

**Impact of the COVID-19 Pandemic on Occupational Training Abilities: An Exploratory Study**

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Submitted to the Graduate Faculty of the

*Department of Epidemiology*

Graduate School of Public Health in partial fulfillment

of the requirements for the degree of

Master of Public Health

University of Pittsburgh

2021

UNIVERSITY OF PITTSBURGH  
GRADUATE SCHOOL OF PUBLIC HEALTH

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University of Pittsburgh, 2021

## **Abstract**

Training on hazard and accident prevention in the workplace is an essential part of maintaining worker health and safety. There is currently limited knowledge on the extent to which occupational safety and health training has been affected by the COVID-19 pandemic. The objective of this exploratory project was to understand how the COVID-19 pandemic has affected the training abilities of the National Institute of Environmental Health Sciences (NIEHS) Worker Education and Training Program (WETP) grantees. A mixed methods approach was utilized to collect and analyze data. A cross-sectional descriptive study consisting of an online survey and qualitative personal interviews was used to obtain data. Online surveys were distributed to gather information from training participants on how occupational safety and health training has been affected by the COVID-19 pandemic. Survey data was analyzed through descriptive and inferential statistics including measures of frequency and Kendall's rank correlation tests. Telephone interviews were conducted to obtain in-depth qualitative data and key themes were identified from interview transcripts. Approximately 49% of survey respondents reported that due to the COVID-19 pandemic, they have not received the training to safely perform their job tasks. In addition, 72.9% of participants indicated that most trainings were cancelled or postponed. Approximately 15% of participants strongly agreed to both above statements, indicating that these participants may not have received safety and health training at all during the pandemic. Almost 80% of respondents identified that trainings were moved to

online platforms during the COVID-19 pandemic. Interviews revealed that in-person, hands-on training is the preferred training format among most workers. Further, participants reported that the quality and effectiveness of health and safety training during the pandemic were at a lower level than before the COVID-19 pandemic. Understanding how the COVID-19 pandemic has affected the training abilities of NIEHS WETP training partners is essential to advancing occupational health and safety. The public health significance of these findings is that they provide an initial understanding of how the COVID-19 pandemic has indirectly impacted the occupational health of workers across the country and an insight into effective public health intervention measures.

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## **Preface**

First and foremost, I would like to thank all the workers that participated in this project and shared their experience on occupational safety and health training during the COVID-19 pandemic. I would like to thank my team at the United Steelworkers (USW) Tony Mazzocchi Center (TMC) for assisting in the design, implementation, and success of this research project. I would like to thank Diane Stein and Ashlee Fitch not only for their immense help with this project, but for their guidance throughout my journey at the University of Pittsburgh that led to my future career and passion for occupational health.

I would like to thank my research advisor, Dr. Thomas J. Songer, who provided invaluable assistance on this research project and essay and introduced me to the field of injury epidemiology. I would like to thank my academic advisor and essay reader, Dr. Nancy W. Glynn, who played a key role in the development of this essay and has provided me with the tools that I need to succeed in my career. Lastly, I would like to thank Dr. Aaron Barchowsky, a reader on my essay committee, for his expertise and insight that made this essay come together.

Further, this project was carried out with funding from the National Institute of Environmental Health Sciences (NIEHS) grant number 5U45ES006175-30. I'd like to acknowledge the National Institute of Environmental Health Sciences (NIEHS) Worker Training Program (WTP) for funding the USW Tony Mazzocchi Center, other labor-based health and safety organizations, and academic institutions to make research projects and public health intervention related to occupational health and safety training possible.

## **1.0 Introduction**

### **1.1 Occupational Injuries, Illnesses, And Fatalities**

Despite improved regulations and advancements in occupational safety and health training over the years, workers are still injured on the job every day in the U.S., with some of these workplace accidents resulting in fatalities. In 2019, 275 persons died each day while at work and a total of 5,333 persons in the U.S. died from a workplace incident.<sup>1</sup> In addition, an estimated 95,000 workers died from occupational diseases in 2019.<sup>1</sup> Employers reported nearly 3.5 million occupational injuries and illnesses in 2019, with musculoskeletal disorders making up the largest portion (~30%) of occupational injuries and illnesses.<sup>1</sup> States with the highest fatality rates for 2019 included Alaska, Wyoming, North Dakota, Montana, and West Virginia.<sup>1</sup> The cost of job injuries and illnesses is estimated at \$250 billion to \$330 billion a year.<sup>1</sup>

Previous research suggests that there may be higher rates of occupational injury or illness among certain racial minority groups.<sup>2,3</sup> Fatality rates among certain minority populations, including Latino and Black workers, increased in 2019.<sup>1</sup> The Latino fatality rate rose sharply to 4.2 per 100,000 workers in 2019.<sup>1</sup> This is a 14% increase in the Latino fatality rate from 2018.<sup>1</sup> The Black worker fatality rate was 3.6 and a total of 634 Black workers died on the job in 2019.<sup>1</sup> This is the highest number in more than two decades.<sup>1</sup> In addition, older workers are at a higher risk of experiencing a workplace injury, illness, or fatality.<sup>1</sup> In 2019, more than one-third of workplace fatalities occurred among workers ages 55 or older.<sup>1</sup> Furthermore, workers ages 65 or older have nearly three times the risk of dying on the job as workers in other age groups, with a fatality rate of 9.4 per 100,000 workers.<sup>1</sup>

According to the Bureau of Labor Statistics' Survey of Occupational Injuries and Illnesses (SOII), an estimated 2.8 million nonfatal workplace injuries were reported among

private industry employers in 2019.<sup>4</sup> Furthermore, the incidence of occupational injury among private industry employers was 2.8 cases per 100 full-time equivalent (FTE) workers in 2019.<sup>4</sup> Approximately 888,220 of the reported injuries in 2019 resulted in one or more days of missed work.<sup>4</sup> The incidence rate of days away from work cases was 0.9 cases per 100 FTE workers in 2019.<sup>4</sup> The industries with the highest incidence rates for total recordable cases in 2019 include motor vehicle body and trailer manufacturing, animal slaughtering and processing, machine shops, turned product, screw, nut, and bolt manufacturing, clay product and refractory manufacturing, and household appliance manufacturing.<sup>4</sup> Ensuring that companies provide all workers with the necessary occupational safety and health training to safely perform their job tasks may diminish the number of workplace injuries, illnesses, and fatalities across industries in the U.S.

## **1.2 Importance of Training**

Occupational safety and health training ensures that workers understand how to perform their job tasks safely and adequately.<sup>5</sup> When someone participates in occupational safety and health training, they are learning how to perform their job in a way that minimizes the risk of occupational injury, illness, or fatality.<sup>5</sup> Safety and health training differs by industry and is usually unique to the job of the worker being trained.<sup>6</sup> For workers at a Department of Energy gaseous diffusion plant, safety and health training may include information on how to properly don and doff personal protective equipment, how to properly handle and store hazardous wastes, how to safely clean up asbestos, and what to do in case of an emergency at the site.<sup>7</sup> For nurses and other healthcare workers, safety and health training may include how to prevent exposures to bloodborne pathogens,<sup>8</sup> how to prevent back injuries,<sup>9</sup> and how to properly dispose of needles and other medical wastes.<sup>10</sup> For office workers, safety and health training may be focused on

workplace ergonomics to prevent the development of musculoskeletal injuries overtime.<sup>11</sup> Safety and health training can be conducted in many different forms.<sup>6</sup> Safety and health training can be computer-based or instructor-led.<sup>6</sup> Computer-based training often consists of modules and videos followed by an evaluation that participants can move through at their own pace.<sup>6</sup> Instructor-led training may either be virtual or online and is similar to a typical classroom setting with lectures and group discussions.<sup>6</sup>

Previous research suggests that occupational safety and health training can prevent accidents in the workplace and lead to more effective hazard control.<sup>5,12</sup> Safety and health training has been linked to an increase in the reporting of occupational injuries, illnesses, and fatalities, which enhances metrics on and advances occupational safety and health.<sup>5</sup> Similarly, previous research findings indicate that safety and health training is linked to increased hazard awareness and a greater understanding and adoption of safe work practices.<sup>12</sup> Data from previous research shows that a lack of safety and health training or inadequate training could have potentially contributed to workplace injuries and fatalities.<sup>13</sup> Occupational safety and health training has also been linked to an increase in sharing the knowledge with co-workers, increased efforts to make improvements in the workplace, and overall greater success in making these improvements.<sup>14</sup>

Occupational safety and health training benefits workers of all ages and levels of work experience.<sup>15</sup> In a cross-sectional study evaluating work characteristics and safety training among 6,810 working teenagers in Wisconsin, 15% of participants reported being injured on the job.<sup>15</sup> Out the sample, 63% of the teenagers reported receiving safety training before the start of their job and 43% reported receiving a safety manual.<sup>15</sup> Authors noted that improved safety training

may help reduce the occurrence of injury reported by entry-level workers, including high school students.<sup>15</sup>

