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Increasing Environmental Public Health Practitioner Capacity to Address Population Health Challenges

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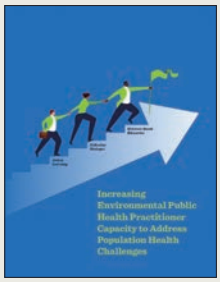

Environmental public health (EPH) practitioners are faced with an increasing scope and scale of population health challenges. This month's cover article, "Increasing Environmental Public Health Practitioner Capacity to Address Population Health Challenges: Evaluation Results From a Workforce Development Project," highlights an action learning initiative that was developed to increase practitioner knowledge of commonly identified EPH issues and assets, increase collective action through dialogue and shared learning, and create an EPH state action plan. The highlighted project provides evidence that using an action-learning format could serve as a workforce development approach to help practitioners address EPH challenges.

See page 20.

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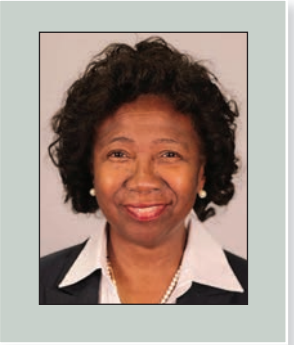

Priscilla Oliver, PhD

Reflecting Back and Looking Forward

William Shakespeare said it best, "Parting is such sweet sorrow." The emotions are mixed with both sadness as I did not do more and happiness that I did some of what was needed for the time. Being the 85th president of the National Environmental Health Association (NEHA) was an awesome experience. It was like the dessert after a full career of working in the field, offices, labs, and classrooms in environmental health.

I thank you for allowing me to speak and write in so many places, from boardrooms with leaders to open hallways of the U.S. Congress, in your offices, in your cars, on smartphones and computers, in homes, in airports, etc. The technology for environmental health has burst wide open with so many varied methods of communication in all settings. We have now utilized all methods of communication: Twitter, Instagram, telephone, Zoom, e-mail, etc. The *Journal of Environmental Health* has been the rock, the glue, that has held us together. The monthly columns have allowed me to speak and write to each of you frankly and regularly. We seek to educate, inspire, and simply inform you about environmental health and our "One NEHA." It has been a privilege and an honor to serve as president. The special moments as president of NEHA and the moments spent together with you individually and in groups will remain precious and will forever be etched in my heart and soul.

The special moments as president of NEHA will remain precious and will forever be etched in my heart and soul.

Reflecting Back

We had some very good discussions on meaningful topics in writing and orally. We got some swag and marketing for NEHA, new members, new employees, new board members, and new partners, and engaged more students, faculty, practitioners, and retirees. We touched others in the profession by speaking at affiliate meetings, conferences, and celebrations, and widely traveled across this country and around the globe. No, we did not visit all of you. Meetings were cancelled, mostly due to actions beyond our control. We were, however, ready, willing, and able. We remain positive and will leave others to complete the rest of the travel and speaking. We have adapted and will continue to work with the leadership to honor our One NEHA. I have and will continue to carry our message that environmental health is the thrust and throws of public health. We are the heartbeat of total health and touch all of life, the total global environment.

The highlights of the year include the establishment of the NEHA History Project and Committee; the Sick, Bereavement, and Memorial Committee; the restoration of the Student and Young Professionals Committee and its activities, and a Technical Advisor group that is full of experts with stellar careers in environmental health. The NEHA board, affiliates, executive director, and staff are most active locally and internationally in environmental health. The partners are active, standing with us and assisting with funding projects and activities as expressed in the *Journal* and on the website. New affiliates are being explored and leaders are emerging to continue this growth.

All members are encouraged to get more involved in activities of NEHA that are growing each day. Individual and group efforts and contributions are welcomed. Donations are up, volunteerism has increased, and funding is secure. All of these outcomes have been through the work of you. Thank you, members, staff, leaders, partners, and friends, for making NEHA better and better.

Looking Forward

At the time of initially writing this column (Palm Sunday), the forecast for the world is bleak. Since the beginning of March, our lives have changed. Dr. Raphael Warnock, my green pastor, preached a sermon online titled "There Is a Stranger in Town, the Coronavirus." He stated, as we know, that it has resulted in daily adjustments. In October, while on NEHA business in Jamaica, I fractured my right ankle and could not walk or drive for 3 months. That too was sheltering in place, a change for me. Yes, change is inevitable and requires adjustments constantly. Changes provide a ripple effect of impacts. We do not know the future but we can look forward with some rest, hope, newness, and enhanced energy.

I called for an emergency NEHA board of directors meeting that was held on Thursday, April 16, 2020, to discuss the NEHA 2020 Annual Educational Conference (AEC) & Exhibition. There was a quorum with national officers, regional vice-presidents, NEHA Exec-

utive Director Dr. David Dyjack, and NEHA Associate Executive Director Gail Vail. The prevailing vote was to cancel the physical 2020 AEC scheduled to take place July 13–16 in New York City. This decision was made due to the severity and uncertainty of the COVID-19 pandemic. Concerns were expressed with the impacts on people, New York, and around the world. The risk of losses of lives, funds, and the reputation of NEHA could be unrecoverable. Notifications have been distributed so adjustments to this change can be made for all.

The priorities in NEHA are being given to protecting the health and safety of the members, exhibitors, partners, contractors, attendees, speakers, leaders, students, residents, and other visitors of New York City. Many members are working around the clock with the pandemic and will not be able to attend due to job obligations and budget changes and cuts. Having a NEHA conferences for 83 years has been great. We will have time to be together again but for now we must remain apart. Future conferences are being planned. There may be a NEHA virtual conference this year. This separation is just a reminder that we must take care of ourselves and each other now. We are indeed One NEHA and One World.

Well, I have a dream for NEHA. I dream of future conferences in many cities across the country and in Jamaica, a NEHA Hawaii affiliate, a NEHA Guam and Island affiliate, the Student National Environmental Association, additional NEHA scholarships for students, recognition awards for faculty and young professionals, the NEHA Endowment Foundation, and new strategic partnerships. The affiliate conferences have been or likely will be canceled. NEHA officials are very sorry for these changes but we want to comply and keep all of us safe, happy, and healthy. There will be changes but we will adjust and keep the business of NEHA going. I am so proud of NEHA President-Elect Sandra Long who will follow me as president of NEHA. Sandra has been on the NEHA board of directors longer than most of us. She has a wealth of knowledge and experience with the board and as NEHA Region 5 vice-president. Passing the baton to Sandra is a joy for I know NEHA will continue to have good leadership.

Change is inevitable. Coping with change can be painful. Dr. Richard Barbe, my professor and former dissertation chair, gave this advice: "Learn to flip your worldview and see the change from several angles. Flip to see the other sides." Keep faith, love, and hope in the situation. Make the most out of the change. Make lemonade out of this situation. Focus on other activities. Work is just a part of life. There are other activities we can do such as hobbies, family time, self-development and improvement, school, and many home projects. Remember to take care of yourself and your family and to work smart. Thank you for all the work each of you has done during the COVID-19 pandemic. Your work is greatly appreciated by so many of us. The One NEHA and the blue, green, and gold goals are visible and should remain on the horizon for the future of NEHA. One NEHA and One World. We are better together. Thank you, NEHA!

Priscilla

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Restaurant Characteristics Associated With the Use of Specific Food-Cooling Methods

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Abstract **Pathogen growth caused by improper or slow cooling of hot foods was a contributing factor in 504 of restaurant- and deli-related outbreaks in the U.S. from 1998–2008. Little is known, however, about restaurant cooling practices. To fill this gap, the Centers for Disease Control and Prevention's Environmental Health Specialists Network (EHS-Net) conducted an observational study to identify and understand factors that might determine which methods restaurants follow to rapidly cool food. These methods include refrigerating food at ≤41 °F, at shallow depths, and in containers that are ventilated, unstacked, and have space around them. EHS-Net personnel collected data through manager interviews and observation of cooling processes in 420 randomly selected restaurants. Regression analyses revealed characteristics of restaurants most likely to use the cooling methods assessed. These characteristics included ownership by restaurant chains, manager food safety training and certification, few foods cooled at a time, many meals served daily, and a high ratio of workers to managers. These findings suggest that regulatory food safety programs and the retail industry might improve cooling methods—and reduce outbreaks—by providing and encouraging manager food safety training and certification, and by focusing intervention efforts on independent and smaller restaurants.**

Introduction

Improper or slow cooling of hot foods is a significant cause of foodborne illnesses, such as those caused by *Clostridium perfringens* and *Bacillus cereus* (Schaffner et al., 2015). Improper cooling of hot food, leading to pathogen growth, was a contributing factor in 504 U.S. restaurant and deli outbreaks from 1998–2008 (Brown et al., 2012). These outbreaks indicate that food-cooling practices in restaurants need to be improved.

The Food and Drug Administration's (FDA) *Food Code* represents the best food safety recommendations for retail food service establishments (U.S. Department of Health and Human Services [HHS], 2009a). Most state and local food codes are modeled on the FDA *Food Code*, which contains several guidelines to reduce pathogen growth during the cooling of food. These guidelines include cooling food rapidly from 135–70 °F (57–21 °C) within 2 hr and from 135–41 °F (57–5 °C) within a total of ≤6 hr (HHS, 2009b, 2017a). The FDA *Food Code* also includes recommendations for facilitating rapid cooling. These recommendations include refrigerating cooling food and placing cooling food in shallow pans. The *Food Code* also recommends ventilating the food (e.g., leaving containers uncovered or loosely covered) and arranging cooling food to maximize heat transfer through food container walls (e.g., by not placing containers of cooling food close to or on top of each other) (HHS, 2009b, 2017a).

Data on restaurant food-cooling practices can inform cooling interventions but few data were available on restaurant cooling practices. To fill this gap, the Centers for Disease Control and Prevention's (CDC) Environmental Health Specialists Network (EHS-Net) conducted an observational study on restaurant food cooling practices. The goal was to identify gaps in restaurant food cooling practices and to identify restaurant characteristics related to proper food cooling practices. Data from the study indicate that the cooling practices of many restaurants do not meet FDA recommendations for rapid cooling (Brown et al., 2012; Schaffner et al., 2015). For our analysis, we used data from the same study to determine what restaurant characteristics (e.g., ownership type, meals served per day, food safety training and certification) are related to whether restaurants use FDA-recommended methods to facilitate rapid cooling. An understanding of these associations can inform food-cooling interventions, regulatory food safety programs, and the retail industry.

Methods

Data Collection

EHS-Net conducted the study from July 2009–March 2010. EHS-Net is a collaboration of environmental health specialists and epidemiologists focused on examining factors that contribute to foodborne illness associated with retail food service establishments. EHS-Net members include CDC, FDA, and state and local health departments. When EHS-Net conducted this study, CDC funded nine state and local health departments to participate in EHS-Net. These state and local health departments, or EHS-Net sites, were located in California, Connecticut, Georgia, Iowa, Minnesota, New York, Oregon, Rhode Island, and Tennessee. Each state has its own set of food safety regulations; the regulations vary in how closely they matched FDA *Food Code* guidelines. The study protocol was cleared by the appropriate institutional review boards in each EHS-Net site.

Within each EHS-Net site, EHS-Net site staff (i.e., data collectors) solicited restaurant participation by telephoning randomly selected restaurants within a specified geographic location and following a standardized recruiting script to obtain informed consent. Data collectors from each site collected data in approximately 50 restaurants that cooled foods. As noted by Brown and coauthors (2012), 420 restaurant managers agreed to participate in the study, a participation rate of 68.4%. All data collectors participated in training to increase data collection consistency. We did not collect any data that could identify individual restaurants or staff.

In each restaurant, data collectors conducted prearranged on-site interviews with English-speaking kitchen managers about restaurant characteristics. These restaurant characteristics included number of meals served daily, ownership (independent versus chain), cuisine type (e.g., American, Chinese, etc.), kitchen manager experience, number of kitchen managers and food workers, and if kitchen managers and food workers were trained or certified in food safety. For this study, a person was considered certified if they had successfully completed a food safety training or educational program and received a certificate upon completion.

In restaurants that were cooling food during the on-site visit, data collectors also recorded their observations about the cooling processes being used. Some restaurants were cooling multiple foods or using multiple steps to cool food (e.g., refrigerating food in a large, deep container and then separating the food into shallow containers would be two separate steps). For each cooling step of each food at each restaurant, data collectors assessed the overall method of cooling (e.g., refrigeration) and the specifics of each method (e.g., ambient temperature of the refrigeration unit).

Previous analyses of data from this study indicate that restaurants most frequently cool food by refrigeration. Other methods include placing food in blast chillers and placing ice wands in food (Brown et al., 2012). This article examines data on food cooled through refrigeration. Data collectors determined whether the refrigeration units used for cooling could maintain food temperatures of ≤41 °F by assessing whether the ambient temperature of the refrigeration units was ≤41 °F (measured from centermost point of cooling unit) (HHS, 2017b). For each food cooled with refrigeration at the time of the on-site visit, data collectors assessed if several FDA-recommended methods for cooling were used. Specifically, they assessed if the cooling food was at a shallow depth (≤3 in.), the food was ventilated (loose covering or perforations or holes in covering), and the containers within refrigeration units were arranged to maximize heat transfer through food container walls. We used two measures to determine if equipment was arranged to maximize heat transfer: 1) if the cooling food containers were unstacked and 2) if there was open air space around food containers (cleared area around sides and top of containers ≥3 in.).

Statistical Analysis

We first created a categorical measure for each of the five methods we assessed. If all of the foods in a restaurant were cooled with the specific method, then the restaurant was coded as consistently using that method. If at least one of the foods was not cooled with that method, then the restaurant was coded as not consistently using that method. For example, if a restaurant cooled two foods, and for one food the container was ventilated but for the other food the container was not ventilated, then the restaurant would be coded as not consistently ventilating their cooling food containers.

We also created an overall measure of cooling methods. This measure assessed the average percent of foods in a restaurant being cooled using all five of the assessed methods. For example, if a restaurant cooled two foods, and one of those foods was cooled using all five (100%) of the methods, and the second food was cooled using two (40%) of the methods, then this restaurant's average percent of use of all methods would be 70%, the average of these two percentages.

We then built five regression models—one for each of the five methods—to examine associations between restaurant characteristics and the outcome variable: if restaurants consistently used the method. Because these outcomes were categorical (consistently used the method versus did not consistently use the method), we used logistic modeling methods for these models. Finally, we built a regression model to examine associations between restaurant characteristics and the outcome variable measuring overall use of cooling methods (i.e., the average percent of use of all recommended methods). Because this outcome is continuous, we used linear modeling methods for this model. Final models for each regression were chosen using a backward selection level of 0.05. We stratified by EHS-Net site to account for potential differences inherent to sites, such as differing data collectors and food safety regulations.

Results

Restaurant Characteristics

As noted by Brown and coauthors (2012), 420 restaurant managers agreed to participate in the study, which is a participation rate of 68.4%. Analyses for this article were based on data from the 351 restaurants in which at least one food was cooled by refrigeration. Across these 351 restaurants, we observed 508 cooling foods. In most of these restaurants, data collectors observed one food being cooled (70.9%), but in 29.1% of restaurants, data collectors observed between two and six foods being cooled.

