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ABOUT THE COVER



The popularity of farmers markets has grown over the past two decades and there is an increasing need to ensure that fresh produce and ready-to-eat foods sold at these markets are safe and free of microbial contamination.

The objective of this month's cover article, "Food Safety Resources for Managers and Vendors of Farmers Markets in Texas," was to survey farmers market managers and vendors to identify food safety educational needs and current food practices. Furthermore, observational studies were conducted at 10 farmers markets in Houston, Texas, to identify positive and high-risk practices. Educational materials were created based upon the study's survey and observational findings and were disseminated to farmers market managers and vendors.

See page 8.

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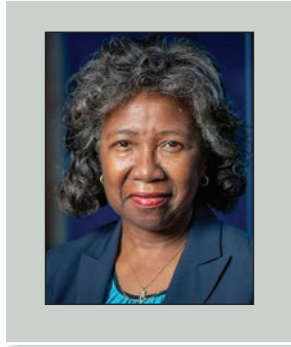
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► PRESIDENT'S MESSAGE



Priscilla Oliver, PhD

When Disastrous Weather Hits Close to Home

On March 3, 2019, we left Atlanta and headed to church in Opelika, Alabama. A 91st birthday celebration was planned for my mother afterwards as the 90s Club of Greater Peace Baptist Church traditionally holds an annual dinner for its members celebrating birthdays. Suddenly, text messages started to come in about a severe weather alert and our pastor suggested that we finish the celebration and get home. There was nothing unusual about the day until this point. Unfortunately, widespread and advanced warning for disastrous weather does not always happen.

While getting gas on the way home, I heard the weather siren and received a text about the tornado. I recall as we drove back to Atlanta on I-85 that the rain was heavy and traffic was moving slowly but steadily. When we reached I-285 in Atlanta, the sun was brightly shining. It was refreshing.

I then received a call from my cousin Deborah to report the devastation caused by a tornado that had occurred just blocks away from her home. She could not get home due to debris, downed power lines and trees, and road closures. She reported that bodies of neighbors were all over the area. She was devastated, saying she had to park her car and walk to get home. Her folks at home were safe, having taken refuge in the bathtub during the tornado. The 23 people, including 4 children, that were killed that day were basically sucked up and out of their homes. A mother told me that her two boys had laid on the floor and were taken by the wind to about a mile away and then dropped to the ground. They were fortunate to survive the event; however, they were visiting relatives from the

Let us work individually and together to overcome these unpredictable disasters.

area who lost their lives. The tornado hit and it was deadly.

The National Weather Service reported that the EF4 tornado hit south Beauregard, Alabama. My hometown is located within 30 miles of Beauregard. My father was from this area. The tornado was 1 mile wide and 24 miles long. The winds reached up to 170 mph, destroying trees, animals, homes, cars, churches, buildings, and people. It was reported that 41 tornadoes hit in Alabama, Florida, Georgia, and South Carolina within 6 hours. Many people who survived these tornadoes were left homeless. The environmental health cleanup and restoration in these areas are ongoing.

Almost every day there are dangerous weather events occurring around the world. Some have attributed these events to climate change and the rising temperature of our planet. We must plan and live with these weather changes and the individual and collective consequences. Being environmental health professionals, we are on the frontline

to responding to the aftermath of weather events. The destruction of property and injured people carries a high financial burden that we all share in the long run.

Returning to Atlanta, I asked what I could do. We were glued to media and communication outlets, calling people and churches to learn what was happening. The following week we visited Deborah and her family to check-in on them. We had to be escorted by a resident within the stricken area. While there I was able to observe inspections being conducted by the Federal Emergency Management Agency, American Red Cross, and Salvation Army. Representatives from all over the country were present, some as far away as Seattle, Washington. Churches and nonprofit groups were giving out supplies in various locations within the affected area.

I decided to call Tim Hatch, MPA, REHS, the National Environmental Health Association's Region 7 vice-president and an environmental health professional and leader in Alabama. Hatch attended my rival college—he went to Auburn University and I went to the University of Alabama, which are traditional football rivals. While the rivalry is a bit of fun between us, it dissipates when we have to deal with the work at hand. Regardless of our differences, we work together because of our passion for the environment and the people in our communities.

Hatch, who is from Montgomery, Alabama, told me that he was at the tornado scene within hours of the event. He shared with me his experience and perspectives:

“As an environmental health specialist and emergency manager, I have seen firsthand

the devastation and need for environmental health field staff. In a career of public service, it is the environmental health specialist who becomes the face of public health, which is often an asset when responding to disasters and assisting the public. Environmental health specialists are capable of functioning in a disaster area but specialized training and experience are a must.

In the aftermath of the tornado that hit Beauregard, Alabama, on March 3, 2019, numerous environmental health concerns were apparent. Sheltering, food safety, water quality, and debris management were among the more obvious. State and county staff worked with emergency managers and federal responders to gather data and make plans to mitigate any health effects the environmental conditions might cause. Staff were in the field for days assisting in this monumental task.

In 2011 a string of tornadoes tore through Alabama and the city of Tuscaloosa was hit. Some areas near the University of Alabama

were impacted and a few students lost their lives. Putting rivalry and team loyalty aside, members of the Auburn University family banded together as Toomers for Tuscaloosa to render aid to our neighbors in west Alabama. Environmental health professionals in Alabama were traveling across the state to help in well water evaluations, restaurant inspections, and shelter operations. The same rang true with the March 2019 storms—Tide for Tigers was formed and the normal banter was set aside to offer assistance to those in need.

Being an environmental health specialist lends itself to myriad roles and responsibilities. It takes a special person to not only perform at their highest professional level on 'blue sky days' but also go above and beyond to help their communities in times of great need. God bless the environmental health practitioner!"

We all pull together in environmental health during severe weather events and other disasters. Each area of environmental health has an important role. With the

enhancements made to the Pandemic and All-Hazards Preparedness and Advancing Innovation Act of 2019 legislation that was signed into law in June 2019, environmental health professionals are now able to take on a greater role in emergency preparedness and response.

Personally, we need to digitalize our home, office, and school records; catalogue what we have; prepare emergency plans; and educate and train people to prepare for disastrous weather and other emergency events. We also need to train our pets and prepare for their safety. It is important that we take extra efforts to restore our communities and help each other in times of emergency. Disastrous weather hit close to home for me in March and there is no telling when it might occur in your community. Let us work individually and together to overcome these unpredictable disasters. 🐾

Priscilla President@neha.org

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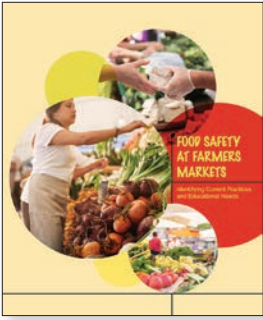
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Food Safety Resources for Managers and Vendors of Farmers Markets in Texas

Editor's Note: Supplemental files were submitted along with this peer-reviewed article and have been posted online due to space limitations. The Journal did not copy edit these files; the authors have provided them as extra resources should the reader want more information. The supplemental information can be accessed at www.neha.org/jeh/supplemental.

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Abstract Farmers markets have grown exponentially in the past two decades; however, there is an increasing need to ensure that fresh produce and other ready-to-eat food commodities sold directly to consumers are safe and free of microbial contamination. Therefore, it is crucial to equip managers and vendors at farmers markets with food safety materials that are engaging and educational. The objective of this study was to survey market managers and vendors to identify food safety educational needs and current food safety practices. Observational studies were conducted at 10 farmers markets (300 vendors) in Houston, Texas, to identify positive and high-risk practices. Based on the results obtained, educational materials in the form of videos and information sheets were developed and disseminated to managers and vendors at Texas farmers markets. Feedback on the educational materials obtained from stakeholders was positive and 88% of market managers and vendors stated that the food safety materials were effective as an educational tool.

Introduction

The number of farmers markets in the U.S. has rapidly grown over the past two decades. The U.S. Department of Agriculture (2013) listed 1,755 markets in 1994 compared with 8,144 in 2013. This statistic shows a 364% increase in the number of farmers markets in the past 20 years. Organically grown produce or produce grown with minimal pesticides and high-quality produce are the primary attractions for farmers market consumers (Wolf, Spittler, & Ahern, 2005; Yu, Gibson, Wright, Neal, & Sirsat, 2017).

In the U.S. alone, however, there were 20 fresh produce commodities associated with foodborne illness outbreaks from 1996–2010. These outbreaks resulted in 14,350 illnesses, 1,382 hospitalizations, and 34 deaths (Food and Drug Administration [FDA], 2019). Fresh produce continues to be the dominant food commodity implicated in multiple foodborne disease outbreaks in the U.S. Therefore, questions have been raised about the agricultural food safety practices related to the production and transport of these commodities for sale at farmers markets. A con-

tributing factor to this issue is many of these small farms that sell direct-to-consumer might be new to agricultural production and have varying field preparation, production, harvest, and postharvest handling practices (Sirsat, Gibson, & Neal, 2015).

The Food Safety Modernization Act (FSMA) Produce Safety Rule went into effect in 2016 and aimed to enhance the safety of fresh produce nationwide in a proactive manner. Small produce growers, however, are exempt from FSMA under the following conditions: 1) growers earn \leq \$25,000 in average produce sales per year during a 3-year period, 2) their average food sales are \leq \$500,000 per year during a 3-year period, and 3) they sell direct to consumers, restaurants, and stores within 275 miles of their farm (FDA, 2019). Even if a farm is FSMA exempt, the grower is still required to have on the produce label their name, address, and place where the produce was grown.

The FSMA exemption can be withdrawn, though, if the farm is associated with a food safety outbreak or issue (FDA, 2019). Hence, both farmers market managers and vendors (i.e., farmers and workers of prepared food) need to ensure that appropriate good handling practices and best management practices are followed to ensure that fresh produce commodities sold at the market are safe for human consumption.

Although there have been several foodborne disease outbreaks directly linked to farmers markets, the majority of foodborne disease outbreaks are never identified or

reported. For instance, 18 illnesses were reported in 2008 after customers consumed contaminated bagged peas sold at an Alaskan farmers market (Gardner et al., 2011). Fresh guacamole and salsa sold at a farmers market in Iowa were possibly contaminated with *Salmonella*, leading to several hospitalizations in 2010 (Quinlisk, 2010). A produce-related outbreak at an Oregon farmers market in 2011 was traced to strawberries contaminated with *E. coli* O157:H7 (Laidler et al., 2013).

Research has been conducted on the implications of microbial contamination in farmers markets. For instance, Park and coauthor (1992) conducted a study to compare thermotolerant *Campylobacter* in samples obtained from outdoor farmers markets and supermarkets. The results demonstrated the presence of *Campylobacter jejuni* on six vegetable types obtained from the outdoor farmers market; all samples obtained from the supermarket were negative for *Campylobacter*.

Sirsat and coauthor (2013) compared the microbial profiles of lettuce obtained from farmers markets with those obtained from grocery stores. The results showed that lettuce from the farmers market had a significantly higher (10^3 log CFU/g) *E. coli* load compared with the lettuce obtained from grocery stores. Wood and coauthors (2015) isolated antibiotic-resistant *E. coli* strains from produce samples obtained from farmers markets located in Vancouver, British Columbia. The researchers found that 97% of the *E. coli* strains isolated were resistant to either one or multiple antibiotics. Li and coauthors (2017) tested for foodborne pathogens *Salmonella* spp. and *Listeria* spp. on 212 produce samples from farmers markets. The results showed that *Salmonella* spp. was detected on 56.3% cantaloupe, 18.6% spinach, 18.5% peppers, and 10.9% tomatoes. Even though *Listeria* spp. was found on only 3.78% of the samples, 50% were confirmed as *Listeria monocytogenes*.

These results demonstrate an increasing need to equip farmers market managers and vendors with science-based educational tools. To this end, the objectives of this study were to 1) conduct farmers market vendor and manager surveys ($N = 59$) to identify manager and vendor perception of food safety, current food safety training, and materials available to them; 2) complete an observational study

at 10 farmers markets (300 vendors) across Houston, Texas, to identify positive and high-risk practices at farmers markets; and 3) develop and disseminate innovative educational materials (videos and workbooks) for market vendors and managers.

Methods

Survey Development

After receiving the appropriate approvals from the Human Subjects Committee of the Institutional Review Board at the University of Houston, we administered a 25-question survey regarding food safety practices at conferences about farmers markets across Texas (see supplemental files at www.neha.org/jeh/supplemental). We did not collect identifying information from any participants. We developed the survey as a tool to identify: 1) perceptions of farmers market managers and vendors of market food safety and 2) educational materials (specific to food safety) that were available to them.

We administered the survey over a 3-month period across Texas during several farmers market conferences. The questions were manager- and vendor-specific and related to the following two areas: 1) food safety training materials and 2) safe food handling at farmers markets. This survey was administered to evaluate the need for providing task-specific food safety educational materials and to see if stakeholders (i.e., managers and vendors at farmers markets) had received food safety training and had access to training and educational materials.

Observational Studies

Passive observational studies were conducted at 10 farmers markets (300 vendors) across the Houston, Texas, area and neighboring suburbs by 7 different investigators to identify positive and high-risk practices. We adapted the questions and observation criteria from a previously published survey designed to observe food safety practices at farmers markets (Vandeputte et al., 2015). An advisory board consisting of city and county health inspectors, members of the state department of agriculture, and managers of farmers markets provided feedback on the observational criteria and questions.

The observations were related to the following four areas: 1) availability of water

for hand washing or produce washing, 2) general food safety at the farmers market, 3) vendor behavior and hygiene, and 4) transportation methods. In order to ensure that there were no alterations of behavior among the subjects (i.e., Hawthorne effect), the investigators were away from the vendor sites, appearing to use their smartphones so that vendors did not know they were being observed (survey tool can be found at www.neha.org/jeh/supplemental).

Educational Material

We developed food safety educational materials in the form of information sheets (infosheets) and videos. We used screenshots of the videos for the infosheets. The primary goal of designing infosheets was to ensure that farmers market managers and vendors who do not have access to a computer were able to access the educational materials. The educational materials were disseminated to more than 100 market managers and vendors across Texas. We obtained feedback via a survey tool on the educational materials from the farmers market managers and vendors using questions related to video length, content, and ease of instruction.

The educational videos and infosheets were disseminated at farmers market conferences, small grower meetings, and through the state department of agriculture. The goal was to ensure that the materials were provided to as many farmers, market managers, and vendors as possible. After showing the training video during the meeting, we disseminated a brief survey to gain feedback and determine the effectiveness of the educational video.

Results

Market Manager and Vendor Survey

A total of 59 managers and vendors at farmers markets completed the survey (Table 1). Of these, 53% were male and 46% were female. The majority of respondents were over 50 years (68%), followed by 25–50 years (22%). In addition, 80% of the participants were market managers and 20% were vendors. Approximately 66% of market managers and vendors believed that food safety training was beneficial, followed by 22% who felt it was not beneficial. Multiple respondents, however, did not have any food safety training or education (48%). Additionally, 54%

reported that management required them to follow safe practices but 64% of the vendors reported that management did not provide any food safety educational materials.