The benefits of occupational safety and health training have been reported in various industries including, but not limited to, forestry,<sup>16</sup> construction,<sup>17</sup> manufacturing, transportation, and nursing.<sup>4</sup> A study consisting of 2,795 construction workers of a major railway construction project assessed the impact of a health and safety training program on injury rates.<sup>18</sup> At the end of the training program, the incidence of occupational injuries had decreased by 16% after a basic training module and by 25% after a specific training module.<sup>18</sup> Another study evaluating the effects of safety and health training on work-related injury in the construction industry found that workers who received safety and health training throughout the study were 12% less likely to file for workers' compensation than workers that were not trained throughout the study.<sup>19</sup> Implementation of this training program resulted in a 42% decrease in workers' compensation claims, suggesting a decrease in workplace accidents and injuries.<sup>19</sup>

Health care is another industry that presents many occupational hazards. A study conducted in France evaluated individuals in over 12,000 different job positions to assess how occupational safety and health education during schooling impacted workplace injury incident rates.<sup>20</sup> Results indicated that workers who reported having received occupational safety and health education during their schooling had two times fewer occupational injuries than workers reporting that they had not received occupational safety and health education.<sup>20</sup> In addition, this study found that workers who received first aid training at work had a lower workplace injury risk than those workers that did not receive this training.<sup>20</sup> Additionally, a study conducted among nursing students in China evaluated the effect of an occupational safety and health

training program on needle-stick injuries.<sup>21</sup> Results showed that following the safety and health training program, needle-stick events, and therefore injuries, significantly decreased.<sup>21</sup>

Previous research suggests that the benefits of occupational safety and health training are widely recognized within companies and organizations. A study conducted in Western Australia implemented a mandatory certification in safety awareness for construction industry workers. Subsequently, researchers evaluated whether implementation of this safety training decreased work-related injuries and attitudes of management towards safety and health training. Findings from a survey on attitudes towards training indicated that the majority of management in the construction industry believed that the implementation of the safety training benefitted their staff and business. Furthermore, the majority of management believed that the safety training reduced rates of accidents in their workplace. Lastly, since the introduction of this safety training, there was a reported reduction in days of lost work due to work-related injuries at a time of increased production and hiring of new workers.<sup>22</sup>

### **1.3 Training Requirements**

The Occupational Safety and Health Administration (OSHA) requires training for workers in specific industries.<sup>23</sup> Under the Occupational Safety and Health (OSH) Act of 1970, OSHA implemented regulations that establish training requirements for workers in different industries.<sup>23</sup> Under the OSH Act of 1970, OSHA divides the regulation, including training requirements, into five categories including general industry, maritime, construction, agriculture, and federal employee programs.<sup>23</sup> Examples of required training topics, which can be found in Title 29 Part 1910 of the Code of Federal Regulations (CFR), include but are not limited to hazardous waste operations and emergency response (HAZWOPER), occupational noise exposure, process safety management, radiation worker training, fire prevention, and storage and

handling of potentially hazardous substances.<sup>23</sup> In addition, hazardous waste handling training is required under the Resource Conservation and Recovery Act (RCRA) for any worker who handles hazardous waste.<sup>24</sup> For some of these trainings, employers may be required to provide an annual refresher in addition to initial training so that their employees stay competent and up to date on safe workplace practices. Some trainings are not required by law but are highly recommended for workers in specific industries. Examples of highly recommended trainings include incident investigation training and hazard mapping training.

Different entities, including the employer, labor unions, and other training organizations, may provide both required and recommended safety and health training to workers. One of these entities is the National Institute of Environmental Health Science's (NIEHS) Worker Education and Training Program (WETP). In 1987, the NIEHS established the WETP to provide safety and health training to workers across the U.S. and Puerto Rico.<sup>25</sup> Since its establishment, the WETP has trained over three million workers.<sup>25</sup> This program provides grants to nonprofit organizations to develop and deliver training across different occupational sectors.<sup>26</sup> Some of these sectors include environmental cleanup workers, first responders, health care employees, industrial or construction workers, law enforcement officers, and transportation or rail workers.<sup>26</sup> NIEHS WETP grantees include labor or union-based safety and health organizations as well as academic institutions.<sup>26</sup> The goal of the WETP is to ensure that workers play an active role in improving workplace conditions.<sup>26</sup> In addition, the WETP strives to foster relationships between employees and employers by encouraging them to work together to improve workplace conditions and enhance worker safety and health.<sup>26</sup> The implementation of the OSH Act of 1970, as well the creation of worker training programs such as the WETP, have increased occupational safety and health training in various industries over the years.

## **1.4 Covid-19 Pandemic Impact on Training**

In March 2020 when the COVID-19 virus began to spread across the U.S., workplaces were affected in more ways than one. Some workplaces were able to switch to remote work, whereas others conducted business as usual throughout the entirety of the pandemic. Some workers were required to wear masks, social distance, and rotate shifts to decrease virus transmission in the workplace. One component of maintaining a safe and healthy workplace that has often been overlooked during the COVID-19 pandemic is occupational safety and health training. Many employers, NIEHS WETP grantees, and other training organizations have adapted health and safety training to online platforms during the COVID-19 pandemic. However, many workers and training entities have reported that trainings have been completely cancelled or postponed until further notice given the state of the COVID-19 pandemic. Still in some industries, work operations and training have continued as usual throughout the entirety of the COVID-19 pandemic.

Previous research indicates that the gold standard for occupational safety and health training is in-person training that allows workers to obtain a hands-on learning experience alongside a seasoned professional or experienced trainer to answer questions as needed. Research has shown that as training methods become more engaging and require active participation from training participants, workers demonstrate greater knowledge acquisition and a decrease in accidents, illnesses, and injuries is observed.<sup>27</sup> In addition, in-person training gives workers the opportunity to work and learn together in small groups. In-person training, rather than computer-based training, allows workers to share personal experiences and stories that foster advanced learning and problem-solving tailored to their job. Within the NIEHS WETP, this is often referred to as the small group activity method. A study conducted on online versus



in-person delivery of the OSHA 10-hour general industry safety and health training showed that in-person training resulted in significantly higher test scores than those that took the course online.<sup>28</sup> This raises the question of how workers are learning, retaining, and applying health and safety information to maintain safe work practices during and directly following the COVID-19 pandemic.<sup>28</sup>

### **1.5 Gaps in Knowledge**

There is a lack of extensive research on the topic of occupational safety and health training within the past 10 to 20 years. Literature that is available on occupational safety and health includes the analysis of trends over time in occupational injuries, illnesses, and fatalities as well as the impact of policy and regulation on occupational safety and health. Research has also been published on the effectiveness of injury prevention and mitigation measures in the workplace. Due to the recent timing of the COVID-19 pandemic, little to no previous research has been performed or published on how the pandemic has potentially impacted occupational safety and health training in different industries and, subsequently, impacted the safety and health of workers. A lack of occupational safety and health training could potentially lead to an increase in occupational injury, illness, or fatality.<sup>16</sup> Because of the widespread effects of the COVID-19 pandemic on various industries, and the importance of occupational safety and health training to worker health and safety, the impact that the COVID-19 pandemic has had on training is a topic that merits further research. In this essay, the question of how the COVID-19 pandemic has impacted occupational health and safety training among a set of NIEHS WETP grantees is investigated through a cross-sectional exploratory study design.

## **1.6 Public Health Significance**

Occupational safety and health training is an important component of maintaining worker health and safety in all industries.<sup>5</sup> However, the work operations of almost all industries across the U.S. have been negatively impacted or significantly altered since March 2020 due to the COVID-19 pandemic.<sup>29</sup> There is a consistently high number of occupational injuries, illnesses, and fatalities each year that result in costs of up to \$330 billion dollars annually.<sup>1</sup> It is important to understand factors that exacerbate these incidents so that future work-related injuries, illnesses, and fatalities can be prevented. Previous research suggests that occupational safety and health training is one tool for preventing workplace accidents.<sup>12</sup> Therefore, understanding how the COVID-19 pandemic has impacted occupational safety and health training in various industries will allow for public health intervention aimed at addressing gaps in occupational health and safety training. This will advance the occupational health and safety of workers across the U.S.

## **2.0 Objective**

The objective of this exploratory research study was to better understand how the COVID-19 pandemic has potentially impacted occupational safety and health training and, subsequently, the safety and health of workers. We anticipate that findings from this study will influence the development of future research studies to continue further investigation into this important yet understudied topic.

## **3.0 Methods**

### **3.1 Study Design**

A mixed methods approach was implemented to collect and analyze data. A cross-sectional descriptive study consisting of an online survey and qualitative personal phone interviews was used to obtain data. The study took place over a 4-month period from May 2021 to August 2021.

### **3.2 Recruitment**

All workers over the age of 18 that had previously trained with an NIEHS WETP grantee organization were invited to participate in this study. Recruitment took place during the month of May 2021 and was conducted via email and announcement at virtual events. Emails about the project with a link to the survey were sent out via the webmasters of NIEHS WETP grantees that consist of previous training participants. The subset of NIEHS WETP grantees involved in recruitment include the United Steelworkers, the Communication Workers of America, the International Chemical Workers Union Council, the United Automobile Workers, and the International Association of Machinists and Aerospace Workers. The survey was sent out to a total of 400 workers.