Interview responses from kitchen managers indicated that these restaurants primarily served American cuisine (61.0%), were independently owned (68.7%), served ≤150 meals a day (51.9%), had workers who

mostly spoke English in the kitchen (78.3%), had cooling policies in place (80.8%), and required kitchen managers to be certified in food safety (58.6%) (Table 1). About one half of kitchen managers indicated that they had worked at the restaurant for ≤4 years (50.7%), at least one kitchen manager had been trained in food safety (94.9%), and at least one kitchen manager was certified in food safety (73.6%) (Table 1). Most restaurants employed ≤2 kitchen managers (67.5%), ≤7 food workers (51.9%), and most food workers had received training in food safety (93.7%).

Use of Cooling Methods

Table 2 shows the frequency with which restaurants followed these five methods: 1) refrigeration unit is maintained at ≤41 °F, 2) cooling food is stored at shallow depth, 3) cooling food is ventilated, 4) cooling food containers are unstacked, and 5) cooling food containers have open air around them. In most restaurants (80.3%), the refrigeration units in which the cooling food was stored were ≤41 °F (Table 2). In most restaurants (79.5%), food was consistently cooled in unstacked containers, and in most restaurants (79.5%), food was consistently cooled in containers with space between them. Furthermore, in 59.8% of restaurants, food was consistently cooled in ventilated containers, and in 49.0% of restaurants, food was consistently cooled at shallow food depths. In only 18.2% of restaurants, however, were all five methods consistently used. On average, restaurants' mean percent of foods cooled using all of the methods was 74.1% (*SD* = 20.4%, median = 80.0%).

Regression: Individual Cooling Methods Consistently Used in Restaurants

Multiple logistic regressions identified five explanatory variables that were significantly associated ($p < .05$) with restaurants consistently using at least one of the five assessed methods to facilitate rapid cooling (Table 3). These five variables included: 1) restaurant ownership, 2) kitchen manager training, 3) kitchen manager certification, 4) number of foods cooling in refrigeration, and 5) ratio of food workers to kitchen managers. Compared with independent restaurants, chain restaurants had 2.1 times greater odds (95%

TABLE **1**

Frequency and Percent of Restaurant Characteristics Obtained From Manager Interviews

Restaurant Characteristic	#	%
Cuisine (*N* = 351)		
American	214	61.0
Other	137	39.0
Ownership type (*N* = 351)		
Independent	241	68.7
Chain	110	31.3
Language spoken most often (*N* = 351)		
English	275	78.3
Other	76	21.7
Meals served daily (*N* = 341)		
≤150	177	51.9
150–300	81	23.8
>300	83	24.3
Restaurant has cooling policy (*N* = 350)		
No	48	19.2
Yes (not written)	202	80.8
Yes (written)	100	49.5
Kitchen manager certification required (*N* = 343)	201	58.6
Food-worker-to-kitchen-manager ratio (*N* = 349)		
≤2	97	27.8
2–4	125	35.8
>4	127	36.4
Kitchen manager has been at the restaurant (*N* = 351)		
≤4 yr	178	50.7
>4 yr	173	49.3
Number of kitchen managers (*N* = 351)		
≤2	237	67.5
>2	114	32.5
Any kitchen managers received food safety training (*N* = 351)		
No	18	5.1
Yes	333	94.9
Kitchen manager training includes cooling (*N* = 329)		
No	6	1.8
Yes	323	98.2
Kitchen manager is food safety certified (*N* = 349)	257	73.6
Number of food workers (*N* = 349)		
≤7	181	51.9
>7	168	48.1
Food workers received food safety training (*N* = 347)		
No	22	6.3
Yes	325	93.7
Worker food safety training includes cooling (*N* = 319)		
No	22	6.9
Yes	297	93.1

Note. N equals the denominator for the question; values vary throughout the table because of skip patterns and nonresponses in the interview.

TABLE **2**

Frequency and Percent of Restaurants That Consistently Used Recommended Methods to Facilitate Rapid Cooling (*N* = 351)

Cooling Method Used	#	%
Ambient refrigeration temperature ≤41 °F	282	80.3
Unstacked containers	279	79.5
Space between containers	254	72.4
Ventilated food	210	59.8
Shallow food depth (≤3 in.)	172	49.0
All recommended methods	64	18.2

TABLE **3**

Multiple Logistic Regression Odds Ratios of Restaurant Characteristics Associated With Each of the Five Food and Drug Administration-Recommended Methods to Facilitate Rapid Cooling Being Used With All Foods Cooled[ab]

Restaurant Characteristic	Odds Ratio (*OR*)	95% Confidence Interval (*CI*)	*p*-Value
Ambient refrigeration temperature ≤41 °F (*N* = 351)			
Chain ownership (reference = independent)	2.05	1.01, 4.15	.047
Ventilated food (*N* = 349)			
Kitchen manager is food safety certified (reference = not certified)	2.13	1.10, 4.17	.027
Unstacked containers (*N* = 351)			
One food cooled (reference = >one food)	1.90	1.02, 3.54	.043
Kitchen manager has food safety training (reference = not trained)	4.70	1.38, 15.91	.013
Space between containers (*N* = 347)			
One food cooled (reference = >one food)	3.65	1.79, 7.42	<.001
Kitchen manager is food safety certified (reference = not certified)	3.44	1.30, 9.11	.013
Ratio of food workers to kitchen managers (reference = ≤2)[c]			
2–4	0.94	0.43, 2.05	.094
>4	2.71	1.10, 6.60	.008

[a]None of the restaurant characteristics considered was significantly associated with restaurants meeting the recommended method of ensuring rapid cooling, which is food depth of ≤3 in.

[b]*N* values vary throughout the table because of skip patterns and nonresponse in the interview.

[c]For the overall *OR*, $p = .026$.

confidence interval [*CI*] [1.01, 4.15]) of consistently storing cooling food at the recommended refrigeration temperature (≤41 °F) (Table 3).

Restaurants that employed at least one food safety-certified kitchen manager had 2.1 times greater odds (95% *CI* [1.10, 4.17]) of consistently ventilating cooling food than did restaurants that did not employ food safety-certified kitchen managers (Table 3). Restaurants that cooled only one food during the observation had almost 2 times greater odds (odds ratio [*OR*] = 1.90; 95% *CI* [1.02, 3.54]) of consistently following the recommendation to not stack containers than did restaurants that cooled more than one food (Table 3).

Restaurants that employed at least one food safety-trained kitchen manager had 4.7 times greater odds (95% *CI* [1.38, 15.91]) of consistently not stacking containers than did those that did not use any food safety-trained kitchen managers. Restaurants that cooled only one food during the observation had 3.7 times greater odds (95% *CI* [1.79, 7.42]) of consistently leaving space between containers than restaurants that cooled more than one food. Restaurants where any kitchen managers were certified in food safety had 3.4 times greater odds (95% *CI* [1.30, 9.11]) of leaving space between containers compared with those without food safety-certified kitchen managers (Table 3). Restaurants with a high food-worker-to-kitchen-manager ratio (>4) had 2.7 times greater odds (95% *CI* [1.10, 6.60]) of consistently leaving space between containers than did restaurants with a low food-worker-to-kitchen-manager ratio (≤2) (Table 3).

Regression: Average Percent of Cooling Methods Used in Restaurants

Multivariable linear regression analyses identified two significant explanatory variables: 1) number of meals served daily and 2) kitchen manager food safety training. Those two variables were significantly associated ($p < .05$) with a difference in the average percent of recommended methods used in restaurants (Table 4). On average, restaurants serving >300 meals a day used 6.7% more recommended cooling methods (95% *CI* [0.1%, 13.2%]) compared with restaurants that served 150–300 meals a day (Table 4). On average, restaurants that employed any food safety-trained kitchen managers used 15.0% more recommended methods (95% *CI* [4.8%, 25.1%]) than restaurants that did not employ food safety-trained kitchen managers (Table 4).

Discussion

This study identified associations between several restaurant characteristics and restaurant use of methods to rapidly cool food.

Regression analyses showed that the odds of restaurants using these methods were greater for chain restaurants, restaurants where at least one kitchen manager was food safety-certified or food safety-trained, where only one food was cooled at a time, and where the ratio of food workers to kitchen managers was high. Furthermore, a greater percentage of methods were used to cool foods in restaurants that served >300 meals a day, and where any kitchen manager was food safety certified.

Restaurants that were cooling only one food during the observation were more likely to not stack containers and to leave space between containers. Restaurants cooling more than one food at a time might have inadequate refrigeration space for cooling these foods, forcing workers to stack containers and store food containers close to each other. Restaurants might not be able to increase their space but they might be able to adjust food preparation processes to reduce the number of foods cooled at one time.

Restaurants under chain ownership were more likely to follow recommended cooling methods than those with independent ownership, as were those serving more meals daily compared with those serving fewer meals daily. These findings are consistent with other data suggesting that chain and larger establishment food safety practices tend to be better than those of independent and smaller establishments (Green et al., 2005, 2007; Lee et al., 2004). These restaurants might have more resources, more or better trained staff, or more standardized food safety procedures. The restaurants also might be larger or have better or larger cooling equipment, and thus have more space for cooling. The relationship between worker-to-manager ratio and the use of recommended cooling methods also might be a function of restaurant size.

The cooling methods examined in this article help ensure that foods cool quickly, thereby reducing foodborne illness risk. Schaffner and coauthors (2015) found that following recommended cooling methods led to faster estimated cooling rates. Our results suggest that restaurants with food safety-trained or food safety-certified kitchen managers were more likely to follow these recommended methods to facilitate rapid cooling. Our finding is consistent with other research indicating that kitchen manager training and certification are important contributors to food safety in retail settings (Bogard, Fuller, Radke, Selman, & Smith, 2013; Brown, 2013; Brown et al., 2012, 2016, 2018; Hedberg et al., 2006; HHS, 2009a; Lipcsei et al., 2018).

TABLE **4**

Linear Regression of Restaurant Characteristics Associated With the Average Percent of Food and Drug Administration (FDA)-Recommended Methods Used With Refrigeration in Restaurants (*N* = 326)

Restaurant Characteristic	Mean Difference	95% Confidence Interval (*CI*)	*p*-Value
Meals served daily (reference = 150–300)[ab]			
≤150	-3.6%	-9.0%, 1.8%	.187
>300	6.7%	0.1%, 13.2%	.045
Kitchen manager has food safety training (reference = not trained)[c]	15.0%	4.8%, 25.1%	.004

[a]Average percentage of FDA-recommended methods used among restaurants serving 150–300 meals daily = 74.9%, *SD* = 20.9%.

[b]For the overall average percent difference, $p = .004$.

[c]Average percentage of FDA-recommended methods used among restaurants without a food safety-trained kitchen manager = 59.2%, *SD* = 25.2%.

Our study has several limitations. First, because data were collected only in restaurants with English-speaking managers, they might not reflect practices in restaurants that lack English-speaking managers. Second, only one restaurant of any given chain was included in the study because restaurants of the same chain were expected to have similar cooling practices. This sampling method likely resulted in an undersampling of chain restaurants. Third, manager interview data might be affected by social desirability bias, which results in over-reporting of socially desirable responses (e.g., existence of food safety policies). Fourth, the cross-sectional nature of this study does not allow causal inferences about relationships between restaurant characteristics and cooling methods. Fifth, data were collected through observations. When people are observed, they might change their behavior to meet the expectations of the observer.

This study, however, mostly involved observations of equipment rather than of people. For example, data collectors went into refrigerators and examined whether food cooling containers were stacked on top of one another. Despite any possible observation bias, data collectors noted improper cooling practices in many establishments. Finally, we collected the data between 2009 and 2010. Current regulations on recommended cooling methods, however, remain similar to regulations in place during the data collection. Furthermore, improper cooling continues to be a source of foodborne outbreaks in restaurants and contributed to 10% (63) of U.S. restaurant outbreaks from 2014–2016 (Centers for Disease Control and Prevention, 2019). These facts suggest that the data reported here likely are still relevant.

Conclusion

The findings in this article can inform interventions to prevent foodborne illness and outbreaks related to improper cooling of foods. We found that kitchen manager training and certification were associated with better cooling methods. Regulatory food safety programs and the retail industry should consider providing and encouraging kitchen manager training and certification. Regulatory programs also might consider targeting interventions in independent and smaller restaurants, given that these restaurants were less likely to use recommended methods when cooling foods. Finally, corrective actions in restaurants might need to include adjustments to current food preparation and cooling processes based on available space and equipment for food cooling.

Research consistently finds that chain restaurants use better food safety practices compared with independently operated restaurants but little published research examines why this difference exists. A better understanding of why chain ownership is associated with better food safety practices could provide insight into ways independently operated restaurants can improve food safety. Future studies should investigate what advantages chain restaurants have over independent restaurants.

Disclaimer: This article is based on data collected and provided by CDC's EHS-Net. The findings and conclusions in this article are those of the authors and do not necessarily represent the views of CDC or the Agency for Toxic Substances and Disease Registry. Office of Management and Budget (OMB) Paperwork Reduction Act clearance was obtained for this study under OMB Control No. 0920-0792.

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INTERNATIONAL PERSPECTIVES

Effect of Increased Cleaning on Keyboard Bioburden and Employee Absence in an Office Building

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Abstract **Insufficient cleaning can create reservoirs of microorganisms, resulting in the spread of infection in the workplace. In this study, we examined the effects of increased cleaning of high-frequency touch sites on bioburden and absence rates at an office building. Daily cleaning of computer keyboards, mice, and telephones was performed on one floor and compared with a control floor. Contact plate samples were taken weekly from keyboards and bacterial contamination was assessed over a 3-month period. Increased cleaning and bioburden were compared to employee absence rates. Increased cleaning reduced overall bioburden on keyboards from 27–44 CFU/25 cm² to 7–11 CFU/25 cm² (n = 550), when compared with standard practice. Keyboards were found, however, to be recontaminated once used. Levels of bacteria from control floors decreased over the intervention period. Skin flora was most commonly isolated. Isolation of *Enterococcus* spp., suggesting fecal contamination, was reduced after increased cleaning. Regular cleaning reduces bioburden and has a lasting effect. Despite efficacy of increased cleaning, there was no significant effect on absences due to the wide variability of absence rates over time.**

Introduction

In an open plan office environment, staff members are exposed to risk of infection from fellow staff, especially through shared surfaces such as computer keyboards. Illnesses spread by contact, such as viral respiratory and gastrointestinal infections, are a common reason for sick leave. Respiratory or enteric viruses can be spread directly through droplets from coughing or indirectly from contaminated surfaces to hands. Less commonly, bacterial infections due to *Staphylococcus aureus* or group A *Streptococcus* can be transmitted by direct contact. Pathogens can persist on surfaces for several days or, in the case of staphylococci and streptococci, many months (Marks, Reddinger & Hakansson, 2014; Neely & Maley, 2000).

