NIH National Institute of
Environmental Health Sciences
Worker Training Program

COVID-19 Biosafety Training and Infectious Disease Response Evaluation Report

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Contents

Executive Summary

In March 2020, in response to the COVID-19 pandemic, the federal government of the United States (U.S. government) issued an emergency declaration. The National Institute of Environmental Health Sciences (NIEHS) Worker Training Program (WTP) received Congressional appropriations to fund worker-based training to prevent and reduce exposure to the coronavirus. WTP evaluated their COVID-19 training program for effectiveness, outcomes, and impact. This evaluation report focuses on data and results provided by WTP funded organizations (grantees) gathered from annual progress reports, training courses provided, a survey of grantee leadership and staff, and a focus group of grantee leadership and staff.

Training Data

Grantees uploaded progress reports and training course data to the NIEHS Data Management System (DMS); data was downloaded by the evaluators. During the 2020 program year, across all WTP funding streams or program areas, 34,741 people were trained in 1,004 courses focused on COVID-19, for a total of 76,398 contact hours. The courses delivered to the most workers were Infectious Disease Awareness, Community-level infectious disease awareness, Final Rule Awareness (a hazardous material overview course applied to COVID-19), Infectious Disease Operations, and Infection Control Risk Assessment.

Progress Reports

Based on progress report findings, the funded trainings generally used materials from the NIEHS WTP "Protecting Yourself from COVID-19 in the Workplace" and "Protecting Workers from COVID-19 in the Workplace: Essential and Returning Workers Training Tool." While grantees reported that many training programs were canceled due to COVID-19, some grantees described training delivered using adaptable methods under social distancing. And, in addition to general awareness courses, they included integrating COVID-19 into broader topics and disseminating courses online. WTP support aided the online training of grantees and instructors in the development and delivery of worker training program curricula by NIEHS. Grantees reached out to vulnerable populations with training and resources to support those most at risk, including American Indians, Alaska Natives, tribal organizations, and specific high-risk occupational sectors.

Ratings for COVID-19 training effectiveness and outcomes were limited, as evaluations take time and the results may not have been available or finalized by the progress report program year 2020 deadlines. However, reported effectiveness findings were generally positive. Descriptions of outcomes from COVID-19 training programs, such as creation or amendment of organizational practices, plans, policies, and hierarchy of controls; knowledge applied; skills used; or actions taken by trainees, were limited.

Grantee Survey and Focus Groups

Program data was gathered from grantee surveys and focus group sessions. The evaluators distributed grantee surveys by email (n=44) and held focus groups online. Among the survey responses (n=36, response rate = 81.8%) over 90% agreed with each evaluation question on how NIEHS WTP funding supported their organization or consortium in responding to the COVID-19 pandemic. Six focus groups were held with 26 total participants from 12 grantees. The focus groups supported the grantee survey findings. Participants described how useful the COVID-19 curriculum, webinars, and national calls had been for their organization or consortium. Some participants mentioned how NIEHS supported partnerships through webinars and national grantee calls were helpful in responding to COVID-19. Participants reported that they were able to provide outreach to vulnerable populations and their populations of focus through in-person and virtual platforms. Participants explained that the Ebola Infectious Disease Response Training Program (Ebola) helped prepare grantee organizations and consortia response to COVID-19 among Ebola grantees and non-Ebola grantees. They described the need for sustained funding because the Ebola grants ended in May 2020.

Participants described other ways that occupational safety and health training and response capacity was built over time. For example, grantees described how having NIEHS funding, fostered partnerships through grant training, and existing infectious disease response training programs helped build capacity to respond to the COVID-19 pandemic. Participants described how COVID-19 training materials were integrated into broader training. TTT and leadership programs were used to widely disseminate COVID-19 awareness and prepare instructors. Participants specified that NIEHS support has been instrumental in providing a more focused response to the COVID-19 pandemic.

Discussion

There were no examples of inconsistency between the qualitative (focus groups) and quantitative (survey) results when compared for the following evaluation topics: NIEHS WTP developed resources; funding from NIEHS WTP; changes in workplace infection control policies, plans, and programs; preparing instructors to deliver COVID-19 training programs; COVID-19 outreach programs in addition to training courses; training essential workers and populations with high-risk of exposure to COVID-19; and integrating infectious training into broader curricula.

Grantees used NIEHS WTP funding to support the development, implementation, and dissemination of occupational safety and health and infection control worker training programs at their organizations or consortiums. Grantees were supported by NIEHS with funding, as well resources, such as webinars, national calls, and forums for discussion across grantees. Using NIEHS support, grantees changed organizational policies and programs related to occupational infection control and prepared a national cadre of instructors able to educate workers on health and safety aspects of COVID-19. WTP funding and training resources helped grantees' COVID-19 response by raising organizational capacity to train and to increase confidence in responding to future disasters. Funding dedicated to infectious disease response builds preparedness and facilitates an efficient response during a pandemic.

Recommendations

Based on findings, the following recommendations may improve NIEHS WTP COVID-19 response and prepare NIEHS WTP for other occupational safety and health training and future disasters or pandemics. The recommendations may also help WTP in supporting grantees and the broader occupational safety and health community.

Recommendations from COVID-19 Training Program evaluation results	
Issue	**Recommendation**
COVID-19 program	COVID-19 and infectious disease training program and materials should continue to be used, updated, and incorporated into a sustained training program to protect workers from occupational exposure to infectious diseases.
Infectious disease training program	Based on experiences of Ebola and COVID-19, identify sustained funding for infectious disease preparedness and response.
Ebola evaluation	Perform evaluation to understand impact of and future directions for infectious disease training.
Recovery centers	Evaluate COVID-19 recovery centers for continued lessons learned and effectiveness.
Virtual learning	Continue to dedicate program resources to assist instructors on the use of synchronous training platforms, incorporating interactive sessions, identifying ways to use technology in a virtual classroom, and use of hybrid training models.
Partnerships	Continue to focus on developing and reinforcing partnerships among grantees and other stakeholders.
Vulnerable and High-risk Populations	Continue to focus on providing training and education to vulnerable populations. For American Indians and Alaska Natives, organize discussion with those populations' leadership on how to better provide training during times of social distancing and disaster.
WTP National Clearinghouse Curriculum	Continue to use curriculum, materials, and logistical support by WTP and the National Clearinghouse in disaster responses to develop and disseminate timely and relevant information.
Webinars and weekly calls	Continue to use outreach to grantees during disasters to help disseminate timely and accurate information and share across grantees, partner organizations, and subject matter experts.
Mental health and resilience	Continue to incorporate mental health and disaster resilience materials into future curricula and discussions on disaster responses.
Social media	Use NIEHS and grantees' social media platforms to provide timely information during disasters.
Train-the Trainer (TTT)/ Leadership	Continue use of TTT and leadership programs in future disaster response curricula by WTP.
Evaluation	Continue to support the Evaluation Community of Practice and dissemination of evaluation tools and tips.
NIEHS Data Management System (DMS)	Revise DMS to better capture accomplishments not easily placed in the current format, such as asking what are one or two of a grantee's greatest accomplishments and allowing grantees to report their outreach activities (plans underway for both). Continue to use other mechanisms to capture activities and accomplishments, such as technical workshops.
Vaccination	WTP should continue to produce vaccination information and resources.
Consistency of guidance	In training resources, include acknowledgements of WTP's position of providing guidance that prioritizes worker safety and health, which may be more protective than some federal or state guidance.

Introduction

In March 2020, the United States federal government issued an emergency declaration in response to the COVID-19 pandemic.[1] On March 6th, 2020, the National Institute of Environmental Health Sciences (NIEHS) Worker Training Program (WTP) received $10 million from the Coronavirus Preparedness and Response Supplemental Appropriations Act, 2020 to fund "worker-based training to prevent and reduce exposure of hospital employees, emergency first responders, and other workers who are at risk of exposure to coronavirus through their work duties."[2] WTP had three main program objectives to respond to the pandemic: development of training tools and resources, including online content; providing funding to grantees; and providing technical and collaborative support to grantees for training in both online and in-person delivery.