At the end of the survey, participants had the opportunity to sign up for personal interviews by providing their name and email address through a separate form to keep survey responses anonymous. Individuals who signed up for personal interviews were emailed with date and time slots for the interview. Due to a low sample size of responses for personal interviews through the survey, emails were sent out to provide another opportunity to sign up for the interviews following the survey.

### 3.3 Survey

Surveys were developed and distributed using the Qualtrics platform. Survey questions were conceived by the research team over a 1-month period. The survey questions (**Appendix A Survey Questions**) were divided into three general sections. The first section contained two 5-point Likert-scale questions to obtain information on attitudes towards occupational safety and health training in general. The second section consisted of eleven, 5-point Likert-scale questions aimed at obtaining information strictly on the impact of the COVID-19 pandemic on training and other related factors. Answer choices for both sets of Likert-scale questions consisted of strongly agree, somewhat agree, neither agree nor disagree, somewhat disagree, and strongly disagree. The last section consisted of five multiple choice questions aimed at obtaining demographic information on the sample. At the end of the survey, participants had the opportunity to sign up for personal interviews. The survey was distributed in both English and Spanish and responses were collected over a 2-week period in June 2021. Over two weeks, 115 English survey responses and three Spanish survey responses were received. The response rate for surveys was 29.5%.

### 3.4 Telephone Interviews

When the study was initially designed, virtual focus groups were going to be utilized for qualitative data collection in addition to the online survey. However, due to a low number of interested participants and scheduling issues, personal phone interviews were implemented instead. The personal phone interviews typically lasted between ten and twenty minutes and consisted of seven questions. These questions (**Appendix B Interview Questions**) were very similar to the survey questions and were aimed at obtaining more in-depth qualitative data to supplement the survey data. The interviews were recorded and manually transcribed. The

interview transcripts were analyzed for key themes and stand-out quotes. The personal interviews took place over the month of July 2021. Six personal interviews were conducted.

### **3.5 Statistical Analysis**

Survey results were downloaded from Qualtrics as an Excel (16.51) file and imported into Stata® (16.1, StataCorp LLC, College Station, TX). Stata® was utilized for data clean-up and analysis. Survey data was coded by answer choice, with 1 representing strongly disagree, 2 representing somewhat disagree, 3 representing neither agree nor disagree, 4 representing somewhat agree, and 5 representing strongly agree. Analysis of survey data consisted of both descriptive and inferential statistics. Descriptive statistics included measures of frequency and central tendency statistics. To supplement the central tendency statistics for the Likert-scale survey questions, graphs were generated to enable visualization of answer trends. Graphs were also created to examine between-group differences by industry, age, and race/ethnicity for the statements *“Due to the COVID-19 pandemic, I have not received all of the necessary health and safety training needed to safely perform my job tasks”* and *“Due to the COVID-19 pandemic, the quality of health and safety training in my workplace has declined.”* These statements were chosen for visual analysis in between-group graphs to identify gaps in health and safety training in each group, and to understand if the quality of health and safety training differs by group. This will allow for focused health and safety training intervention if between-group differences are observed. Inferential statistics included Kendall rank correlation tests on a specific set of statements. Statements that provided an insight into how changes to health and safety training during the COVID-19 pandemic impacted increased fear for health and safety at work, the quality of training, and whether training occurred at all were chosen for inferential analysis. There is disagreement in the literature on whether to use parametric (Pearson’s correlation) or

non-parametric tests (Kendall rank or Spearman correlation) to analyze Likert-scale and Likert-type data.<sup>30</sup> The data collected from the surveys do not satisfy the assumption of Pearson's correlation that variables are continuous or measured at interval or ratio scales.<sup>31</sup> Therefore, a non-parametric test was chosen for analysis. Kendall rank correlation has been utilized in studies to obtain an idea of associations between Likert-type data.<sup>32</sup> The data from the surveys satisfies the assumption of Kendall rank correlation, as the answers are on an ordinal scale.<sup>33</sup> The Kendall rank correlation test was chosen over the Spearman correlation test given the smaller sample size of this dataset.<sup>34</sup> Analysis of the Kendall's tau-b correlation coefficient was chosen over the Kendall's tau-a correlation coefficient due to its adjustment for ties in the data.<sup>35</sup> Analysis of the Kendall's tau-b correlation coefficient was also chosen over the Kendall's tau-c correlation coefficient given that the scales of the Likert-scale questions in the survey all have the same number of answer choices.<sup>35</sup> The Kendall's tau correlation coefficient indicated to what extent positive answer choices (strongly and somewhat agree) on one survey question are associated with positive or negative answer choices (strongly and somewhat disagree) on another survey question.<sup>36</sup> The significance level used for analysis was 0.05. The null hypotheses for each Kendall rank correlation test are that the tau-b correlation coefficients equal zero in the population under analysis.

## 4.0 Results

### 4.1 Demographic Characteristics

In total, 118 survey responses were received. As outlined in **Table 1**, approximately 46% of survey respondents fell between the ages of 50 and 59 and 80% of participants were White. All regions of the U.S. were represented in the survey results with the majority of respondents from the Great Lakes and Southeast regions (**Table 1**). General manufacturing was the most represented industry among survey participants and Labor Union was the most represented organization (**Table 1**).

**Table 1: Demographic characteristics of participants that responded to survey assessing the impact of the COVID-19 pandemic on occupational safety and health training (n=118)**

	N (%)
Organization	
Labor Union	105 (89.0)
Worker Center	4 (3.4)
Other	5 (4.2)
Labor Union, Other	1 (0.9)
Labor Union & Worker Center	1 (0.9)
Labor Union, Worker Center, & Other	1 (0.9)
Missing	1 (0.9)
Industry	
Utilities	7 (5.9)
General Manufacturing	60 (50.8)
Health Care and Social Assistance	2 (1.7)
Mining	3 (2.5)
Construction	6 (5.1)
Telecommunications	1 (0.9)
College, University, And Adult Education	2 (1.7)
Public Sector	3 (2.5)
Other.	31 (26.3)
Prefer Not to Say.	2 (1.7)
Missing	1 (0.9)
Location	
U.S. – New England	13 (11.0)
U.S. – Mideast	19 (16.1)
U.S. – Southeast	24 (20.3)
U.S. – Great Lakes	30 (25.4)
U.S. – Southwest	3 (2.5)



	U.S. – Rocky Mountains	3 (2.5)
	U.S. – Far West	6 (5.1)
	Other.	18 (15.3)
	Prefer Not to Say.	1 (0.9)
	Missing	1 (0.9)
Age		
	18-39 Years Old	7 (5.9)
	40-49 Years Old	28 (23.7)
	50-59 Years Old	54 (45.8)
	60-69 Years Old	28 (23.7)
	Prefer Not to Say.	1 (0.9)
Race/Ethnicity		
	White	94 (79.7)
	Hispanic, Latino, Or Spanish Origin	8 (6.8)
	Black Or African American	4 (3.4)
	Native Hawaiian or Pacific Islander	1 (0.9)
	Prefer Not to Say.	11 (9.3)

#### 4.2 Survey Data

As outlined in **Table 2**, the median answer choice for “*Training on hazard and accident prevention in the workplace is an essential part of maintaining worker health and safety*” was strongly agree. No participants disagreed or neither agreed nor disagreed to this statement. Similarly, the median answer choice to “*Due to the COVID-19 pandemic, a majority of my health and safety trainings were cancelled or postponed*” was strongly agree. Furthermore, participant responses for “*Due to the COVID-19 pandemic, I have not received all of the necessary health and safety training needed to safely perform my job tasks*” range from strongly disagree to strongly agree, with the median answer choice being neither agree nor disagree as shown in **Table 2**. The median for “*Due to the COVID-19 pandemic, the quality of health and safety training in my workplace has declined*” also ranged from strongly disagree to strongly agree, with the median answer choice being somewhat agree (**Table 2**). A median response of strongly agree was observed for “*There is a need for more health and safety trainings in my workplace,*” “*Due to the COVID-19 pandemic, the small group activity method could not be used in health and safety training at my workplace,*” and “*Due to the COVID-19 pandemic, the*

*number of workers able to be trained at once in my workplace has decreased for social distancing purposes.*” Additionally, the median answer choice was neither agree nor disagree for *“Previous safety and health training prior to the COVID-19 pandemic prepared me for addressing infectious disease hazards in the workplace”* as presented in **Table 2**. Lastly, the median participant response was somewhat agree for *“Due to the COVID-19 pandemic, some health and safety trainings were moved to an online platform”* and was somewhat disagree for *“Due to the COVID-19 pandemic, my workplace shut down for a period of time”* (**Table 2**).