Currently there are no guidelines or legislation to stipulate minimum cleaning requirements of shared areas in the workplace. Consequently, surfaces such as keyboards might be heavily contaminated with flora from skin and the respiratory tract. Exposure to microorganisms on keyboards can be a source of horizontal transmission, particularly when "hot desking" (multiple workers using a single physical work station or surface during different time periods). Keyboards have been identified as environmental reservoirs in healthcare; however, the issue is less well studied in office environments (Wilson et al., 2006).

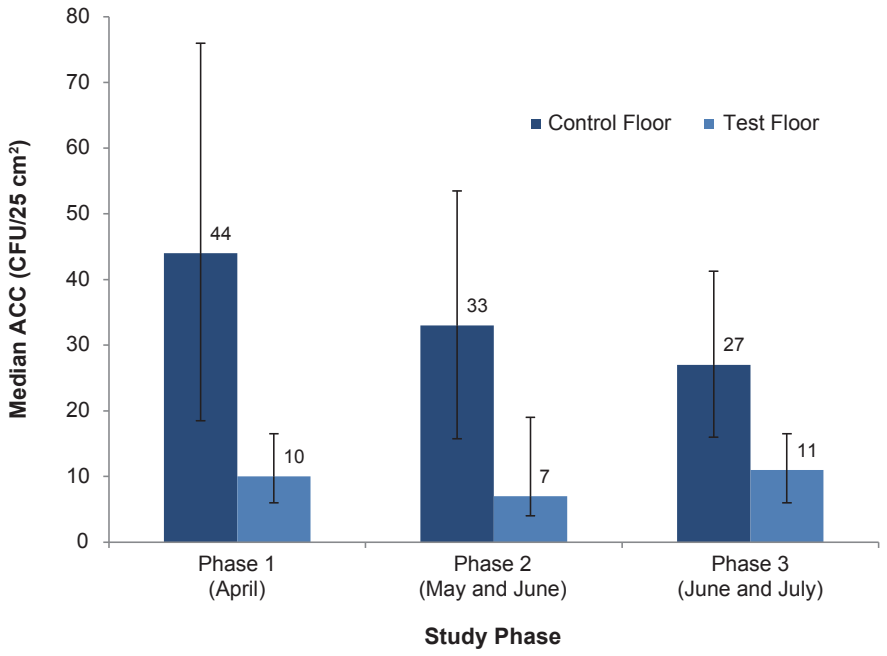
Illnesses associated with modern office buildings are categorized into sick building syndrome (SBS) and building-related illness (BRI) (Burge, 2004). SBS has been extensively studied and describes a range of symptoms amongst workers. Symptoms include respiratory and skin irritation, headaches, and fatigue—symptoms that are associated with time spent in a building. No specific cause, however, has been identified.

BRI describes symptoms of a known cause, such as infectious diseases (bacterial, viral, and fungal) spread from worker to worker or from building to worker. In contrast to SBS, symptoms can persist after the person leaves the affected building. SBS and BRI symptoms can decrease worker productivity and increase employee absence.

Multiple environmental factors have been associated with causing SBS and BRI, including heating, ventilation rate, air conditioning, dust, and lighting (Appleby, 1996; Marmot et al., 2006). Airborne bacterial and fungal contamination has been suggested as a cause of respiratory symptoms in both categories (Bholah & Subratty, 2002). Surface contamination in an office environment, however, is less well studied.

FIGURE **1**

Median Aerobic Colony Counts (ACC) for Control and Test Floors for the Three Phases of the Study



Note. Upper and interquartile ranges shown as error bars. During phase 1 (April) and phase 3 (June and July), floor 7 and floor 14 were test and control floors, respectively. This designation was reversed during phase 2 (May and June).

Our study was performed to demonstrate that despite continued use throughout the day, increased cleaning of keyboards, mice, and phones reduces the bioburden to which workers are exposed. The secondary aim of our study was to determine if the increased cleaning had an appreciable effect on employee sickness absence rates. Aerobic colony counts (ACC) provided an indication of cleanliness and overall bioburden.

Methods

Study Location

Floors 7 and 14 of a 36-floor central London office building were selected for the study. The building has mechanical heating and ventilation, and sealed windows. Floors were of identical size and each was split into four zones by area. Floors 7 and 14 had 95 and 110 desks, respectively. All desks were equipped with computer keyboards, mice, and telephones. The design of each item, however, was not identical between desks.

Of the total number of desks on floors 7 and 14, permanent workers were assigned 60 and 92 desks, respectively. The remaining desks were allocated as hot desks. The total number of hot desking employees, however, varied per day.

Cleaning

This study was conducted over three phases lasting 4 weeks each with a washout period of 1 week between phases in order to reduce the risk of a Hawthorne effect. During each phase, a dedicated team cleaned all computer keyboards, mice, and phones on one floor every day with alcohol wipes (70% isopropyl ethanol). Each desk area (keyboard, mouse, and telephone) was cleaned with a single alcohol wipe per day. On the control floor, no additional cleaning took place. Computer keyboards, mice, and phones were not cleaned routinely by the office cleaners.

During phase 1 and phase 3, floor 7 and floor 14 were test and control floors, respectively. This designation was reversed during phase 2 (i.e., phase 1: floor 7 test, floor 14 control; phase 2: floor 7 control, floor 14 test; and phase 3: floor 7 test, floor 14 control). During the washout period between phases, no additional cleaning took place on either floor.

Sampling

We selected 25 desks per floor at random each week to be sampled during each phase. No sampling took place during washout weeks. Individual desks might have been sampled more than once over the study period. Samples were taken from keyboard "return" keys with 25 cm^2 Colombia blood agar (CBA) contact plates. Sampling took place at the same day and time each week. Plates were incubated aerobically at 37 °C for 48 hr and ACC were recorded. Bacteria were presumptively identified to genus level by colony morphology.

Employee Absence

Employee absence data were collected by the employer from 3 months prior to the study to 3 months after. Infections were categorized into respiratory system, digestive system, and other infectious and parasitic disease. Absences due to other factors were excluded. Employee absence rate was calculated as a percentage of lost working days from permanent staff.

Statistical Analysis

Medians for test and control floors were calculated and differences between sample populations were compared by Student's *t*-test. We determined that *p*-values of ≤.05 indicated statistical significance. Effect sizes as Cohen's *d* and 95% confidence intervals (*CI*s) were calculated (Cohen, 1988).

Results

Aerobic Colony Counts

Over the study period, 550 samples were taken from computer keyboards. There were significant differences in ACC between the test and control floors during all three phases (p = .024, <.001, and <.001, respectively). Effect sizes between the two floors during phases 1, 2, and 3 were d = 0.74, 95% *CI* [0.41, 1.07]; d = 1.03, 95% *CI* [0.73, 1.32]; and d = 0.78, 95% *CI* [0.49, 1.06], respectively. Median counts in offices with keyboard cleaning were 7–11 CFU/25 cm^2

TABLE **1**

Workdays Lost (Absence Rate) to Employee Absence Due to Illness

	Floor 7 Illnesses				Floor 14 Illnesses			
Month (Study Phase)	Respiratory System # (%)	Digestive System # (%)	Other: Infectious or Parasitic # (%)	Total # (%)	Respiratory System # (%)	Digestive System # (%)	Other: Infectious or Parasitic # (%)	Total # (%)
January	10 (0.8)	2 (0.2)	4 (0.3)	16 (1.3)	17 (0.9)	6 (0.3)	3 (0.2)	26 (1.3)
February	10 (0.8)	0 (0)	3 (0.3)	13 (1.1)	18 (1.0)	4 (0.2)	1 (0.1)	23 (1.3)
March	15 (1.1)	0 (0)	0 (0)	15 (1.1)	9 (0.4)	9 (0.4)	0 (0)	20 (1.0)
April (1)*	1 (0.1)	0 (0)	2 (0.2)	3 (0.2)	5 (0.3)	1 (0.1)	1 (0.1)	7 (0.4)
May (2)*	0 (0)	8 (0.7)	1 (0.1)	8 (0.7)	2 (0.1)	2 (0.1)	0 (0)	4 (0.2)
June (2 and 3)*	4 (0.3)	1 (0.1)	7 (0.5)	12 (0.9)	3 (0.1)	1 (0.1)	0 (0)	4 (0.2)
July (3)*	0 (0)	0 (0)	0 (0)	0 (0)	3 (0.1)	17 (0.8)	5 (0.2)	25 (1.2)
August	0 (0)	3 (0.2)	1 (0.1)	4 (0.3)	2 (0.1)	3 (0.2)	21 (1.1)	26 (1.3)
September	4 (0.3)	0 (0)	0 (0)	4 (0.3)	1 (0.1)	2 (0.1)	4 (0.2)	7 (0.3)
October	4 (0.3)	2 (0.2)	2 (0.2)	8 (0.6)	3 (0.1)	0 (0)	0 (0)	3 (0.1)

*During phase 1 (April) and phase 3 (June and July), floor 7 and floor 14 were test and control floors, respectively. This designation was reversed during phase 2 (May and June).
Note. The absence rate was calculated as percentage of lost workdays due to illness from total available workdays per month (excluding bank holidays and weekends). Employee workdays are based on 60 and 92 full-time employees on floors 7 and 14, respectively.

compared with 27–44 CFU/25 cm^2 in control offices. There was a decrease in bioburden on control keyboards, even without cleaning, throughout the study period. Prior to intervention, median ACC was 44 CFU/25 cm^2. This median decreased to 33 and 27 CFU/25 cm^2 from phases 2 to 3, respectively ($p = .006$; $d = 0.50$, 95% *CI* [0.19, 0.80]). We found no significant difference in ACC on floors with increased cleaning between phases 1 to 3 ($p = .45$) (Figure 1).

Bacterial Identification

Bacteria isolated were primarily *Staphylococcus* spp. and *Micrococcus* spp. On control floors, 34% of colonies isolated were *Staphylococcus* spp. and 34% were *Micrococcus* spp. On test floors, 57% of colonies isolated were staphylococci and 19% were micrococci. Levels of *Enterococcus* spp. were higher in control offices than in test offices (11% and 1%, respectively). There was no difference in levels of other bacteria isolated between control and test offices.

Employee Absence

Absence rates varied widely (Table 1). Respiratory illnesses accounted for most absences. The total workdays lost due to sickness from both floors was low. From January–October, employee absence in terms of lost workdays ranged from 0–1.3% on floor 7 and 0.2–1.3% on floor 14. Lost workdays were highest in January (1.3%) for both floors. On floor 7, lost workdays decreased from 1.1% in March to 0.2% in April after increased cleaning. The decrease, however, was due to respiratory illnesses only and was also recorded on the control floor. There was no evidence of a correlation between keyboard cleaning and absence rates.

Discussion

Computer keyboards, mice, and telephones are among the most frequently touched items in offices—often by many people within a day. Workers with respiratory or gastrointestinal infections who do not follow proper hand hygiene can deposit pathogens on these surfaces that can survive for hours, or even days. In healthcare, despite strict hand hygiene policies, previous studies have shown that computer keyboards are a reservoir of microorganisms and a source of indirect transmission of pathogens (Bholah & Subratty, 2002). In office environments where many users share surfaces throughout the day that are not cleaned, staff sickness rates might be expected to reflect increased transmission. Cleaning keyboards and telephones every day significantly reduced the microbial flora but was not justified by any concomitant reduction in worker absence rates. Absence rates were low and varied widely; staff members might work despite feeling ill from an infection. Many shared surfaces such as doorknobs and toilets were not included in our study. Furthermore, we did not include sources at home or related to transportation.

This study is unique in targeting an office environment outside the healthcare setting. Routine cleaning policies might not include desk items and can miss high-frequency touch sites. The increasing use of communal hot desks in offices might result in the spread of bacteria and viruses among workers. With frequent use, computer keyboards can become recontaminated quickly (Hartmann et al., 2004; Neely, Maley & Warden, 1999). Bacterial contamination of keyboards in Internet cafes is significantly higher than in offices due to the number of users and consumption of food while working (Tagoe & Kumi-Ansah, 2010).

Daily cleaning of keyboards, mice, and phones was effective at reducing keyboard bioburden. On control keyboards, ACC were significantly higher than on test keyboards for all phases of the study. Regular cleaning was necessary to maintain low bioburden. The decrease in ACC from phases 1 to 3 on control keyboards suggests cleaning has a lasting beneficial effect on persistent bioburden. On cleaned keyboards, ACC were similar during phases 1 to 3, suggesting a baseline was reached. Regular but less frequent cleaning might be sufficient to maintain a low baseline bioburden.

Micrococcus spp. and *Staphylococcus* spp. were the most frequently isolated bacteria on both test and control keyboards. These bacteria are commonly found on skin and highlight the transfer of organisms from users to keyboards. *Enterococcus* spp. was isolated frequently (11%) on control keyboards. *Enterococcus* spp. are commensal bacteria found in the digestive tract and suggest poor hand hygiene and a potential source of gastrointestinal infection (Boehm & Sassoubre, 2014). With regular cleaning, levels of *Enterococcus* spp. decreased to 1% of the isolated bacteria. Although fecal flora was frequently found on keyboards, there were no outbreaks of viral gastroenteritis at the time of the study. Norovirus survives for 12–48 hr on computer and phone surfaces (Clay, Maherchandani, Malik, & Goyal, 2006).

Employee absences decreased in April on floor 14 but was also reported on floor 7, suggesting the decrease was due to other factors. The overall absence rate was low in the study group but was dependent on the quality of employee occupational health records. It is a limitation of this study that the need to maintain confidentiality prevented causes of illnesses being reliably and independently verified. Limiting investigation to hot desk facilities could have increased the power of the investigation. Conducting an investigation during a community outbreak of viral gastroenteritis, though likely to be impractical, would be more likely to demonstrate efficacy.

Desk surfaces were not sampled or cleaned during this study. The desk is a high-frequency touch surface that might act as a reservoir of microorganisms to cross-transfer to recently cleaned surfaces. We chose to use alcohol wipes for this study due to wide compatibility with surfaces and low cost; however, alcohol wipes do not have long-term residual activity. The lower levels of bacteria observed in phase 3 suggest that removal of dirt/debris from surfaces can minimize overall bioburden over time.

Conclusion

Although regular cleaning of keyboards, mice, and telephones in the office environment reduces the microbial flora to which staff are exposed, it was not cost effective in terms of an effect on staff absences due to sickness. Nevertheless, staff members should be educated on the potential risks of acquiring infection from shared equipment and the importance of their own hand hygiene in avoiding infection from the environment.