Using the COVID-19 Congressional appropriations, NIEHS WTP provided supplemental funding to some grantees in Spring 2020 to support pandemic-related training activities.[3] Additionally for the response, all U45 cooperative agreements for the 2021 program year received Congressional COVID-19 funding.[4] Lastly, all grantees used their regular WTP funding in some way to manage the response, for training, technology improvements, outreach, or other activities.

WTP has historically provided occupational health and safety training responses to hazardous working conditions, such as disasters and infectious disease events.[5,6] WTP's funding to organizations and consortiums nationwide has contributed to disaster response training, for example, the anthrax attacks in 2001, H5N1 and H1N1 outbreaks, Hurricanes Katrina and Sandy, and the Ebola epidemic in 2013.[6]

Evaluation and quality control is emphasized for the training programs using evaluation requirements in the grant funding opportunity announcement and the Minimum Criteria for Worker Health and Safety Training for Hazardous Waste Operations and Emergency Response (HAZWOPER) (Minimum Criteria) guidance. Grantees have been publishing their training and evaluations since the early 1990s. WTP hosts regular grantee meetings and workshops that contain evaluation discussions, including "Prove it Makes a Difference: Evaluation Best Practices for Health and Safety Training" in 2012.[7]

In response to the COVID-19 pandemic, WTP focused on evaluating their COVID-19 training program for effectiveness, outcomes, and impact. They developed an online training course in March 2020; evaluation questions from this course were analyzed and described in detail in a presentation on the effort.[8] In summary, respondents agreed that "the training has prepared me to recognize COVID-19 hazards on the job" and "the training has increased my knowledge on how to control COVID-19 workplace exposures."[8]

WTP organized both stakeholders and a previously developed community of evaluators to prepare an evaluation plan for COVID-19. First, the plan was prepared as a draft by NIEHS staff, using the Ebola overall plan as a template, and then shared for review and feedback to a community of NIEHS-partnered evaluators in April 2020. The plan included the draft logic model for the NIEHS WTP COVID-19 Biosafety Training and Infectious Disease Response Initiative. Throughout the COVID-19 pandemic response, the plan was revised to update the evaluation focus, questions, intended outcomes, and a methodology for capturing and analyzing the data to draw conclusions and future response recommendations.

The components of the evaluation that contributed to findings are:

- Needs assessment
- Grantee quantitative training data
- Grantee progress reports
- Online trainee survey data (immediate post-course and follow-up)
- Focus groups (described in this report)
- Grantee survey (described in this report)

The evaluation report focuses on better understanding how funding was used by grantees to support the development, implementation, and dissemination of occupational safety and health and infection control worker training programs at their organizations or consortiums. The report also includes what outcomes resulted from the training activities. The evaluation will be used to provide lessons learned, support program accountability, and prepare for future occupational health and safety training responses.

Methods

The evaluation questions were derived from the overall logic model and discussions of evaluation priorities. Through an iterative process, program evaluators developed questions in collaboration with stakeholders, WTP community of evaluators, and NIEHS WTP staff. Process evaluation, program outputs, and outcome evaluation questions were identified. Then the evaluators reviewed whether prior activities had already addressed or provided data towards any of the evaluation questions. Evaluation topics in the "WTP COVID-19 Training Needs Assessment" include challenges in delivery of COVID-19 awareness training, such as

- virtual training logistics and reaching essential workers and vulnerable populations
- ways in which grantees moved their Hazardous Waste Worker Training Program (HWWTP), HAZMAT Disaster Preparedness Training Program (HDPTP), Environmental Career Worker Training Program (ECWTP), and Department of Energy (DOE) Program regularly scheduled training to virtual platforms
- how Small Business Innovation Research (SBIR) programs conducted e-learning activities
- how grantee training addressed traditionally in-person skills development under pandemic conditions
- and use and utility of training technologies in virtual training.[9]

Some questions were addressed in the trainer development webinar series and grantee calls, such as how disaster resiliency training was integrated into the WTP response.

Data Management System

Grantees report on delivery of training courses and related program outputs through the NIEHS WTP online Data Management System (DMS). The data are uploaded into the DMS through a secure platform and include details related to each course offered and its funding mechanism. Interim data are submitted through two months before the end of the budget year while final data are submitted two months after the end of the budget year. Full descriptions of the DMS results of COVID-19 trainings for the 2020 program year are provided in a fact sheet (**WTP Coronavirus Activities: Results from 2020 Supplemental Appropriations and Other Funding**),[3] and a similar analysis for 2021 data will be available in 2022. Analysis of the DMS provided the number of training courses delivered; number of contact hours; number of training participants; types of courses delivered; levels of training (such as awareness, operations, and TTT); number of TTT courses delivered; types of training delivery formats used; location of in-person courses; and location of online only course participants.

Progress Reports

Grantees upload progress reports of their annual activities twice a year. Interim and final reports are due at the same time as the training data, two months before the end of the budget year and two months after the end of the budget year. For this evaluation report, submitted October 2020 (HWWTP, HDPTP, ECWTP) and November 2020 (DOE), final progress reports from the 2020 program year were used. The progress report outlines the training activities the grantee conducted under HWWTP, HDPTP, ECWTP, and DOE.

WTP provides the progress reports template, which covers sections such as training accomplishments, training effectiveness, trainee follow-up, instructor support, supplemental progress/carryover, and COVID-19 activities.

Based on the overall evaluation plan for the COVID-19 Biosafety Training and Infectious Disease Response Initiative, the evaluators, stakeholders, WTP community of evaluators, and NIEHS WTP staff used an iterative process to develop the progress report data collection questions. The questions were organized into a data collection table, and then with five grantee reports, evaluators pilot tested the initial progress report data collection. Based on those findings and identified issues, the evaluator worked with WTP staff to further revise the data collection instrument. The following focused topics were developed by the evaluators to review the progress reports:

- Examples of NIEHS-funded COVID-19 trainings being used to support grantee organizations and communities (including Sectors trained);
- Rating COVID-19 training effectiveness, which may include common metrics such as:
  1. Preparing workers to recognize COVID-19 hazards on the job;
  2. Increased knowledge on how to control COVID-19 workplace exposures; and
  3. Preparing trainers to instruct a COVID-19 worker health and safety training class (TTT).
- Develop training resources and cite publications;
- Descriptions of outcomes from COVID-19 training programs, such as created or amended organizational practices, plans, policies, and hierarchy of controls; knowledge applied; skills used; or actions taken by trainees;
- Grantee's ability to quickly develop and deliver infectious disease response training; and
- Efforts in training instructors on COVID-19, such as TTT programs.

For all funded programs, the evaluators downloaded the respective final 2020 program year progress reports for each grantee. One evaluator reviewed each progress report. Comparing findings across grantees allowed identification of common themes for each metric. No personal identifying information was collected during the analysis. Additional findings will be assessed from the 2021 progress reports due August 1st (HWWT, HDPTP, ECWTP) and October 1st (DOE).

Surveys and Focus Groups

There were still several inadequately addressed evaluation questions in the existing DMS data collection and progress reports. For those remaining evaluation questions, a survey and focus group instrument were developed through an iterative process with stakeholders, WTP community of evaluators, and NIEHS WTP staff.

The grantee survey included seven items using a 5-point Likert scale of "strongly agree" to "strongly disagree" with a "not applicable" (N/A) option. The Qualtrics survey link was sent by email to all grantee Principal Investigators (PIs), as well as Program Directors when applicable, including grantees under the Ebola Biosafety and Infectious Disease Response Training (IDR) Program (n=44). The survey distribution relied on a snowball sampling method, and asked email recipients to share with consortium leadership, such as subgrantee directors. Respondents identified which organization or consortium they represented and if they were a trainer at that listed organization or consortium. The grantee survey was analyzed by frequency and proportion of responses and used a chi-square analysis to compare responses for trainers versus non-trainers.

Focus group sessions used a convenience sampling method. Individual emails were sent to each PI and related Program Director, as applicable (n=29), and asked them to provide names of up to two individuals who would best be able to answer the focus group questions. IDR grantees were excluded. The focus group questions were sent as an email attachment. Recipients could designate themselves, a key staff person, a consortium lead, or a trainer.

The email contained a Qualtrics survey link where respondents could list times and dates that they might attend based on a list the evaluators provided, with an option to list dates and times if none were feasible. The respondents were divided into five sessions.