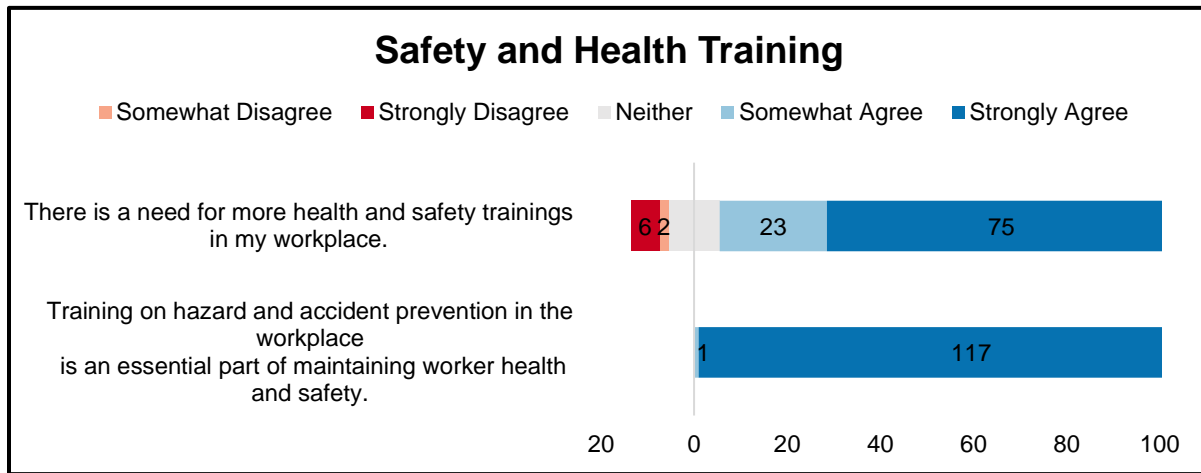
**Table 2: Central tendency statistics for Likert-scale responses on survey assessing the impact of the COVID-19 pandemic on occupational safety and health training (n=118)**

Statement	Median	Min	25 <sup>th</sup>	75 <sup>th</sup>	Max
Training on hazard and accident prevention in the workplace is an essential part of maintaining worker health and safety.	5.00	4.00	5.00	5.00	5.00
There is a need for more health and safety trainings in my workplace.	5.00	1.00	4.00	5.00	5.00
Previous safety and health training prior to the COVID-19 pandemic prepared me for addressing infectious disease hazards in the workplace.	3.00	1.00	2.00	4.00	5.00
Due to the COVID-19 pandemic, I have not received all of the necessary health and safety training needed to safely perform my job tasks.	3.00	1.00	2.00	4.00	5.00
Due to the COVID-19 pandemic, a majority of my health and safety trainings were cancelled or postponed.	5.00	1.00	3.00	5.00	5.00
Due to the COVID-19 pandemic, some health and safety trainings were moved to an online platform.	4.00	1.00	4.00	5.00	5.00
Due to the COVID-19 pandemic, the small group activity method could not be used in health and safety training at my workplace.	5.00	1.00	4.00	5.00	5.00
Due to the COVID-19 pandemic, the quality of health and safety training in my workplace has declined.	4.00	1.00	3.00	5.00	5.00
Due to the COVID-19 pandemic, the number of workers able to be trained at once in my workplace decreased for social distancing purposes.	5.00	1.00	4.00	5.00	5.00
Due to the COVID-19 pandemic, my workplace shut down for a period of time.	2.00	1.00	1.00	5.00	5.00
I have noticed an increase in occupational injuries, illnesses, and fatalities during the COVID-19 pandemic.	3.00	1.00	2.00	4.00	5.00
The COVID-19 pandemic has negatively impacted my work life and has made it harder for me to do my job.	4.00	1.00	3.00	5.00	5.00
Due to the COVID-19 pandemic, I feared more for my health and safety at work.	4.00	1.00	2.00	5.00	5.00

*Note:* Coding for Likert-scale responses: 1 = Strongly Disagree, 2 = Somewhat Disagree, 3 = Neither Agree nor Disagree, 4 = Somewhat Agree, 5 = Strongly Agree

The majority of survey participants either somewhat or strongly agreed that there is a need for more health and safety training in their workplace (**Figure 1**). In addition, 99% of

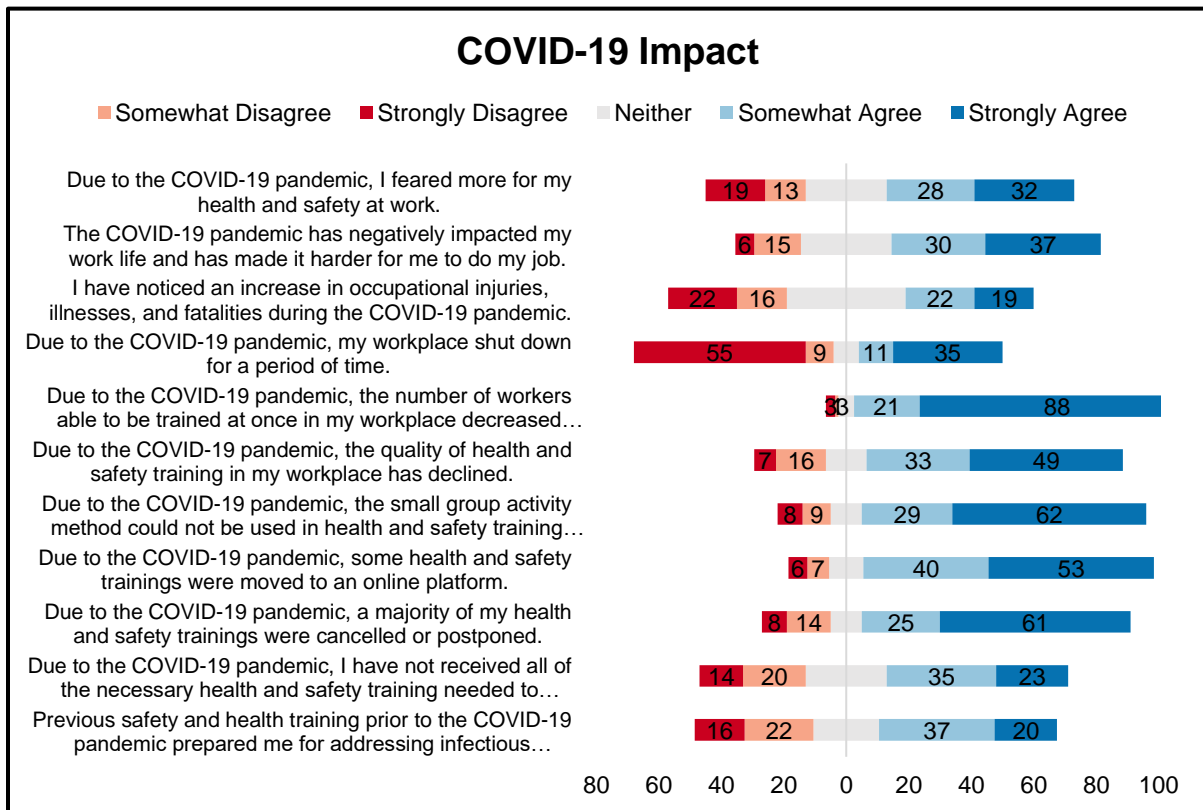
survey respondents strongly agreed that training on hazard and accident prevention in the workplace is an essential part of maintaining worker health and safety (**Figure 1**).



**Figure 1** Distribution of answers for Likert-scale survey questions about attitudes towards and overall gaps in occupational safety and health training

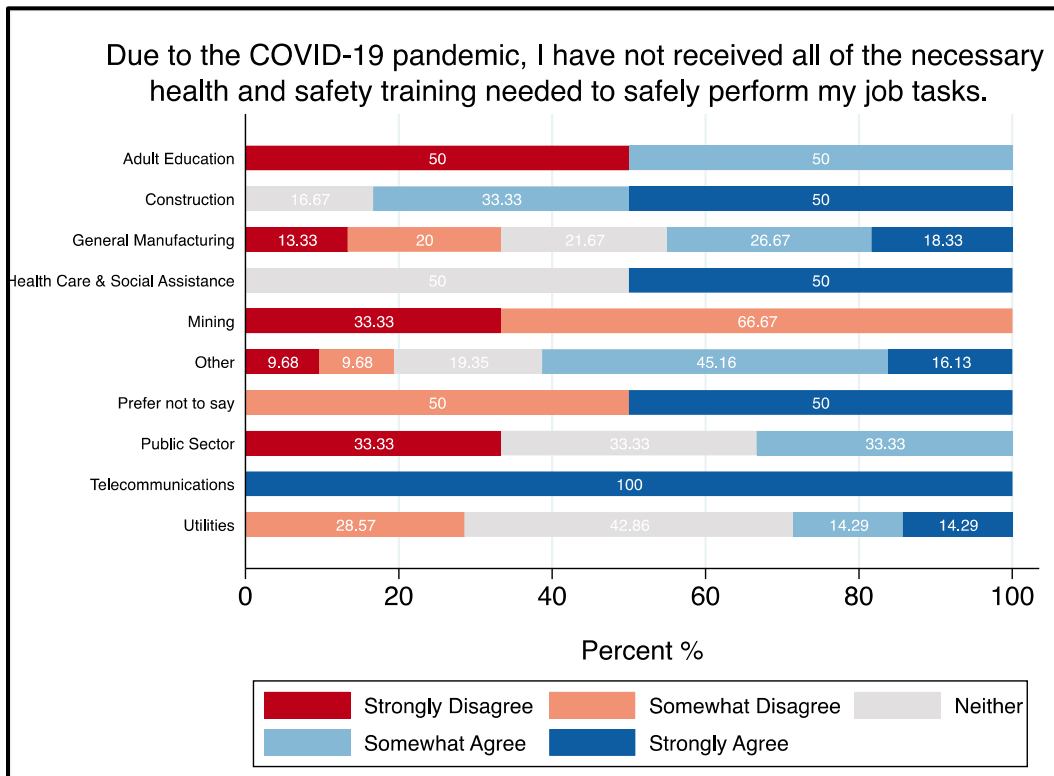
As shown in **Figure 2**, survey participants were divided on whether they agreed or disagreed that previous health and safety training prior to the COVID-19 pandemic prepared them for addressing infectious disease hazards in the workplace, with the majority of respondents leaning towards somewhat or strongly agree. Approximately 49% of participants either strongly or somewhat agreed that they have not received all the necessary health and safety training needed to safely perform their job tasks due to the COVID-19 pandemic. Most survey respondents strongly agreed that most of their health and safety training were cancelled or postponed during the pandemic (**Figure 2**). Approximately 44% of survey respondents indicated that they have not received all the necessary health and safety training needed to safely perform their jobs tasks, and that a majority of their health and safety trainings were cancelled or postponed. Approximately 15% of survey respondents strongly agreed to both above statements. Furthermore, approximately 79% of participants either strongly or somewhat agreed that some of their trainings were moved to an online platform (**Figure 2**). Approximately 52% of participants