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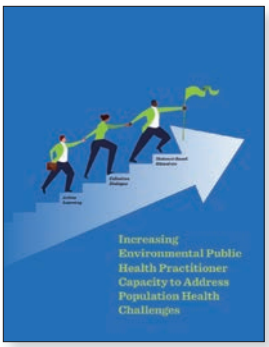

Increasing Environmental Public Health Practitioner Capacity to Address Population Health Challenges: Evaluation Results From a Workforce Development Project

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Abstract **Environmental public health (EPH) practitioners are faced with an increasing scope and scale of population health challenges. To address these challenges, the Great Lakes Public Health Training Collaborative developed an action learning initiative titled the EPH Inquiry Towards Communities of Practice Project to increase EPH practitioner knowledge of commonly identified EPH issues and assets, increase collective action through dialogue and shared learning, and create an EPH state action plan. Fifty-five local health department EPH governmental leaders and six facilitators participated, representing each of the six states within Health Resources and Services Administration Region V. A multicomponent evaluation, incorporating post-session satisfaction surveys, action learning discussion transcripts, post-session reflections, and follow-up interviews at 6 months were completed. Results suggested that the majority of respondents found the process was somewhat or very effective in identifying state-based needs and setting an agenda for addressing EPH issues. Participants reported value in the overall process and the need for more collective learning. All states implemented at least one recommendation in their action plans. The EPH Inquiry Towards Communities of Practice Project provided evidence that using an action-learning framework could serve as a workforce development approach to help practitioners address EPH challenges.**

Introduction

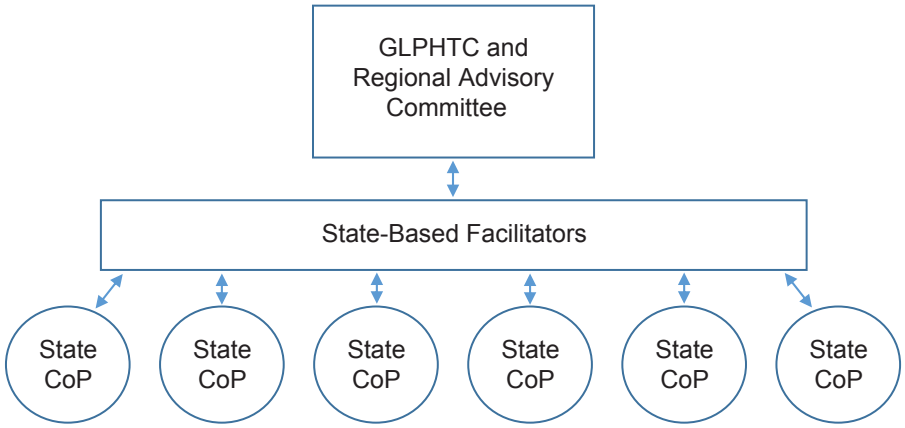
Governmental environmental public health (EPH) practitioners play a unique and vital role to address population health (American Public Health Association, 2017; London, 2017; Osiecki, 2016; Resnick, Zablotsky, & Burke, 2009). EPH issues affect our everyday lives in a variety of ways and at multiple levels in the public health system, and these issues are becoming increasingly complex with changes in our environment (Association of State and Territorial Officials, 2016). EPH practitioners also are undertaking an even greater role in community and systems change efforts such as adopting Health in All Policies frameworks; addressing social determinants of health through policy, systems, and environmental (PSE) change; and focusing more on health equity (Freudenberg, Pastor, & Israel, 2011; Huang, Kerner, & Whitehead, 2018). As such, governmental EPH practitioners must increasingly possess great depth and breadth of competencies to address the diverse scope of EPH issues.

Challenges exist to effectively and efficiently train the governmental EPH workforce. First, EPH workforce development approaches that are focused on individual skill building in specific content areas might fall short in addressing the current and complex EPH challenges, whereas collective learning models might adapt to the ever-changing nature of issues such as climate change (Chehimi & Cohen, 2013; Erwin, & Brownson, 2017; Hess, McDowell, & Luber, 2012; Plough, 2014; Welter, Jacobs, Jarpe-Ratner, Naji, & Gruss, 2017). Second, while distance-based training has become a popular modality for training, often many online trainings are didactic, with limited learner engagement.

To address these challenges, the Great Lakes Public Health Training Collaborative (GLPHTC) created the EPH Inquiry Towards Communities of Practice Project for EPH practitioners to collaboratively learn and improve population health via a distance-based platform. GLPHTC was a Health Resources and Services Administration (HRSA) Region V federally funded six-state partnership: the

FIGURE **1**

Great Lakes Public Health Training Collaborative (GLPHTC) Environmental Public Health Inquiry Towards Community of Practice (CoP) Project Structure



University of Illinois at Chicago School of Public Health (UIC SPH), Indiana University Richard M. Fairbanks School of Public Health at Indiana University–Purdue University Indianapolis (IUPUI), University of Michigan School of Public Health, University of Minnesota School of Public Health, The Ohio State University College of Public Health, and University of Wisconsin School of Medicine and Public Health.

Project Overview

The EPH Inquiry Towards Community of Practice Project was led and coordinated by the GLPHTC central office at the MidAmerica Center for Public Health Practice at UIC SPH. GLPHTC created a Regional Advisory Committee (RAC) to help design the project. RAC included 1) regional EPH academic and practice experts and 2) National Environmental Health Association (NEHA) staff and its president at the time.

GLPHTC and RAC employed action learning through Communities of Practice (CoP) as foundational adult learning approaches to identify and address EPH challenges. Action learning is a problem-solving and capacity-building process led by a facilitator in which participants examine data and engage in reflective group dialogue to identify collective action (Marquardt, Leonard, Freedman, & Hill, 2009). By learning together about shared challenges, assets, and opportunities, GLPHTC envisioned that each state would form an ongoing CoP—a structure whereby learning through dialogue and action could be sustained (Jennings Mabery, Gibbs-Scharf, & Bara, 2013; Wenger, 1998). In addition, action learning is known as a process to foster systems thinking, a crucial strategy to addressing population health improvement strategies (Frieden, 2010; Marquardt et al., 2009).

GLPHTC applied action learning to create CoPs with EPH leaders in each HRSA Region V state to accomplish three short-term objectives. The objectives were to increase: 1) knowledge of shared EPH issues and assets, 2) perceived value for collective action through dialogue and learning, and 3) collective identification of opportunities to address EPH issues through a shared action agenda.

In summer 2016, GLPHTC and RAC worked with state health department staff, state public health association affiliates, and state EPH association members to recruit action learning facilitators and project participants. Facilitators were EPH experts with significant practice experience. CoP project participants were middle management or higher-tier management employed with local public health departments in EPH specializations. A total of 61 participants agreed to participate in the project (n = 6 facilitators; n = 55 CoP participants). Figure 1 shows the structure of the project.

The EPH Inquiry Towards CoP Project employed a 6-step process that took place October 2016–June 2017 and reflected the action-learning process (Figure 2). Step 1 of the process began in October 2016 with a webinar to all facilitators and participants providing a project overview and instructions for completing the EPH Scope and Services Assessment. This assessment was developed by GLPHTC and RAC to look closely at participants' progress specific to EPH domains including air quality, food quality, and water quality on the first two Essential Services of Public Health: 1) monitor health status to identify and solve community health problems and 2) diagnose and investigate health problems and health hazards in the community. The assessment was administered to individual CoP participants in late October 2016 via Qualtrics, who had a 3-week period to complete it. Results served as evidence for discussion among the participants, not as a basis to produce an overall generalizable summary of EPH challenges.

In Step 2, during November–December 2016, GLPHTC central office staff provided a state-based, deidentified report of the EPH Scope and Services Assessment results to each CoP. Additionally, facilitators were trained on action-learning concepts and provided with a facilitation guide and PowerPoint templates to ensure similar conversation structures across all six states.

Step 3 (Conversation 1) focused on reviewing assessment data for Essential Services 1. In Step 4 (Conversation 2), assessment data for Essential Services 2 was presented and discussed. In Step 5 (Conversation 3), participants developed a state-based action plan. Finally, Step 6 included a final regional webinar with all CoPs to validate the overall project findings and develop regional recommendations.

Methods

A multicomponent evaluation with both quantitative and qualitative data collection was designed to answer the following questions: 1) How did the project impact the participant's knowledge of EPH issues and facilitate collective action? and 2) What were the perceived benefits and opportunities of

the project? Table 1 is a crosswalk of the data that were used to address the two evaluation questions, alongside a summary of results for each question. This project was deemed nonresearch by the institutional review board of the University of Illinois at Chicago (#2016-0241).

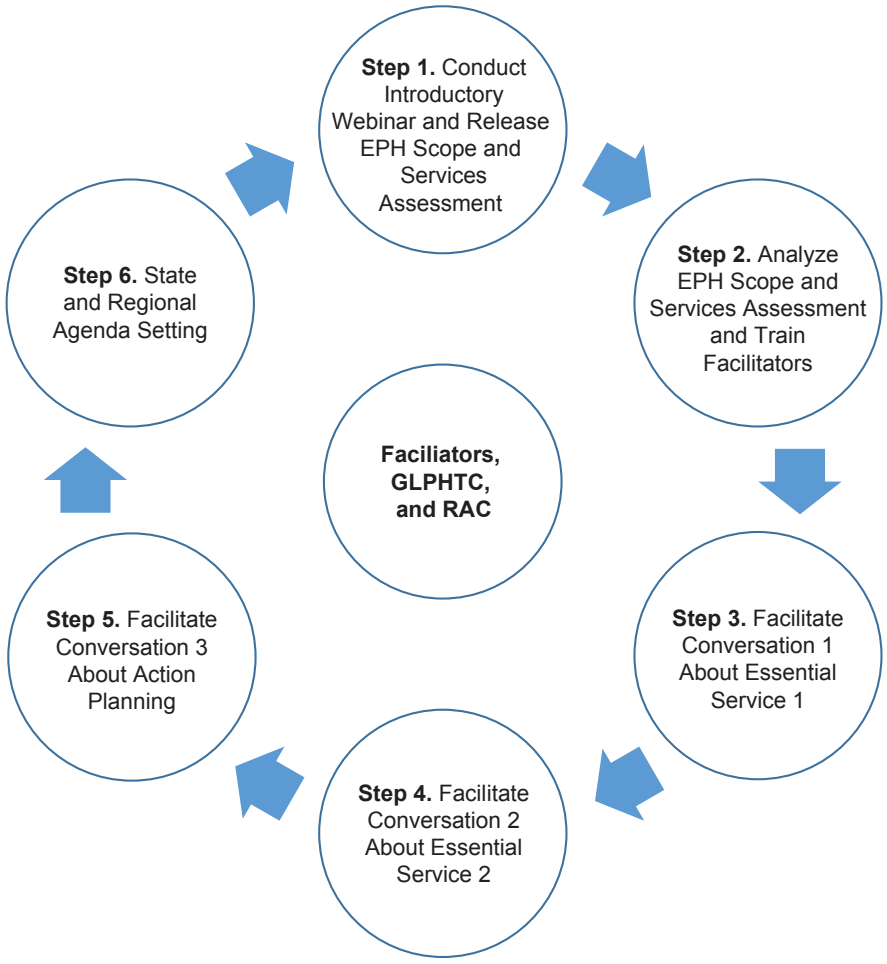
Participants completed an evaluation survey post-project to assess their level of project satisfaction and beliefs of whether they could take action based on their participation in the project. A total of 29 participants completed the post-survey evaluations. Surveys consisted of close-ended items with Likert response options. Data were analyzed descriptively using frequencies and means for the close-ended items.

There were four forms of qualitative data in the evaluation (Table 1). First, all conversations held in the six states were recorded and transcribed by facilitators and shared back with the GLPHTC central office (N = 18). Second, all participants were asked to complete post-reflection open-ended questions after each conversation. There were a total of 134 reflections submitted, or approximately 7 per conversation. Third, during March and April 2017, each state-based CoP facilitator participated in an interview to assess impressions of the overall process and the value of the program (N = 6). Fourth, between November 2017 and January 2018, the GLPHTC central office recruited at least one participant from each state to conduct 6-month post-project interviews to obtain project feedback and understand what action steps continued. Five interviews were conducted with four of the six states; in one state, two interviews were conducted (N = 5). Two states could not participate in the interview but did report activities 6-months post-project via e-mail. All interviews were conducted via phone calls by the GLPHTC central office staff, then recorded and transcribed.

To complete the qualitative data analysis, evaluators developed a thematic codebook based on a preliminary review of the major themes emerging from the data. Two evaluators coded the same transcripts and reviewed them for coding agreement. Once an 80% agreement rate had been reached on code application, the codebook was finalized and one evaluator applied the codes to the remaining transcripts. Dedoose software was used to conduct the qualitative data analysis.

FIGURE **2**

Environmental Public Health (EPH) Inquiry Towards Communities of Practice Project Action Learning Steps



GLPHTC = Great Lakes Public Health Training Collaborative; RAC = Regional Advisory Committee.

Results

Results are presented by evaluation question and by evaluation data collection method (Table 1).

Evaluation Question 1: How Did the Project Impact the Participant's Knowledge of Environmental Public Health Issues and Facilitate Collective Action?

Quantitative Findings

Quantitative data found that out of 29 respondents, 27 (93%) reported the process was "somewhat effective" or "very effective" in identifying needs in their state. Out of 29 respondents, 26 (90%) stated the process was "somewhat effective" or "very effective" in setting an agenda for addressing problems.

Qualitative Findings: Shift in Problem Identification Pre- and Post-Program

Participants were asked to identify the top EPH priorities in the EPH Scope and Services Assessment prior to their participation in discussions. EPH priorities identified pre-project consisted predominately of content-specific challenges related to air quality, water qual-

TABLE **1**

Crosswalk of Project Evaluation Questions With Data and Results

Evaluation Question	Data Collected to Address Evaluation Question	Results Summary
1) How did the project impact the participant's knowledge of environmental public health issues and facilitate collective action?	Quantitative data: • Post-evaluation satisfaction surveys (*N* = 29)	• Out of 29 respondents, 27 (93%) reported the process was "somewhat effective" or "very effective" in identifying needs in their state. • Out of 29 respondents, 26 (90%) stated the process was "somewhat effective" or "very effective" in setting an agenda for addressing problems.
	Qualitative data: • Three conversation transcripts from each state (*N* = 18 transcripts) • Post-session reflections (*N* = 134) • Follow-up interviews with facilitators at 1-month post-program (*N* = 6) • Follow-up interviews with participants at 6-months post-program (*N* = 5)	• Shift in problem identification pre- and post-program. • Collective action was identified.
2) What were the perceived benefits and opportunities of the project?	Qualitative data: • Three conversation transcripts from each state (*N* = 18 transcripts) • Post-session reflections (*N* = 134) • Follow-up interviews with facilitators at 1-month post-program (*N* = 6) • Follow-up interviews with participants at 6-months post-program (*N* = 5)	• The role of action learning was not explicit but seemed impactful. • Networking with colleagues expanded participant perceptions and facilitated focused action. • The role of facilitators helped identify collective areas of action. • A data-driven, evidence-based conversation might increase a focus toward action.

ity, and food quality, as well as disease vectors and preparedness. Upon project completion, participants more frequently identified cross-cutting challenges that the entire CoP and larger EPH community could address. For example, as one facilitator said, "The participants didn't talk about shared services [cross-jurisdictional sharing of resources, data, activities, etc.] in the first conversations… that changed by end of the third conversation. They all saw that was a possible solution for training and leadership development."