The focus groups were held over a Zoom platform. An NIEHS contractor facilitated the focus groups, while an NIEHS staff member attended to support technical issues, provide feedback on the order of questions, and ask follow-up questions when applicable. The facilitator followed the introductory script from the focus group tool, which described how the session would be conducted. The sessions were recorded for transcription purposes only. Each session was held for one hour and questions were asked based on the flow of discussion and roles of participants.

The evaluator transcribed the recording of each session and coded it for common themes related to the evaluation questions. No identifying information was collected during the notetaking, and any information that could be linked back to a trainee was removed or paraphrased.

Both the survey and focus group were voluntary and confidential. However, during focus group discussions, the identity of participants could not be private between the participants.

The qualitative and quantitative results were integrated into a joint table to assess consistency between these results and to help generate lessons learned and recommendations.

The study was given fast-track clearance on April 22, 2021 by the Office of Management and Budget under study number 0925-0648.

All survey quantitative analyses were performed using IBM SPSS Statistics Version 27. All qualitative analyses were performed using NVivo Version 12.

Results

Data Management System

Results of the DMS 2020 supplemental grants are available in full detail **in a separate report** that includes: number of training courses delivered; number of contact hours; number of training participants; types of courses delivered; number of TTT courses delivered; types of training delivery formats used; location of in-person courses; and location of participants from online only courses. Some of the findings are presented in this report below.

Across all WTP funding streams or program areas during the 2020 program year (January 2020 through July or August 2020, depending on the program), 34,741 people were trained in 1,004 courses focused on COVID-19, for a total of 76,398 contact hours. The courses delivered to the most workers were Infectious Disease Awareness, Community-level Infectious Disease Awareness, Final Rule Awareness (a hazardous material overview course, applied to COVID-19), Infectious Disease Operations, and Infection Control Risk Assessment (see Table 1 and Figure 1).

Table 1. Number of courses, number of workers trained, and total contact hours of training under any funding source (Jan-Aug 2020)

| Course Name	Number of Courses	Number of Workers	Total Hours Contact Hours
Airborne Transmission Standard	12	251	753
Blood Borne Pathogen Train-the-Trainer	4	58	143
Community-Level Infectious Disease Awareness	126	10,977	20,915
Domestic Preparedness Awareness	45	688	9,853
Emergency Response Awareness	12	236	398
Emergency Response for Specific Hazards	2	20	50
Emergency Response Refresher	2	28	224
Evaluation of Industrial Ventilation	1	58	464
Final Rule Awareness	18	3,951	11,853
General Construction Safety	5	159	1716
General Industry Safety	14	238	414
Hazard Communication	1	11	22
Industrial Emergency Responder Technician	1	10	400
Infection Control Risk Assessment	41	1,537	3,064
Infectious Disease Awareness	631	13,814	21,493
Infectious Disease Awareness Train-the-Trainer	32	368	763
Infectious Disease Operations	20	1,782	2,363
Infectious Disease Worker Refresher	3	108	216
Opioids in the Workplace	1	9	18
Personal Protective Equipment Awareness	3	48	180
Resiliency	24	329	895
Respiratory Protection	1	12	24
Site Worker Refresher	1	10	80
Training Methods/Trainer Development	4	39	97
Grand Total	**1,004**	**34,741**	**76,398**
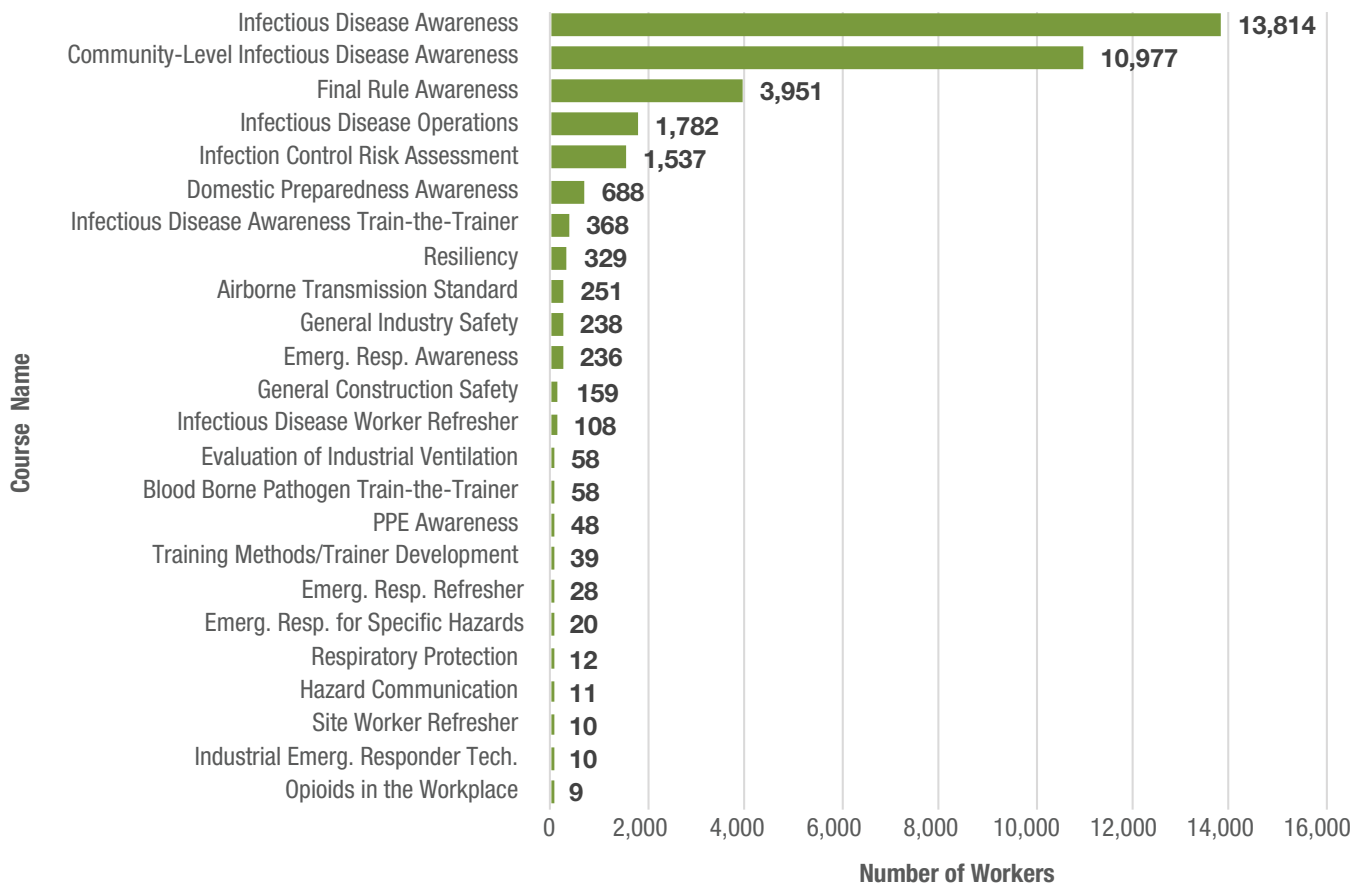
Figure 1. Total workers trained by course name under any funding source (Jan-Aug 2020).

Progress Report 2020 Program Year

The following findings are from the 2020 progress reports.

Integration and Delivery

Examples of NIEHS-funded COVID-19 trainings are being used to support grantee organizations and communities that include different occupational sectors. Generally, the funded trainings used materials from the NIEHS WTP "Protecting Yourself from COVID-19 in the Workplace" and "Protecting Workers from COVID-19 in the Workplace: Essential and Returning Workers Training Tool." Some grantees described delivering training using adaptable methods under social distancing and beyond general awareness courses, including integrating COVID-19 into broader topics and through online dissemination. Grantees provided the following examples:

- Developed two different simulation platforms — e-simulation and virtual reality — and supported timely information delivery through webinars and synchronous training.
- Integrated the theme of COVID-19 with Leptospirosis, Mold, and use of personal protective equipment (PPE).
- Our training is done in a synchronous online environment and delivered in English and Spanish. We have been able reach a new set of populations through our online platform.
- The COVID-related training resources from WTP and the Clearinghouse have been invaluable for these efforts. As many businesses are now beginning to reopen, we expect the need to further develop or adapt training materials to support workers and employers in implementing effective coronavirus controls.