strongly agreed that during the COVID-19 pandemic, the small group activity method commonly used in health and safety trainings could not be utilized, and 88% strongly agreed that the number of workers able to be trained at once in their workplace decreased due to social distancing and class size adjustments as shown in **Figure 2**. Most survey respondents also agreed that the quality of safety and health training in their workplace has declined due to the COVID-19 pandemic. Lastly, other survey questions outlined in **Figure 2** indicate if workplaces were shut down due to the COVID-19 pandemic, how the COVID-19 pandemic has impacted the ability to perform job tasks, if the COVID-19 pandemic has increased fear for health and safety in the workplace, and if workers have noticed an increase in occupational injuries, illnesses, and fatalities during the COVID-19 pandemic.



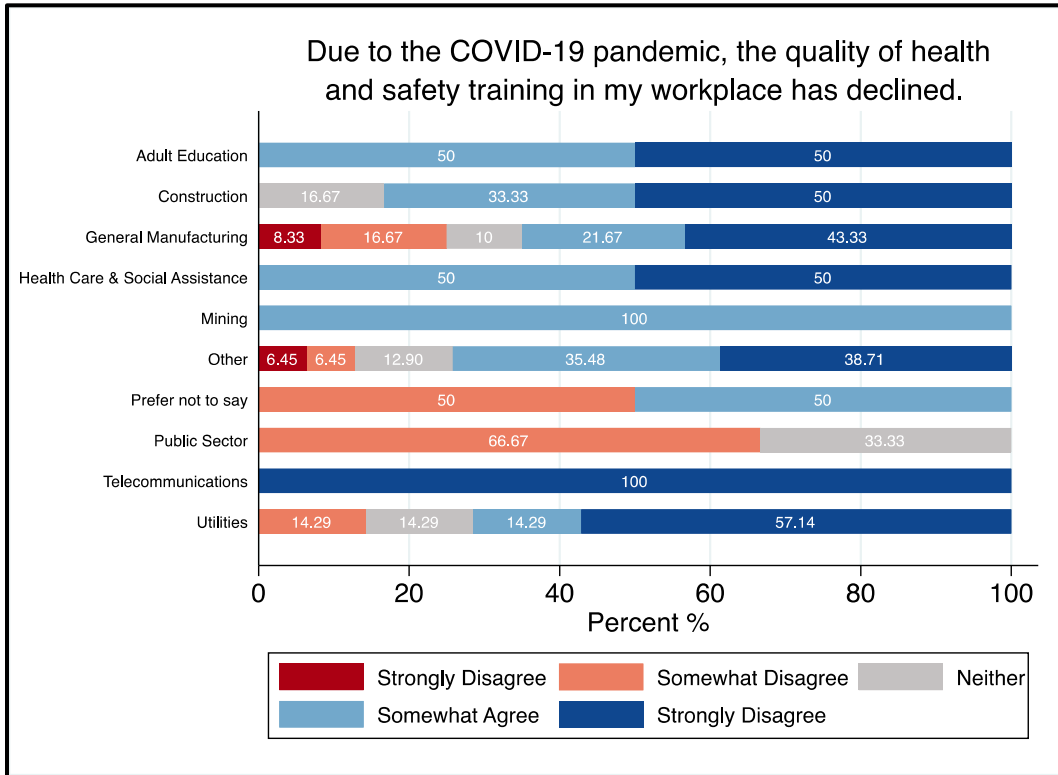
**Figure 2** Distribution of answers for Likert-scale survey questions about how the COVID-19 pandemic has impacted occupational safety and health training and the safety and health of workers in general

As shown in **Figure 3**, the general manufacturing workers and “other” workers were more likely to somewhat agree with “*Due to the COVID-19 pandemic, I have not received all of the necessary health and safety training needed to safely perform my job tasks*” than workers in other industries. Specifically, approximately 27% of participants in general manufacturing and 45% of participants from “other” industries somewhat agreed with this statement. Examples of industries reported as “Other” include oil refining, non-profit organizations, community education and outreach, and chemical. Construction workers were more likely to strongly agree with this statement than workers in other industries, and miners were more likely to strongly disagree with the statement than workers in other industries (**Figure 3**). Specifically, 50% of construction workers strongly agreed and approximately 67% of miners somewhat disagreed with the statement. Utility workers were more likely to neither agree nor disagree with the statement than workers in other industries, with approximately 43% of utility workers neither agreeing nor disagreeing. Adult education, health care and social assistance, public sector, and utility workers were more divided between answer choices than the other industries (**Figure 3**)



**Figure 3 Distribution of answers for Likert-scale survey question on a lack of occupational safety and health training due to the COVID-19 pandemic by industry**

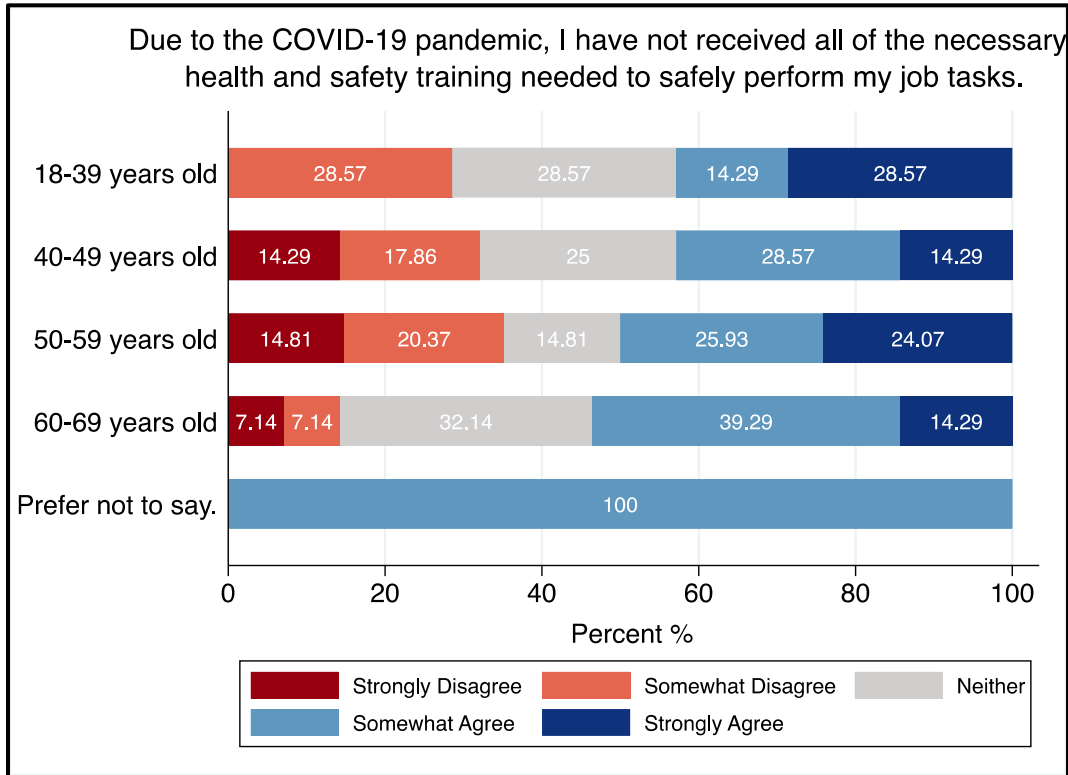
As shown in **Figure 4**, the general manufacturing, “other,” construction, and utility industry workers were more likely to strongly agree with *“Due to the COVID-19 pandemic, the quality of health and safety training in my workplace has declined”* than workers in other industries. Specifically, approximately 50% of construction, 43% of general manufacturing, 39% of “other” industries, and 57% of utilities strongly agreed with this statement. Miners were more likely to somewhat agree with this statement than workers in other industries, and public sector workers were more likely to somewhat disagree with the statement than workers in other industries. Workers in adult education and health care and social assistance were more divided in their answer choices.