Furthermore, leadership development was identified as a shared challenge and opportunity by the end of the project but was not listed by anyone earlier in the project. One facilitator said, "We heard frequently that there was a need for greater training, leadership training, [and] things like evidence-based practices [to help develop] environmental health messages for the community, advocacy, policy development." Table 2 presents the final agreed upon EPH challenges and recommendations developed by the region.

Collective Action Identified

All CoPs participated in action-planning conversations, identifying recommendations for state-based CoP action to address EPH challenges. At 6 months post-project, all of the CoPs reported advancing at least one of the recommendations identified through the project. For example, one state hosted a webinar series in summer 2018 that focused on leadership training and incorporating EPH into community health assessments. Several CoPs also collaborated across the region post-project to conduct an inventory of existing EPH trainings by assessing course quality and relevance vis-à-vis the project findings, which resulted in the development of an Environmental Health 101 online course for the region.

Evaluation Question 2: What Were the Perceived Benefits and Opportunities of the Project?

Action Learning Was Not Explicit but Seemed Impactful

Overall, participants and facilitators did not explicitly mention action learning as an approach they had learned through the process. Many participants and facilitators, however, noted the value in the reflective and process-oriented approach. Facilitators specifically indicated that participants are "more likely to take action…because the results of the assessment and conclusions they came to, and the themes and gaps they identified [were not] just anecdotal any more, that process forced them to put it in writing." In addition, participants did heavily comment on aspects of the action learning process, such as using data or evidence to structure conversations, networking to identify collective and focused action, and the importance of the facilitator role.

Networking With Colleagues Facilitated Focused Action

One of the main benefits of the project articulated by participants was networking with other EPH professionals. Most participants indicated that they rarely have time and space to learn from each other. One participant said, "There's not really many chances [that] other directors or staff members can get together to discuss [EPH] things. Really ever. Unless you're at a conference, and you're getting lunch with a couple other people from different departments, and [it] kind of happens organically. Something like this never really occurs."

The specific value of networking was at least twofold. First, most participants agreed that convening a group of colleagues from across the state to discuss challenges broadened their thinking to outside of their individual health departments. As one participant stated, the project "opened our eyes again. You get caught in the same day-to-day things, you kind of forget there's an overall bigger picture besides our little health department and our community." This broader view helped participants to "see what was out there and what could be focused on."

Second, participants reported that the project helped them learn new approaches and

practices as well as then focus on where to move forward. "We all have similar needs and issues, manpower and capacity, expanding and creating programs. But we saw how other departments approached the programs differently; we were amazed at it," one participant noted. Another participant said that a project benefit included "getting different perspectives from people in different situations, new information about how to deal with an issue or resources."

Facilitators Helped Identify Collective Areas of Action

Participants emphasized the important role of the facilitators and identified specific facilitation strategies that helped to create collective action. For example, the most commonly used facilitation strategy noted by participants as helpful was "asking for other's input." Using this strategy, facilitators promoted dialogue and reflection. In addition, "asking for more specification" was the second most mentioned facilitation strategy and involved the facilitator asking follow-up questions to get more detailed answers from a participant. This approach allowed the participants to give more thought to their previous answer, promoting deeper thinking and discussion.

Evidence-Based Conversation Might Increase Focus Toward Action

Participants reported that the data-driven discussion helped maintain conversation focus and ideas for action. Specifically, facilitators used the EPH Scope and Services Assessment results to help participants reflect on their own EPH experience versus the collective group and then envision areas of alignment and action. Participants mentioned that this evidence framed their discussions. For example, one participant said that the assessment "gave us a starting point of what we were going to discuss…because a lot of times, people get together and then you don't have a baseline of the topics you want to have…and you don't get as much out of it." It is important to note, however, that participants found the EPH Scope and Services Assessment to be too long and burdensome and recommended a simpler assessment going forward.

TABLE **2**

Regional Environmental Public Health (EPH) Challenges and Recommendations Post-Project

Shared Challenges
1. Limited data collection and analysis systems to inform EPH needs.
2. System fragmentation among local health departments (LHDs) and between the state and LHDs.
3. A lack of integration between EPH and other public health functions.
4. The public lacks a clear understanding of the role of EPH.
5. Funding constraints.
6. Emerging issues (e.g., Zika virus).
7. A lack of policy, standards, and mandates.
8. A lack of workforce and leadership competency and capacity.
Shared Recommendations
1. Build leadership capacity of the EPH workforce to 1) better use data to drive decisions, 2) facilitate collaborative processes, and 3) organize and advocate for EPH needs (e.g., develop and/or promote leadership institutes).
2. Improve standardized EPH informatics and surveillance systems to support the collection and analysis of EPH data (e.g., department of health annual reporting for local public health).
3. Develop improved mechanisms of sharing and integration (e.g., apply for shared service grants).
4. Address fragmentation between state and local entities by clarifying and/or standardizing the role of EPH (e.g., create a position paper).
5. Expand access and use of evidence-based practices to address ongoing and emerging needs (e.g., vapor intrusion, Zika virus).
6. Develop workforce competency for EPH to build the pipeline and current workforce (e.g., standard EPH roles such as environmental health specialist).
7. Expand and integrate the role of EPH within public health activities (e.g., community health assessment, Health in All Policies).
8. Expand connections and partnerships with state associations and other agencies to better address broader health needs (e.g., state-based partnership between affiliates of the National Environmental Health Association and the American Public Health Association).
9. Use various communication platforms to demonstrate the role and value of EPH (e.g., YouTube, etc.).

Discussion

The EPH Inquiry Towards CoP Project was a novel workforce development approach to facilitate collective action by employing action learning within a CoP via distance-based education. Lessons learned from this project could influence workforce development models to address EPH population health issues.

Action Learning Can Be a Strategy to Build and Employ Evidence Toward Action

While action learning was not explicitly mentioned as a benefit of the project, a core tenet of the model is the use of evidence as a basis for discussion—something participants valued in this project to identify new approaches to solving EPH problems and developing shared action. Public health as a discipline places a heavy emphasis to build capacity of practitioners to employ evidence in decision making (Brownson, Fielding, & Green, 2018; Brownson, Fielding, & Maylahn, 2009). Moreover, action learning, including the use of evidence to foster learning, is an underdeveloped workforce development strategy and an opportunity to explore. Future adoption of the action-learning model, however, should be more explicit about its use so that it can be learned by participants more fully.

Collective Dialogue Through Action Learning Might Facilitate Systems Thinking

There has been an increased emphasis on increasing public health practitioners' capacity to employ a more policy and systems approach, and in relation, to build the workforce's strategic skills (de Beaumont Foundation, 2017). Action learning might present an opportunity to build collective efforts by pro-

moting systems thinking. Bringing practitioners together with a trained facilitator reflecting on shared data and experiences appeared to expand participant perceptions of the root causes of EPH issues, increase overall connectivity among EPH practitioners, and help participants identify focused systems issues and approaches for change.

Distance-Based Education Might Be an Approach to Foster Shared Learning

One of the most salient themes found in the evaluation was the value of collective dialogue with EPH peers. Participants also noted a lack of opportunity for collaborating in their field, as well as the project's value in providing space for sharing concerns and strategies to address challenges. Further, there were no comments or criticisms of the use of distance-based education as an approach to bringing EPH practitioners together. Employing collective learning approaches through distance-based education could be an opportunity to help address practitioner desires for connecting and learning.

Facilitators Appear to Be Vital in Driving Collective Systems Thinking

This project found that the role of facilitation was vital in helping participants reflect on evidence and identify points of convergence and leverage. The benefits of the facilitator's ability to help identify and direct action on collective change were the most commonly mentioned benefits in this project. Unfortunately, there are limited opportunities and trainings available in public health for facilitation.

Limitations

This evaluation has several limitations. Participant selection was purposive, and while deliberate to include small, large, urban, and rural health departments, was not representative of all EPH practitioners or the Midwest region. In addition, the project experienced loss-to-follow-up throughout the course of the project, as participant survey reflections and responses declined. The project did not intend to inform generalizable results but was designed to explore workforce development approaches to impact population health improvement.

Conclusion

The EPH Inquiry Towards CoP Project used an action learning and CoP adult learning framework to address EPH leader challenges via a distance-based platform. The project highlighted the benefits of an evidence-informed process fostering collective learning. As EPH practitioners and other governmental public health practitioners are increasingly faced with both technical and adaptive challenges, the project highlighted the need for more programming and evaluation efforts around diverse workforce development approaches.

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BUILDING CAPACITY

Darryl Booth, MBA

Building Capacity for a Remote Environmental Health Workforce

Editor's Note: A need exists within environmental health agencies to increase their capacity to perform in an environment of diminishing resources. With limited resources and increasing demands, we need to seek new approaches to the business of environmental health. Acutely aware of these challenges, NEHA has initiated a partnership with Accela called Building Capacity—a joint effort to educate, reinforce, and build upon successes within the profession using technology to improve efficiency and extend the impact of environmental health agencies.

The *Journal* is pleased to publish this column from Accela that will provide readers with insight into the Building Capacity initiative, as well as be a conduit for fostering the capacity building of environmental health agencies across the country. The conclusions of this column are those of the author(s) and do not necessarily represent the views of NEHA.

Darryl Booth is the general manager of environmental health at Accela and has been monitoring regulatory and data tracking needs of agencies across the U.S. for almost 20 years. He serves as technical advisor to NEHA's informatics and technology section.

As of this writing (April 2020), public health is marshalling its response to the coronavirus disease 2019 (COVID-19) pandemic. The sobering statistics that are available today will be outdated within hours. Suffice it to say that, upon the June 2020 publication of this column, our collective understanding of the pandemic, the response, the efficacy of the response, and the new normal will be better known. At every stage of understanding, however, our primary and enduring wish is that our families, colleagues, neighbors, and friends are safe.

As environmental health protections are considered essential, the expectations of this profession remain high, arm-in-arm with the other essential workers in our communities. In the same moment, other businesses and workers are directed to change the very nature of their work or to suspend operations temporarily.

As new public directives surrounding shelter-in-place, social distancing, masks, disinfection, etc. are established, we will explore new norms around continued operations in environmental health.

In my network, I observe widely varying department policies. Some rely on recommendations for simple social distancing. In other cases, personal protective equipment (PPE) are introduced and required. In the extreme, some health departments are limiting their exposure through phone "check-in inspections" that are needed to guide operators who are also finding their ways. The degree to which health departments modify practices is a function of local and state orders and the orders of their health officers.

Working Remotely

Today, most everyone in the environmental health workforce is working from home either part-time or full-time. This specific challenge—being effective away from the office—is not very different from loan officers, insurance agents, counselors, and teachers in that we're all defining new ways to work. And while there's no shortage of online articles about working from a home office, for environmental health professionals working in a crisis, I offer five practices to master:

1. **Dress for work**: Without exception, remain professional in your communications and routines. Preparing for and dressing for work is a fantastic way to reinforce those ideals. Dressing is more than your clothes, it's your mindset. Keep to a schedule and a work plan.
2. **Claim your workspace**: If you're sharing a workspace with others in your household, work out timing and agree to reasonable accommodations. Since not everybody has a dedicated office, expect some dust-ups. It's not unreasonable, however, to prioritize among wage earners, students, and entertainment. You might just have to sit in your car to take an important call if that's what it takes.

3. **Commit to communication**: Don't underestimate how much regular office communication is done by the coffee machine and in the hallways. So, you must not be shy about picking up the phone to send a text or suggesting daily stand-up meetings. A daily stand-up is short meeting (nobody sits, they all stand) designed to rapidly surface the most immediate activities and needs.
4. **Build a practice**: Become an expert in the technical aspects of web meetings, conference calls, collaborative workspaces, and security and privacy. Take 30 minutes to learn and practice Zoom, WebEx, GoToMeeting, or Skype meetings as one or more of these tools is likely essential.
5. **Take care of yourself**: Even while sheltered in place, we must take breaks, stand, stretch, walk, and practice good nutrition. In the transition, do not be too hard on yourself as you work to master this new skill. It's no different from learning a new software program. Pick up the phone and chat with a friend for a few minutes. Catch up.

Technical Components

We do not achieve our successes alone. We rely on our leadership and the contributions of our information systems/information technology departments. Realize that they are also scrambling to support departments across the state, county, city, or district.

Internet Connectivity

The foundational element to remote work is Internet connectivity. Typically provided by your cable company, phone company, or wireless company, you'd be wise to consider increasing bandwidth (typically for an additional fee) and hard wiring your workstation to the router instead of relying on Wi-Fi. A network or Wi-Fi extender can also improve performance throughout the house.

VPN Connectivity

If the software or files you access reside primarily on your health department's servers, you might be asked to launch a VPN on your workstation or tablet. VPN stands for virtual private network. It's a networking tool to protect and encrypt communications between your workstation and the health department office. The VPN software will prompt you for credentials and once it is up and running, will intercept, route, and encrypt those communications.

You could also be prompted for two-factor authentication. This authentication means that in addition to your username and password, you might have to confirm a text on your phone and/or enter a code from a special device. This extra step just enhances security since passwords can be shared or guessed.

Note that VPN connections can time-out (shut down after a period of inactivity). So, be sure to check the VPN connection status before you call for assistance.

Cloud-Based Software and Collaboration

For health departments that have committed to cloud-based software, the transition to work-from-home is easier. It's not much different from how the same worker uses those systems in the office.

Microsoft's Office 365 (recently rebranded Microsoft 365) and Google's G Suite (the commercial version of Google Docs) are two very popular cloud-based collaborative solutions for e-mail, word processing, spreadsheets, and presentations.

Video, Voice, and Chat

There are several video and voice conferencing services available as Zoom, WebEx, GoToMeeting, Microsoft Teams, and others vie for our business. The free versions might have time or other limits. The paid services are likely more appropriate for business.

When conducting a video conference, turn on your camera to enhance the personal connection among attendees and to encourage proper attention. Mute your line when not speaking and avoid multitasking.

New to many environmental health professionals is online chat. Nearly identical to text messaging, chat systems such as Microsoft Teams and Slack are great for quick questions as well as group discussions. With software integration, an active chat can be promoted to a video meeting.

Don't overlook the mobile versions for your iPhone or Android phones.

Managing and Motivating a Remote Workforce

Clear and frequent communication, including regular individual feedback and more relaxed opportunities, is key. You must trust and care about your team and now is the time to show it. Use a regular stand-up meeting to share an Internet meme of the day or funny joke.

Encourage the team to problem solve and to share and celebrate their successes. The bottom line is that managing a remote workforce can be tough.

A Final Word on Security

One final word and it relates to security. When you remove your laptop from the office or use your personal computer equipment, years of security policy can be undermined. Don't be the one who clicks on an errant attachment or leaves an unencrypted hard drive unattended.

As we all navigate what being remote means for us in our individual roles, I hope you take some comfort in knowing that your work and the collective work of the environmental health community are critical and relevant. Together we will take our learnings from this time and show up even stronger and more impactful than before. Stay safe.