Observations at Farmers Markets

Using the observational survey tool (see supplemental files at www.neha.org/jeh/supplemental), multiple high-risk observations were recorded at farmers markets as follows: pets were seen defecating near produce booths, vendors were reusing produce box containers, no signage was observed (e.g., to wash produce before eating), live farm animals such as goats and chicken were present, no electricity was provided for refrigeration (e.g., when vendors were selling frozen raw meats), and some markets did not have accessible restrooms (Table 2). Some examples of positive behaviors observed were: wash stations were available for hand washing, anti-bacterial gel was available, and cold ready-to-eat samples were provided with toothpicks and placed on ice.

Educational Material Design and Effectiveness

We used the results of our observations at farmers market to design educational materials in the form of infosheets and videos. Examples of the educational materials included communicating about the importance of having hand washing stations at farmers markets, the risk of reusing cardboard containers, having appropriate signage at vendor booths (e.g., to wash produce before consumption), and having designated eating areas prominent at farmers markets.

The videos incorporated a combination of humor and scientific food safety facts. A format of “good idea” and “bad idea” was used to demonstrate positive and high-risk practices, respectively. Screenshots of the videos were used to design the infosheets for managers and vendors who preferred a hard copy of the training materials (see supplemental files at www.neha.org/jeh/supplemental).

The effectiveness of the food safety educational video was determined by using a survey tool handed out after showing the video at grower and farmers market meetings. Of the survey respondents (*N* = 60), 98% found the video easy to understand and 88% found that the educational materials were effective and engaging (Table 3).

TABLE 1

Farmers Market Manager and Vendor Responses to Survey Questions (N = 59)

Question	Response (%)
Sex	
Male	52.5
Female	45.8
Age range (years)	
0–25	8.5
25–50	22.0
>50	68.0
Ethnicity	
Caucasian	76.3
Black	13.6
Hispanic	3.4
Are you a manager or vendor?	
Manager	79.7
Vendor	20.3
What is your perception of food safety training?	
Beneficial	66.0
Not beneficial	22.0
Does your market facility have access to sinks?	
Yes	50.8
No	44.1
Have you ever taken a food safety training course?	
Yes	49.2
No	47.5
Do managers require safe practices while handling food (e.g., use of disposable gloves, utensils when providing food samples, etc.)?	
Yes	53.6
No	43.0
Do managers provide food safety training/educational materials to vendors?	
Yes	30.0
No	63.8

Discussion

A study by Worsfold and coauthors (2004) conducted at a farmers market in the UK demonstrated that most vendors had received some type of food safety training and scored their own hygiene practices very highly. Less than 50% of the vendors, however, had a risk management plan and did

not consider the possibility that their produce could be contaminated.

An independent study recommended that training for farmers market personnel should be different from that offered to restaurant employees (Choi & Almanza, 2012). Training for managers and vendors needs to be focused specifically on the food items sold at

TABLE 2

Positive and High-Risk Behavioral Observations Related to Food Safety at 10 Farmers Markets (Approximately 300 Vendors) Across Houston, Texas

Positive Observation	High-Risk Observation
Food is stored at least 6 in. away from the ground	Produce boxes reused
Cold ready-to-eat samples provided with toothpicks and placed on ice	Pets allowed to defecate and urinate close to produce booths
Designated eating areas	No restrooms available
Antibacterial gel provided	Shopping bags reused
Booths have tent covering	Farm animals present at the farmers market
Vendor uses clean gloves and tongs as barriers	No electricity provided for refrigeration

TABLE 3

Farmers Market Manager and Vendor Key Survey Responses After Watching the Educational Videos (N = 60)

Question	Response (%)
Is the video easy to understand?	
Yes	98
No	1
Do you think the video is an effective educational tool?	
Yes	88
No	8
What was most effective about the video?	
Factual information	47
Music	45
Illustrations	8

the farmers market, as well as good hygiene, food handling, and behavior practices. This recommendation for specialized training is because common handling practices and behaviors for restaurants are not the same for farmers markets.

Previous research demonstrated that over 43% of growers and 25% of farmers market managers do not sanitize produce contact surfaces on farm and farmers market surfaces (Harrison et al., 2013). Berry and coauthors (2013) identified specific training needs of farmers market managers and

found that 64% wanted food safety resources and training materials. The results of our current study showed similar responses from farmers market managers and vendors, with a majority asking for food safety training materials specific to farmers markets. Overall, these results showed that there is an increasing need to address food safety practices at farmers markets using science-based food safety training and education for managers and vendors.

A study conducted by Behnke and coauthors (2012) at Indiana farmers markets

showed that only 9 out of 18 vendors had access to functional hand washing stations. Teng and coauthors (2004) reported similar findings while observing cheese vendor practices at farmers markets. The researchers observed 17 cheese vendors in 9 farmers markets in Ontario, Canada, and reported that approximately 47% of vendors had issues with refrigeration, 41% were not restraining their hair, 24% did not have hand washing sinks at their disposal, and 24% stored cheese adjacent to raw meat products.

An observational study conducted in Canada of a farmers market showed similar results to our current study: several customers brought their pets to the farmers markets, vendors were handling money and food at the same time, and some markets had no hand washing facilities (McIntyre, Herr, Kardan, Shyng, & Allen, 2014).

Conclusion

The overarching goal of our study was to use the observational data to 1) design task-specific educational materials for managers and vendors at farmers markets and 2) disseminate the educational materials to stakeholders in Texas. The observational data showed that even though several managers and vendors followed positive food safety practices, there were multiple instances of unsafe food handling practices. Our identification of specific food safety training needs for farmers markets in Texas led to the design of training materials specifically for managers and vendors at farmers markets. With the help of the Texas Department of Agriculture, as well as extension and nonprofit agencies, we will use the educational tools designed in this study for ongoing training and outreach. 🐾

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► SPECIAL REPORT

Recommendations for Catastrophic Wastewater System Failures in a Modern Metropolitan Area

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Abstract In the late 1980s it was discovered that the Pacific Northwest is sited in the Cascadia subduction zone, a fault capable of producing a magnitude 9.0 earthquake, which could result in significant destruction along the almost 700 miles of impact. One likely result of this earthquake would be a catastrophic impact to wastewater systems in the Portland metropolitan area, with anticipated loss of wastewater systems for 6 months–1 year. With approximately 2.3 million residents in the area, this loss poses a significant threat to the public's health in the aftermath of an earthquake of this magnitude.

A group of multidisciplinary professionals from the five counties in the area was convened to develop recommendations to assist the public to safely handle their sanitation needs in the absence of a functional wastewater system for an extended period of time. Participants represented the disciplines of public health, emergency management, public works, wastewater treatment, waste hauling, and the Oregon Department of Environmental Quality. The group developed recommendations for the handling of human waste by residents of the Portland metropolitan region following a catastrophic earthquake. In this special report, we review the process, assumptions, and final recommendations for use by the public in a long-term wastewater system failure.

Introduction

In the aftermath of a major disaster, environmental health professionals have a key role in protecting the public's health in the response to and recovery from the disaster. Planning for an emergency event is critical to the response effort: a proactive approach can help ensure an affected community's resilience. The planning process allows for a greater awareness of capabilities around

which a response mechanism can be developed and also supports effective public messaging campaigns.

The ability of a developed country to treat its water and wastewater is a foundational element of the modern public health system. When a major disaster disrupts the public infrastructure (e.g., electricity, water, transportation), preventing a major disease outbreak (e.g., cholera, hepatitis) is a pri-

mary concern for the public health system. Identifying and implementing ways to safely separate people from their waste (i.e., urine and feces) plays a major role in reducing and preventing the spread of diseases. Thoughtful discussion and whole community planning before the event is critical in providing clear and consistent messages to the public after the event. This special report briefly describes the process conducted in the Portland, Oregon, metropolitan area that resulted in the development and implementation of a joint coordinated message to provide to the region's residents.

Need

The September 2010 (magnitude 7.1) and February 2011 (magnitude 6.3) earthquakes that struck Christchurch, New Zealand, caused massive disruption to the sewage transport and treatment system of this modern city with a population, at the time, of 376,700 residents. Significant damage to the sewer system from liquefaction, broken pipes, damaged treatment ponds, and loss of power occurred, with some parts of the system remaining offline for well over 1 year (Zare, Wilkinson, & Potangaroa, 2011).

The bulk of readily available information on how communities can, and should, deal with postdisaster human waste has been focused either on the humanitarian response to these needs in developing countries, such as the information contained in *The Sphere Handbook, Humanitarian Charter and Minimum Standards in Humanitarian Response* (The Sphere Project, 2011), or on temporary solutions for localized emergencies such as those provided by the Federal

Emergency Management Agency and the Centers for Disease Control and Prevention on postflooding waste collection and disposal. No information could be found on how a major metropolitan area should respond in the face of a near-total collapse of all sewage infrastructures for an unforeseeable amount of time.

Background

Not until the 1980s did scientists begin to understand the potential danger posed by the Cascadia subduction zone (CSZ), a significant crustal fault running from Northern California to mid-Vancouver Island, British Columbia. A CSZ earthquake is capable of producing up to magnitude 9.0 earthquakes lasting for minutes rather than seconds. Earthquakes of this size and duration would result in significant destruction along the almost 700 miles of impact area. The Oregon Resilience Plan anticipates that one of the consequences of this subduction zone earthquake will be catastrophic impacts to wastewater systems in the Portland metropolitan area (Oregon Seismic Safety Policy Advisory Commission, 2013). The plan has anticipated a complete loss of wastewater systems for a period ranging from 6 months–1 year. With approximately 2.3 million residents in the area, failure to address this loss poses a significant threat to the public's health in the aftermath of the earthquake.

The Regional Disaster Preparedness Organization (RDPO), a partnership of government agencies, nongovernmental organizations, and private sector stakeholders in the Portland metropolitan area, is collaborating to increase the region's resiliency to disasters (The City of Portland, 2019). The metropolitan region spans Clackamas, Columbia, Multnomah, and Washington counties in Oregon and Clark County in Washington state. Under the auspices of RDPO, a disaster sanitation task force of multidisciplinary professionals from the area was convened. Their goal was to research and provide guidelines for the public on how to safely handle sanitation needs in the absence of a functional sewer collection and treatment system for an extended period of time.

Purpose and Assumptions

The mission of the group was to develop practical, safe, and hygienic recommenda-

tions for residents of the Portland metropolitan area in regard to handling human waste following a catastrophic earthquake. These recommendations are framed by the following assumptions:

- Sewage collection and treatment systems will be out of service for many months following a CSZ earthquake.
- Although outside assistance eventually will arrive in the area, there will be a period of time (estimated at 14–30 days) when the public will be on their own.
- Methods for handling human waste must be simple, cheap, effective, and protect the public's health by limiting exposure to the waste.
- No single sanitation method is right for every situation—there must be a variety of recommendations to handle a variety of needs (e.g., high to low density, urban versus rural, congregate living).
- Within 30 days of the event, local sewage and solid waste agencies, acting in concert with federal and state responders, will be positioned to provide more specific guidelines.

Process

The task force met monthly from January–September 2016. Initial meetings involved setting a scope and mission for the group, followed by brainstorming and researching various methods of waste collection and disposal. This phase ended with all identified methods being discussed in depth and either being adopted, adapted, or discarded as impractical for various reasons.

About halfway through the process, the proposed methods were reviewed and refined. At this point, it was recognized that refuse haulers and the Oregon Department of Environmental Quality were not represented in the task force. It was determined that these agencies were key stakeholders, as one of the recommendations would require refuse haulers and local solid waste agency involvement. At this point, both agencies were invited to all subsequent meetings and participated in the development of the final recommendations.

Having a diverse and complete group of stakeholders was recognized as a necessary part of an effective public messaging effort and the ability of individual agencies to subsequently prepare their own plans. The task

force, rather than presume to dictate a specific plan, believed the better approach was to involve and/or notify the agencies involved so that individual agencies could prepare their own recovery implementation plans.

Results and Recommendations

The final three recommendations that met the stated requirements were:

1. use of viable septic systems,
2. construction of pit toilets/trench latrines, and
3. use of the twin bucket system.

Public messaging after the earthquake should include designated collection locations or other instructions that support emergency plans developed by the various waste collection entities, which is why their involvement is vital to successful implementation of this effort.

Septic Systems

The use of functioning systems, when possible, is always the preferred approach. Typically found in areas not serviced by a sewer collection system, septic systems are susceptible to ground movement at many points. Local septic subject matter experts developed a flyer with recommendations for making septic systems more resilient, as well as providing information on determining if a septic system is functional after a CSZ earthquake. If a septic system is still functional, it could continue to be used postearthquake. The flyer recommended that a monitoring plan and inspection routine be developed by the septic system owner to ensure it remains operational until other services are restored.

Pit Toilets/Trench Latrines

Pit toilets/trench latrines are a common, albeit temporary, solution in areas where people are located but no developed (or functioning) sewer collection system exists. Careful development and management of these areas are necessary to meet the public health system's goals of disease prevention and personal safety. Participants of this task force developed information on where to locate pit toilets and how deep they should be. The information included elements that address local conditions (such as a high local water table), with special recommendations on personal safety (using the buddy

system) when congregate toilets are necessary. The sites of these pits should be noted after filling, for treatment at a later date.

Twin Bucket System

After careful evaluation, the no-mix twin bucket system also met the most important elements of the task force’s requirements: hyperlocal, effective, and cheap, with the added benefit of being easy to implement. The twin bucket system was developed in Christchurch, New Zealand, after their devastating 2011 earthquake. Championed by a local volunteer agency, Public Hygiene Lets Us Stay Human (PHLUSH), the system is based on the principle that urine and feces are more safely and easily dealt with if separated by using separate buckets (PHLUSH, 2011). Collected urine can be diluted and, in most cases, safely disposed of on an outdoor permeable surface. Feces, separated from the urine, would be sprinkled with organic matter such as toilet paper, sawdust, leaves, or grass clippings, and then double bagged and stored in a location away from children and animals, to be collected at a later time.

Next Steps

The culmination of the task force’s work was presented to the RDPO Disaster Public Messaging group with the charge of developing a public education marketing campaign and materials for public distribution. The messaging includes both pre-earthquake preparedness and immediate postearthquake instructions and information for all three recommendations (use of viable septic systems, construction of pit toilets/trench latrines, use of the twin bucket system). With these materials in hand, waste collecting entities will be better able to develop coordinated disaster debris management and recovery plans for the Portland metropolitan area. The public messaging phase was completed in December 2017 and can be found at www.emergencytoilet.org. 🐾

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- Clark County in Washington state;
- Regional Disaster Preparedness Organization;
- City of Portland;
- Metro (a metropolitan planning organization for the Portland region);
- Oregon Water/Wastewater Agency Response Network;
- Oregon Refuse and Recycling Agency;
- Oregon Department of Environmental Quality;
- Public health, including those from emergency preparedness, environmental health, and a public health officer; and
- County emergency management, sewage agencies, septic and wastewater protection, and public works agencies.

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Did You Know?

NEHA’s board of directors approved a new policy statement at the 2019 Annual Educational Conference & Exhibition this July in Nashville, Tennessee. Through the policy statement, NEHA recommends the adoption and implementation of the current Food and Drug Administration’s *Food Code* by all federal, state, local, tribal, and territorial governmental agencies to promote the most current knowledge on food safety and to reduce the incidence of foodborne illnesses. You can view this statement and others at www.neha.org/publications/position-papers.