Occupations

Sectors trained were across various industries, occupations, and unions. The reported occupations trained were:

Occupations reported in 2020 Progress Reports.
•   Healthcare Workers
•   Teachers/Students
•   Construction Workers
•   Painters
•   Maintenance Professionals
•   First Responders and Emergency Medical Service Workers
•   Attorneys
•   Public Health Professionals
•   Nail Salon Workers
•   Disaster and Community Volunteers/Workers
•   Maritime Workers
•   Waste Haulers
•   Transport Workers
•   Food Service Workers
•   Laboratory Workers
•   Airline/Airport Workers
•   Oil and Gas Workers
•   Parks and Recreation Workers
•   Agriculture Workers
•   Wastewater Treatment Workers
•   Day Laborers
•   Casino Workers
•   Management and Supervisors
•   Acupuncturists

Reaching Vulnerable and High-risk Populations

As part of efforts to reach high-risk groups, grantees reached out to American Indians, Alaska Natives, low-wage Spanish speakers, and other groups vulnerable to COVID-19. Examples include:

- Given the limited internet availability on the Navajo Nation and other reservations [grantee] provided USB flash drive copies of its COVID-19 training courses for dissemination among the Southwest tribal communities
- Conducted 14 virtual COVID-19 awareness courses for Alaska Natives in partnership with the Alaska Forum
- Access to time and adequate computer technology has also proven difficult for reaching low-wage Spanish-speaking workers
- The most vulnerable populations – those working in healthcare facilities, nursing homes and group homes who are working mandatory overtime – are the most difficult populations to reach. Their time is extremely limited, and they have not been provided time for training, not even just-in-time training…CSEA offered courses at a variety of times of day (6AM, 4 PM, 7 PM, 11PM), so that members could work it into their schedule, if possible. Through the COVID-19 related training, CSEA saw dramatic increases in training women and minority populations. Training for women

increased 913%. Training for African Americans rose 175% and training for Hispanic/Latinx workers jumped 1,451% over the 2019-2020 training year. Providing the Cleaning After COVID-19 in Spanish training was very important to, and well received by, our members, particularly those working in childcare. It was important to have Spanish speaking trainers on hand, not just to deliver content but to assist members with technical difficulties.

Evaluation

In the progress reports, grantees reported evaluation of their training programs and effectiveness. Specific ratings for COVID-19 training effectiveness were limited, as evaluations may take time and the results may not have been available or finalized by the progress report due date. However, reported effectiveness was generally positive. Some grantees used common metrics, which were recommended by WTP, but others used their own specific questions and methods:

- A majority (94%) of participants agreed or strongly agreed their understanding of the subject matter improved because of the training; 90% of participants agreed or strongly agreed that they identified actions they will take to apply information they learned from the training in their work; 95% of participants agreed or strongly agreed the information was presented clearly; 94% of participants agreed or strongly agreed they were satisfied with the program.
- These evaluations will address the current use of the distance learning training (e.g., effectiveness of the trainer and trainee adaptiveness to the new format; course effectiveness in enhancing training-related safety knowledge, skills, and attitudes), and the feasibility and effectiveness of integrating the synchronous distance learning into future training efforts as workplace restrictions and requirements change.
- The course assessment section asked questions regarding the training. Responses were rated on a 5-point scale from 1 (strongly disagree) to 5 (strongly agree). The overall average course rating from the student evaluations was 4.59, the highest rating (4.67) was for Instructor Delivery. Most trainees were able to recognize COVID-19 hazards (4.63) after completing the course, and believed they were more knowledgeable on how to control workplace hazards due to COVID-19 (4.57). Although most of the comments on how to improve this training were answered with, 'the training was excellent, great or good,' some trainees did provide suggestions. Some examples were the following: provide more training time; improve the presentations - one example was to tailor presentations to the audience (e.g., healthcare workers); and providing a follow-up course with updated information.
- Most (97%) of the participants in the online COVID-19 training agreed or strongly agreed to the statements, "The training has increased my knowledge on how to control COVID-19 workplace exposures on the job" and "The training has prepared me to recognize COVID-19 exposures on the job."

Publications, Videos, and Online Content

Grantees provided examples of developing training resources and citing publications, including online video and information content:

- Provided four webinars and co-sponsored a fifth as part of the supplemental COVID-19 funding. (**Chemical Hazards during COVID-19: Disinfectants, Cleaning Chemicals and Tear Gas**; **Operational Challenges Facing EMS During COVID-19**; **Self Care in Challenging Times: Care for the Caregiver in the Age of COVID-19**; **COVID-19 in Pediatrics**; **PPE: What Always Works, What Sometimes Works, What Never Works and Why**)
- Developed a series of YouTube videos to serve as just-in-time and refresher training that demonstrated institutional protocols for donning and doffing PPE. These protocols are intended for healthcare workers involved in the assessment and care of individuals with suspected or confirmed COVID-19.
- Developed three COVID-19 Kitchen Table episodes that are accessible on our YouTube channel and Facebook page. **COVID-19 Health and Safety Update**; **Leaders on the Frontline of COVID-19**; **Communicating During COVID-19**.
- We began to communicate with our members about the dangers of COVID-19 in the workplace through a series of seven factsheets that covered specific industries including corrections, law enforcement, healthcare, social service, long-term facilities, and other non-healthcare environments. The fact sheets are available in English and Spanish.

- To educate members on how to protect themselves, their fellow workers, and stop the spread of COVID-19, [grant-funded consortium member] developed an online course to familiarize members with the OSHA guidance document "Preparing Workplaces for COVID-19" and recommended jobsite protocols.
- In response to a request from the NIEHS WTP, we developed a COVID-19 training module specific to death-care professions. The training module is now available in the NIEHS National Clearinghouse for Worker Safety and Health Training.
- Created a COVID-19 factsheet in English and Spanish for farmworkers in California. To date, the factsheet has been adapted and distributed to workers in five counties across the state. There are plans to create a wallet-card version of the resource to support its further distribution.

Training Outcomes

There were limited descriptions of outcomes from COVID-19 training programs, such as creation or amendment of organizational practices, plans, policies, and hierarchy of controls; knowledge applied; skills used; or actions taken by trainees. This may be due to the lack of time to follow up on COVID-19 specific outcomes before the progress report program year 2020 deadlines. Some examples of outcomes grantees provided included:

- **Developing a set of recommendations for training centers to adopt as they plan to re-open:** The recommendations outline the steps that every training center employee and trainee can take to reduce the risk of exposure to COVID-19. The recommendations describe how to prevent trainee exposure to coronavirus, protective measures to be taken at the training center, PPE, and hands-on training practice controls to be used. They included cleaning and disinfecting procedures and what to do if a training center staff or trainee becomes sick.
- **Lessons learned:** The curriculum content was needed by and valuable to workers; the hierarchy of controls was unfamiliar to most attendees; trainers needed to be up to date on the latest knowledge of COVID-19 to respond effectively to attendees' questions; and increasing registration caps were needed to ensure adequate attendance in response to increases in "no-shows" on training days.
- **Reported changes:** Employee temperature is taken prior to building entry; employees are asked questions regarding symptoms or exposure to someone with symptoms or with COVID-19; employees are given a facemask and are asked to wear it at all times, with the following exceptions, eating, drinking, and smoking; there are 6-foot distance markings at time clocks, turnstiles, and cafeteria lines; there are dividers along production line to ensure six-feet separation between employees; seating is marked in all social areas, such as break rooms, cafeteria, and smoking areas; plexiglass partitions have been placed between restroom sinks; there is a designated quarantine area for symptomatic employees; high touch areas and hand tools are cleaned with a bleach solution; and deep cleaning is done after shift.