Disclaimer: The mention of specific companies, products, and services in this column is not an endorsement of those companies, products, and services by either the National Environmental Health Association or Accela.

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Did You Know?

NEHA continues to add relevant resources for environmental health professionals to its COVID-19 web page at www.neha.org/covid-19. The page provides links to pandemic situation reports; guidance for work, facilities, schools, and homes; disinfection guidance; food safety; related *Journal of Environmental Health* articles, and partner organization resources.

DIRECT FROM CDC ENVIRONMENTAL HEALTH SERVICES

Risk Communication for Environmental Health Practitioners

Vivi Siegel, MPH
National Center for Environmental Health, Centers for Disease Control and Prevention

Editor's Note: NEHA strives to provide up-to-date and relevant information on environmental health and to build partnerships in the profession. In pursuit of these goals, we feature this column on environmental health services from the Centers for Disease Control and Prevention (CDC) in every issue of the *Journal*.

In these columns, authors from CDC's Water, Food, and Environmental Health Services Branch, as well as guest authors, will share insights and information about environmental health programs, trends, issues, and resources. The conclusions in these columns are those of the author(s) and do not necessarily represent the official position of CDC.

Vivi Siegel is the crisis and emergency risk communication lead for CDC's Division of Environmental Health Science and Practice in the National Center for Environmental Health.

Is This Water Safe to Drink? Is This Food Safe to Eat?

Environmental health practitioners have many occasions to speak with the public about concerns regarding clean water, safe food, and a healthy environment. These occasions could happen during an unexpected event or disaster—a chemical spill in the local water supply, a foodborne illness outbreak, or a hurricane with power outages. Or, it could happen in the course of a normal workday, like during a routine inspection.

Our ability to explain a situation and the risk someone is facing clearly, succinctly, and with empathy can make the difference of whether or not they are able to make the best choices for themselves and their family. The Centers for Disease Control and Prevention (CDC) has communications resources and trainings (Figure 1) that can help environmental health practitioners with these sometimes tricky conversations:

- **CDC's Drinking Water Advisory Communication Toolbox** provides tools and templates to help plan for, develop, implement, and evaluate communication activities with the public during drinking water notifications and advisories.
- **CDC's Crisis and Emergency Risk Communication (CERC) Training** gives suggested strategies for reaching people experiencing an emergency and provides the context for why these strategies work.

Understanding How Someone Receives a Message Is Just as Important as the Content of the Message

CDC's risk communications body of knowledge draws in part from communication lessons learned in the field of environmental health by the Agency for Toxic Substances and Disease Registry and U.S. Environmental Protection Agency during the 1980s and 1990s. Risk communication experts such as Vince Covello, Frederick W. Allen, Peter Sandman, Baruch Fischhoff (see quote on page 31), and others looked at environmental risks and the way authorities talked with people about them. They found that good communication included

- accepting the public as an equal partner and
- giving people an opportunity to ask questions and share feelings.

Covello and Sandman defined risk as "hazard + outrage" and examined the factors that make risks feel less acceptable and more dangerous to people. They defined hazard as the amount of harm a risk is likely to do and outrage as how upset it is likely to make people. The level of outrage people feel about a risk rises with the following factors, among others:

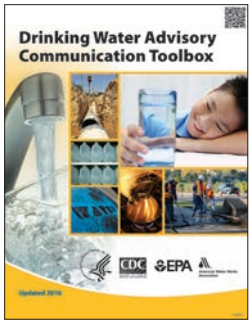
- They are invisible or hard to observe (e.g., germs in food).
- They affect some groups more than others (e.g., children and older adults).
- They are out of our personal control (e.g., a chemical spill).

Consequently, environmental health risks might be seen with more fear and less understanding than other types of health risks: they are invisible, affect some populations disproportionally, and are often out of our control.

With that in mind, there are things we can do to address the anxiety people can feel and help them listen to, understand, accept, and follow health protection messages. CDC's CERC principles (see sidebar) are designed to do that. While all principles are important,

FIGURE **1**

Drinking Water Advisory Communication Toolbox



QUICK LINKS

- Centers for Disease Control and Prevention's (CDC) Crisis and Emergency Risk Communication Training: https://emergency.cdc.gov/cerc/training/index.asp
- CDC's Drinking Water Advisory Communication Toolbox: www.cdc.gov/healthywater/emergency/dwa-comm-toolbox/index.html

there are two that can be particularly critical for environmental health issues:

1. **Show empathy**: For the person who has experienced an unwanted and unexpected environmental exposure, even a small dose is unacceptable and disruptive. Accept and understand that people might be feeling justifiable anger and fear. Acknowledge those feelings in words.
2. **Promote action**: The first question asked by people in an emergency is, "What do I need to do to protect myself and my family?" CDC's educational materials, emergency communications, and social media include action messages wherever possible. Actions you recommend will depend on where someone is geographically in relation to the exposure threat and how much time has passed as actions will change over time. For example, actions for people closest to the exposure (e.g., "Don't drink tap water until further notice.") can be different from actions for people who are out of the geographically affected area (e.g., "Call and check on your friends," or "Learn more by reading our online fact sheet.").

Make a Plan Before the Emergency

Finally, plan and evaluate for good communications (see sidebar). Communications plans can be as in-depth as you need, with precleared messages laid out in advance, or as simple as identifying in advance who will be a spokesperson for a given scenario, knowing how you will quickly clear information, and which channels you will use to reach all of your audiences. Communications plans should be part of any exercise scenario and should be exercised along with other plans.

"If we have not gotten our message across then we ought to assume that the fault is not with our receivers."

— Baruch Fischhoff

Communicating with the people affected by an emergency is an important step in any public health emergency response situation and an imperfect plan is better than no plan at all. Furthermore, each opportunity to communicate is an opportunity to learn from our mistakes. It is also an opportunity to connect and build trust in the role of environmental health in an emergency situation. CDC's risk communication resources can help you prepare for your next emergency.

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Centers for Disease Control and Prevention's Crisis and Emergency Risk Communication Principles

- **Be first:** Crises are time sensitive. Communicating information quickly is crucial. For members of the public, the first source of information often becomes the preferred source.
- **Be right:** Accuracy establishes credibility. Information can include what is known, what is not known, and what is being done to fill in the gaps.
- **Be credible:** Honesty and truthfulness should not be compromised during crises.
- **Show empathy:** Crises create harm and the suffering should be acknowledged in words. Addressing what people are feeling and the challenges they face builds trust and rapport.
- **Promote action:** Giving people meaningful things to do calms anxiety, helps restore order, and promotes some sense of control.
- **Show respect:** Respectful communication is particularly important when people feel vulnerable. Respectful communication promotes cooperation and rapport.

Additional Risk Communication Resources

- Prepare a plan to communicate before, during, and after an emergency: https://emergency.cdc.gov/cerc/resources/templates-tools.asp
- Develop products for diverse audiences with these preparedness key messages: www.cdc.gov/cpr/readiness/hurricane_messages.htm
- Share health and safety information in the event of a natural disaster: www.cdc.gov/disasters
- Use these tools for cross-cultural communication: www.cdc.gov/healthliteracy/culture.html
- Reach at-risk populations in an emergency: https://emergency.cdc.gov/workbook/index.asp

EH CALENDAR

Editor's Note: Due to the coronavirus disease 2019 (COVID-19) pandemic, many conferences and events are being canceled as organizers assess health and safety issues, as well as take into consideration current state and local orders related to social distancing. As cancellations are occurring rapidly, the status of the conferences listed below might not be correct. Attendees are encouraged to check the websites for each conference listing for the latest information. Any cancellations that occurred prior to time of press have been noted below. After careful deliberation, the National Environmental Health Association (NEHA) made the difficult by necessary decision to cancel the 2020 Annual Educational Conference & Exhibition. More information about the cancellation can be found on pages 38 and 40. The Legionella *Conference 2020 is still scheduled and NSF Health Sciences and NEHA will continue to closely monitor developments and communicate any changes in a timely manner.*

UPCOMING NATIONAL ENVIRONMENTAL HEALTH ASSOCIATION (NEHA) CONFERENCES

CANCELED: July 13–16, 2020: NEHA 2020 Annual Educational Conference & Exhibition, New York City, NY, www.neha.org/aec

July 12–15, 2021: NEHA 2021 Annual Educational Conference & Exhibition, Spokane, WA

NEHA AFFILIATE AND REGIONAL LISTINGS

Colorado
September 15–18, 2020: Annual Education Conference, Colorado Environmental Health Association, Pueblo, CO, www.cehaweb.com

Florida
August 2–8, 2020: 72nd Annual Education Meeting, Florida Environmental Health Association, Jensen Beach, FL, www.feha.org/2020AEM

Illinois
November 2–3, 2020: Annual Educational Conference, Illinois Environmental Health Association, Utica, IL, http://iehaonline.org

Indiana
September 21–23, 2020: 70th Annual Fall Educational Conference, Indiana Environmental Health Association, Lawrenceburg, IN, www.iehaind.org/Conference

Iowa
October 14–15, 2020: Fall Conference, Iowa Environmental Health Association, West Des Moines, IA, www.ieha.net/FallConference2020

Jamaica
October 25–30, 2020: One Health, One Global Environment Conference, Jamaica Association of Public Health Inspectors and the Americas Region of the International Federation of Environmental Health, Montego Bay, Jamaica, www.onehealthconference.com

Kansas
September 15–16, 2020: Fall Conference, Kansas Environmental Health Association, Manhattan, KS, www.keha.us

Michigan
September 14–16, 2020: Annual Education Conference, Michigan Environmental Health Association, Traverse City, MI, www.meha.net/AEC

Missouri
October 19–21. 2020: Annual Education Conference, Missouri Environmental Health Association, Springfield, MO, https://mehamo.org

North Carolina
September 16–18, 2020: Fall Educational Conference, North Carolina Public Health Association, Wilmington, NC, https://ncpha.memberclicks.net

Texas
October 26–30, 2020: 65th Annual Education Conference, Texas Environmental Health Association, Austin, TX, www.myteha.org

Wisconsin
September 23–25, 2020: Educational Conference, Wisconsin Environmental Health Association, Eau Claire, WI, https://weha.net

TOPICAL LISTINGS

Climate Change
August 26–27, 2020: American Climate Leadership Summit, ecoAmerica, Washington, DC, www.ecoamerica.org

Water Quality
August 19–21, 2020: *Legionella* Conference 2020, NSF Health Sciences and NEHA, Chicago, IL, www.legionellaconference.org

Did You Know?

You can post your upcoming events, such as conferences and webinars, on NEHA's Community Calendar at www.neha.org/news-events/community-calendar. If you need to reschedule or cancel a posted event, please e-mail webmaster@neha.org so we can update your listing.

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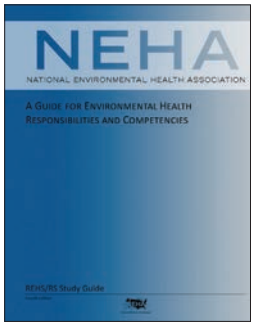
RESOURCE CORNER

Resource Corner highlights different resources the National Environmental Health Association (NEHA) has available to meet your education and training needs. These resources provide you with information and knowledge to advance your professional development. Visit NEHA's online Bookstore for additional information about these and many other pertinent resources!

NEHA BOOKSTORE
www.neha.org/store

REHS/RS Study Guide (4th Edition)

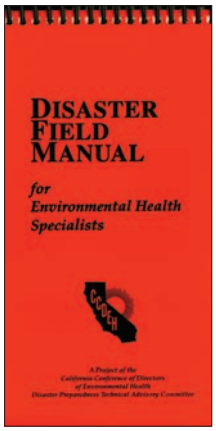
National Environmental Health Association (2014)



The Registered Environmental Health Specialist/Registered Sanitarian (REHS/RS) credential is the National Environmental Health Association's (NEHA) premier credential. This study guide provides a tool for individuals to prepare for the REHS/RS exam and has been revised and updated to reflect changes and advancements in technologies and theories in the environmental health and protection field. The study guide covers the following topic areas: general environmental health; statutes and regulations; food protection; potable water; wastewater; solid and hazardous waste; zoonoses, vectors, pests, and poisonous plants; radiation protection; occupational safety and health; air quality; environmental noise; housing sanitation; institutions and licensed establishments; swimming pools and recreational facilities; and disaster sanitation.
308 pages / Paperback
Member: $149 / Nonmember: $179

Disaster Field Manual for Environmental Health Specialists

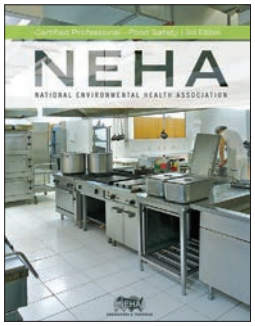
California Association of Environmental Health Administrators (2012)



This manual serves as a useful field guide for environmental health professionals following a major disaster. It provides an excellent overview of key response and recovery options to be considered as prompt and informed decisions are made to protect the public's health and safety. Some of the topics covered as they relate to disasters include water, food, liquid waste/sewage, solid waste disposal, housing/mass care shelters, vector control, hazardous materials, medical waste, and responding to a radiological incident. The manual is made of water-resistant paper and is small enough to fit in your pocket, making it useful in the field. Study reference for NEHA's Registered Environmental Health Specialist/Registered Sanitarian credential exam.
224 pages / Spiral-Bound Hardback
Member: $37 / Nonmember: $45

Certified Professional–Food Safety Manual (3rd Edition)

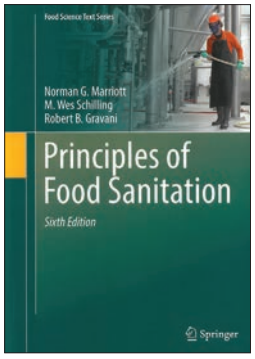
National Environmental Health Association (2014)



The Certified Professional–Food Safety (CP-FS) credential is well respected throughout the environmental health and food safety field. This manual has been developed by experts from across the various food safety disciplines to help candidates prepare for NEHA's CP-FS exam. This book contains science-based, in-depth information about causes and prevention of foodborne illness, HACCP plans and active managerial control, cleaning and sanitizing, conducting facility plan reviews, pest control, risk-based inspections, sampling food for laboratory analysis, food defense, responding to food emergencies and foodborne illness outbreaks, and legal aspects of food safety.
358 pages / Spiral-bound paperback
Member: $179 / Nonmember: $209

Principles of Food Sanitation (6th Edition)

Norman G. Marriott, M. Wes Schilling, and Robert B. Gravani (2018)



Now in its 6th edition, this highly acclaimed book provides sanitation information needed to ensure hygienic practices and safe food for food industry professionals and students. It addresses the principles related to contamination, cleaning compounds, sanitizers, and cleaning equipment. It also presents specific directions for applying these concepts to attain hygienic conditions in food processing or preparation operations. The new edition includes updated chapters on the fundamentals of food sanitation, as well as new information on contamination sources and hygiene, HACCP, waste handling disposal, biosecurity, allergens, quality assurance, pest control, and sanitation management principles. Study reference for NEHA's Registered Environmental Health Specialist/Registered Sanitarian and Certified Professional–Food Safety credential exams.
437 pages / Hardback
Member: $84 / Nonmember: $89

Did You Know?