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▶ SPECIAL REPORT / INTERNATIONAL PERSPECTIVES

A Qualitative Analysis to Identify the Food Safety Training Needs of Government Sanitation Inspectors in the Philippines

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Abstract A cross-sectional survey was conducted in 2016 to identify the food safety training needs of government sanitation inspectors in the Philippines who carry out the role of food inspectors as a part of their job. The paper survey was answered by 235 sanitation inspectors of different cities selected randomly. Answers showed 67.2% did not attend any formal training on methods of inspection for food safety and 78.7% did not attend any formal training on hazard analysis critical control point (HACCP). Further, 80.4% did not receive any formal training on the Food Safety Act of 2013. Among these participants, 81.1% believed that their current performance could be improved by attending relevant training and 89.8% showed strong need to be trained on HACCP. It was concluded that a training program for sanitation inspectors, including an exam and refresher, needs to be enforced and that resources should be allocated for such a program to include at least the basics of food safety, HACCP, the Food Safety Act of 2013, and methods of risk-based food safety inspection for different food establishments.

Introduction

An effective food control system is dependent on adequately trained inspectors of ensured competence to undertake their regulatory function (Collado, Corke, & Dizon, 2015). As human resources in some food control agencies in developing countries can be limited, environmental health inspectors are often asked to work also as food inspectors. This situation is not ideal, as they might lack the skills and knowledge to effectively evaluate and inspect food operations (Food and Agriculture Organization, 2003). This

case was found to be true in the Philippines, where in a local government setting, the sanitation inspectors carry out food safety inspection of different food establishments (public markets, small processing plants, restaurants, etc.) under the autonomous control of local government units.

Although the new role of a food safety officer was defined under the newly released Implementing Rules and Regulations (IRR) of the Philippines Food Safety Act of 2013 (Article 2, Section 4), this role is not yet in effect and local government unit sanitation

inspectors are currently the ones in charge of food safety enforcement, especially in catering, retail, and small/micro processing food establishments (Republic of the Philippines Department of Agriculture, Department of Health, 2015).

Food sanitation is among the nine areas of sanitation inspector roles and responsibilities. Food sanitation inspectors are responsible for the provision of safe and wholesome food to consumers through proper enforcement of sanitation rules and regulations and training of food operators and food handlers (Republic of the Philippines Department of Health, 2006).

Additionally, the World Health Organization (WHO) and Food and Agriculture Organization of the United Nations (FAO) clearly state that food inspectors must have appropriate training, a certificate/diploma, and updated certificates (Food and Agriculture Organization, 2003, 2008).

There has been a rising number of foodborne illness cases recently in the Philippines. In 2015 alone (from January to August), there were 4,379 cases of foodborne illness identified, 11 deaths reported, and 1,328 people hospitalized. More than 40% of the cases occurred at schools, hotels, and other food establishments (Republic of the Philippines Department of Health Epidemiology Bureau, 2015).

There are some training programs provided to inspectors currently by the government but the programs are not consistent and most have no examination or certification process to be used as an indicator of improvement.

At the time of our questionnaire, 52.0% of inspectors had attended some food safety training and only 25.5% had taken an exam.

The U.S. had a similar case in the recent past, just before 2013, where a certification process did not exist to indicate that the food regulators had achieved competency in performing the responsibilities of their jobs (Kaml et al., 2013). In a regional context, in Taiwan and under the Food Safety Control System, government inspectors in charge of food sanitation must have at least 16 hr of training in the principles and application of hazard analysis critical control point (HACCP) (Jeng & Fang, 2003).

In 2011, the State Council's Food Safety Committee in China established a food safety promotion education works program (2011–2015) that required enhanced training of food safety inspectors, food producers, and traders (Jia & Jukes, 2013). In a study done on food safety in Southeast Asia, it was stipulated that competent food inspectors need ongoing training and those who are adequately trained and equipped for food inspection are vital in ensuring consistent, transparent, and effective food inspection (Othman, 2007).

Currently in the Philippines there is a need to develop standardized risk-based food inspection training, with assessment and certification processes, tailored specifically to the needs of sanitation inspectors. The Department of Health granted us a memo facilitating our access to different city health offices around the Philippines to carry out this study. Our main objective of conducting a training needs analysis was to identify the food safety training needs of sanitation inspectors in the Philippines. This study will help us 1) identify any gaps in inspector food safety competencies in order to develop a tailored training program with effective learning outcomes and 2) justify allocating resources to what should be included in such a training program.

Methods

This descriptive cross-sectional study took place between July and September 2016 using a questionnaire that was developed to help identify the training needs of sanitation inspectors specifically in food safety inspection. In the first section, participants were asked for demographic characteristics, current roles and responsibilities, relevant

training and examinations already received (if any), and which organization provided it. Next, the participants were asked to express their need to be trained on different topics including food safety basics, HACCP, national food safety laws and regulations, and methods of food safety inspection. The questions were answered on a three-level scale from “not needed” to “not sure if needed” and “strongly needed.”

Instrument Validity and Reliability

The questionnaire was tested for face validity, construct validity, and reliability; the results showed very good validity and reliability of the instrument. The instrument has almost perfect internal consistency reliability with Cronbach's α of .961. The internal consistency reliability was not improved if any of the items were deleted, reflecting the stability of the responses to all of the items (no need to remove or revise any item). The split half reliability of the 29 items used to measure the construct of training needed was almost complete, as measured by the Spearman–Brown coefficient = .926 and the Guttman Split-Half coefficient = .922.

Sampling and Data Collection

To collect data, the Department of Health in the Philippines issued a memo to all its regional offices to facilitate our access to the sanitation inspectors. A random sample of the country's city health offices was generated together with a few cities directly recommended by the Department of Health based on risk level in those cities as perceived by the government. All the available sanitation inspectors of the selected city health offices completed the questionnaire, totaling 235 sanitation inspectors across 10 regions and 28 municipalities. A copy of the Department of Health memo and official samples of communication with the city health offices are available in the form of e-mails and scanned letters with received copies. Clear verbal instructions were given to the participants and the paper questionnaire was answered during working hours and collected for analysis.

Results

In all, 235 sanitation inspectors (131 female, 104 male) answered the questionnaire. Their field experience ranged from 1 month–37 years, with a mean of 13.2 years of field experience.

Almost all (98.2%) of them graduated college, out of which only two inspectors graduated from majors directly related to food and nutrition. As a part of their roles and responsibilities, sanitation inspectors perform food inspection in a variety of food establishments such as school canteens, catering providers, restaurants, food manufacturing establishments, slaughterhouses, and hospital kitchens.

Responses showed that 55.7% attended training related to the food safety part of their work and 25.5% took an exam of some kind. Most of the training was provided by the Department of Health, with 67.2% of the participants not receiving any formal training on methods of food safety inspection and 78.7% not receiving any formal training on HACCP (Table 1). Moreover 80.4% did not receive any formal training on the IRR of the Food Safety Act of 2013 and 52.8% did not receive any formal training on the Sanitation Code of the Philippines.

Among these participants, 80.4% believed that they did not know all the tools and/or equipment needed to conduct a successful food safety inspection and 81.1% believed that their current performance as food inspectors could be improved by attending relevant training (Table 1). For questions about food safety basics training needs, 89.9%, 89.4%, and 79.6% showed a strong need to be trained on types of food hazards, time and temperature control for food, and personal hygiene requirements, respectively (Table 2).

Regarding laws and regulations, 91.9% showed a strong need to be trained on the Food Safety Act of 2013, 73.6% showed a strong need to be trained on the Sanitation Code of the Philippines, and 88.1% showed a strong need to be trained on how to write food safety inspection reports and recommendations (Table 3). When asked about HACCP training needs, 89.8% and 89.4% showed a strong need to be trained on HACCP at a basic level and an advanced level, respectively (Table 4).

Finally, when participants were asked about methods of inspection, 86.4%, 88.9%, and 85.1% showed a strong need to be trained on food safety methods of inspection for kitchens, food manufacturing establishments, and slaughterhouses, respectively. A strong need was expressed by 88.9% of the

participants to have a detailed food safety inspection checklist for use during field inspections and 82.6% showed a strong need to be trained on how to observe and/or interview food handlers during a food safety inspection (Table 5). Under the open comments section, 50.0% of the participants wrote in the need for a comprehensive food safety training that should be mandatory to all sanitation inspectors.

Discussion

The Philippines Food Safety Act of 2013 and its IRR of 2015, Section 29, Inspection of Food Business Operators states that, “Regular inspection of food business operators shall be performed by the Food Safety Regulatory Agencies or the control bodies delegated to conduct the activity. In addition, the following rules shall be followed in the conduct of inspections: (a) Inspection shall take into account compliance with mandatory food safety standards, the implementation of HACCP, good manufacturing practices and other requirements of regulations.” And, in Section 31(c), “Government personnel shall be trained on the scientific basis for the provisions of the law and on the conduct of official control” (Republic of the Philippines Department of Agriculture, Department of Health, 2015).

A study by Collado and coauthors (2015) addressing the problems and solutions of food safety in the Philippines was published almost at the same time the IRR of the Food Safety Act of 2013 was released, which recommended that government personnel should be trained on the regulatory requirements for food safety. The results of our survey clearly indicate a strong need on different areas of food safety, hygiene, and risk-based inspection. Considering that sanitation inspectors are technically the ones in charge of front-line public health across the Philippines, this need should be addressed by the government with urgency.

In other parts of the world, for example in the U.S., government personnel who perform HACCP review of firms must complete a relevant training and pass an exam that is mandatory for regulators (Kvenberg, Stolfa, Stringfellow, & Garrett, 2000). Moreover, the Food and Drug Administration’s *Food Code* states that, “Inspectors need the proper training before they can be expected to conduct

TABLE 1
General Food Safety Training Questions

Question	Yes # (%)	No # (%)	N/A # (%)
Have you received any formal training on methods of food safety inspection?	71 (30.2)	158 (67.2)	6 (2.5)
Have you received any formal training on HACCP?	42 (17.9)	185 (78.7)	8 (3.4)
Have you received training on how to write a food safety inspection report and recommendations?	70 (29.8)	159 (67.7)	6 (2.5)
Have you received any formal training on the Sanitation Code of the Philippines?	101 (43.0)	124 (52.8)	10 (4.3)
Have you received any formal training on the Implementing Rules and Regulations of the Food Safety Act of 2013?	38 (16.2)	189 (80.4)	8 (3.4)
Do you think you know all the tools and/or equipment needed to conduct a successful food safety inspection?	37 (15.7)	189 (80.4)	9 (3.8)
Do you think your current performance as a food inspector can be improved by attending relevant training?	193 (81.1)	34 (14.5)	8 (3.4)

HACCP = hazard analysis critical control point; N/A = not applicable to their current status as they perceive it.

TABLE 2
Training Needs for Food Safety Basics

Question	Not Needed (%)	Not Sure If Needed (%)	Strongly Needed (%)
Do you need to be trained on the types of food hazards?	1.3	2.6	89.8
Do you need to be trained on time and temperature control for food?	1.3	7.7	89.4
Do you need to be trained on personal hygiene requirements?	8.5	10.2	79.6
Do you need to be trained on food establishment design requirements?	3.0	7.7	87.7
Do you need to be trained on how to stay safe while conducting inspections?	3.0	6.8	89.4
Do you need to be trained on welfare requirements at food establishments?	3.4	8.9	85.5
Do you need to be trained on the food safety requirements of the flow of food step-by-step?	1.7	6.8	89.4

risk-based inspections. Training includes a combination of classroom training, in-field training, standardization, and continuing education” (U.S. Department of Health and Human Services, 2013).

According to a study carried out in North Africa, it was stressed that food inspectors need technical training on HACCP and other areas of food safety. Furthermore, the

training should conclude with an exam providing evidence of satisfactory completion (Ababouch, 2000).

At some point, we thought the inspectors might have not understood the questions properly due to the consistency of reporting a strong need for all the elements of training. Upon taking a closer look, however, we found that the pattern did change in two or

TABLE 3

Training Needs for Food Safety Laws and Regulations

Question	Not Needed (%)	Not Sure If Needed (%)	Strongly Needed (%)
Do you need to be trained on the Sanitation Code of the Philippines?	18.9	15.7	73.6
Do you need to be trained on the Food Safety Act of 2013?	0.4	6.4	91.9
Do you need to be trained on how to write down food safety violations?	2.6	8.9	86.4
Do you need to be trained on how to write food safety inspection reports and recommendations?	2.1	7.7	88.1

TABLE 4

Training Needs for Hazard Analysis Critical Control Point (HACCP)

Question	Not Needed (%)	Not Sure If Needed (%)	Strongly Needed (%)
Do you need to be trained on HACCP only to a simple awareness level?	2.6	6.4	89.8
Do you need to be trained on HACCP only to an advanced level?	0.9	8.9	89.4
Do you need to be trained on conducting a hazard analysis?	1.3	6.8	91.1
Do you need to be trained on determining critical control points?	1.7	6.4	91.1
Do you need to be trained on establishing critical limits?	1.7	6.8	90.2
Do you need to be trained on establishing monitoring procedures?	1.7	5.1	91.9
Do you need to be trained on developing corrective actions?	3.0	7.2	88.5
Do you need to be trained on conducting verification?	2.6	8.9	87.7
Do you need to be trained on keeping documented information?	2.6	7.7	88.5

more instances when the inspectors were asked if they think that their current performance can be improved by attending relevant training: 81.1% answered yes and not no like the other questions in the same section of the questionnaire (Table 1).

Another result that was surprising to us was when participants were asked if they needed to be trained on the Sanitation Code of the Philippines, which was issued a few decades ago. Many inspectors are familiar with the code but only 43.0% answered that

they had received training on the code (Table 1) and 73.6% reported a strong need to be trained on it, unlike the 88.1% and higher average of the rest of their answers (Table 3). The previous examples gave us an indication that the inspectors were quite aware of the answers they were giving.

On the other hand, a study done in Canada to explore the perceptions of public health inspectors responsible for food safety showed that, unlike in the Philippines, inspectors were quite confident about their knowl-

edge of food safety issues and food pathogens. Specifically, they felt it to be the area they were most comfortable with in public health, unlike the situation in the Philippines reflected by the results of our study (Pham, Jones, Sargeant, Marshall, & Dewey, 2010). It is likely that the results of this study can be generalizable to the population of sanitation/food inspectors of the Philippines. Further investigation, however, is recommended to conclude generalizability to food inspectors in other developing countries.

The fact that 55.7% who had attended previous training related to food safety as part of their work showed almost the same level of need for training on different food safety-related topics as those who did not attend previous training shows that the previous training received was either inadequate, forgotten, a refresher training was needed, or that the inspectors were being too modest answering the questions and didn't like to say they did not need training. We would argue against the latter reasoning because 18.9% of the inspectors showed no need to be trained on the Sanitation Code of the Philippines and 15.7% said they were not sure if training was needed. Add this information to the fact that 43.0% of the inspectors received previous training on that specific code, this suggests to us that the training on the regulations might have been more adequate than the training on food safety topics.

It is therefore recommended and justified that the Philippine Department of Health 1) develops a credentialing program with a standardized examination/certification process (with refresher) and 2) makes sure the program is enforced and monitored as a requirement for all sanitation inspectors and/or food inspectors to implement the latest legal requirements under the Food Safety Act of 2013 and its IRR 2015: "Rule 15f.2 The Department of Agriculture and the Department of Health shall conduct training programs for Local Government Units food safety inspectors and other personnel." And, as stated in Article 8 Rule 26c.2, "Food Safety Officer or equivalent personnel involved in food inspection shall pass a certified training course on food inspection every three years." The WHO Philippines and the Philippine Department of Health are working on enforcing the new role of the food safety officer.