**Figure 4 Distribution of answers for Likert-scale survey question on quality of occupational safety and health training due to the COVID-19 pandemic by industry**

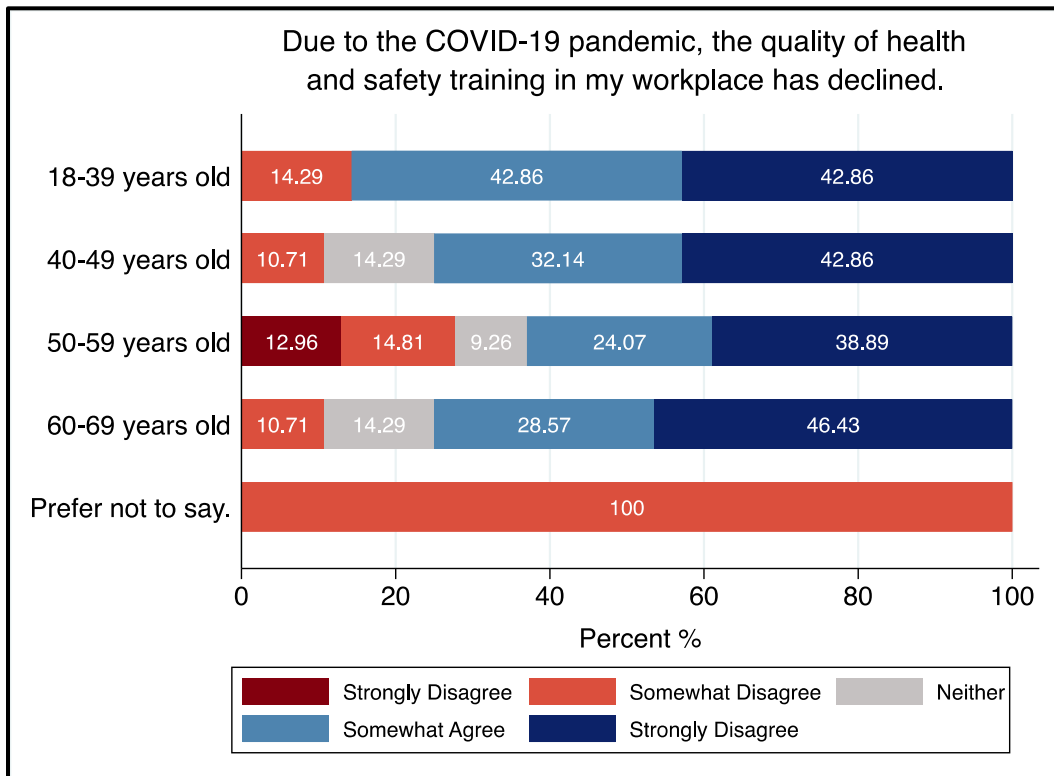
As shown in **Figure 5**, workers aged 40-49 years, 50-59 years, and 60-69 years old were more likely to somewhat agree with the statement *“Due to the COVID-19 pandemic, the quality of health and safety training in my workplace has declined”* than the other age groups. In detail, approximately 29% of participants aged 40-49, 26% of participants aged 50-59, and 39% of participants aged 60-69 somewhat agreed with the statement. Workers in the 18-39 age group were divided between answer choices, with the majority either somewhat disagreeing or strongly agreeing with the statement.





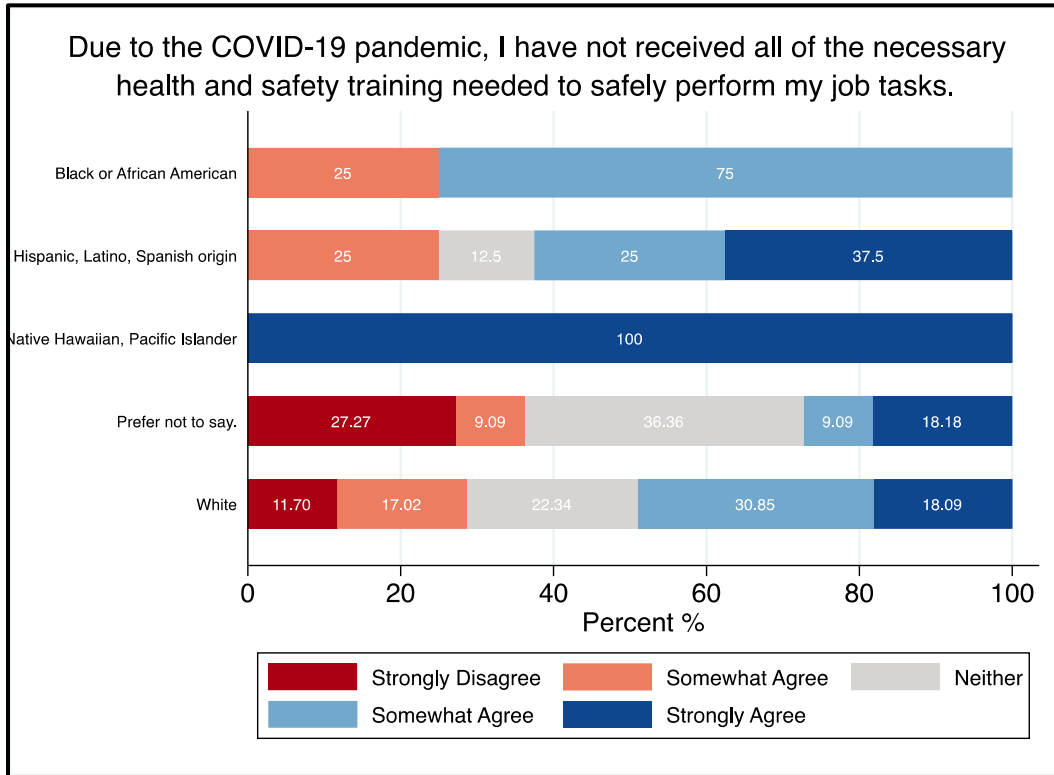
**Figure 5** Distribution of answers for Likert-scale survey question on a lack of occupational safety and health training due to the COVID-19 pandemic by age group

As shown in **Figure 6**, workers aged 40-49 years, 50-59 years, and 60-69 years were more likely to strongly agree with “*Due to the COVID-19 pandemic, the quality of health and safety training in my workplace has declined*” than the other age groups. Approximately 43% of participants aged 40-49, 39% of participants aged 50-59, and 46% of participants aged 60-69 strongly agree with this statement. The majority of workers in the 18-39 age group were split between somewhat agreeing and strongly agreeing with the statement.



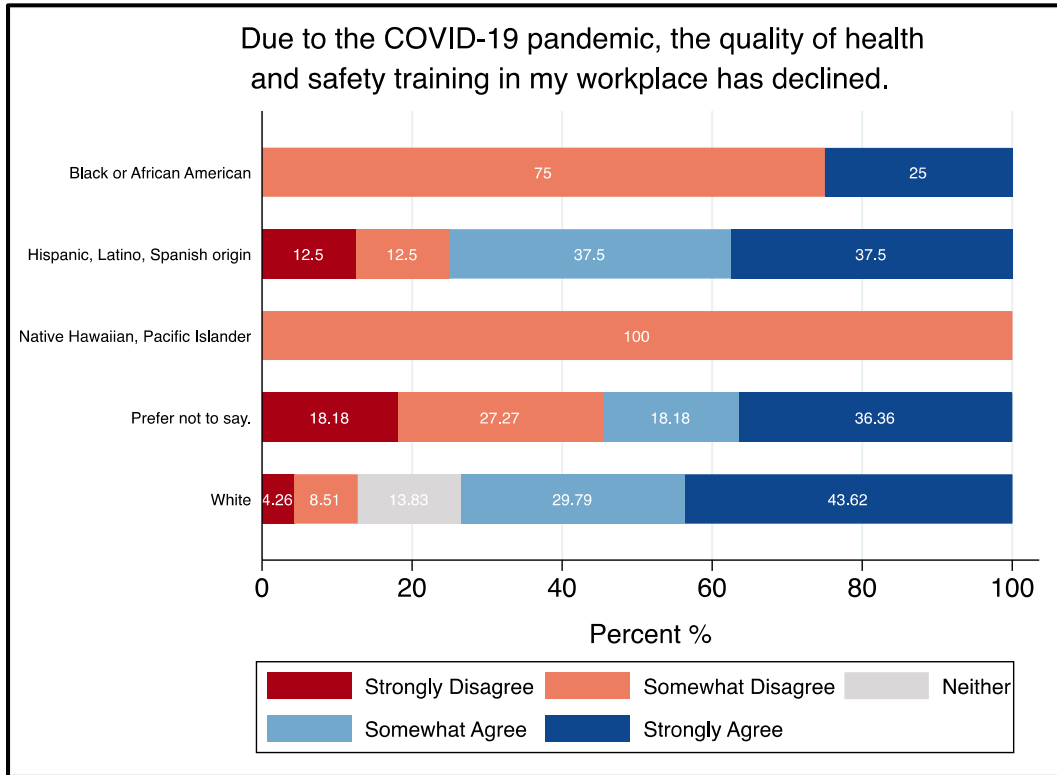
**Figure 6** Distribution of answers for Likert-scale survey question on quality of occupational safety and health training due to the COVID-19 pandemic by age group

As presented in **Figure 7**, White and Black or African American participants were more likely to somewhat agree with “*Due to the COVID-19 pandemic, the quality of health and safety training in my workplace has declined*” than workers of other races/ethnicities. More specifically, approximately 31% of White participants and 75% of Black or African American participants somewhat agreed with the statement. Hispanic, Latino, or Spanish origin participants were more likely to strongly agree with the statement than workers of other races/ethnicities. Participants that preferred not to specify their race/ethnicity were more likely to neither agree nor disagree with the statement than participants of other races/ethnicities (**Figure 7**).