Adapting for Social Distancing

There was considerable overlap in investigating the grantees' abilities to develop and deliver infectious disease response training quickly from the progress reports when compared to the WTP COVID-19 Training Needs Assessment. Grantees reported COVID-19 disruptions; having to cancel much of their training programs and shift to an online delivery (if applicable) and that WTP support aided their delivery of worker training programs:

- Because of the COVID-19 pandemic, our consortium, like many other organizations, stopped providing in-person training and started providing synchronous distance learning training.
- On March 16, 2020, we cancelled all classes and travel for March, and continued to evaluate our schedule. On a week-by-week basis, we canceled classes that were five to eight weeks out, but by early June we realized that we had to cancel all 2020 physical classes and travel. We are, therefore, only developing, delivering, and conducting web training.
- Our activities would not have been possible without the Infectious Disease Response grant we've had since 2016.

- COVID changed the way our Center delivered courses. Many instructors and staff attended the NIEHS Weekly Updates and training sessions on using technology in training. These sessions helped our instructors pivot to using synchronous training platforms, incorporating interactive sessions, and identifying ways to use technology in the virtual classroom.
- With the support of NIEHS-WTP's webinars and TTT sessions, trainers learned about COVID-19 and worker protection. By April 9, 2020, the consortium was delivering virtual and interactive online training on COVID-19.

Instructor Training

Some grantees reported efforts in training instructors on COVID-19, such as TTT programs in the progress reports. Grantee examples of instructor training on COVID-19 included:

- Hosted an 8-hour TTT for our existing trainers and affiliate staff at the California Independent Training Providers Center in our newly created training program: Protecting Yourself from COVID-19, What Workers Need to Know. The program was based on materials sourced from the NIEHS March 2020 COVID-19 Training Tool. The program we developed focused on COVID-19 basics including how the disease is transmitted, the incubation period, and the behavior of coronaviruses. The training also discussed protections for workers in the healthcare sector and considerations for other workers on the frontlines of the COVID-19 fight like DPW workers, Parks and Recreation, Social Service workers and staff at Correctional Institutions. This webinar is available and has been delivered in English, Spanish and Vietnamese languages.
- Due to the COVID-19 pandemic that precluded our face-to-face trainer's exchange session in March 2020, we immediately trained our trainers who had the hardware capabilities to work in the online learning platform, which is Zoom. We did the TTT session that was provided by NIEHS, and we did extra training for our trainers and provided an online manual and links to resources to enhance their knowledge of Zoom and its capabilities.
- Pivoted to online training when possible, focusing on TTT courses in *Principles of Infectious Diseases, Bloodborne Pathogens*, and *COVID-19 Awareness* and these were offered to consortium instructors. Following the TTT, instructors are prepared to provide COVID-19 Awareness and Essential and Returning Workers training, using NIEHS-created tools.
- Three of our instructors completed the NIEHS Worker Training Program's TTT workshop in COVID-19. Held on March 25-26, 2020, this 12-hour virtual course helped prepare our instructors to provide COVID-19 safety training in an online environment.
- United Steelworkers partner National Day Labor Organizing Network carried out TTT sessions for organizations across the U.S., using materials and information adapted from the NIEHS trainings on Covid-19. Organizations were then able to disseminate the information through workshops, social media platforms, Zoom, outreach on corners, and emergency response work in the community.
- Our partner received the TTT course on the NIEHS's *Protecting Yourself from COVID-19 in the Workplace and COVID-19 in the Workplace: Essential and Returning Workers Training Tool*. These courses will be added to the community health worker curriculum for the next year and they will be offered as well to community health worker participants from past cohorts, food pantry volunteers, and community members. Many of the community health workers that we have trained are now working as essential workers and we want to ensure they receive proper training.

Grantee Survey

Of the 44 emailed grantees, 36 (81.8%) responded and completed the survey. On average, the survey took approximately five minutes to complete. On all survey items, greater than 90% "strongly agreed" or "agreed" with the question (Table 2). Participants were encouraged to invite others within their organization or consortium leadership to participate and, therefore, the sample size may be larger than the original 44 emailed grantees. Organizations that participated was collected in the survey (Table 3).

Table 2. Grantee survey responses with "strongly agree" and "agree" responses (n=36)

Evaluation Question	N (%)
4. NIEHS WTP developed helpful resources for our organization's COVID-19 training programs (n=35)	35 (100%)
5. Funding from NIEHS WTP helped increase our program's or consortium's ability to train during the COVID-19 pandemic (n=34)	33 (97.1%)
6. Our NIEHS-funded program or consortium, contributed to changes in workplace infection control policies, plans, and programs (n=33)	32 (97.0%)
7. Our NIEHS-funded program or consortium prepared instructors to deliver COVID-19 training programs	36 (100%)
8. Our NIEHS-funded program or consortium provided COVID-19 outreach programs (such as developing informational videos or factsheets) in addition to training courses (n=35)	32 (91.4%)
9. Our NIEHS-funded program or consortium trained essential workers and populations with high-risk of exposure to COVID-19 (n=34)	33 (97.1%)
10. Our NIEHS-funded program or consortium integrated infectious disease training into broader curricula (e.g., HAZWOPER or OSHA courses) (n=35)	34 (97.1%)

Table 3. Which NIEHS grantee organization do you represent? (n=36)

The results are shown as number of respondents from the parent grant organizations, with sub-bullets for additional respondents from consortium members/subgrantees

Grantee Organization
- International Chemical Workers Union Council (4)   - American Federation of Teachers (1)   - Association of Occupational and Environmental Clinics (1)   - University of Cincinnati (1)   - Alabama Fire College (2)   - CPWR The Center for Construction Research and Training (CPWR) (4)   - Deep South Center for Environmental Justice (1)   - Midwest Consortium (6)   - Emergency Response Solutions International (1)   - Greater Cincinnati Occupational Health Center (1)   - United Steelworkers (2)   - Make the Road New York (1)   - Mount Sinai (1)   - NJ/NY Hazardous Materials Worker Training Center (6)   - NYC District Council of Carpenters Training Center (1)   - New York Committee for Occupational Safety and Health (NYCOSH) (1)   - NYU School of Global Public Health (1)   - World Cares Center (1)   - National Partnership for Environmental Technology Education (1)   - Nova Southeastern University Project SEAMIST (South East Area Maritime Industry Safety Training) (1)   - OAI, Inc (1)   - P2R Consortium (formerly Texas-Utah Consortium) (2)   - UT Houston Occupational and Environmental Medicine (1)   - The New England Consortium — UMass Lowell (1)

Among survey respondents, 20 (55.6%) were trainers with the NIEHS grantee organization that they listed (Table 4). The only disagree responses were in item 5; there were two trainers with "strongly disagree". A Chi-Square analysis was used to compare trainers versus non-trainers and whether there was a significant difference between "strongly agree" and "agree". When comparing responses by trainer status, item 1 varied significantly between "strongly agree" and "agree" (χ^2 = 4.21, p-value = 0.04) (Table 5).

Table 4. Are you a trainer with the NIEHS grantee organization that you listed? (n=36)

	N	%
Yes	20	55.6
No	16	44.4

Table 5. Grantee survey responses by options and a chi-squared comparison between trainers and non-trainers between "strongly agree" and "agree" (n=36)

Question	Strongly Agree N (%)	Agree N (%)	Unsure N (%)	Strongly Disagree N (%)	χ^2 (p-value)
1. NIEHS WTP developed helpful resources for our organization's COVID-19 training programs (n=35)	25 (71.4)	10 (28.6)	0 (0)	0 (0)	4.21 (0.040)
2. Funding from NIEHS WTP helped increase our program's or consortium's ability to train during the COVID-19 pandemic (n=34)	27 (79.4)	6 (17.6)	1 (2.9)	0 (0)	0.346 (0.557)
3. Our NIEHS-funded program or consortium, contributed to changes in workplace infection control policies, plans, and programs (n=33)	24 (72.7)	8 (24.2)	1 (3.03)	0 (0)	0.389 (0.533)
4. Our NIEHS-funded program or consortium prepared instructors to deliver COVID-19 training programs	27 (75.0)	9 (25.0)	0 (0)	0 (0)	0.600 (0.439)
5. Our NIEHS-funded program or consortium provided COVID-19 outreach programs (such as developing informational videos or factsheets) in addition to training courses (n=35)	24 (68.6)	8 (22.9)	1 (2.86)	2 (5.71)	1.046 (0.306)
6. Our NIEHS-funded program or consortium trained essential workers and populations with high-risk of exposure to COVID-19 (n=34)	27 (79.4)	6 (17.6)	1 (2.94)	0 (0)	0.172 (0.678)
7. Our NIEHS-funded program or consortium integrated infectious disease training into broader curricula (e.g., HAZWOPER or OSHA courses) (n=35)	28 (80.0)	6 (17.1)	1 (2.86)	0 (0)	0.185 (0.667)

Focus Groups

A total of six focus groups were held in May-June 2021. Of the 29 emailed grantees, 26 participated (89.7%). On average, focus groups had 4.3 participants (range = 1 to 7). Focus group sessions were each one hour in length. Participants were encouraged to invite others within their organization or consortium leadership to participate, therefore the sample size may be larger than the original 29 emailed grantees. A list of participating organizations or consortiums was collected (Table 6) and a self-identified role within that listed organization or consortium was identified (Table 7). While the request was for one or two individuals per consortium, two groups ended up with more than two, due to broader grantee distribution of the request, and inclusion of a retired program manager. Individuals who were available were not turned away from participation in a focus group.