The findings of this study can represent some benefits to the international reader as well, mainly because we provide a means of benchmarking to compare the performance of developed countries (e.g., the U.S.) to a developing country (in this case the Philippines). This study might also offer reassurance to the visitors of the Philippines, whether for business or tourism, that the government is taking serious steps to enhance the competency of its sanitation inspectors who are partially in charge of public health. In addition, this study sheds light on new areas of future research needed, which could be of interest to U.S. scholars interested in conducting relevant studies in collaboration with low and/or middle-income countries.

A limitation of this research might be the lack of evaluation regarding sanitation inspector knowledge related to technical aspects of food safety and risk-based inspection. This insight into their existing knowledge would have helped us in assessing the effectiveness of new training programs—but as previously mentioned, this question could be addressed in a future study.

Conclusion

WHO states that food inspectors must have knowledge of at least food laws and regulations, principles of hygiene, prerequisite programs, HACCP systems, and inspection techniques, among others (Food and Agriculture Organization, 2008). Based on the results of the data analysis and the frequency tables from this study, the government now might justify allocating the needed resources to include at least the following in the recommended credentialing program for sanitation/food inspectors:

- basics of food safety and hygiene;
- HACCP principles and practice;
- National Philippines Food Safety Laws and Regulations, especially the Food Safety Act of 2013 and its IRR of 2015; and

TABLE 5

Training Needs for Food Safety Methods of Inspection

Question	Not Needed (%)	Not Sure If Needed (%)	Strongly Needed (%)
Do you need to be trained on food safety methods of inspection for kitchens?	3.4	7.2	86.4
Do you need to be trained on food safety methods of inspection for food processing/manufacturing?	2.6	5.1	88.9
Do you need to be trained on food safety methods of inspection for slaughterhouses?	2.6	8.5	85.1
Do you need a detailed food safety inspection checklist to use during your field food safety inspections?	2.1	6.0	88.9
Do you need to be trained on how to use an inspection checklist to conduct a food safety field inspection?	2.6	8.9	85.5
Do you need to be trained on how to observe and verify if there is an actual violation in a food establishment?	3.0	6.4	87.2
Do you need to be trained on how to observe and/or interview food handlers during a food safety inspection?	4.7	9.4	82.6
Do you need to know what the basic tools/equipment/forms are that you need to use during a food safety inspection?	3.0	6.4	87.2
Do you need to be trained on how to take pictures during a food safety inspection?	4.3	10.2	82.1

- methods of food safety inspection for kitchens, food manufacturing establishments, and slaughterhouses.

Further studies are recommended to assess improvement in inspector knowledge and performance before and after each training session. 🐼

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► BUILDING CAPACITY



Darryl Booth, MBA

Downstream Data Flows to Build Capacity

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.

Many health departments publish their routine restaurant inspections to the Internet. On a simple web form, consumers can easily search by a restaurant's name to find inspection history, inspector comments, violations or inspection checklists, and details on an establishment's score, grade, or placard (where applicable). A practice once considered sensitive—and possibly even controversial—is now commonplace.

There are some unexpected ways, however, in which these data can be repackaged.

Open Data

A few health departments have embraced the open data philosophy by publishing inspections and other data files online for bulk download or quick consumption through digital tools like application programming interfaces (APIs). This open data publishing practice—an ideology that embraces the idea that data should be freely used, reused and redistributed by anyone—allows any software, person, or company to ingest and repack the data, presumably adding value to them through the process.

Yelp advocates for this practice, having published a standard file format known as Local Inspector Value-Entry Specification (LIVES). Health departments that put their inspection data in this prescribed format could expect their inspection scores or grades to be visible alongside Yelp reviews.

In a searchable website intended for consumers, health departments can create and dictate the brand, presentation, and search method of their data. A health department can inject its philosophy, framing the results with useful articles about safe operations and consumer awareness. Let's call this site a "Web Search."

With an open data API or bulk download, data are repackaged with little to no expectation of a health department's specific perspective. In fact, if the data are combined with disparate data from other sources (e.g., other health departments and consumer reviews), the data's origin is clouded. I'll call this practice "Bulk Download."

Screen Scraping

Did you know that your Web Search site is likely being turned into a Bulk Download? It happens through screen scraping. Screen scraping is a technique through which computer software navigates your website by pretending to be a human clicking links. Each time your website serves up a snippet of data (i.e., a web page), the screen scraping program grabs that text and adds it to a database. The process might take many hours or days and generate hundreds of thousands of simulated clicks to your website. When every click is exhausted, all the data on your Web Search site is consolidated into a massive database to be sold or repackaged.

Screen scraping can be a tricky proposition and is generally not preferred because the program has to be aligned to your website's design. That is, it has to know where to find the facility name, facility address, violations, and score (if applicable). It also has to know where to click to get the next page of results and so forth, until it reaches the last link on the last facility. A Bulk Download or API request is much more preferred.

Consolidated Data

I believe it's a problem that no national accounting of retail food safety inspection results exists. I also believe it's a problem that scoring/grading across the U.S. lacks a standard methodology. It's confusing to consumers and problematic for multiregional owners (i.e., business with facilities in many different jurisdictions).

Some firms seek to solve these problems by collecting data from different local jurisdictions. They then consolidate the data by calculating restaurant inspection scores through their own scoring methods.

The final destination for these scores? Yelp, for one, licenses a data stream from HDScores. HDScores scours a good portion of the U.S. and boasts 1.3 million restaurants in its database. If a local health department calculates a score, then the health department score is

visible on Yelp. Otherwise, the proprietary HDScore is displayed in Yelp, alongside consumer reviews. The HDScores calculation weighs both current and historical inspection results. Details can be found on the HDScores website at <https://hdscores.com>.

Another example is Hazel Analytics (<https://hazelanalytics.com>). Hazel Analytics publishes food inspection scores through its Food Safety Insight, a food inspection analytics system that benefits corporate brands such as Subway, Starbucks, and Red Robin. The value proposition for these customers is homogenized results that are displayed in a dashboard of actionable alerts for their facilities.

Operational Matters

It is possible that, for good reason, a set of data should be excluded from consolidation. There are two methods to prevent the automatic scraping of your agency's data.


1. Identify and contact the companies doing the scraping/consolidation. With just a couple phone calls, I confirmed that the companies will honor most requests for exclusion.
2. Work with your information technology (IT) department or software vendor to block originating screen scraping requests from reaching your web server. This method is similar to blocking an unwanted

caller on your mobile phone but is imperfect in the sense that the originating computer system could change in an endless game of cat-and-mouse.

If, however, your Web Search site suffers from an undo amount of traffic due to screen scraping (screen scraping can cause web traffic spikes as the process hits every link on your website), your IT department or software vendor can offer to publish a Bulk Download link or API, thus optimizing the regular transactions and reasserting your control over the data stream.

At the end of the day, publicly available data can still be requested through public records requests.

At a minimum, a health department should assure that flow (no matter what the method) is updated at least weekly and that operators have easy access to identify errors and that errors are corrected promptly.

Join the discussion on the LinkedIn Building Capacity in Environmental Health group at www.linkedin.com/groups/6945520/. 

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Did You Know?

NEHA has transitioned its online courses, trainings, webinars, and other resources to an upgraded learning management system. The new platform is free to all active NEHA members and can be used to earn continuing education credits toward a NEHA credential. The platform provides an improved interface to find and access resources right away. Visit www.neha.org/professional-development/education-and-training/neha-e-learning to learn how to access the new E-Learning platform and to take advantage of these resources.

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▶ DIRECT FROM AEHAP



Jamie D. Hisel,
MPH



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Growing the Environmental Health Science Profession: Recruit, Retain, Graduate

Editor's Note: In an effort to promote the growth of the environmental health profession and the academic programs that fuel that growth, NEHA has teamed up with the Association of Environmental Health Academic Programs (AEHAP) to publish two columns a year in the *Journal*. AEHAP's mission is to support environmental health education to ensure the optimal health of people and the environment. The organization works hand in hand with the National Environmental Health Science & Protection Accreditation Council (EHAC) to accredit, market, and promote EHAC-accredited environmental health degree programs.

This column provides AEHAP with the opportunity to share current trends within undergraduate and graduate environmental health programs, as well as efforts to further the environmental health field and its available resources and information.

Jamie Hisel is the president of AEHAP and a clinical faculty member at Eastern Kentucky University. Clint Pinion is the past-president of AEHAP and an associate professor at Eastern Kentucky University.

Introduction

The mentality regarding student success has changed over the past three decades in higher education. Historically, students were solely responsible for their academic and social success while attending college. Colleges would provide some resources in an attempt to bolster student success but failed to use a proactive and systematic approach for recruiting, retaining, and graduating students. Today, colleges and universities take an ecological or holistic approach for student success. Colleges and universities now have dedicated faculty and staff working to modify policies, programs, and even campus facilities to better accommodate student needs (Schuh, Jones, & Torres, 2017).

The ecological perspective of college environments, crafted by Banning and Kaiser (1974), notes the importance of colleges adapting institutional environments to meet the needs of current and prospective students (Schuh et al., 2017). Colleges choosing not to adapt environments are failing to take any responsibility for student success. Failing to cultivate environmental conditions in which all students can succeed is especially harmful to diverse student populations (Schuh et al., 2017).

According to the National Center for Education Statistics, nearly half of all undergraduate students majoring in traditional STEM (science, technology, engineering, and mathematics) fields do not complete the degree.

These students opt to pursue another major or leave college all together (Belsler, Prescott, Daire, Dagley, & Young, 2017). Environmental health science (EHS) is often a discovery degree, meaning most students arriving on college campuses aren't aware that an EHS major exists. EHS programs are increasingly becoming more racially and ethnically diverse. National Environmental Health Science & Protection Accreditation Council (EHAC)-accredited programs across the nation must be cognizant of these trends and work diligently and purposefully in attracting, retaining, and graduating EHS students. This column includes four suggested strategies for increasing and sustaining enrollment.

Pathway to a 4-Year STEM Degree

The physical element of campus environments can positively or negatively influence a student's academic outcome. Sometimes traditional 4-year college campuses are intimidating and overwhelming for new students, especially first-generation and minority students. A significant number of students across the nation initially enter higher education through community colleges. This trend is especially true for first-generation, low income, racial-ethnic minority, and nontraditional age college students. The community college can be a more economical and less intimidating choice for students to step into the world of higher education. Creating a pathway to an EHS degree through the community college can be an excellent recruiting tool and be attractive to a variety of students who have not otherwise considered an EHS degree (Sithole et al., 2017).

Advising Students for Success

Campus processes, policies, and procedures must address why students are not succeeding in their STEM coursework. One key organizational element—academic advising—is an integral part of student success across all disciplines, especially with STEM majors. Advising can serve as a great resource to students, helping reduce fears and concerns about the major and future careers, while also aiding in career and life goal development and referring to academic and nonacademic resources as needed (Sithole et al., 2017). Developing strong faculty–student relationships through advising can provide necessary support for students and result in increased retention. It is important for EHS programs to have a strategic advising system in place to provide the necessary support for students to successfully matriculate through the challenging degree.

Creating a Community

The human element of a campus environment is key in creating a positive campus climate and in recruiting and retaining students. As presented by Stern (1970), behavioral settings such as college campuses tend to attract and influence individual behaviors. Individuals coexisting in a behavioral setting will either assimilate to the behaviors around them or seek alternative spaces on campus with like-minded individuals (Schuh et al., 2017). Ultimately, students will gravitate to microenvironments on campus in which they feel comfortable; quite often spaces of comfort include people with similar views. Marginalized students will seek subcultures or comforting microenvironments when colleges fail to recognize and celebrate diversity (Schuh et al., 2017).

Across the nation, universities are facing many challenges with underrepresentation of minority students and faculty, especially within the sciences. This challenge is particularly problematic considering the growing need to increase training in these fields to avoid a shortage of qualified and competent workers in the future. If programs want to increase the number of diverse students entering their respective program, they must also have a diverse faculty and staff. Most institutions understand the importance for multicultural outreach and engagement but often come up short in the end. It is noted that when a successful diverse faculty member is hired, the institution relaxes

efforts. This new hire often becomes the token representative for the department and is overloaded with service and committee assignments, is solely responsible for recruitment and mentoring of minority students, and is not adequately acknowledged or rewarded, which can result in burnout (Whittaker, Montgomery, & Martinez Acosta, 2015).

Programs must be diligent in hiring faculty and staff that reflect their student population. Students need cultural familiarity or spaces on campus to connect with faculty, staff, and fellow students who identify with and understand their backgrounds. EHS programs must be mindful to create a welcoming and inclusive environment where all students thrive.

Extending Your Reach

Outreach efforts should target students and their families so they can learn about the many career opportunities within EHS. Recruitment is much more effective when using this approach as students can more clearly see the advantage of completing a 4-year STEM degree like EHS. While one-time initiatives such as career days or information campaigns can be great at exposing large groups to information, it doesn't have as much of an impact as more time intensive outreach programs. These time intensive programs include precollege summer camps or programs in which students are exposed to hands-on learning and experiences over an extended period of time. A more intensive program can provide a great deal of information and engage prospective students in hands-on activities and increase overall interest in the major (Belser, et al. 2017).

Research studies have indicated that participation in a STEM-focused career planning class can be a predictor in retention. Considering the abundance of careers in EHS, EHS programs should be able to use career planning as a recruitment and retention tool to attract and retain high caliber students. Encouraging current EHS students to be ambassadors on campus for an EHS program is key in attracting and retaining new students. Potential EHS students are more likely to engage with and relate to fellow students than faculty or staff. Using a variety of outreach and recruiting methods can ensure EHS programs are reaching a broad audience, in turn increasing their chance at recruiting more students.

Conclusion

Higher education is ever-changing and it is important for EHS programs and faculty to be willing and able to adjust and change instruction methods to meet the growing needs of students. Through extending your recruiting reach, creating a sense of belonging, providing consistent advising services, and being creative with new pathways to degree completion, accredited schools can continue to fill the needs of a growing EHS profession. 🌱

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▶ DIRECT FROM ATSDR

Federal Research Action Plan on Recycled Tire Crumb Used on Playing Fields: Tire Crumb Rubber Characterization and Exposure Characterization Study Overview

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*Agency for Toxic Substances
and Disease Registry*

Editor's Note: As part of our continued effort to highlight innovative approaches to improve the health and environment of communities, the Journal is pleased to publish a bimonthly column from the Agency for Toxic Substances and Disease Registry (ATSDR) at the Centers for Disease Control and Prevention (CDC). ATSDR serves the public by using the best science, taking responsive public health actions, and providing trusted health information to prevent harmful exposures and diseases related to toxic substances. The purpose of this column is to inform readers of ATSDR's activities and initiatives to better understand the relationship between exposure to hazardous substances in the environment, its impact on human health, and how to protect public health.

The conclusions of this column are those of the author(s) and do not necessarily represent the official position of ATSDR or CDC.

Kelsey Benson is an environmental epidemiologist at ATSDR. Elizabeth Irvin-Barnwell currently serves as the acting chief of the Environmental Epidemiology Branch at ATSDR. Angela Ragin-Wilson currently serves as the acting deputy director of the Division of Toxicology and Human Health Sciences at ATSDR. Pat Breyse is the director of CDC's National Center for Environmental Health/ATSDR.