**Figure 7** Distribution of answers for Likert-scale survey question on a lack of occupational safety and health training due to the COVID-19 pandemic by race/ethnicity

As shown in **Figure 8**, White participants were more likely to strongly agree with “Due to the COVID-19 pandemic, I have not received all of the necessary health and safety training needed to safely perform my job tasks” than participants of other races/ethnicities. More specifically, approximately 44% of White participants strongly agreed with the statement. Black or African American participants were more likely to somewhat disagree with the statement than participants of other races/ethnicities. Among Black or African American participants, 75% somewhat disagreed with the statement. Hispanic, Latino, or Spanish origin workers were split between somewhat and strongly agreeing with the statement (**Figure 8**).



**Figure 8 Distribution of answers for Likert-scale survey question on quality of occupational safety and health training due to the COVID-19 pandemic by race/ethnicity**

As shown in **Table 3**, there was a moderate, positive correlation between *a lack of necessary training due to the COVID-19 pandemic* and *an increase in workers' fear for their health and safety due to the COVID-19 pandemic* ( $\tau\text{-}b = 0.33, p < 0.0001$ ). There was a weak, non-significant positive correlation between *moving training to online platforms* and *a decline in the quality of training due to the COVID-19 pandemic* ( $\tau\text{-}b = 0.13, p = 0.11$ ). There was a strong, positive correlation between *the elimination of the small group activity method* and *a decline in the quality of training due to the COVID-19 pandemic* ( $\tau\text{-}b = 0.36, p < 0.0001$ ). There was a moderate, positive correlation ( $\tau\text{-}b = 0.21, p = 0.01$ ) between *noticing an increase in occupational injuries, illnesses, and fatalities* and *the cancellation of training due to the COVID-19 pandemic* (**Table 3**).

**Table 3: Kendall’s rank correlation statistics for Likert scale responses on select survey questions assessing the impact of the COVID-19 pandemic on occupational health and safety training in various industries.**

<b>Statement 1</b>	<b>Statement 2</b>	<b>Kendall’s tau-b</b>	<b>Kendall’s score</b>	<b>SE of score</b>	<b>p</b>
Due to the COVID-19 pandemic, I have not received all of the necessary health and safety training needed to safely perform my job tasks.	Due to the COVID-19 pandemic, I feared more for my health and safety at work.	0.33	1772	407.78	<0.001
Due to the COVID-19 pandemic, some health and safety trainings were moved to an online platform.	Due to the COVID-19 pandemic, the quality of health and safety training in my workplace has declined.	0.13	613	375.00	0.11
Due to the COVID-19 pandemic, the small group activity method could not be used in health and safety training at my workplace.	Due to the COVID-19 pandemic, the quality of health and safety training in my workplace has declined.	0.36	1726	373.42	<0.001
I have noticed an increase in occupational injuries, illnesses, and fatalities during the COVID-19 pandemic.	Due to the COVID-19 pandemic, a majority of my health and safety trainings were cancelled or postponed.	0.21	1034	379.10	0.01

### 4.3 Telephone Interviews

From the six personal interviews conducted, eight key themes were identified from the interview transcripts. These include importance of hazard recognition, lack of preparedness, communication issues, changes to in-person training, pros and cons of online training,

accessibility issues, quality of training, attitudes towards the COVID-19 pandemic, and abuse within the company.

### Importance of Hazard Recognition

Safety and health training was important to participants for the sake of hazard recognition. Participants noted that hazard recognition leads to the mitigation of injuries, illnesses, and fatalities in the workplace and allows workers to return home to their families the same way they left.

### Lack of Preparedness

Participants reported an overall lack of preparedness for widescale emergency situations in their workplace, including the COVID-19 pandemic. Adapting to the changes implemented in response to the COVID-19 pandemic resulted in “chaos” in the workplace. More specifically, participants reported that they had little to no knowledge of how to use virtual platforms to participate in training. Therefore, participants reported that it was difficult to adapt to the movement of training, communication, and other day-to-day tasks to online platforms.

### Communication Issues

Participants reported that there was an overall lack of communication during the COVID-19 pandemic that made scheduling and participating in training difficult. Participants reported that there were a lot of unknowns surrounding the guidelines and procedures for conducting and participating in training during the COVID-19 pandemic that were not effectively communicated to workers. In addition, if a training course was held in-person, it was not made clear whether the rooms were properly disinfected beforehand, the quality of ventilation within the training rooms, and if there were any exposures to or close contacts of positive COVID-19 cases throughout the training.

### Changes to In-Person Training

Some participants reported that in-person training was cancelled or postponed due to the COVID-19 pandemic, whereas others reported that in-person training never ceased. Participants reported that if in-person training was still being held, several changes were implemented to decrease virus transmission. These changes include required mask wearing, social distancing, and subsequent elimination of the small group method. The challenges affected both trainers and participants in the class.

“Wearing a mask influenced one trainer to quit. It was hard at first, wearing the mask while teaching. I had a brand-new appreciation for schoolteachers, conducting class, day-after-day wearing masks.”

### Pros and Cons of Online Training

Participants reported that online training was often more condensed than in-person training. In addition, online training limited the number of teaching methods able to be implemented and, as a result, hindered the learning abilities of participants. Workers reported a lack of interaction and engagement in online training for a variety of reasons including comfort levels with technology, available resources, and distractions from remote environments. On the other hand, participants indicated that a benefit of online training is the opportunity for greater diversity within the classes. Workers from different locations and worksites in the U.S. can share their experiences and learn from each other during online trainings.

“I think in some lessons it could be valuable doing it online. You can have a broader group...not only looking at what happened at our sites, but we’re hearing things from other sites.”

### Accessibility Issues

Participants reported a lack of accessibility to a variety of resources during the COVID-19 pandemic in terms of training. First and foremost, information on training updates, changes, and scheduling were often communicated via email, which workers may not have access to or use regularly during the workday. In addition, participants reported that they did not have access to devices with microphones or cameras to adequately participate in online training sessions.

### Quality of Training

The consensus among interview participants is that the overall quality of online training has declined from before the COVID-19 pandemic to present-day, which at the time was July 2021. The preferred method of training reported among participants is in-person training with hands-on and small group activity methods.

### Attitudes Towards the COVID-19 Pandemic

Participants reported that personal attitudes towards the COVID-19 pandemic heavily influenced whether changes in training requirements or COVID-19 guidelines were being followed. Participants indicated that these personal attitudes towards the COVID-19 pandemic often made it difficult to safely conduct in-person training with proper masking and social distancing.

### Abuse Within the Company

Participants often reported that their companies or management took advantage of the COVID-19 pandemic to not hold any training at all. Furthermore, participants indicated that employers still have not made plans to re-schedule training that was cancelled or “postponed”. Some participants also reported that if training was moved to online platforms, the company had no plans of ever reverting to in-person training in the future, claiming that online training saved time, money, and other resources.



## 5.0 Discussion

Findings from this exploratory study suggest that the COVID-19 pandemic may have impacted occupational safety and health training by limiting and subsequently decreasing the amount of training received by workers. Results indicate that about 15% of participants may not have received safety and health training at all during the pandemic. Survey data implied that the number of workers able to be trained at once in the workplace substantially decreased during the COVID-19 pandemic, limiting the number of trainings conducted. In addition, an inability to utilize the small group activity method often implemented in NIEHS WETP training programs may have hindered the learning experiences of training participants. Furthermore, findings suggest that experiences with occupational safety and health training may have differed between industries. However, both survey and interview data reveal that a decline in the quality of occupational safety and health training during the COVID-19 pandemic may be a universal experience across industry, age, and racial/ethnic groups.

Between-group graphs revealed potential differences by industry, age group, or racial/ethnic group in gaps in training and the quality of training received. Results indicate that gaps in occupational safety and health training during the COVID-19 pandemic may have varied by industry and were somewhat consistent across age and racial/ethnic groups. The results suggest that overall, there was a perceived decline in the quality of occupational safety and health training among workers during the pandemic. The adaptation of safety and health training to online platforms, as well as the inability to implement the small group activity method during the COVID-19 pandemic, may account for the reported decline in the quality of safety and health trainings across groups.

Comparison of response choices yielded interesting findings, suggesting that the learning abilities and training experiences of workers may be enhanced by the ability to implement small group learning methods into training. However, answer choices to the statement about the adaptation of training to online platforms were not significantly associated with the responses for the statement on quality of safety and health training. Lastly, results indicate that there is a weak association between noticing an increase in occupational injury, illness, and fatalities during the COVID-19 pandemic and the cancellation of trainings. This weak association could be explained by a decrease in the number of workers on each shift and the implementation of work from home policies during the COVID-19 pandemic.