Table 6. Listed organizations reported by participants in focus group sessions (n=26).

Organizations
• Alabama Fire College (2)
• International Brotherhood of Teamsters (2)
• International Chemical Workers Union Council (4)
• Midwest Consortium for Hazardous Waste Worker Training (2)
• New Jersey/New York Hazardous Materials Worker Training Center (2)
• Nova Southeastern University (2)
• OAI, Inc. (3)
• Prevention, Preparedness, and Response Consortium
• Sustainable Workplace Alliance (2)
• The Center for Construction Research and Training (2)
• The New England Consortium - Civil Service Employees Association (2)
• United Steelworkers
• Western Region Universities Consortium

Table 7. Role of participant in listed organizations in focus group sessions (n=26)

Participant Role
• Staff
• Principal Investigator (9)
• Program Director (6)
• Instructor (6)
• Curriculum Development
• Training Coordinator or Manager (2)
• Grant Manager

Curriculum and Meetings

Participants described how useful the COVID-19 curriculum, webinars, and national calls had been for their organization or consortium:

- "We have thirteen training centers, and everyone's needs are different, and it has been a real challenge. We didn't have a strong infectious disease curriculum going, and this is going to help us going forward for the next pandemic to have curricula more generalized in place."
- "The meetings you had where there was an expert in the field was really useful to us, they were great and they added to our knowledge."
- "I also think it was helpful that NIEHS did these national calls about this when it was first starting up and we were all first at home, it gave us access to a national network of people to see what was going on and what was the new guidance that was coming out."
- "The slide deck for infectious disease has been useful, we use it up to this very day."
- "Sharing the information that NIEHS provided, the zoom classes, the sharing of the challenges from the NIEHS community was huge. NIEHS helped to do that by sharing the webinars and getting out first with the materials and putting it out there and soliciting feedback. It helped some of us with no expertise gain that expertise."
- "We weren't left at creating our own resources for training, and the quality of the training resources we used were gleaned from the weekly or monthly webinars and check-in meetings and web update meetings WTP had. It was timely and it was current."

Grantee Accomplishments

Participants mentioned how NIEHS funding was used for a wide range of accomplishments:

- "NIEHS funding for our evaluation of distance learning and for how effective or potentially ineffective distance learning was in our population, it has given us the documentation to show our consortium that distance learning can be taken in certain cases and be effective."
- "We were also able to distribute about 3,000 masks and sanitizers to individuals, and provided some other courses related to COVID. The first was COVID awareness, mental health and wellbeing, and safe return to work strategies."
- "Using the NIEHS input, we created a document that was a training plan that was generic, that was sent out to all the different union training centers in all the different union trades so that they had a plan for what they can then personalize to open their facilities back up and be able to do the in-person hands-on training."
- "One of our greatest accomplishments using the NIEHS funding, just the expertise we gained through working with the NIEHS, we were able to develop a lot of industry-specific fact sheets and materials and get that information to our membership. Most of whom could not attend our training courses, but we were able to get that information out to them, with them being essential employees."

Partnerships Formed

Some participants mentioned how partnerships were developed and helpful in responding to COVID-19, and how NIEHS supported these partnerships through webinars and national grantee calls:

- "It allowed us to take what were already teaching ourselves, and now be able to give to another organization and see how they fared with it and if we were successful in transitioning that information from our hands to someone else, so they can go out and reach other people in the community and the workplace."
- "Because of the training we were doing and getting these testing sites up and going, that increased the capacity for the COVID-19 testing in our communities, and really throughout Alabama. If we did not have this consortium available, we would not have had the expertise to do that and to do that really quickly, we were able to contribute to that."
- "I feel we are really ready and prepared, and we have the capacity and the alliance partners in various areas to help us mobilize, especially the grassroot organizations that allows us to infiltrate into those vulnerable populations."

Training and Outreach to Vulnerable Populations

Participants mentioned how they were able to reach out to vulnerable populations and their focused populations through in-person and virtual platforms:

- "We had a series that focused on providing free training to dental assistants and dental hygienists, and sometimes dentists. It really helped the small clinics out there that have very little training on infection control standards. And they were able to better understand their recommendations and the hierarchy of controls. Many of those clinicians mentioned never being properly trained on N95, surgical masks, that they didn't know as much until our classes. No one had explained to them how ventilation can reduce risk."

- "Not only being able to reach our members, through this virtual challenge, but also being able to reach many more folks than we normally do. Folks who may not have had the opportunity in the past has been an accomplishment for us."

- "We were able to push for language equity through our outreach to immigrant and refugee populations offering classes in Spanish, Vietnamese, Chinese, Polish, and Arabic."

- "We never transitioned to online training because it was not feasible with the target population which we work. We trained seven days a week for a while."

- "We had a food distribution in a Hispanic area with low income, and they brought folks to the food distribution and did a 30-minute training, basic health and safety and COVID awareness."

- "We developed some podcasts to get to a population that is very difficult at this, which is primarily our drivers."

- "We put together some factsheets for agricultural workers, a video on proper maintaining facemasks, we've done short video clips and factsheets."

- "The materials NIEHS was assembling was used particularly by a lot of our more community-based programs to do outreach efforts, and were very effective and allowed them to do outreach in different ways, some in-person… providing training to immigrant workers at a food line, and they were able to use NIEHS materials. Having those materials available was really critical for some of our training centers."

- "We have two primary training populations with our grant, one of them is Native American tribes, often providing training to tribes. It was nearly impossible to reach during the COVID experience, the shutdowns were closing the entry to folks outside the tribe. In April [2021], we started in person training to deliver some Incident Command System training, our first in-person Native American training."

- "We really strengthened our reach in the rural areas, in particular in Puerto Rico. The real grass roots, getting out there in these barrios and these communities that may not being served as much as they need to be. That is going to serve us to lay groundwork for future training, whether it is a pandemic or a hurricane, that is going to set us up to have those connections."

Ebola Training Program

Participants described how the Ebola Biosafety Infectious Disease Response Training Program (Ebola) helped prepare grantee organizations and consortiums in their response to COVID-19:

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."

- "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, and we are preparing for infectious pandemics and disasters, we can all figure out ways to adapt if needed."
- "It was invaluable having the Ebola grants, I think we learned a lot when our comfort zone was chemicals, that learning the basics. 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."

Non-Ebola 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."
- "We also had one of the biosafety grants… having this existing consortium in place gave us quick access to subject matter expertise."

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. Having some importance but on infectious disease and biosafety and worker health and safety."
- "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."