Time is running out to participate in NEHA's second annual Be a Beacon for Membership campaign. The campaign will end on June 15. Current members can receive a limited edition Beacon of NEHA gift for recommending membership to colleagues and friends. The top 3 recruiters will be announced on NEHA's website and social media channels. Learn more at www.neha.org/nehabeacon.

SPECIAL **LISTING**

The board of directors includes NEHA's nationally elected officers and regional vice-presidents. Affiliate presidents (or appointed representatives) comprise the Affiliate Presidents Council. Technical advisors, the executive director, and all past presidents of the association are ex-officio council members. This list is current as of press time.

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NATIONAL ENVIRONMENTAL HEALTH ASSOCIATION

84th ANNUAL EDUCATIONAL CONFERENCE & EXHIBITION

NEW YORK CITY ◆ JULY 13–16

NEHA 2020 Annual Educational Conference & Exhibition Canceled Due to COVID-19 Pandemic

After careful deliberation, the NEHA Board of Directors has made the difficult but necessary decision to cancel the 84th Annual Educational Conference (AEC) & Exhibition scheduled for July 13–16 in New York City. We prioritize the health of our members, attendees, partners, presenters, contractors, students, and staff over all other concerns.

Complete Details and Refund Information
neha.org/aec

Free Access to NEHA E-Learning

To support the environmental health workforce during the COVID-19 pandemic, NEHA is offering free access to online trainings to all environmental health professionals regardless of membership status until June 30, 2020.

Earn Your Continuing Education Contact Hours Through NEHA E-Learning
neha.org/elearning

NATIONAL ENVIRONMENTAL HEALTH ASSOCIATION

NEHA **NEWS**

NEHA Cancels 2020 AEC Due to COVID-19 Pandemic

The National Environmental Health Association (NEHA) has closely monitored developments of the COVID-19 pandemic since its inception earlier this year. After careful deliberation, the NEHA board of directors has made the difficult but necessary decision to cancel the 84th Annual Educational Conference (AEC) & Exhibition scheduled for July 13–16 in New York City. We prioritize the health of our members, attendees, partners, presenters, contractors, students, and staff over all other concerns.

"For the first time in our 83-year history we will be unable to gather face-to-face to celebrate our environmental health unsung heroes," said Dr. David Dyjack, NEHA executive director. "We are desperately needed in communities everywhere to assist in a return to normalcy. Let our science drive the recovery and resiliency of our communities and let us share our lessons learned the next time we meet at the 2021 AEC in Spokane, Washington." View Dr. Dyjack's important message regarding cancellation of the 2020 AEC at www.neha.org/node/61349.

NEHA is working on a plan for maintaining professional credentials and continuing education. Details will be announced upon finalization. Furthermore, in response to this need, NEHA is offering free access to online trainings to all environmental health professionals regardless of membership status until June 30, 2020. The online trainings include webinars, partner courses, and NEHA's E-Learning videos of sessions from the 2017–2019 AECs. By completing these videos, webinars, and courses, environmental health professionals can earn continuing education contact hours toward their NEHA credentials. Information about the online training offerings and how to access them can be found at www.neha.org/elearning.

Visit the AEC website (www.neha.org/aec) for complete details regarding the 2020 AEC cancellation and refund information. Please remember to cancel any personal arrangements you have made including travel and lodging reservations.

Registration Refund Details

All NEHA 2020 AEC conference registrations, preconference workshop registrations, and special event registrations will automatically be refunded based on the receipt of payment. An e-mail confirmation will be sent after the registration cancellation has been processed. 2020 AEC registrants do not need to contact NEHA to initiate the refund process.

Refunds will be processed in the following manner:

- For payments received before December 31, 2019, a refund will be processed by April 30, 2020. For payments received between January 1, 2020 and February 29, 2020, a refund will be processed by May 31, 2020. For payments received on or after March 1, 2020, a refund will be processed by June 30, 2020.
- If the registration payment was made via credit card, the refund will be returned to that same credit card.
- If the registration payment was made via check, the refund will be returned with a check mailed to the main address listed in the MyNEHA account for that registration.
- If the registration payment was not submitted and there is an open invoice, the invoice will be canceled and removed from the account.
- If the registration payment was made by an employer, the refund will be made directly to the employer.
- If you would like to transfer your NEHA 2020 AEC registration fee to NEHA 2021 AEC in Spokane, Washington, or donate your registration fee to the NEHA general fund to assist us in offsetting the significant cost of canceling the conference, please e-mail staff@neha.org.
- If a membership was purchased with the registration, individuals will be contacted by NEHA's membership department about processing the refund. We would like these individuals to consider retaining their membership to support the operations of our organization.
- If a donation was made to NEHA with the registration, thank you. A letter has already been provided as a tax receipt and these donations will not be refunded.
- 2020 AEC exhibitors and sponsors have the choice of receiving a full refund, transferring funds to the 2021 AEC, or utilizing the funds for other NEHA marketing opportunities. Exhibitors and sponsors will be contacted via e-mail outlining these options and the refund policy. Please contact Soni Fink at sfink@neha.org if you have additional questions.

Thank you for your patience and understanding during these challenging times. We deeply appreciate and are indebted to everyone who contributed their resources, time, and hard work in support of the 2020 AEC planning phases. We look forward to seeing you next year in Spokane!

NEHA Conducts Rapid Needs Assessment in Response to COVID-19 Pandemic

Environmental health professionals are the second largest part of the local public health workforce behind nursing. To support this essential workforce during these uncertain times, NEHA conducted a rapid needs assessment of environmental health activities and needs in response to the COVID-19 pandemic on March 25, 2020. The convenience sample generated 1,175 responses from federal, state, local, tribal, territorial, and other environmental health program personnel. "The environmental health workforce is being called upon to provide critical public health assessment and assurance functions during this pandemic," said Dr. David Dyjack, NEHA executive director. "Our report details the urgency to provide the workforce tools and resources they can use to effectively protect and promote the health of their communities."

Summary of Results

A total of 1,175 responses were received with more than half of the respondents (57%) indicating they were from local environmental health programs (Table 1). The next two largest workforces responding to the survey were other (19%, includes the private food industry, academia, healthcare facilities, and consulting and third-party auditing companies) and federal environmental health programs (13%). Respondents were asked to characterize the employee size of their environmental health programs. Of state, federal, and U.S. territory respondents, 39%, 59%, and 64% indicated a workforce of ≥50 employees, respectively. Conversely, local and tribal programs reported smaller workforces with 52% and 67% indicating a workforce of 1–10 employees, respectively.

All environmental health sectors responding to the survey indicated being actively involved in the COVID-19 response (Figure 1, page 44). Of the local environmental health program respondents,

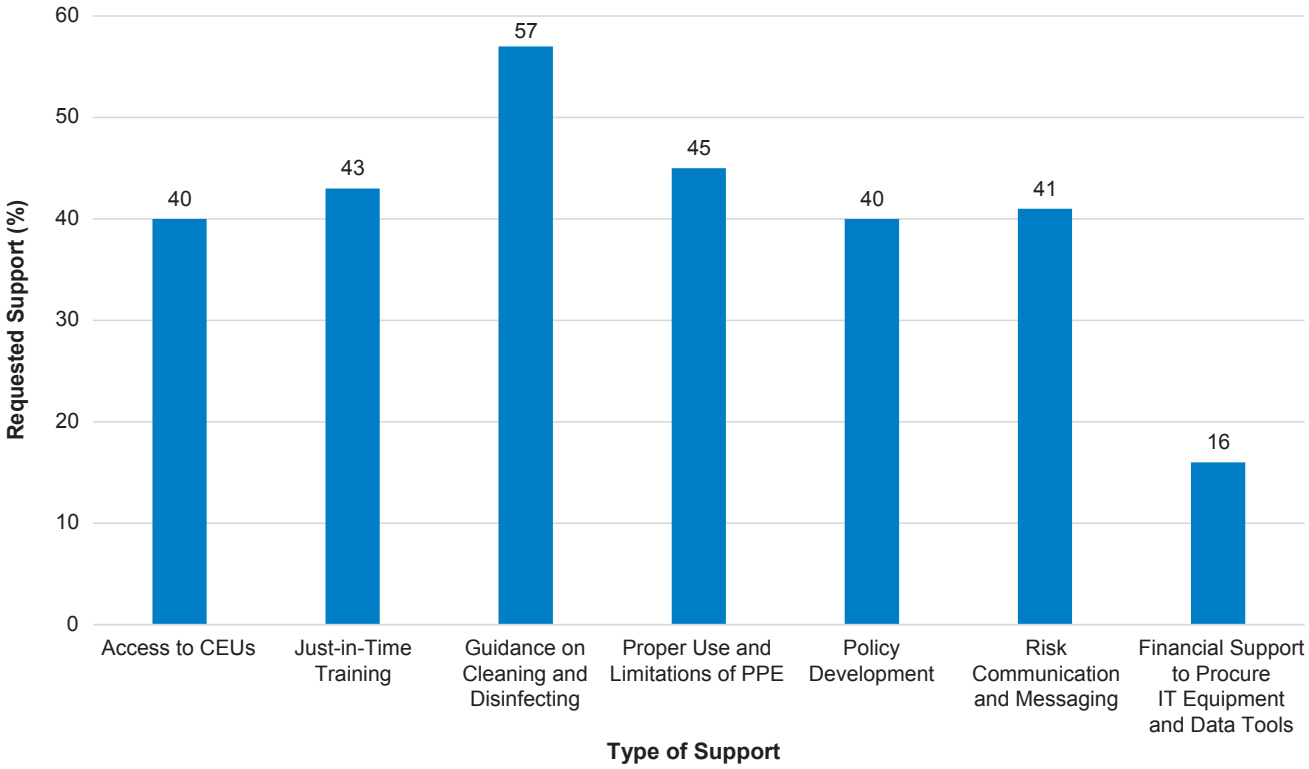
TABLE **1**

Environmental Health Workforce Breakdown of Rapid Needs Assessment Respondents (*N* = 1,175)

Workforce Category	%
Local environmental health program	57
State environmental health program	13
Federal environmental health program	7
Tribal environmental health program	2
U.S territory environmental health program	1
Other local, state, and federal department	1
Other	19

FIGURE **1**

Needs Identified by the Environmental Health Workforce That Can Be Supported by the National Environmental Health Association



CEUs = continuing education units; IT = information technology; PPE = personal protective equipment.

60% stated they were actively involved, followed by 47% of federal environmental health program respondents and 44% of tribal environmental health program respondents. The lowest reported involvement was from the other category (34%).

Respondents were asked to specify their access to COVID-19 situation reports and updates, as well as to technical COVID-19 response information and guidance. Tribal environmental health programs had the highest percentage of respondents (33%) reporting inadequate access to COVID-19 situation reports and updates. All other workforce categories, with the exception of other local, state, and federal departments (8%), had an 18–21% range of respondents reporting inadequate access to situation reports and updates. In terms of access to technical COVID-19 response information and guidance, tribal programs indicated the largest disparity with 39% not having adequate access, followed by local and state programs (31%), other (30%), and federal and U.S. territorial programs (27%). Over 77% of all program respondents reported that they use the Centers for Disease Control and Prevention website as their primary source of information.

Looking specifically at the COVID-19 response for retail food safety, respondents had the opportunity to indicate the support their programs might need. In total, 50% of respondents reported a need for assistance in developing and providing guidance materials for the food industry on preparing safe food during the pandemic. Other needs indicated were communicating food safety requirements (41%), guidance for cottage food operations (21%), and fielding inquiries from the food industry (20%).

Finally, the survey explored how NEHA can support environmental health programs during this pandemic (Figure 1). The highest reported need was guidance on cleaning and disinfecting (57%). Other types of support included proper use and limitations of personal protective equipment (45%), just-in-time training (43%), risk communication and messaging (41%), and access to continuing education units and policy development (40%).

Thank you to all that responded to the rapid needs assessment. We appreciate the time spend completing the survey and providing us with your input. Your insight will guide us in determining how best to meet your needs. This report also provides evidence and support that the environmental health profession is crucial to the health of our communities and countries at all times. A full report of the assessment can be found at www.neha.org/covid-19.

NEHA 2020 General Election Results

By Angelica Ledezma (aledezma@neha.org)

Elections are a critical part of the democratic process and are one way to provide members a voice in the running of their organization. NEHA voting members have an opportunity to vote for candidates of contested board of director and regional vice-president positions, as well as cast votes regarding proposed Articles of Incorporation and Bylaws changes. National officers of NEHA's board of directors serve a 1-year term in each officer position (second vice-president, first vice-president, president-elect, president, and immediate past-president) for a total of 5 years. Regional vice-presidents (RVPs) serve 3-year terms.

Eligible voters were encouraged to vote during the month of March and the deadline to vote was March 31, 2020. The following are results from the 2020 general election.

Second Vice-President

There were two qualified candidates for the second vice-president position: Thomas J. Butts, MSc, REHS, and Timothy Murphy, PhD, REHS, DAAS. All eligible NEHA members were asked to vote for the position of second vice-president and Butts received the majority of votes. Both candidate profiles were published in the March 2020 *Journal of Environmental Health* and on NEHA's website. Butts will assume the second vice-president position in July 2020.

Regional Vice-Presidents

NEHA's membership is broken down into nine regions that represent U.S. geographic areas, as well as members in the U.S. military and abroad. The terms of three RVP positions expire in 2020—Region 1: Matthew Reighter; Region 5: Tom Vyles; and Region 7: Tim Hatch.

Regions 5 and 7 had only one eligible candidate and did not appear on the election ballot. Each of these candidates will automatically assume their RVP roles in July 2020. Region 1 had no candidate applications received by the initial deadline of December 1, 2019. Per NEHA bylaws, the board of directors made an appointment to fill the vacancy after putting out an additional call for nominations in Region 1. Following the call for nominations, two qualified candidates—Frank Brown, MBA, REHS/RS, and David E. Riggs, MS, REHS/RS—were considered by the board of directors.

The unopposed and elected individuals will assume their positions in July 2020 and their terms will expire in 2023. All candidate profiles were published in the March *JEH*. The new and returning RVPs are as follows:

- Region 1: Frank Brown, MBA, REHS/RS (Region 1 includes Alaska, Idaho, Oregon, and Washington);
- Region 5: Traci (Slowinski) Michelson, MS, REHS, CP-FS (Region 5 includes Arkansas, Kansas, Louisiana, Missouri, New Mexico, Oklahoma, and Texas); and
- Region 7: Tim Hatch, MPA, REHS (Region 7 includes Alabama, Florida, Georgia, Mississippi, North Carolina, South Carolina, and Tennessee).

A listing of current NEHA national officers and RVPs, along with state breakdowns for each region, can be found on page 36. More information about NEHA's governance, including its Articles of Incorporation and Bylaws, the election process, and associated deadlines, can be found at www.neha.org/about-neha/governance.