Background Introduced in the 1960s, synthetic turf fields are commonly installed at numerous venues including municipal and county parks, schools, colleges, professional team stadiums, practice fields, and military installations. In the U.S., there are between 12,000–13,000 synthetic turf fields and approximately 1,200–1,500 new installations each year (Synthetic Turf Council, Safe Fields Alliance, Recycled Rubber Council, & Institute of Scrap Recycling Industries, communication, 2016). Millions of people are estimated to use these fields, including professional, college, and youth athletes;

coaches; fans; recreational users; and military personnel.

In an estimated 95% of existing turf fields in North America, recycled tire crumb rubber material, produced from waste automobile and truck tires, is used as infill, either exclusively or in a mixture with sand or alternative infills, while the remaining 5% contain only alternative infills (Synthetic Turf Council et al., communication, 2016). Outdoor synthetic turf fields with tire crumb rubber infill are more common than indoor fields, with some sources reporting that indoor fields make up approximately 5–15% of the market (D. Gill, FieldTurf, personal

communication, May 5, 2016; R. Reddy & B. Cheskin, Sprinturf, personal communication, May 2, 2016).

In recent years, concerns have been raised about the safety of recycled tire crumb rubber used as infill for playing fields and playgrounds. The public has expressed concerns that the use of these fields could potentially be related to certain health effects. Although studies to date have not shown an elevated health risk from playing on fields with tire crumb rubber, they have limitations and do not comprehensively evaluate the concerns about health risks. Additional research is needed to fill important data gaps that will address key environmental and human health questions regarding the use of recycled tire crumb rubber.

Study Overview

In 2016, the Centers for Disease Control and Prevention/Agency for Toxic Substances and Disease Registry (CDC/ATSDR), U.S. Environmental Protection Agency (U.S. EPA), and U.S. Consumer Products and Safety Commission (CPSC) launched the Federal Research Action Plan on Recycled Tire Crumb Used on Playing Fields and Playgrounds (FRAP) (U.S. EPA, 2017). The research activities specific for playing fields were conducted by ATSDR and U.S. EPA under the approval of the Office of Management and Budget's Information Collection Request review process. The purpose of FRAP is to study key questions concerning the potential for human exposure resulting from the use of recycled tire crumb rubber in playing fields and playgrounds. There are four major components of FRAP that include a literature review and data gaps analysis, a tire crumb rubber characterization study, an exposure characterization study, and a play-

FIGURE 1

Tire Crumb Rubber Collection Sites on a Synthetic Turf Field



FIGURE 2

Sample Collection Methods to Remove Tire Crumb Rubber From a Synthetic Turf Field Surface



Note. Combs were used to sample for organics and metals and particles. Spatulas were used to sample for microbes. Samples were taken from approximately the top 3 cm of the synthetic turf field surface.

ground study. The research activity involving playgrounds is being conducted by CPSC.

The aim of the tire crumb rubber characterization study was to collect tire crumb rubber material from tire recycling plants

and synthetic turf fields around the U.S. and analyze the material for a wide range of metals, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), particle size, moisture, sand content, and

microbial characterizations. A convenience sampling approach was used to recruit up to 40 facilities with synthetic turf fields across the four U.S. census regions. The geographic extent of the recruitment was intended to provide a range of material weathering conditions for outdoor fields and potential differences in tire crumb rubber source material.

The study design also accounted for facility type (i.e., indoor or outdoor fields) in the facility identification and recruitment stage. Fields were recruited across a range of synthetic turf ages to allow potential differences in chemical content and particle size distribution to be assessed with age. For inclusion in the study, facility owners/managers were required to provide written agreement for sample collection and answer a questionnaire that included information on general facility operations, turf history and maintenance, and public use at the facilities. Samples were collected from seven set locations at each field to allow for analysis of between-field and within-field variations (Figure 1).

The second research activity under FRAP, the exposure characterization study, was a pilot-scale effort to collect information on synthetic turf field users and to conduct a human exposure measurement substudy. Several different age groups were included, specifically adults (≥ 18 years old), adolescents (13–17 years old), youth (10–12 years old), and children (7–9 years old). Questionnaires included queries on the frequency and duration of field use, as well as contact rates with field materials. A subset of participants were videotaped engaging in a physical activity on a synthetic turf field. Personal and biological samples were collected from a subset of the participants. Urine and blood samples were collected before and after practice. Personal samples included passive air and dermal wipe sampling. Field environmental samples were also collected, including ambient air monitoring, surface wipes, and dust samples. These samples were analyzed for metal, VOC, and SVOC analytes. A subset of VOC and SVOC samples were analyzed for suspect screening and nontargeted analysis.

Study Accomplishments

As part of the tire crumb rubber characterization study, CDC/ATSDR and U.S. EPA contacted seven companies operating tire recycling plants that produce tire crumb rubber

for synthetic turf infill. The agencies reached agreements with six companies to collect samples at nine recycling plants that were located across all four U.S. census regions. Researchers collected samples from three separate lots at each facility for SVOC analyses, metals analyses, and particle characterization.

From August–November 2016, ATSDR researchers contacted a total of 306 community field owners and obtained participation agreements to sample at 21 community synthetic turf fields with tire crumb rubber infill. Researchers also collaborated with the U.S. Army Public Health Center to identify synthetic turf fields with crumb rubber infill installed at military installations across the U.S, which resulted in the inclusion of 19 additional U.S. Army fields. Tire crumb rubber infill samples were collected from a total of 40 synthetic turf fields to characterize chemical constituents and particle size, as well as examine microbial species (Figure 2). Questionnaires were administered to facility owners or field managers to obtain information on types and numbers of field users and maintenance practices.

Due to scheduling and availability issues that reduced the number of fields and participants available for recruitment during the field study implementation window, the target sample size of 6 fields and 60 participants was not reached during the study period. Overall, the research team recruited 32 participants at 3 field locations.

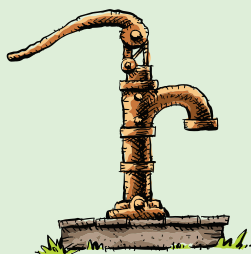
On December 30, 2016, the agencies released a status report on FRAP that included the final peer-reviewed literature review report and described the progress on other research activities (U.S. EPA, 2016). The collection and laboratory analyses of samples have been completed for both the tire crumb rubber and exposure characterization parts of the study. The tire crumb rubber characterization study will be released in 2019. Currently, CDC/ATSDR is initiating a biomonitoring study to investigate potential exposure to constituents in tire crumb rubber infill. The information from the biomonitoring study will be released, along with information collected as part of the FRAP exposure characterization study, at a later date. The results and information from

this effort will fill specific data gaps about the potential for human exposure to chemical constituents found in recycled tire crumb rubber infill material. 🌱

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- U.S. Environmental Protection Agency. (2017). *Federal research action plan on recycled tire crumb used on playing fields*. Retrieved from <https://www.epa.gov/chemical-research/federal-research-action-plan-recycled-tire-crumb-used-playing-fields>



THE PRIVATE WELL CLASS

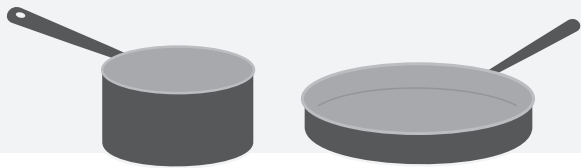
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1 MAKE A SANITIZING SOLUTION



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(6% STRENGTH)

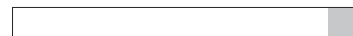


1
GALLON
WATER



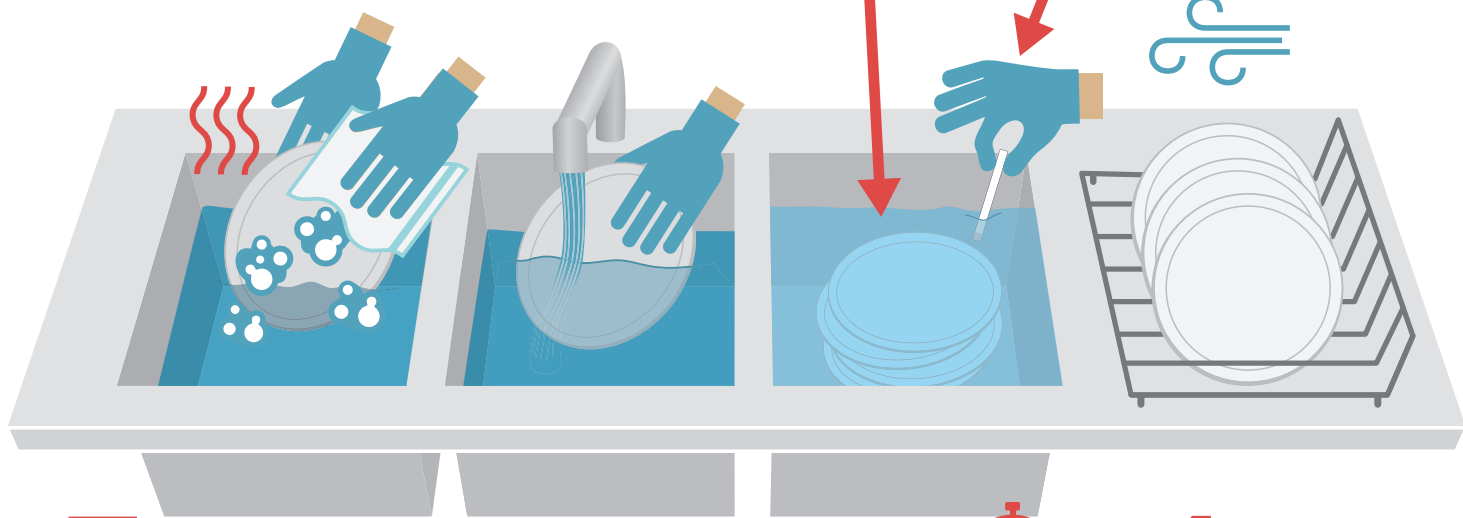
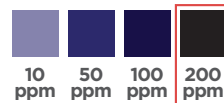
FILL

2 FILL SINK AND TEST SOLUTION



CHLORINE TEST STRIP

TEST



3 WASH → RINSE → SANITIZE

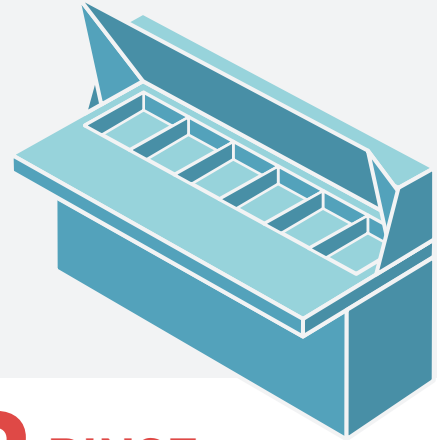
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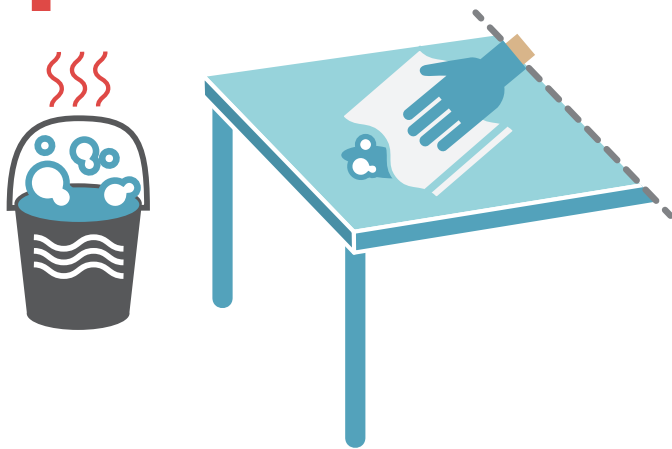
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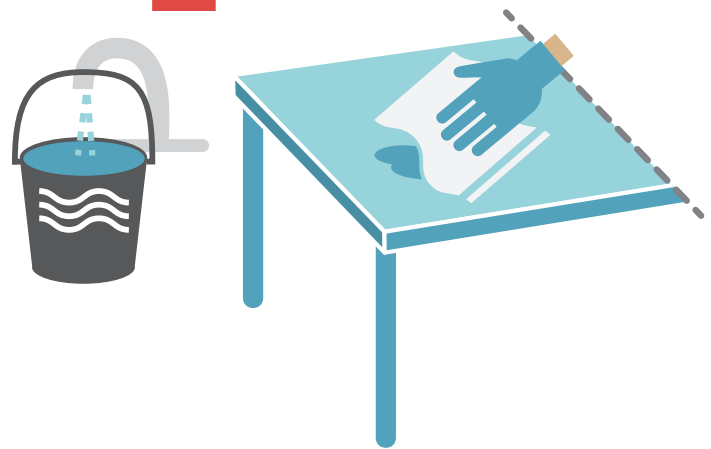
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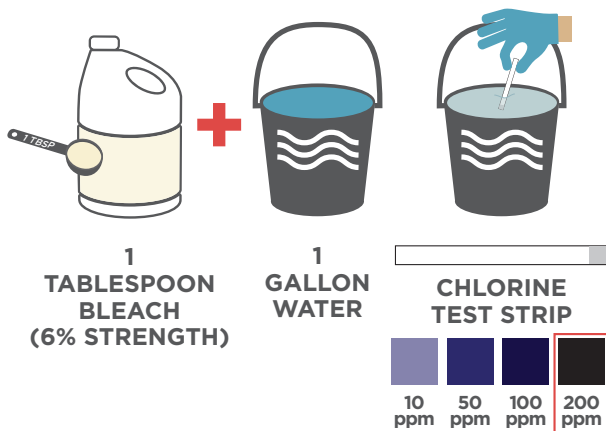
1 WASH