Capacity Building

Participants described other ways that occupational safety and health training capacity has been built over time to respond in the past and for future events:

- "Our organization started preparing for disaster response post-9/11. We continue to push workers having some sort of disaster response training, it's a hard sell, because luckily, knock on wood, disasters don't happen all the time… disasters are little many times…we are very good at responding to big national disasters, you got 9/11, you got the pandemic, it's the little ones that happen like flooding, it's something we continue to struggle with. But it prepared us for… the pandemic, because the structure was in place, we knew what to do, we knew what the steps were, it wasn't new in the sense that we had never seen this before…Whereas other disasters your trainers had to learn how to show up on the ground in a devastated area and adapt training…driving around in your car and handing out NIEHS booklets having impromptu class. If you think about it we did it sort of the same thing, we just did it virtually, we took the training, we retooled it to be on the virtual world, and then we opened up the classes virtually. And we said hey people come to them. I think all of that truly, prior response to disasters, gave us at least a blueprint to respond to today's pandemic."
- "We have connections now, we are well prepared, we have a house, because of the worker training program funding we are ending our 11th year, we know what we are doing now, we know how to create, deliver and evaluate training. I feel prepared to deliver any kind of training. If someone asks us a difficult question, I can find a subject matter expert to help us give them an answer."
- "Our response collectively has shown us how much NIEHS funding has helped us. We went to the Ebola, to the avian flu, H1N1, we keep going and going with these pandemics and we keep getting quicker. When NIEHS first started their funding in '88, the first class I think in the center was '91- '92. It took 4 years to put a together a program with that first grant. We did it in a month, we had our intro to COVID and teaching people. And we kept evolving and kept going. It shows that NIEHS has made a huge impact, their funding makes a huge impact."

Organizational Change

Some participants mentioned the impacts of the training and how it was applied:

- "One of the questions we ask is did you take the training and apply it to the jobsite, and we were able to get responses that show workers were using the information on the jobsite. When I go back and read this 13 months later, I got to remember we were doing this in March-April when we were asking things if you even have hand sanitizer and hand washing stations on site. We were happy to see workers 6-months later, supervisors were making that available on site."
- "We did some training with Veteran Affairs. Some of them were not aware they had an infection control plan, did not even know it existed. When they read it, they wanted to change the plan... We did a survey with our intro to COVID, and the people who actually saw that change was needed to happen, they were actually willing to listen to put things into place."
- "Our COVID-19 awareness courses helped a lot of our members and worker center members be able to see what hazards, not just associated with COVID-19, but does in their workplace, to build plans or use specific data to go to their employers"

Integration into Broader Programs

Participants mentioned how COVID-19 training materials were integrated into broader training:

- "What we tried to do was embed our COVID-19 presentation in anything we could, haz-waste refreshers, to put in any kind of training. To find that 45 minutes to put it in there."
- "Pretty much on any refresher, COVID is talked about at the beginning of the program."
- "In the hazmat classes, confined space classes, the asbestos classes that we teach it drives home the point we are always trying to make to protect them from the hazards, whether it's a hard hat or a mask. It's a nice thing to build on as you're starting the training."
- "We were able to take the resiliency training that WTP put together before COVID and bring that into a palatable 4-hour zoom portion of the refresher training and it was really well received."

Instructor and Leadership Programs

TTT and leadership programs were used to widely disseminate COVID-19 awareness and prepare instructors:

- "One thing we did was reach out to community-based organizations and especially ones we had existing relationships with and provided TTTs. Which allowed them to go provide training and information within their communities. You train 10 people; those 10 people can train 100 people pretty quickly. They are engaged and trusted in the community."
- "We were able to get the message out using our TTT courses, deliver those to our trainers who then coordinated with the NIEHS return to work outline."
- "We did a lot of awareness training, one of our initial target audiences was our union leadership, both at the headquarters and with our local unions. Those were going to be the people who would be negotiating memorandum of understanding and collective bargaining agreements to deal with COVID. We used the training to train those target audiences first. We were able to use our program to increase the basic knowledge level of all our decision makers to provide protection."

Mandates and Guidance

Participants mentioned how differing guidance from federal and local agencies led to confusion:

- "Recently we had to go back and look at the materials with the opening of the country and the mask mandates. It has gotten harder now because it is so local now. It is almost like fifty different presentations because each state is still slightly different. Even what the CDC has put out has made things more confusing versus helping the situation."
- "We not only had to follow federal guidelines, but every state, that was definitely a challenge."

Helpfulness of NIEHS

Participants described how NIEHS support has been appreciated and helpful in the response to COVID-19:

- "NIEHS did a lot for us. NIEHS had enough of a game plan to keep us going…kept everyone involved and together. Pulling off the meetings... the genius of NIEHS over the years has been to keep the whole community together, though we all have different populations. We are able to make a difference. Bringing in the clearinghouse was smart to tap into those resources."
- "There is nothing that I could say that is additional, NIEHS has been very much an advocate for what we are doing. We just got to stay on this path and keep grinding."
- "It was really valuable for us early on to get the messages from the WTP staff saying figure out how to respond, we got your back, you do what you need to do and figure out how to make it work. That was a huge benefit for us and our consortium."

Additional Assistance and Future Challenges

Participants mentioned additional assistance needed and greatest challenges faced:

- "Those WTP grantee calls at the beginning of the pandemic were really helpful just to hear what people were thinking and what they were doing to respond. I still think there needs to be a mechanism used to spread information across the network for evolving events. I feel like the clearinghouse lags behind, that is where you put a product once it was finalized. It would be helpful to have a forum just to get together to hear what grantees are working on."

- "We also need to remember the construction workers, there was a lot of talk about vulnerable populations. But it seems like the populations that were the foundation of the grant was ignored, we don't need to worry about them. We have a wide assortment of grantees, and yes there are vulnerable populations, but they are existing populations that also need NIEHS support."

- "We had employers calling us how do we bring workers back, how do we protect the schoolteachers; how do I disinfect the copy machine buttons in my law office, lots of questions like that, a lot of the training was to answer questions like that on a larger scale. There was a lot going on and some things probably didn't get put into the Data Management System."

- "What is acceptable for evaluation?"

- "There is going to be a significant amount of people who are not going to get the vaccine, and anything you can do to address that, continue to get information out there."

- "Greatest challenge was really connecting with Native American trainees outside of the structure of an in-person by appointed time class. The access to even the information about training on hazardous materials on the individual level… just weren't sure how to generate the participation in the training we offered online compared to how we would deliver it if there was a point of contact."

Table 8 provides a joint display of the qualitative and quantitative results. The participant results in the joint display were organized by evaluation outcome topics. We found the qualitative and quantitative results to be consistent with each other.

Table 8. Joint display of grantee survey and focus group by evaluation outcome topics.

Evaluation Topic	Survey (close-ended)	Focus groups (open-ended)
NIEHS WTP developed resources	100% of respondents agreed with "NIEHS WTP developed helpful resources for our organization's COVID-19 training programs".	• Grantees expressed how useful the curriculum was in responding with helpful resources • National calls and webinars were helpful • Partnerships and collaboration helped
Funding from NIEHS WTP	97.1% of respondents agreed with "funding from NIEHS WTP helped increase our program's or consortium's ability to train during the COVID-19 pandemic".	• Ebola IDR helped grantees quickly and confidently respond to COVID-19 • NIEHS Funding supported capacity building over time • Wide range of worker populations reached
Changes in workplace infection control policies, plans, and programs	97.0% of respondents agreed with "our NIEHS-funded program or consortium, contributed to changes in workplace infection control policies, plans, and programs".	• Trainees used the training to change workplace infection control plans • DMS does not always capture impact of training
Prepared instructors to deliver COVID-19 training programs	100% of respondents agreed with "our NIEHS-funded program or consortium prepared instructors to deliver COVID-19 training programs".	• TTT programs were used to disseminate COVID-19 training and prepare a cadre of trainers
COVID-19 outreach programs (such as developing informational videos or factsheets) in addition to training courses	91.4% of respondents agreed with "our NIEHS-funded program or consortium provided COVID-19 outreach programs (such as developing informational videos or factsheets) in addition to training courses".	• Factsheets, podcasts, videos, and social media were used to reach workers in training and education • Partnerships formed with non-profits and community health workers
Trained essential workers and populations with high-risk of exposure to COVID-19	97.1% of respondents agreed with "our NIEHS-funded program or consortium trained essential workers and populations with high-risk of exposure to COVID-19".	• Virtual training used to reach essential workers and vulnerable populations with high-risk of COVID-19 exposure, including new worker sectors and training audiences • Challenges in reaching American Indians and Alaska Natives
Integrated infectious disease training into broader curricula (e.g., HAZWOPER or OSHA courses)	97.1% of respondents agreed with "our NIEHS-funded program or consortium integrated infectious disease training into broader curricula (e.g., HAZWOPER or OSHA courses)".	• COVID-19 awareness included in refresher courses and other courses as an introductory topic

Discussion

Grantees used NIEHS WTP funding to support the development, implementation, and dissemination of occupational safety and health and infection control worker training programs at their organizations or consortiums. WTP supported grantees in COVID-19 response by providing resources and a national network for partnership and collaboration to share lessons learned. Curricula developed by the WTP National Clearinghouse were helpful in some grantees' ability to adapt it for their training needs. The weekly and monthly calls, conducted by WTP during the COVID-19 response, helped grantees become aware of relevant and reliable information in a timely manner. WTP national calls and webinars supported cross-grantee collaboration to address COVID-19 by sharing resources amongst each other. Grantees would mention how WTP's resources helped develop new and reinforced existing organization and consortium interactions with other grantees. Integral to the success of the training were the resources, managed meetings, and supported grantee technical assistance provided by the WTP National Clearinghouse and WTP contractors.