Thank you to all members who participated in this year's election!

NEHA NEWS

NEHA Staff Profile

As part of tradition, NEHA features new staff members in the *Journal* around the time of their 1-year anniversary. These profiles give you an opportunity to get to know the NEHA staff better and to learn more about the great programs and activities going on in your association. This month we are pleased to introduce you to one NEHA staff member. Contact information for all NEHA staff can be found on page 36.

Brian Hess

I joined NEHA in May 2019 as the program and operations manager in the Program and Partnership Development Department in the Denver office. Before joining NEHA, I was the director of member programs at the Association of Academic Health Centers in Washington, DC, where I managed the domestic programs for an association representing over 140 academic health centers in the U.S. and abroad. In this position I worked with academic health center leaders and staff to create conference programs, webinar content, and a new social media program, as well as managed grant funded projects, internal teams, and executive leadership groups.

I have over 12 years of nonprofit management experience in scientific and health-related associations, having worked in a variety of roles including education, program management, committee management, member services, and communication. In addition to my work experience, I earned my master's degree in anthropology from the University of Colorado Denver with concentrations in medical anthropology and political ecology. My academic interests lie in the intersection of human society, health, and the environment, and the significant impact that social determinants of health— the air we breathe, the water we drink, the communities we live in, etc.—have on people's lives.

At NEHA, I help to manage and improve internal processes including budgets and grant reporting, as well as liaising and communicating with other departments across the association. I also work on water safety, informatics, and vector programs, and interacting with our members, funders, and external partners on a variety of programmatic issues. My goal at NEHA is to draw on my education and experience to advance the environmental health profession and help the hardworking environmental health professionals who constantly strive to make our world safer and healthier.

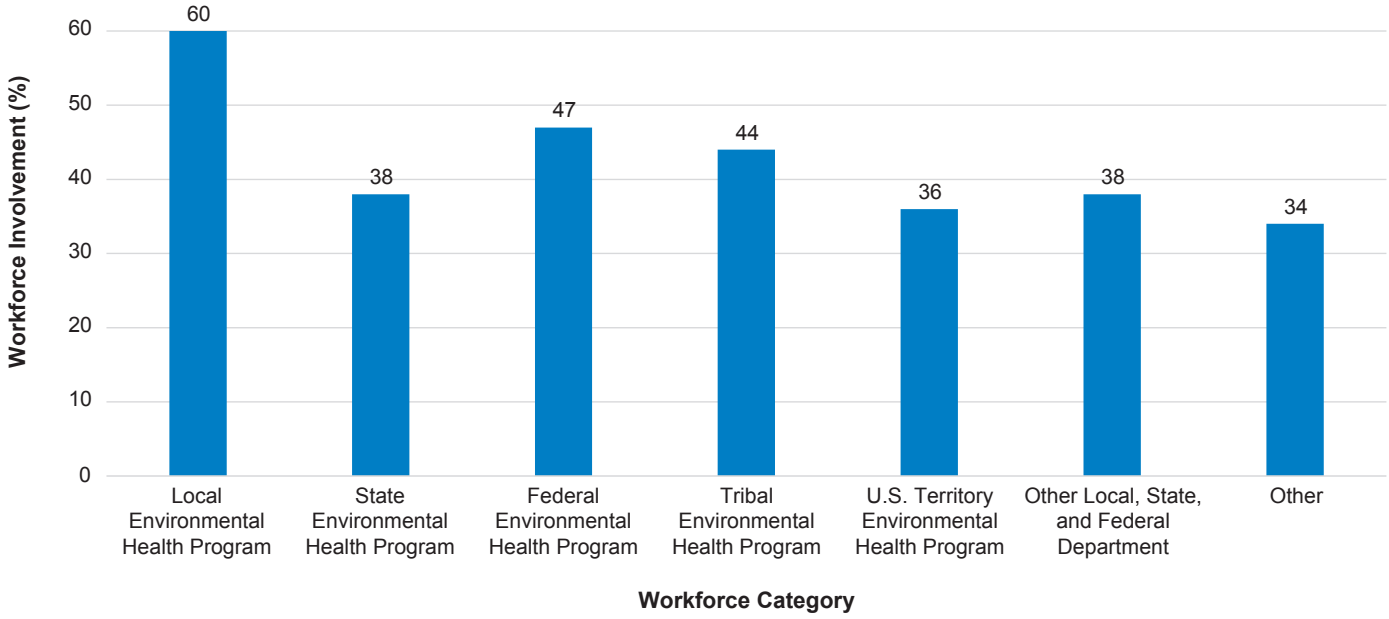
Did You Know?

NEHA has created a new blog series: Environmental Health Heroes in the Time of COVID-19. Through these blogs, the work of NEHA members responding to the COVID-19 pandemic from the frontlines will be highlighted. Read what NEHA members are doing on local, industry, and international levels to ensure the health and safety of the public and the environment during these challenging times at www.neha.org/membership-communities/get-involved/day-in-life.

DirecTalk
continued from page 46

FIGURE **1**

Environmental Health Workforce Involvement in the COVID-19 Response



We distributed the survey results to our colleagues within the Centers for Disease Control and Prevention, National Institute of Environmental Health Sciences, and Office of the Assistant Secretary for Preparedness and Response, among others. We communicated to influencers we felt needed to know. While this moment is not the time to professionally declare, "Hey, look at us," we believed it was important to lay an evidenced-based marker—the environmental health profession is foundational to the health of the nation during normal and abnormal times. As I craft this column, NEHA staff are engaged in a spirited exchange of capacity building ideas. How do we complement the existing barrage of COVID-19 webinars and e-mails that seem to be blanketing the ether?

What I do know is that local governmental and private sector environmental health professionals are essential to life as we know it. Last Friday I was pleased to join a national webinar hosted by Ruth Ann Norton, executive director of the Green & Healthy Homes Initiative. One speaker from Grand Rapids, Michigan, called out the critical role of local environmental health professionals, including our own past-president, Adam London. We learned from Hurricane Katrina, Ebola, and most other urgent health issues that as society we are "on our own." Local environmental health practitioners, local policy makers, local clinicians, local commercial enterprises, and local emergency responders will make the difference in how many of us fall victim to COVID-19. If we are honest with ourselves, this state of affairs has always been the case. Many of you whom I have had the privilege to meet and speak with will recognize my mantra: environmental health is profoundly local. What is more local than the disinfection of your house, school, day care, bus, subway, and other structures?

As I close, and in recognition that it could be a month or more before you read this column, please practice kindness. Please embrace the localness of your personal and professional life and recognize you are a role model. Please take care yourselves and your families. It took 100 years for the government of New Zealand to fully appreciate and restore the potential of Kapiti. Let us begin the journey of radically rethinking our profession and create a common vision of a restored environmental health enterprise.

Epilogue

Since I drafted the original column, our board of directors has directed me to cancel our Annual Educational Conference (AEC) & Exhibition in New York City, July 13–16. I acknowledge that many of us were looking forward to the experience of Junior's Cheesecake, Times Square, and reconnecting with our professional networks in the most important city in the world. Our staff is disappointed as planning, reviewing, and improving the conference is now a year-round endeavor. Our speakers, sponsors, exhibitors, award winners, scholarship recipients, and attendees, young and old, are undoubtedly disappointed, as am I. Our collective emotional investment in the annual meeting is not trivial.

Throughout the summer, instead of attending the AEC, the environmental health profession, like Atlas of Greek mythology, will be asked to hoist many burdens upon our shoulders. We will be requested to greenlight the reopening of schools and day care

centers. We will be prodded for guidance on the flushing and cleaning of building plumbing systems. We will be involved in assessments of restaurants and grocery stores. We will weigh into decisions about the safety of swimming pools and beaches. We will mediate society's return to normalcy. The stress promises to be intense and relentless. The issues will be emotional and compelling.

The time in history that puts us, environmental health professionals, at the intersection of COVID-19 is just ahead of us. I can visualize the bend in the road with the warning sign blinking. This time is the moment for which we were trained. Let's bring a contemporary interpretation to the art of practice. Let our face be one of kindness and empathy. Let our science drive our community's recovery and resiliency. Let this moment be where we safely shepherd the frightened public into the future. The road ahead promises to be arduous and the potholes to be abundant. All of us at NEHA commit to bring the full measure of our capabilities and resources to your support. Let's create a profoundly memorable moment, one that undeniably demonstrates the value of our profession to the health and prosperity of the communities we serve. I can envision no better way to honor the 2020 AEC.

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Did You Know?

NEHA has developed the NEHA Coronavirus Environmental Health Community Facebook page. The purpose of the page is to connect environmental and public health professionals and enable them to share and discuss their experiences, best practices, and success stories during the COVID-19 pandemic. We invite you to help build an interactive and informative community by liking the page and posting in the community. Please share and encourage others to participate. Check it out at www.facebook.com/NEHACoronavirusEHCommunity.

DirecTalk MUSINGS FROM THE 10TH FLOOR

David Dyjack, DrPH, CIH

Kapiti in the Time of a Pandemic

Honda 4-stroke 250cc twin outboards roared to life as we skimmed over the unusually placid Tasman Sea in route to Paraparaumu Beach. Chortling tourists added to the salubrious vibe that washed over me after a day hiking though a New Zealand nature sanctuary, Kapiti Island. I had visited in early March to replenish my perspectives after being the master of ceremonies and opening speaker at the New Zealand Institute of Environmental Health's annual conference in Wellington. I was blessed with a close-up experience with an endangered parrot, the New Zealand kaka, and captured a fleeting glimpse of an elusive spoonbill during my brief visit to the refuge.

Kapiti was identified by naturalists in 1870 as a potential site for a bird sanctuary and achieved that status in 1897. Regretfully, much of the habitat on the island had by that time been deforested and was overrun by feral animals. Despite its status, many native species did not survive. Flash forward 100 years. Goats were eradicated in 1928, followed by cats, deer, sheep, cattle, pigs, and dogs. Possums were removed between 1980 and 1986. Rats were the last to go and they were eradicated using the aerial application of rodenticide in 1996, leaving the island completely free of introduced mammals that had threatened bird life. *Radical measures were required to achieve radical results.*

I had yearned to escape the relentless work pace of the last few years for a few days of exploration, but alas, it was not to be. The coronavirus disease 2019 (COVID-19) cut short my ambitions as I amended my New Zealand travel plans to return to Denver, via San Francisco, on March 15. Our association leadership team convened an early conference call on March 13, during which time we elected to implement a 100% telework policy that would go into effect on March 16. Staff and member communication plans were developed, as were policies and procedures, to ensure essential functions would carry-on unabated. We would care for our employees and members from our respective homes.

> *Our profession provides backbone support to the public health enterprise.*

As I hiked the steep inclines of northern Kapiti's Okupe Valley, I reflected on the state of our profession. The major public health events of the last 20 years were rooted in environmental health: H1N1, H5N1, SARS, MERS, Ebola. Lyme disease, the 2017 hurricane season, the 2018 fire season, and now, COVID-19. At the same time, most academic environmental health programs and environmental public health programs have not enjoyed revitalized interest and growth. As I scan the pandemic news and developments safely ensconced and locked down at home, I am somewhat distraught that there is scant reference to environmental health. Where are the experts on sanitizing and disinfection? How about our expertise in personal protective equipment? The health of jailed inmates? Can't anyone see the root cause of these diseases is poor environmental health practices? Same as it ever was.

One of the major recurring issues I recognize during major disease events is that our profession provides backbone support to the public health enterprise. I am also committed to the notion of teachable moments and in that spirit, hatched an idea to survey our members. Jesse Bliss, our Program and Partnership Development director, and I worked long into the nights of March 23 and 24 to craft a rapid needs assessment of the profession. Our guiding principle was to be able to use the survey results to reframe how our profession is perceived within the public health enterprise and to ascertain how best to meet your needs. The survey was distributed to our membership on the morning of March 25 and by the end of the day we had 1,175 responses. A report of the rapid needs assessment findings can be found at www.neha.org/covid-19 and a summary can be found on page 40.

Figure 1 presents one of our findings. **Environmental health professionals are profoundly involved in pandemic response and undoubtedly will be central figures in the recovery efforts.** You know what's next. How clean is clean? Can I safely open my Head Start operation? Is the clinic safe? I've had a sick family member, what procedures do I employ to disinfect? Can we and should we employ virtual inspections of retail food facilities?

continued on page 44

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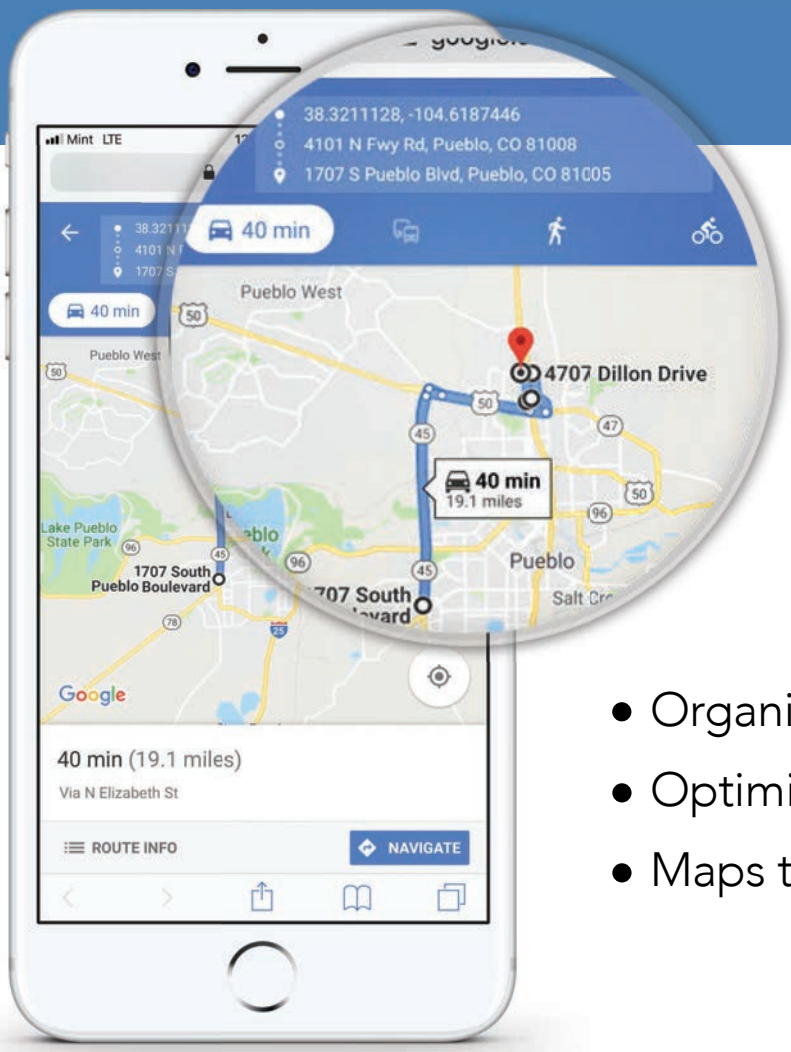

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