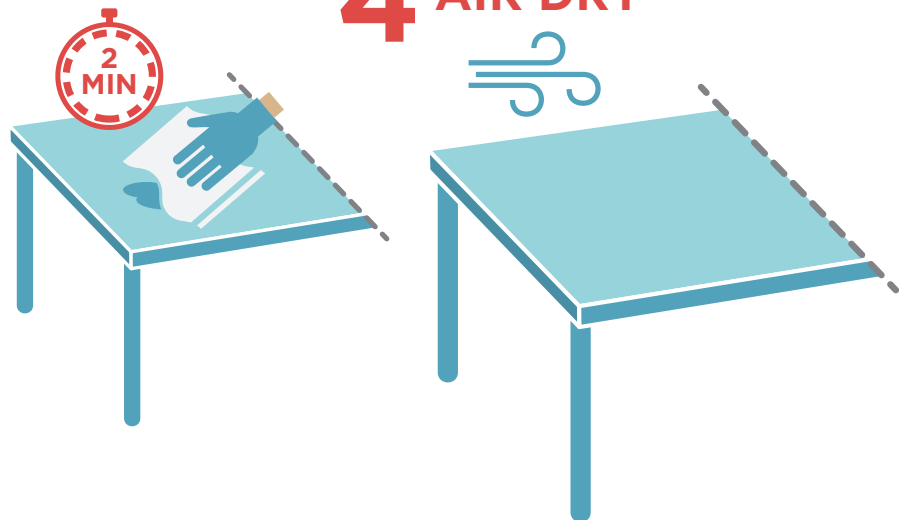
2 RINSE



3 SANITIZE



4 AIR DRY



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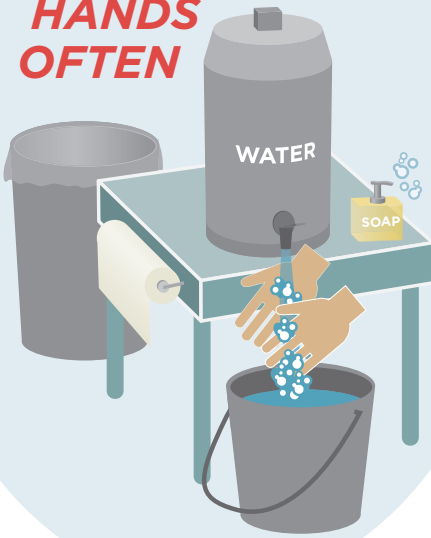
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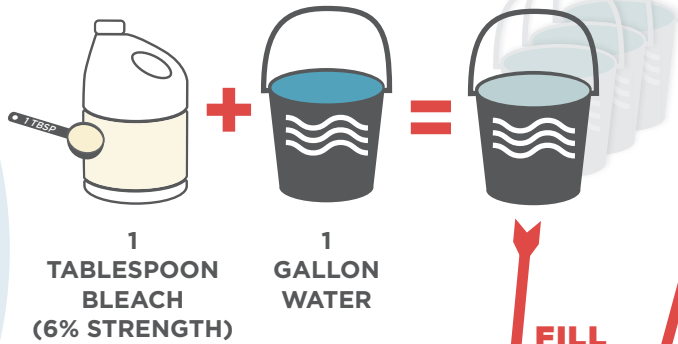
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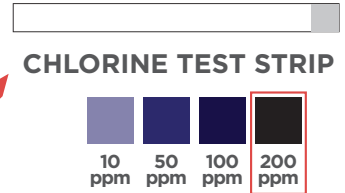
**WASH
HANDS
OFTEN**



1 MAKE A SANITIZING SOLUTION



2 FILL SINK AND TEST SOLUTION



TEST

FILL

3

WASH

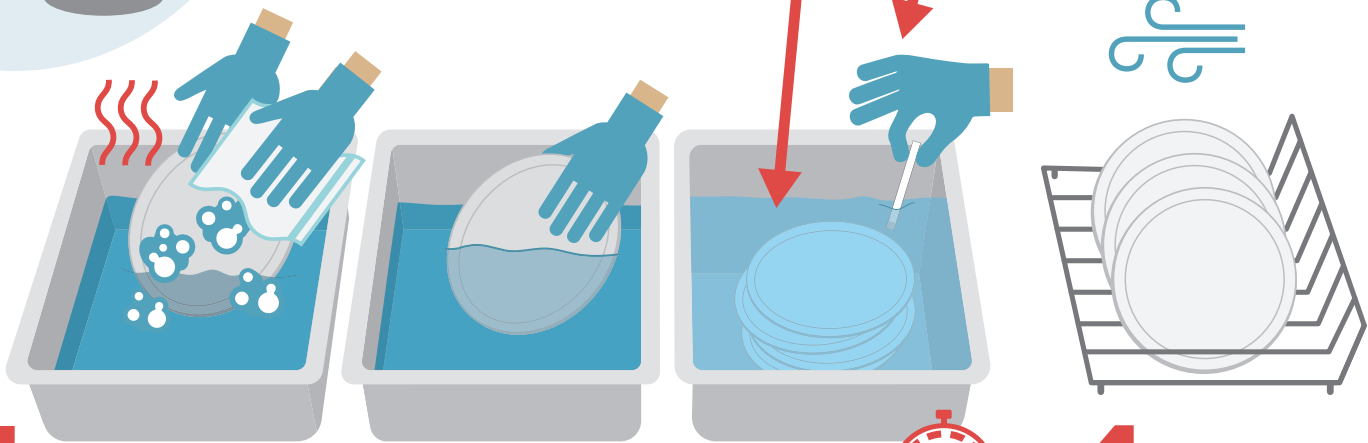
RINSE

SANITIZE



4

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Protection

Food Safety: Environmental Health Data Matter

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.

LCDR Beth Wittry serves as an environmental health officer at CDC's National Center for Environmental Health. James Mack is a senior food scientist with the Division of Food Safety at the Wisconsin Department of Agriculture, Trade, and Consumer Protection.

Introduction

The Centers for Disease Control and Prevention's (CDC) National Environmental Assessment Reporting System (NEARS) (Figure 1) is a surveillance system that captures data collected through the environmental health component (i.e., environmental assessment) of foodborne illness outbreak investigations in retail food establishments (CDC, 2019). These environmental assessment data, typically collected by environmental health staff, can provide valuable information about contributing factors and environmental antecedents to outbreaks.

NEARS data can be used to improve retail food safety prevention efforts. Participating in NEARS can help prevent foodborne ill-

ness outbreaks associated with restaurants, banquet facilities, schools, and other institutions. Recent analysis of 404 outbreaks reported to NEARS by 16 state and local health departments from 2014–2016 found that most of the outbreaks were caused by norovirus and contamination of food by infectious workers contributed to more than half of the outbreaks with contributing factors (Lipcei et al., 2019). These findings are not new—they are consistent with findings from other national outbreak data sets and highlight the role of ill workers in foodborne illness outbreaks (Angelo, Nisler, Hall, Brown, & Gould, 2017). NEARS data showed that many establishments in which outbreaks occurred, however, lacked written

policies about practices that can help prevent norovirus outbreaks caused by infectious workers. These include policies on preventing workers from working while ill and on glove use. NEARS data also showed that many outbreak establishments lacked paid sick leave for workers. These data are novel to NEARS and suggest that these gaps in establishment policies and practices might be antecedents to outbreaks and likely play a role in outbreak prevention.

NEARS also collects data that characterizes outbreak investigation activities and these data can be used to improve outbreak investigations. Analyses of 2014–2016 NEARS outbreaks showed that the majority of environmental assessments in outbreak establishments were initiated the same day the establishment was identified for an outbreak investigation (Lipcei et al., 2019). This finding is encouraging as experts recommend contact with an outbreak establishment immediately (Selman & Guzewich, 2014). Timely environmental assessments are more likely to identify factors contributing to outbreaks, which is an important goal of outbreak investigations (Brown, Hoover, Selman, Hall, & Schurz Rogers, 2017). NEARS data showed, however, that for some outbreaks, environmental assessment initiation took longer—between 3–14 days (7%)—and in a small percentage of outbreaks, more than 2 weeks (1%). These data show a specific need for improvement in outbreak investigation practices.

NEARS data collected and analyzed at the national level can provide data valuable to improving outbreak prevention and investi-

FIGURE 1

The National Environmental Assessment Reporting System



From a National Environmental Assessment Reporting System Pioneer: James Mack

Wisconsin began its participation in the National Environmental Assessment Reporting System (NEARS) when it was piloted in 2007. NEARS became an integral tool in Wisconsin's foodborne outbreak investigation toolbox. Wisconsin has been working to institutionalize NEARS throughout the state. It has been a positive experience for local jurisdictions as they have embraced the environmental assessment training developed to accompany NEARS and the critical thinking skill set fostered by the training (Centers for Disease Control and Prevention, 2018).

Most notable is how the NEARS institutionalization process has led local jurisdictions to adopt the concepts of contributing factors and environmental antecedents, concepts critical to conducting outbreak environmental assessments. Indeed, this focus has carried over to regulatory routine inspections. Staff are now taking a problem-solving approach and focusing on how to mitigate and prevent foodborne illness risk factors during routine inspections.

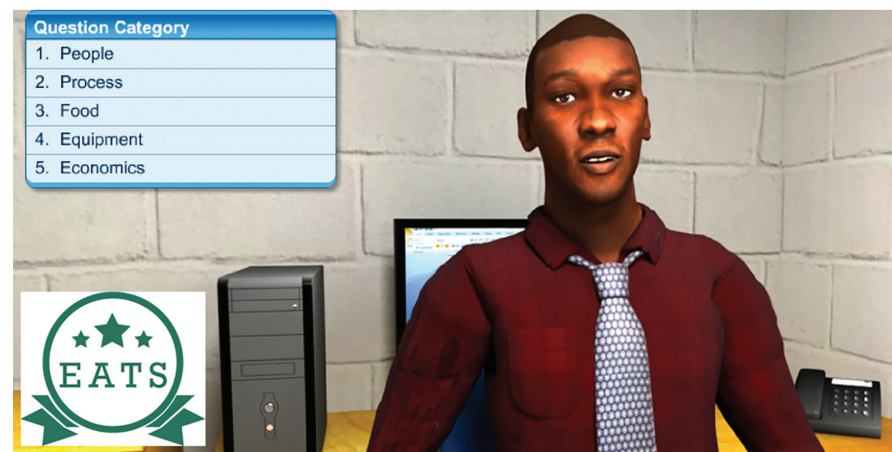
Wisconsin uses NEARS data to identify the most common contributing factors to outbreaks and uses this information to focus efforts on reducing and preventing outbreaks. For example, NEARS data show that contamination by ill workers is a frequent contributing factor to outbreaks in Wisconsin. As a state, we have emphasized the role of ill workers in outbreaks and encouraged field staff to focus their efforts on prevention of ill workers during routine inspections. For example, inspections include the review of employee health policies and verification of knowledge about the employee health policy as it relates to ill worker risk factors.

Wisconsin is also using data collected through NEARS to assess outbreak investigation practices. We are tracking how long it takes to contact outbreak establishments and to visit the

continued on page 36

FIGURE 2

The Environmental Assessment Training Series Offers Simulated Exercises on Interviewing and Other Environmental Assessment Skills



gation practices. In fact, NEARS has helped an individual site improve their prevention and investigation practices (see sidebar).

Summary

NEARS is still in its infancy but given its potential to improve foodborne outbreak investigation and prevention, use of NEARS is growing steadily. CDC is working to support this progression and empower food safety programs to conduct and report environmental assessments. CDC accomplishes this effort by

1. providing free, online, interactive training designed to prepare participants for

NEARS participation called the Environmental Assessment Training Series or EATS (www.cdc.gov/nceh/ehs/learn/eats/index.html) (Figure 2);

2. providing all NEARS jurisdictions an individual report of their NEARS data every year, as well as annual summary reports (www.cdc.gov/nceh/ehs/nears/publications.htm);
3. providing information about NEARS at national meetings and conferences such as the National Environmental Health Association's annual conference, the Integrated Foodborne Outbreak Response and Management (InFORM) conference, and Food

From a National Environmental Assessment Reporting System Pioneer: James Mack

continued from page 35

establishments after they have been identified for an investigation. In other words, we are tracking how quickly we respond to foodborne outbreaks on a systematic basis. Over time, these data will allow us to identify gaps and improve our investigation practices.

Local jurisdictions in Wisconsin also use NEARS data to improve food safety. For example, one jurisdiction is in the process of using NEARS data to better understand the context and causes of foodborne outbreaks occurring in independent ethnic restaurants. The ultimate goal of this project is to develop interventions to improve food safety in ethnic restaurants in the community.

NEARS participation has supported Wisconsin in the improvement of the environmental assessment process and standardization of investigation practices on a state level. Wisconsin understands the importance of outbreak data and how NEARS data contribute to understanding the environmental causes of outbreaks on a national scale. Data drive decisions and ultimately affect interventions. NEARS has been a valuable asset to inform food safety systems and target prevention efforts in the field.

and Drug Administration regional retail food protection seminars; and
4. analyzing and disseminating data from NEARS that show its potential impact (Brown et al., 2017; Freeland, Masters, Nicholas, Kramer, & Brown, 2019; Lipcsei et al., 2019).

Additionally, in 2019, the National Environmental Health Association, through a CDC partnership cooperative agreement, provided 30 jurisdictions an opportunity to explore NEARS. The jurisdictions are not currently involved with NEARS and will have to determine if participation in NEARS is a good fit for their programs.

As more health departments conduct environmental assessments and report their data to NEARS, we will gain a better understanding about the environmental factors responsible for outbreaks on a national scale. This information is critical to inform food safety policies and target public health interventions. 🐞

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

NEHA AFFILIATE AND REGIONAL LISTINGS

Alabama

October 16–18, 2019: Annual Conference, hosted by the Alabama Environmental Health Association, Lake Eufaula, AL. For more information, visit www.aeha-online.com.

California

October 24, 2019: CEHA Update, hosted by the Redwood Chapter of the California Environmental Health Association, Santa Rosa, CA. For more information, visit www.ceha.org/2019-update.html.

Colorado

September 17–20, 2019: Annual Education Conference, hosted by the Colorado Environmental Health Association, Keystone, CO. For more information, visit www.cehawebsite.com.

Illinois

September 16–17, 2019: South Chapter Annual Educational Conference, hosted by the South Chapter of the Illinois Environmental Health Association, Marion, IL. For more information, visit www.iehaonline.org.

November 4–5, 2019: Annual Educational Conference, hosted by the Illinois Environmental Health Association, Utica, IL. For more information, visit www.iehaonline.org.

Indiana

September 23–25, 2019: 69th Annual Fall Educational Conference, hosted by the Indiana Environmental Health Association, South Bend, IN. For more information, visit www.iehaonline.org/Conference.

Massachusetts

September 11–13, 2019: 57th Annual Yankee Conference on Environmental Health, hosted by the Massachusetts Environmental Health Association, Plymouth, MA. For more information, visit <https://maeha.org/event/yankee-conference-2019>.

Montana

September 17–18, 2019: 2019 MPHA/MEHA Conference, hosted by the Montana Public Health and Environmental Health Associations, Bozeman, MT. For more information, visit www.mehaweb.org.

Nebraska

September 25–26, 2019: NEHA Region 4 Fall Conference, hosted by the Nebraska Environmental Health Association, Omaha, NE. For more information, visit www.nebraskaneha.com/region4conference.html.

New Mexico

October 21–23, 2019: Annual Conference, hosted by the New Mexico Environmental Health Association, Albuquerque, NM. For more information, visit www.nmeha.org.

North Carolina

September 25–27, 2019: Fall Educational Conference, hosted by the North Carolina Public Health Association, Greensboro, NC. For more information, visit <https://ncpha.memberclicks.net>.

Texas

October 14–18, 2019: 64th Annual Educational Conference, hosted by the Texas Environmental Health Association, Austin, TX. For more information, visit www.myteha.org.

Virginia

October 29, 2019: Fall Educational Conference, hosted by the Virginia Environmental Health Association, Richmond, VA. For more information, visit <https://veha32.wildapricot.org/events>.

Wisconsin


October 16–18, 2019: Annual Educational Conference, hosted by the Wisconsin Environmental Health Association, Elkhart Lake, WI. For more information, visit www.weha.net.

TOPICAL LISTINGS

Recreational Water

October 16–18, 2019: 16th Annual World Aquatic Health Conference, hosted by the National Swimming Pool Foundation, Williamsburg, VA. For more information, visit www.nspf.org/wahc.

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September 11–13, 2019: Legionella Conference 2019, presented by NSF International and the National Environmental Health Association, Los Angeles, CA. For more information, visit www.legionellaconference.org. 

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If you are interested in an opportunity near you, please send your resume to Attn: Garrison Ford at Garrison.Ford@ul.com or visit our website at www.evercleanservices.com.