The personal interview results indicate that there was an overall lack of preparedness for changes in health and safety training due to the COVID-19 pandemic. Furthermore, communication, resource accessibility, and personal attitudes towards the COVID-19 pandemic exacerbated the challenges faced when participating in or obtaining health and safety training during the COVID-19 pandemic. Although interviewees reported that there were pros and cons to online training, there are concerns that companies who converted to online trainings may never revert to in-person training for several factors including time, money, and resources.

### **5.1 Strengths and Limitations**

Recruitment was a challenge encountered during this study that resulted in a low sample size, hindering the generalizability of study results. Demographic data from the surveys showed that most participants worked in general manufacturing and were White. Spanish speaking participants and workers aged 18-39 were underrepresented in the survey population. Therefore, survey findings may not be generalizable to all industries, age groups, and racial/ethnic groups. In addition, the surveys and interviews were non-standardized tools used for data collection

which may result in measurement or reporter bias.<sup>37</sup> Lastly, Likert-scale questions are subject to acquiescence bias.

An overall strength of this exploratory study was that it was a first step to address a gap in the literature on how the COVID-19 pandemic impacted occupational safety and health training. The findings from this study can guide researchers and training organizations in the development of specific hypotheses and research questions aimed at further exploration of this topic. This study effectively laid the groundwork that will lead to future studies aimed at advancing metrics on occupational safety and health.

## **5.2 Suggested Actions**

Future research should be conducted to further investigate the results from this exploratory study. Importantly, this work does reveal specific suggested actions that NIEHS WETP grantees, employers, and other training organizations can immediately implement to begin addressing the issues and questions raised by this research. First and foremost, among organizations that have adapted their training to online platforms, polls or surveys can be sent out to students beforehand to ensure that they have access to the necessary resources to participate in online training. These resources may include a computer with a camera and microphone or a space that has Wi-Fi. Furthermore, these organizations can offer technology training to both trainers and students to ensure that they have adequate knowledge to conduct and participate in the class via the virtual platform. Training organizations can also ensure that they are able to implement diverse teaching methods within their health and safety trainings to address the learning styles of all students, even during online training sessions.

WETP NIEHS grantees, employers, and other training organizations can develop specific committees dedicated to addressing and preparing for emergency situations that severely alter

training abilities. This may help decrease the chaos and confusion around these processes and procedures when there is a future crisis. In addition, training organizations can conduct in-depth evaluations of specific trainings that participants fill out at the end of a training class. This will allow for direct feedback from participants directly following the class that may expose different challenges and gaps in specific trainings.

### **5.3 Future Research**

WETP NIEHS grantees, employers, and other training entities can utilize the findings from this exploratory study to develop future hypotheses and research questions. A suggested research study based on the findings presented in this essay includes investigating the specific trainings needed by industry. In addition, future research could specifically investigate the learning outcomes of computer-based versus in-person training among occupational safety and health training. This could be evaluated through assessments given at the end of training courses or through participants' ability to apply lessons learned directly in their workplace. A similar study could also compare learning outcomes between company-sponsored occupational safety and health trainings in comparison to WETP-sponsored trainings. Future research should delineate between or compare employer-sponsored training versus NIEHS WETP-sponsored training to understand if there are differences in learning experiences and effectiveness.

Training organizations could conduct evaluation studies for each of their trainings to understand the strengths and limitations of individual trainings and, subsequently, implement measures to enhance their trainings. Lastly, it is important to understand how deficiencies in occupational safety and health training have indirectly impacted worker health and safety. Therefore, a study could be conducted to analyze whether there is an increase in workplace injuries, illnesses, and fatalities following the COVID-19 pandemic and if enhancing

occupational safety and health training programs helps to decrease the frequency and severity of these incidents.

#### **5.4 Conclusion**

Data from this exploratory study suggest that there may be a widespread gap in essential occupational safety and health training in certain industries. Personal interviews revealed that due to the COVID-19 pandemic, there has been an overall lack of communication and clarity surrounding policies and procedures for occupational safety and health training, as well as when cancelled trainings will be rescheduled. Furthermore, data suggest that a major challenge during the COVID-19 pandemic was resource accessibility. Lastly, findings suggest that there was an overall decline in the quality of occupational safety and health training over the course of the COVID-19 pandemic. Given the importance of occupational training on worker health and safety, especially workers in high-risk occupations, this is a significant public health issue that warrants future research.

## Appendix A Survey Questions

### *Health and Safety Training*

1. Please indicate to what extent you agree or disagree with the following statements.

	Strongly Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Strongly Disagree
Training on hazard and accident prevention in the workplace is an essential part of maintaining worker health and safety.	[ ]	[ ]	[ ]	[ ]	[ ]
There is a need for more health and safety trainings in my workplace.	[ ]	[ ]	[ ]	[ ]	[ ]

### *COVID-19 Pandemic Impact*

2. Please indicate to what extent you agree or disagree with the following statements.

	Strongly Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Strongly Disagree
Previous safety and health training prior to the COVID-19 pandemic prepared me for addressing infectious disease hazards in the workplace.	[ ]	[ ]	[ ]	[ ]	[ ]
Due to the COVID-19 pandemic, I have not received all of	[ ]	[ ]	[ ]	[ ]	[ ]

the necessary health and safety training needed to safely perform my job tasks.					
Due to the COVID-19 pandemic, a majority of my health and safety trainings were cancelled or postponed	[ ]	[ ]	[ ]	[ ]	[ ]
Due to the COVID-19 pandemic, some health and safety trainings were moved to an online platform.	[ ]	[ ]	[ ]	[ ]	[ ]
Due to the COVID-19 pandemic, the small group activity method could not be used in health and safety training at my workplace.	[ ]	[ ]	[ ]	[ ]	[ ]
Due to the COVID-19 pandemic, the quality of health and safety training in my workplace has declined.	[ ]	[ ]	[ ]	[ ]	[ ]
Due to the COVID-19 pandemic, the number of workers able to be trained at once in my workplace decreased for	[ ]	[ ]	[ ]	[ ]	[ ]

social distancing purposes.					
Due to the COVID-19 pandemic, my workplace shut down for a period of time.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have noticed an increase in occupational injuries, illnesses, and fatalities during the COVID-19 pandemic.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The COVID-19 pandemic has negatively impacted my work life and has made it harder for me to do my job.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Due to the COVID-19 pandemic, I feared more for my health and safety at work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

*Demographic Questions*

3. What type of organization do you belong to? Please select all that apply.

- Labor Union
- Worker Center
- Other Worker Advocacy Group
- Other. Please Specify \_\_\_\_\_
- Prefer not to say

4. Which of the following categories best described the industry you primarily work in?

- Agriculture and Forestry
- Utilities
- General Manufacturing
- Transportation and Warehousing
- Primary/Secondary (K-12) Education
- Health Care and Social Assistance
- Hotel and Food Services



- Legal Services
- Mining
- Construction
- Telecommunications
- Information Services and Data Processing
- Cultural Institutions
- College, University, and Adult Education
- Public Sector
- Other. Please Specify \_\_\_\_\_
- Prefer not to say.

5. Where do you live?

- United States – New England
- United States – Mideast
- United States – Southeast
- United States – Great Lakes
- United States – Southwest
- United States – Rocky Mountains
- United States – Far West
- Puerto Rico
- Other. Please specify. \_\_\_\_\_
- Prefer not to say.

6. What is your age?

- 18-29 years old
- 30-39 years old
- 40-49 years old
- 50-59 years old
- 60-69 years old
- 70 years or above
- Prefer not to say.

7. Which category best describes you?

- White
- Hispanic, Latino, or Spanish origin
- Black or African American
- American Indian or Alaska Native
- Middle Eastern or North African
- Asian
- Native Hawaiian or Pacific Islander
- Other race, ethnicity, or origin. Please specify.
- Prefer not to say.

## Appendix B Interview Questions

1. Why is health and safety training important to you and the duties that you perform as part of your job?
2. What specific change or cancellations to health and safety training at your workplace were made in response to the COVID-19 pandemic, if any?
  - a. If yes, how did the changes in or cancellations of health and safety training due to the COVID-19 pandemic affect your health and safety at work? Did you feel less safe or less prepared to safely perform your job tasks?
3. What didn't work training-wise during the COVID-19 pandemic? What were the challenges?
  - a. If a participant indicated that health and safety training was moved to online platforms, what were the downfalls or online training?
4. What worked training-wise during the COVID-19 pandemic? What were the opportunities?
  - a. If a participant indicated that health and safety training was moved to online platforms, what were the benefits of online training?
5. Think about life before the COVID-19 pandemic. How did the quality and effectiveness of occupational health and safety training change from before the COVID-19 pandemic to during the COVID-19 pandemic (I.e., from March 2019 to now)?
6. Is there anything we should have talked about or asked during the surveys or during this interview that you feel is important to this topic?

7. Is there anything else that you would like to say about the impact that the COVID-19 pandemic has had on health and safety training, and subsequently, your overall health and safety at work?

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