Through both in-person and online training, NIEHS resources helped grantees reach a wide range of occupations, industries, and vulnerable and hard-to-reach populations. Long established resources helped programs develop occupational safety and health training capacity to respond to infectious disease events rapidly and effectively. Grantees described how the COVID-19 resources increased their confidence to respond to future infectious disease events and other disasters. Grantees utilized these resources to support online technology-based training with greater comfort, fluency, and skill. The IDR grant helped grantees respond to COVID-19 with greater significance to participants. Grantees described the need to continue such a program; having it in place allowed for a response that may not have been possible without the IDR funding.

Participants cited how the impact of the COVID-19 training program changed organizational policies and programs for infection control. For example, trainees were implementing infection control plans back at their workplaces and bringing that training to their jobsites. However, COVID-19 regulations and guidance at the federal and state level led to confusion and challenges in staying abreast of the changing information. Furthermore, outreach activities and training impacts were not always well documented, had not yet been evaluated at the time of reporting, or, in the case of outreach, did not have a mechanism to be systematically captured into the DMS.

TTT programs were used to widely disseminate COVID-19 awareness among the grantees. Trained instructors were able to train others upon return to their organization and communities. Leadership programs, for example, among union leadership, were used to raise COVID-19 awareness and implement policies and programs that were supportive of occupational infection control.

In addition to traditional in-person training, multiple methods were used to reach a wider audience of workers, such as videos, factsheets, podcasts, and social media. Partnerships with non-profits and community health organizations helped reach broader audiences, for example, in Community Emergency Response Team programs, churches, and food distribution centers. To elevate language equity and reach vulnerable populations, some grantees offered training in multiple languages. Virtual training helped to reach workers who may have never been reached. However, virtual training was a barrier for those who lacked technological resources, such as those in rural communities, and those who lacked comfort and fluency with technology-based learning. It was challenging to reach American Indians and Alaskan Natives due to limited internet accessibility and closed entry for non-tribal members for in-person training. Integration of COVID-19 awareness into broader courses, such as refreshers and as introductory content, helped to reach more workers and raise awareness.

Participants appreciated the NIEHS WTP in providing reliable and useful information and formulating a strategy in responding to the COVID-19 pandemic. Grantees cited NIEHS as an advocate in helping to develop a community approach among the grantees in addressing occupational safety and health training during COVID-19.

Logic Model

The evaluation findings support the original COVID-19 logic model intended outputs, short-term outcomes, intermediate outcomes, and some long-term outcomes.[10] Findings of "building a cadre of trainers" and "improving confidence among WTP funded organizations" were evident in the focus groups and grantee survey.

Grantees discussed some challenges, assistance needed, and recommendations for continuing to respond to COVID-19, and for future disaster responses. Participants suggested that NIEHS could:

- Be careful of over-emphasizing vulnerable populations at the expense of grantee traditional worker populations
- Continue to provide and build upon existing evaluation guidance
- Continue to develop and build upon existing vaccination education and training
- Continue as a platform for partnerships among grantees and for rapid sharing of information
- Facilitate recording of outreach activities that may be missed in DMS entry
- Help grantees reach vulnerable populations, such as American Indians, that had challenging circumstances for training and education during the COVID-19 pandemic

Limitations of the evaluation include:

- Because a WTP staff person and a WTP contractor were used to conduct focus group sessions, WTP-funded grantees may have been hesitant to describe negative comments about WTP's COVID-19 response in their presence. The interviewees were made aware that positive and negative comments were both acceptable, and identifying information was excluded from documentation.
- The survey and focus group participants may have varied based on the sampling plan and, therefore, could not be linked. However, since there was high survey agreement with the correct responses, and focus group acceptance of the COVID-19 response led by NIEHS WTP, it is unlikely the inability to link responses poses a large threat to validity.
- Data sources for DMS and progress reports were from 2020. The grantee survey and focus groups were conducted in Spring 2021. The time lapse in data collection may affect how the grantees responded. DMS data and progress reports from the full 2021 training year will also be reviewed in the fall of 2021, and any similarities or differences from these findings will be assessed.

Strengths of the evaluation include:

- Integration of qualitative and quantitative results was helpful to compare findings and support conclusions drawn.
- The evaluator believes this is the first study to evaluate a COVID-19 training program at the federal level, assessing how those who received grants used their funding, and how the funder supported those organizations.

Conclusion

NIEHS WTP funding was used by grantees to support the development, implementation, and dissemination of occupational safety and health and infection control worker training programs at their organizations or consortiums. NIEHS also used resources, such as webinars, national calls, and forums for discussion across grantees and shared these resources with other interested groups. The support of NIEHS allowed grantees to change organizational policies and programs related to occupational infection control, and to prepare a national cadre of instructors able to educate workers on health and safety aspects of COVID-19. WTP funding and training resources helped grantees respond to COVID-19 by building organizational capacity to train and increase worker confidence in responding to future disasters. Funding dedicated to infectious disease response builds preparedness and facilitates an efficient response during a pandemic.

Recommendations

Based on findings, the following set of recommendations may improve NIEHS WTP COVID-19 response and prepare NIEHS WTP for other occupational safety and health training and future disasters or pandemics (Table 9).

Table 9. Recommendations from COVID-19 Training Program evaluation results

Issue	Recommendation
COVID-19 program	COVID-19 and infectious disease training program and materials should continue to be used, updated, and incorporated into a sustained training program to protect workers from occupational exposure to infectious diseases.
Infectious disease training program	Based on experiences of Ebola and COVID-19, identify sustained funding for infectious disease preparedness and response.
Ebola evaluation	Perform evaluation to understand impact of and future directions for infectious disease training.
Recovery centers	Evaluate the COVID-19 recovery centers for continued lessons learned and effectiveness.
Virtual learning	Continue to dedicate program resources to assist instructors on the use of synchronous training platforms, incorporating interactive sessions, identifying ways to use technology in a virtual classroom, and use of hybrid training models.
Partnerships	Continue to focus on developing and reinforcing partnerships among grantees and other stakeholders.
Vulnerable and High-risk Populations	Continue to focus on providing training and education to vulnerable populations. For American Indians and Alaska Natives, organize discussion with those populations' leadership on how to better provide training during times of social distancing and disaster.
WTP National Clearinghouse Curriculum	Continue to use curriculum, materials, and logistical support by WTP and the National Clearinghouse in disaster responses for timely and relevant information development and dissemination.
Webinars and weekly calls	Continue to use outreach to grantees during disasters to help the dissemination of timely and accurate information and sharing across grantees, partner organizations, and subject matter experts.
Mental health and resilience	Continue to incorporate mental health and disaster resilience materials into future curricula and discussions on disaster responses.
Social media	Use NIEHS and grantee' social media to provide timely information during disasters.
Train-the Trainer (TTT)/Leadership	TTT and leadership programs should continue to be used in future disaster response curricula by WTP.
Evaluation	Continue to support the Evaluation Community of Practice and dissemination of evaluation tools and tips.
NIEHS Data Management System (DMS)	Revise DMS to better capture accomplishments not easily placeable in the current format, such as asking what are one or two of a grantee's greatest accomplishments and allowing grantees to report their outreach activities (plans underway for both). Continue to use other mechanisms to capture activities and accomplishments, such as technical workshops.
Vaccination	WTP should continue to produce vaccination information and resources.
Consistency of guidance	In training resources, acknowledge that WTP's position of providing guidance that prioritizes worker safety and health may be more protective than some federal or state guidance.

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