In addition to food safety inspectors, we are also looking for GMP auditors for OTC, dietary supplement, and medical device applications. If interested, contact Diane Elliott at Diane.Elliott@ul.com to apply or receive further information. 🐾

Did You Know?

You can share your event with the environmental health community by posting it directly on NEHA's community calendar at www.neha.org/news-events/community-calendar. Posting is easy, free, and a great way to bring attention to your event. You can also find listings for events from NEHA and other organizations.



ENVIRONMENTAL HEALTH

It's a tough job.
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Join the only community of people as dedicated as you are about protecting human health and the environment.

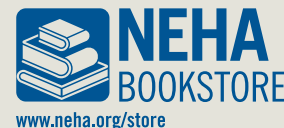
Begin connecting today through NEHA membership.

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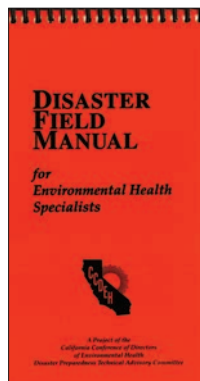
RESOURCE CORNER

Resource Corner highlights different resources the National Environmental Health Association (NEHA) has available to meet your education and training needs. These timely 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!



Disaster Field Manual for Environmental Health Specialists

California Association of Environmental Health Administrators (2012)



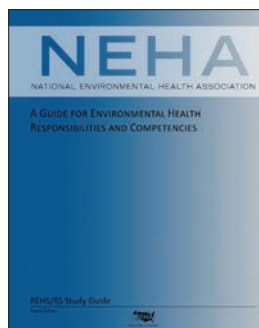
This manual serves as a useful field guide for environmental health professionals following a major disaster. It provides an excellent overview of key response and recovery options to be considered as prompt and informed decisions are made to protect the public's health and safety. Some of the topics 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

REHS/RS Study Guide (4th Edition)

National Environmental Health Association (2014)



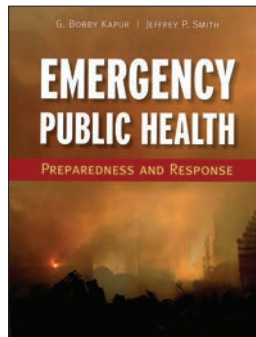
The Registered Environmental Health Specialist/Registered Sanitarian (REHS/RS) credential is NEHA's premier credential. This study guide provides a tool for individuals to prepare for the REHS/RS credential exam and has been revised and updated to reflect changes and advancements in technologies and 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

Emergency Public Health: Preparedness and Response

G. Bobby Kapur and Jeffrey P. Smith (2011)



Emergency Public Health provides a unique and practical framework for disaster response planning at local, state, and national levels. This book is the first of its kind to systematically address the issues in a range of environmental public health emergencies brought on by natural calamity, terrorism, industrial accident, or infectious disease. It features historical perspectives on a

public health crisis, an analysis of preparedness, and a practical, relevant case study on the emergency response. Study reference for NEHA's Registered Environmental Health Specialist/Registered Sanitarian credential exam.

568 pages / Paperback
Member: \$114 / Nonmember: \$124

Control of Communicable Diseases Manual (20th Edition)

Edited by David L. Heymann, MD (2015)



The *Control of Communicable Diseases Manual (CCDM)* is revised and republished every several years to provide the most current information and recommendations for communicable-disease prevention. The CCDM is designed to be an authoritative reference for public health workers in official and voluntary health agencies. The 20th edition sticks to the tried and tested structure of previous editions. Chapters have been updated by

international experts. New disease variants have been included and some chapters have been fundamentally reworked. This edition is an update to a milestone reference work that ensures the relevance and usefulness to every public health professional around the world. The CCDM is a study reference for NEHA's Registered Environmental Health Specialist/Registered Sanitarian and Certified Professional–Food Safety credential exams.

729 pages / Paperback
Member: \$59 / Nonmember: \$64

NEHA's Annual Financial Statement



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INDEPENDENT AUDITORS' REPORT

To the Board of Directors
 National Environmental Health Association
 Denver, Colorado

We have audited the accompanying financial statements of National Environmental Health Association (the "Association"), which are comprised of the statements of financial position as of September 30, 2018, and the related statements of activities and cash flows for the year then ended, and the related notes to the financial statements.

MANAGEMENT'S RESPONSIBILITY FOR THE FINANCIAL STATEMENTS

Management is responsible for the preparation and fair presentation of these financial statements in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

AUDITORS' RESPONSIBILITY

Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditors' judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditors consider internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.



To the Board of Directors
 National Environmental Health Association
 Page Two

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

OPINION

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of National Environmental Health Association as of September 30, 2018, and the changes in its net assets and its cash flows for the year then ended in accordance with accounting principles generally accepted in the United States of America.

OTHER MATTERS

Report on Prior Year Financial Statements

The 2017 financial statements were audited by EKS&H, LLLP, whose report dated December 21, 2017, expressed an unqualified opinion on those statements.

Plante & Moran, PLLC

Plante & Moran, PLLC

Denver, Colorado
 January 14, 2019

	For the Years Ended					
	September 30, 2018			September 30, 2017		
	Unrestricted	Temporarily Restricted	Total	Unrestricted	Temporarily Restricted	Total
Revenues and gains						
Program and partnership development	\$ 1,688,144	\$ -	\$ 1,688,144	\$ 1,868,359	\$ -	\$ 1,868,359
Annual Educational Conference	1,271,869	-	1,271,869	654,199	-	654,199
Credentialing and education	794,630	-	794,630	698,314	-	698,314
Membership dues	492,183	-	492,183	372,184	-	372,184
Journal of Environmental Health	131,942	-	131,942	183,554	-	183,554
Special projects	1,232,004	-	1,232,004	1,545,870	-	1,545,870
Contributions	8,761	1,700	10,461	17,526	5,172	22,698
CDC/NEHA ICLB conference	161,249	-	161,249	-	-	-
Hurricane supplemental	42,196	-	42,196	-	-	-
Publications and module contracts	24,295	-	24,295	30,314	-	30,314
Miscellaneous income	19,413	-	19,413	36,468	-	36,468
Investment income	65,708	1,370	67,078	38,922	1,146	40,068
Total revenues and gains	<u>5,932,394</u>	<u>3,070</u>	<u>5,935,464</u>	<u>5,445,710</u>	<u>6,318</u>	<u>5,452,028</u>
Expenses						
Program and partnership development	1,405,220	-	1,405,220	1,428,954	-	1,428,954
CDC/NEHA ICLB conference	161,250	-	161,250	-	-	-
Hurricane supplemental	42,285	-	42,285	-	-	-
Annual Educational Conference	800,640	-	800,640	590,082	-	590,082
Journal of Environmental Health	312,690	-	312,690	300,256	-	300,256
Credentialing and education	574,867	-	574,867	567,796	-	567,796
Membership	396,520	-	396,520	106,520	-	106,520
Publications and module contracts	4,861	-	4,861	7,691	-	7,691
Special projects	1,197,417	-	1,197,417	1,669,218	-	1,669,218
Administration and general	510,959	-	510,959	770,385	-	770,385
Total expenses	<u>5,406,709</u>	<u>-</u>	<u>5,406,709</u>	<u>5,440,902</u>	<u>-</u>	<u>5,440,902</u>
Change in net assets	525,685	3,070	528,755	4,808	6,318	11,126
Net assets at beginning of year	1,619,547	88,153	1,707,700	1,614,739	81,835	1,696,574
Net assets at end of year	<u>\$ 2,145,232</u>	<u>\$ 91,223</u>	<u>\$ 2,236,455</u>	<u>\$ 1,619,547</u>	<u>\$ 88,153</u>	<u>\$ 1,707,700</u>

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www.colorado.gov/pacific/cdphe/dehs
Eastern Idaho Public Health Department
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HealthSpace USA Inc
www.healthspace.com
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http://kchdvw.org

LaMotte Company
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North Bay Parry Sound District Health Unit
www.myhealthunit.ca/en/index.asp
NSF International
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Seattle & King County Public Health
www.kingcounty.gov/depts/health.aspx
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www.sweepssoftware.com
Texas Roadhouse
www.texasroadhouse.com
Tyler Technologies
www.tylertech.com
Yakima Health District
www.yakimacounty.us/275/Health-District 

Note. As of October 1, 2018, NEHA no longer offers organizational memberships. We will continue to print this section in the Journal to honor the membership benefits due to these listed organizations until their memberships expire. For more information about NEHA membership, visit www.neha.org/membership-communities/join.

Did You Know?

NEHA seeks environmental health professionals with a strong background in vector control to serve as volunteers on the newly established NEHA Vector Control Committee. The committee will help NEHA staff better understand what is happening in the field and on the ground in this area. The deadline to apply is September 30. Learn more at www.neha.org/node/60871.

THANK YOU for Supporting the NEHA/AAS Scholarship Fund

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AEC 2020

NATIONAL ENVIRONMENTAL HEALTH ASSOCIATION
84th ANNUAL EDUCATIONAL CONFERENCE & EXHIBITION

Sheraton New York
Times Square Hotel

NEW YORK CITY

Pre-Con Workshops: July 10-12
Full Conference: July 13-16

CALL FOR ABSTRACTS

BE A LEADING FORCE IN ADVANCING ENVIRONMENTAL HEALTH!

NEHA is seeking abstracts that bring the latest advances in environmental health, as well as unique responses and perspectives to environmental health and protection problems. Practical applications in both the public and private sectors should be emphasized, along with the latest in proven current and emerging technologies, issues, and topic areas.

Deadline for abstract submissions is October 7.

For more details, visit:

neha.org/aec/abstracts

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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NEHA NEWS

The Pandemic and All-Hazards Preparedness and Advancing Innovation Act of 2019 Signed Into Law: NEHA's Journey to Get Environmental Health to the Table

By Joanne Zurcher (jjzurcher@neha.org)

When I first started at the National Environmental Health Association (NEHA) in 2016, Executive Director Dr. David Dyjack and I met with the Assistant Secretary of Preparedness and Response at the U.S. Department of Health and Human Services to discuss the opening of NEHA's new Washington, DC, office. Our agenda for this conversation was to determine how environmental health professionals could get a seat at the emergency preparedness table. We were told that unless environmental health professionals were in the Pandemic and All-Hazards Preparedness Act (PAHPA), they could not be involved in the national emergency preparedness discussion.

PAHPA was signed into law by President George W. Bush on December 19, 2006. Hurricane Katrina in 2005 highlighted the need to enhance coordination among federal, state, local, tribal, and territorial entities to prevent, detect, and respond to outbreaks of plant or animal disease that could compromise national security, international adulteration of food, or other public health threats directly related to public health emergency preparedness and response capabilities. The purpose of PAHPA was to improve the nation's public health and medical preparedness and response capabilities for emergencies, whether deliberate, accidental, or natural.

PAHPA had broad implications for the preparedness and response activities of the U.S. Department of Health and Human Services. Among other things, PAHPA amended the Public Health Service Act to establish within the department a new Assistant Secretary for Preparedness and Response. It also provided new authorities for a number of programs, including the advanced development and acquisition of medical countermeasures. The law was reauthorized by Congress in 2013 with a new reauthorization date set for 2018. In an oversight, however, the original law and subsequent reauthorization omitted explicit mention of environmental health agencies or professionals. The result of this omission was that environmental health professionals were generally absent from emergency preparedness exercises and planning.

After that meeting I began my quest to change the language in the bill. Research was conducted on when the bill required reauthorization (by September 30, 2018) and who the influencers would be on the bill. I joined both formal and informal coalitions of organizations that included many of NEHA's regular partners and several other organizations that NEHA had never worked with before, such as those in the biodefense arena.

I sat down with Christine Ortiz Gumina, NEHA's Program and Partnership Development staff member who had worked in a local health department in Virginia and had seen firsthand the problems

that arise when environmental health professionals are not part of emergency preparedness. She and I reviewed the law and found critical places to insert environmental health agencies and professionals into the legislative text.

As the new bill was drafted, I met with many staffers, senators, and representatives on Capitol Hill to explain the importance of including the language Christine and I had drafted. Throughout these meetings I emphasized over and over that environmental health professionals are second responders and save more lives in the days and weeks after a disaster than are usually lost during the initial event.

To further our cause I attended many coalition meetings, trying to get support from other organizations on our language and explaining time and time again the need to add environmental health language to this legislation. Individual meetings were scheduled with coalition members to help them understand the need for this language. Considerable resistance was encountered from partner organizations who wanted to focus only on the money in the bill and did not believe that environmental health needed to be included in the bill.

In 2017 NEHA held its first Annual Hill Day—a day in which NEHA board members and staff meet with senators, representatives, and their staff from both political parties to ensure that the environmental health profession has a voice in major policy decisions. We held our Third Annual Hill Day on May 1, 2019. During these events, our board members and staff were encouraged to emphasize the need for environmental health to be included in PAHPA.

It was my goal every time NEHA was represented on Capitol Hill that there was a constant drumbeat and reminder of the need to include the environmental health profession in national emergency preparedness initiatives. Week after week, hours of phone calls, and numerous arranged meeting with congressional staff members were conducted to stress the importance of this language. And finally, our efforts were rewarded when our language became part of the U.S. Senate bill. The text remained there as the bill went through the U.S. Senate Health, Education, Labor, and Pensions Committee. It was extremely gratifying to see the bill gain momentum with our priorities included.

As representatives and their staff from the U.S. House of Representatives began to focus on the bill, I had to renew my efforts to emphasize the importance of our environmental health language, even though that groundwork had been laid earlier with them. Once they began to focus on the writing of the legislation, specific conversations on their version of the bill were held. I explained each time the role of environmental health professionals in emergency situations as second responders.

At that point the "politics side" of the process had begun. I worked to make sure that anyone who was concerned with the overall bill, and not necessarily our piece, heard how important this legislation was and why it was needed in the grand scheme

of protecting people's lives when natural or man-made disasters occurred.

The end result of all of this work was that we finally had a U.S. Senate and U.S. House of Representatives bill that contained identical environmental health provisions. Even better, the bill was moving through the U.S. House of Representatives and in fall 2018, they passed PAHPA. It was encouraging that the U.S. Senate was poised to do the same; however, the bill got held up for political reasons that had nothing to do with the bill.

In December 2018, the federal government experience a shut-down and the 115th U.S. Congress ended sine die (i.e., without any future date being designated for resumption) without passing PAHPA. This situation meant that we would have to start over with a new bill in both the U.S. Senate and U.S. House of Representatives because once a Congress ends sine die, all legislation that has not become law must be reintroduced. So, our sights were now set on getting the bill passed by the 116th U.S. Congress.

Many meetings were held to discuss whether a brand-new bill with a new Democrat majority in the U.S. House of Representatives would be needed or if the House could pass what was already agreed upon in fall 2018. Luckily for NEHA, the U.S. House of Representatives agreed to put forward a bill with only one new addition and mostly the exact same language (including the environmental health language) that had passed in fall 2018. The bill was unanimously passed by a voice vote in January 2019.

Once again, PAHPA was stalled in the U.S. Senate due to politics, not policy. Letters of support and many meetings helped us find a way forward, even though the weeks of inaction regarding the bill turned into months. We had to remind everyone of not only the importance of this legislation for the country but also why NEHA was supporting the legislation. We used NEHA's Third Annual Hill Day on May 1, 2019, as a platform to request the passage of PAHPA in the U.S. Senate. NEHA board members and staff held over 50 meetings within one day to plead our case and emphasize the importance of environmental health professionals and PAHPA. Each of these meetings required follow-up and requests to encourage the passing of PAHPA by the U.S. Senate.

