalco PM, Lane P, Rupp LE, Ernest E, Von Seggern D, West K, Herstein JJ, Jelden KC, Beam EL, Gibbs SG, Lowe JJ. 2018. Determining training and education needs pertaining to highly infectious disease preparedness and response: a gap analysis survey of US emergency medical services practitioners. Am J Infect Control 46(3):246-252.

Le AB, Herron R, Herstein JJ, Jelden KC, Beam EL, Gibbs SG, Lowe JJ, Smith T. 2018. A gap analysis survey of US Aircraft Rescue and Fire Fighting (ARFF) members to determine highly infectious disease training and education needs. Disaster Med Public Health Prep 21:1-5; doi:10.1017/dmp.2017.142.

Le AB, Biddinger PD, Smith PW, Herstein JJ, Levy DA, Gibbs SG, Lowe JJ. 2017. A highly infectious disease care network in the US healthcare system. Health Secur 15(3):282-287.

Le AB, Witter L, Herstein JJ, Jelden KC, Beam EL, Gibbs SG, Lowe JJ. 2017. A gap analysis of the United States death care sector to determine training and education needs pertaining to highly infectious disease mitigation and management. J Occup Environ Hyg 14(9):674-680.

Emery, RJ, Patlovich, SJ, King, K, Lowe, JJ, Rios, J. 2016. Comparing the established competency categories of the biosafety and infection prevention professions: a possible roadmap for addressing professional development training needs for a new era. Appl Biosaf 21(2): 79–83.

Appendix

The eight primary consortiums were:

- Atlantic Center for Occupational Health and Safety Training
- Biosafety and Infectious Disease Training Initiative at Indiana Bloomington (BIDTI)*
- Deep South Biosafety WTP at The University of Alabama at Birmingham (UAB)*
- Duke Infectious Disease Response Training Program (DIDRT) at Duke University
- Emory Ebola Biosafety and Infectious Disease Response WTP at Emory University*
- International Chemicals Workers Union Council (ICWUC) Center for Worker Health and Safety Education*
- Laborers' International Union of North America (LIUNA) Training and Education Fund*
- United Steelworkers Tony Mazzocchi Center (USW TMC)

*Grantees that received a no-cost extension to deliver training for an additional year.

NIEHS IDR WTP program data (Years 1-3 and *no-cost extension year)

Year	Workers Trained	Courses	Contact Hours
2017	7,051	374	32,619
2018	15,886	691	58,220
2019	12,741	651	54,870
2020*	8,106	191	19,447
Total	43,787	1,907	165,156

Synchronous and asynchronous on-line training data for years 1-3 of IDR program

On-line only courses	Number of courses	Percent (courses)	Workers trained	Percent (workers)	Contact hours	Percent (contact hours)
N	1310	76%	22,485	62%	129,878	89%
Y	406	24%	13,575	38%	15,831	11%
Total	1,716	100%	36,060	100%	145,709	100%

National Institute of
Environmental Health Sciences
Worker Training Program

For more information on the NIEHS Ebola Biosafety and Infectious Disease Response Worker Training Program, visit:
https://www.niehs.nih.gov/careers/hazmat/about_wetp/ebola/index.cfm.

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