As hurricane season approached, a new focus on passing the legislation began to heat up on Capitol Hill. In the end, a deal was brokered: if the U.S. House of Representatives agreed to drop a provision it added to the bill then the U.S. Senate would agree to pass PAHPA. The U.S. House of Representatives agreed that the added provision was not a deal breaker and the U.S. Senate passed PAHPA. A couple of weeks later, the U.S. Senate version of PAHPA was passed in the U.S. House of Representatives. PAHPA was then sent to President Donald Trump to sign. After 9 days where it looked like it would become law on its own, the president signed PAHPA into law on June 24, 2019.

Information from NEHA regarding how environmental health is mentioned in the law can be found online at www.neha.org/node/60816. In general:

- The law specifically outlines who the Assistant Secretary for Preparedness and Response at the U.S. Department of Health and Human Services considers appropriate partners to consult and engage with as it relates to healthcare providers and professionals. The list includes physicians, nurses, first responders, healthcare facilities, pharmacies, emergency medical providers, trauma care providers, **environmental health agencies**, public health laboratories, poison control centers, blood banks, tissue banks, and other experts that are determined appropriate.
- The law makes changes in reference to laboratories. The reference to "clinical laboratories" has been changed to "clinical laboratories and **public environmental health agencies**."
- The law has redesignated human health to include "taking into account zoonotic diseases, including gaps in scientific understanding of the interactions between human, animal, and **environmental health**."
- The law changes the definition of situational awareness and bio-surveillance as a national security priority. Specifically, under the Situational Awareness and Biosurveillance as a National Security Priority section, "**environmental health agencies**" has been inserted after "public health agencies."
- The law directs federal departments to work with state, local, tribal, and territorial public health labs and other biological threat detections to include collaboration regarding the development of a **coordinated environmental remediation plan**.
- The law directs the reporting on public health preparedness and response capabilities of hospitals, long-term care facilities, and other healthcare facilities to include **environmental health**.
- The law includes an evaluation of coordination efforts between the recipients of federal funding for programs described in Subparagraph (A) and **environmental health agencies** with expertise in emergency preparedness and response planning for hospitals, long-term care facilities, and other healthcare facilities.

NEHA is now working on next steps to ensure that environmental health professionals are at the emergency preparedness table. It has been a long journey to include environmental health into PAHPA and to include our profession in the national conversation regarding planning and response to emergency events. Thank you to all involved in this process and for their hard work.

Note of Thanks to Departing Board Members

NEHA is fortunate to have members who are willing to volunteer their time and energy to NEHA through positions within its board of directors and on committees and work groups, as well as serve as subject matter experts, trainers, and peer reviewers. We would be remiss if we didn't acknowledge the dedication, hard work, and

NEHA NEWS

efforts of two members of NEHA's board of directors on the occasion of their departure from the board: Immediate Past-President Adam London and Region 6 Vice-President Lynne Madison.



Immediate Past-President Adam London leaves the board after 9 years of dedicated service and leadership. He served as Region 6 vice-president before being elected as a national officer and was NEHA's president from 2017–2018. Adam also served as chair for NEHA's Finance and Policy Committees. In the coming year he will serve as president of the NEHA past presidents affiliate.

Adam was the director of environmental health for a Michigan county when his time on NEHA's board began. Since that time he was promoted to the position of health officer and director of the Kent County Health Department in Grand Rapids, Michigan. He also teaches courses in public policy and health at Grand Valley State University, Michigan State University, and the University of Michigan. Adam states, "I believe my experience as a NEHA board member was helpful in my professional development."

Adam has lent his leadership talents to other organizations, serving as president of the Michigan Association of Local Environmental Health Administrators and supporting the Michigan Environmental Health Association. He received the Samuel Stephenson Sanitarian of the Year Award in 2011 from the Michigan Environmental Health Association.

"My time on the NEHA board has been one of the most rewarding experiences in my life," states Adam. "It has been an honor to be part of NEHA's growth and success over the past decade. I have also made friends and built relationships that will last a lifetime. I strongly encourage others to consider running for a board position and/or get involved with one or more of NEHA's many committees."



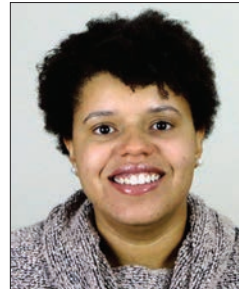
Region 6 Vice-President Lynne Madison leaves the board after 4 years of dedicated service and leadership. While serving on NEHA's board, she represented NEHA on the Council to Improve Foodborne Outbreak Response (CIFOR) and was a member of the CIFOR Governance Committee. It was a career highlight to contribute to the work CIFOR is doing to improve methods to investigate, control, and prevent foodborne disease outbreaks. Lynne also chaired NEHA's Affiliate Engagement Committee and served on the Nominations, Membership, and Annual Educational Conference & Exhibition committees. She's been a strong advocate for the state affiliates and environmental health professionals in her region and was proud to share their concerns with our federal legislators during NEHA's Annual Hill Day for the past 2 years.

Lynne recently retired from a 25-year career as a Michigan registered sanitarian. She served as the environmental health director for Western Upper Peninsula Health Department from 2001 until her retirement last year. Lynne states, "I was fortunate to live and work in a rural area providing my community with a wide range of environmental health services." She has also been active in the Michigan Environmental Health Association, serving as its president in 2010 and receiving its Sanitarian of the Year Award in 2012 and Lifetime Achievement Award in 2017.

"Serving on NEHA's board has been a remarkable experience," states Lynne. "It has been such an honor to represent my colleagues in the environmental health community and to contribute to NEHA's important work supporting environmental health professionals."

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 45.



Kaylan Celestin

I joined NEHA in October 2018 as a public health associate with the Centers for Disease Control and Prevention on a 2-year assignment to NEHA. I graduated in May 2016 with my master's in public health from SUNY Upstate Medical School. Prior to graduating, I was an Oak Ridge Institute for Science and Education (ORISE) fellow for the U.S.

Department of Health and Human Services and worked on immunization programs. Upon graduation, I accepted a position at the Office of the Assistant Secretary for Health at the U.S. Department of Health and Human Services. In this position I was an ORISE fellow working on adult vaccinations and tobacco cessation programs on college campuses. After completing my ORISE fellowship, I accepted a position at the U.S. Department of Veteran Affairs in its Office for Community Care and helped veterans and their families gain access to healthcare coverage.

My role at NEHA is a project specialist working on food safety topics such as restaurant grading. I am working with NEHA's external partner, Dining Safety Alliance, to study the variance in restaurant inspection reporting. I enjoy collaborating and facilitating partnerships to reach a common goal. Working at NEHA is an exciting and rewarding experience because you can feel the impact of your work firsthand. I look forward to interacting with NEHA members and stakeholders throughout my time at NEHA! 🍷

DiracTalk

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anchored in recovery and response to the environment around us. Our profession will need a new playbook of knowledge, skills and abilities if we are to rise to the challenges of our time. This era will necessitate that we rethink the approaches to our subject matter work and assert ourselves in government affairs and planning with discipline and determination.

First, every environmental health professional, governmental or private, should be prepared to contribute to an environmental health strike team. These teams should be assembled and charged to assist after natural and man-made disasters with home, health-care, child care, and business reoccupancy decisions. These strike teams should also assist in temporary shelters and act as scientists-in-residence due to our strong academic preparation.

Second, we need to pay attention and offer our expertise to water service line and premise plumbing issues. As you read this column, many miles of water service lines are being replaced, potentially releasing biofilm, lead, and other contaminants into the public water system. These removals and replacements need to be thought through very carefully to avoid secondary headaches. Complicating matters, service water entering buildings and homes around the country is reportedly



Sargassum seaweed wash up on shore in Playa del Carmen, Mexico. Photo courtesy of David Dyjack.

much warmer than it was a decade ago, giving rise to the potential presence of new and unexpected organisms.

Third, as the earth warms, recreational waters, saline and fresh, will be increasingly hostile environments for bathers, fishermen, and scuba divers. I recently spent the day in Playa del Carmen, Mexico, and witnessed mats of Sargassum seaweed coating the shoreline and waters adjacent to the beach. This phenomenon is relatively new and likely to be climate related. While the seaweed is unsightly and probably not harmful, it is a leading indicator of an ecosystem gone awry.

Fourth, communities affected by poor air quality, particularly in large urban areas and areas adjacent to wildfires, will benefit from our continued surveillance and attention. We should be prepared to answer questions such as, "Should I wear an N95 respirator? Is the soot in my home dangerous? Should I have my ductwork cleaned? What type of air filtration system should I acquire?"

The third era of environmental health presents challenges to us. Morpheus was a sage. The red pill or the blue pill? Do we employ the usual and customary comfortable work pattern, blissfully ignorant of the world around us? Or, do we face directly into the gale of a new brutal truth associated with a rapidly changing environment? 🐷

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David Dyjack, DrPH, CIH

Inflection Point

*I believe
we are entering
a third era.*

Morpheus extends his open hand to Neo, revealing two pills—one red, one blue. He solemnly states, “This is your last chance. After this, there is no turning back. You take the blue pill—the story ends, you wake up in your bed and believe whatever you want to believe. You take the red pill—you stay in Wonderland and I show you how deep the rabbit hole goes.”

A cosmic conversation from the movie, *The Matrix*.

My impression is that our profession is at an inflection point. Frankly, this day has been approaching for quite some time and I liken it to entering the third era of environmental health. First, let me provide some context.

The first modern American environmental health era was arguably an outcome of the Mexican–American War (1846–1848). Of the 79,000 American troops who took part in the war, 13,200 died from mostly infections and diseases. An inspired Abraham Lincoln created the U.S. Sanitary Commission in 1861 to minimize disease-related casualties in the subsequent American Civil War (1861–1865). The commission was so successful that the National Board of Health was created in 1879, which was made possible by the optimism of the environmental health message. This era is characterized by people threatening or transmitting diseases to each other and was exacerbated by localized and poorly maintained environments.

The second era of environmental health spanned post-World War I through the creation of the Nixon-era environmental initiatives, which included seminal legislation

such as the Food, Drug, and Cosmetic Act; Clean Air Act; Clean Water Act; and the Toxic Substances Control Act. During the same time, the Occupational Safety and Health Administration, Food and Drug Administration, National Institute for Occupational Safety and Health, and U.S. Environmental Protection Agency were born. This golden era of inspired legislative advances was paralleled by transformative improvements in sanitation and hygiene engineering throughout much, but not all, of the country. This era, while replete with advances in public health, is also characterized by people threatening their environment through point and nonpoint pollution and was accompanied by large-scale ecosystem disruption.

I believe we are entering a third era, one in which the environment is no longer the stage upon which human actors play their roles as combatants and polluters. I contend in this third era that the environment is increasingly becoming a force of its own, transforming the insults we have heaved upon it over time and catalyzing our surroundings into something new and insidious. Let me provide some illustrations.

This week in my home state of Maryland we experienced a *Vibrio vulnificus* case

(aka, flesh-eating bacteria) originating from exposure to recreational waters near Ocean City. While various *Vibrio* species are ubiquitous in coastal Maryland aquatic systems, I suspect climate change has its fingerprints in the first case of this bacterial infection in my memory. Likewise, the deadly amoeba *Naegleria fowleri*—traditionally associated with warm, shallow, and fresh surface waters in the southern U.S.—is increasingly being detected in northern states.

Forests at one time were considered a prime biological oxygen pump and a place to recreate and rejuvenate the soul. Today, large-scale wildfires throughout the U.S. exacerbate asthma, cause billions of dollars in property loss, and contaminate drinking water, as well as pose other implications to our collective health, safety, and security. Additionally, alternating flooding and drought deliver their own set of challenges to human health. Consider the 2019 crop losses in the U.S. Heartland and the excess nutrients in the Mississippi River giving rise to what the National Oceanic and Atmospheric Administration predicts will be a dead zone—an oxygen-depleted environment anticipated to span more than 20,277 km² in the Gulf of Mexico, which is near the record established in 2017. Coastal marine fishing economies fear the worst. In summary, I could continue my rant on extreme weather, climate, and ecosystem disruptions but alas, that’s not my aim.

I propose that we’ve entered a third era of environmental health, one which will be

continued on page 49

hot water hand washing



hands are like
your best pair
of blue jeans.

the more
you wash them,
the better you feel.

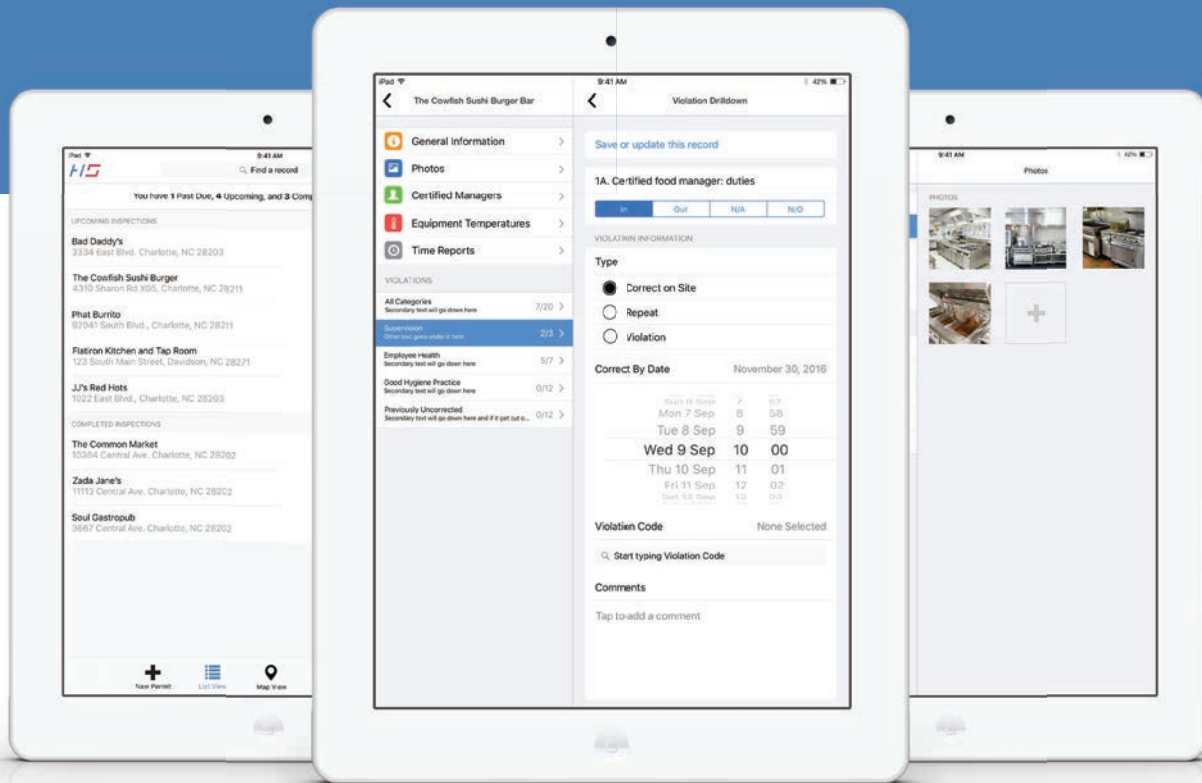


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