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MOBILE FOOD SOURCES:

Foodborne Illness and Seasonality

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ABOUT THE COVER

The author of this month's cover feature, "Foodborne Illness and Seasonality Related to Mobile Food Sources at Festivals and Group Gatherings in the State of Georgia," wanted to address a gap in the literature concerning the connection of location and season to pathogens and impacts of foodborne illness. The author found differences in foodborne illness frequency depending on season as well as location. Based on the results of the author's study, prevention strategies should target specific pathogens during seasons and at venues more likely to see outbreaks.

See page 8.

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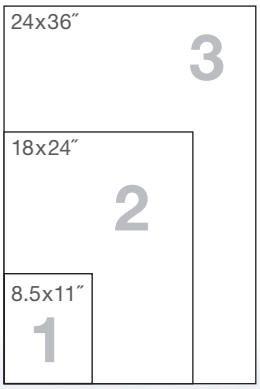

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PRESIDENT'S MESSAGE

Carolyn Hester Harvey,
PhD, CIH, RS, DAAS, CHMM

The NEHA 2015 AEC … So Much More Than a Conference!

Spring is almost here and summer is quickly approaching. Thoughts of a vacation begin to emerge like going to the beach, camping in a national park, Cheyenne Frontier Days Rodeo, and numerous other exciting locations for a great summer vacation. My summer for many years has included NEHA's Annual Educational Conference (AEC) & Exhibition. This year we will be attending the AEC in Orlando, Florida, at the Renaissance Orlando at SeaWorld.

The decision to have the conference in Orlando was an easy one to make as most, if not a large majority of us, have been to one or more of the amusement parks located in the area. The area has an abundance of entertainment, food establishments, and recreational activities for the whole family. NEHA members are our family and we want to meet and get to know their spouses and kids. Hopefully many of the kids will become environmental health majors when they go to college (we are always recruiting to ensure the continuation of our profession). Our attendees can bring their spouses or the entire family as part of their summer vacation. The last time we went to Florida for an AEC was 1993 and it was very well attended by our membership and their families.

This year our theme is "Imagine the New NEHA: Tools for Success Today and Making a Difference for Tomorrow." Our AEC is the meeting location for environmental health training, education, networking, and advancement. It is the event environmental health professionals attend to acquire practical and real-world information and expertise. Attendance at the AEC can enable you to obtain up to 24 hours of continuing education contact hours, which is enough to meet your full two years of NEHA professional credential requirements. In addition to our many technical sessions during the three-day event, we are offering preconference refresher courses for NEHA's Registered Environmental Health Specialist/Registered Sanitarian (REHS/RS), Certified Professional-Food Safety (CP-FS), and Certified in Comprehensive Food Safety (CCFS) credentials and will administer credentialing exams in each of these. A retail level course and certification in hazard analysis and critical control points (HACCP) will also be offered prior to the 2015 AEC. This is an excellent opportunity to obtain valuable training and receive credentials in one or more of these subject areas.

I look forward to seeing and talking with you in Orlando as we begin a new era at NEHA

I decided to do my column this month on the NEHA federation of members and their families attending the 2015 AEC as it will be a turning point for the organization. The 2015 AEC will be a watershed event as our new executive director will be heavily involved in meeting all of you and ensuring the event will be memorable for everyone. We are introducing the "New NEHA" at the AEC. Some familiar faces will be absent and some new faces will be familiar to you as the conference progresses.

NEHA's experienced AEC planning committee (Rance Baker, Laura Brister, Barry Porter, Terry Osner, Jill Schnipke, and Clare Sinacori) have been working diligently in all the numerous aspects of the planning and implementation to ensure this AEC is as good as or better than any before. They are working as a team and in a cooperative environment to make our dream of a 79th annual conference a reality. The planning committee also works closely with staff members from NEHA's other departments—credentialing, customer service, marketing, research and development, the *Journal*, and the Entrepreneurial Zone—to create a cohesive conference that represents all the facets NEHA offers.

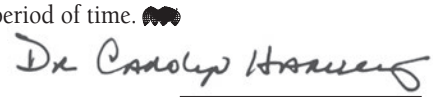
One of the most involved, expensive, time-consuming, and difficult tasks we do at NEHA is our annual conference. Planning, logistics, location, negotiation, and every other aspect of delivering to our members an event worthy of its name begin years before it is reality and our members arrive for the conference. Selection of a location is paramount to how we develop, plan, evaluate, negotiate, and eventually evolve the AEC.

We selected the 2017 site, which is 2.5 years away from fruition, at our winter board

of directors' meeting. We do not even finish the current AEC before we have staff working on the next AEC. It is only with the dedication and hard work of the NEHA staff that we are able to host this wonderful event each year.

I sincerely hope each and every NEHA member is able to attend the AEC this year and be introduced to the new face of the organization. I understand, however, circumstances beyond control will not allow everyone to attend, so I would encourage every member of NEHA, whether you plan to attend the AEC or not, to please e-mail one or more of the staff listed above to thank them for their hard work in this endeavor (NEHA staff e-mail addresses can be found on page 59). We as members seldom show our appreciation to those who keep our organization performing as we expect and in many instances demand. I know I am very grateful for all the hard work of the NEHA staff and would like to thank each and every one of them personally, especially for all their assistance since my becoming NEHA president. I look forward to seeing and talking with you in Orlando as we begin a new era at NEHA.

Just a short note to give you an update on the NEHA executive director search: I want you to know we are working diligently to hire our new executive director, whom we hope to have in place in April. Your e-mails, calls, and suggestions have given the board of directors and me some very good ideas. We are continually mindful of NEHA being your organization and we are your stewards for a short period of time.



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Remember, you can now register online for the NEHA 2015 AEC in Orlando, Florida. On our Web site you can select full conference registration as your all access pass to the 2015 AEC, or you can pick and choose the daily sessions and events that are right for you. Be sure to complete your online registration before May 29 to take advantage of our early bird pricing.

Foodborne Illness and Seasonality Related to Mobile Food Sources at Festivals and Group Gatherings in the State of Georgia

Erica Wilson, MPH, PhD
Walden University

Abstract **Little is known about the relationship of location and season to the pathogen and impact of foodborne illness. A sample of 244 foodborne illness outbreaks from the Foodborne Outbreak Online Database System stemming from festivals (mobile food sources) and group gatherings in Georgia between 1998 and 2010 was examined to determine if season and location were related to pathogen and the number of ill or hospitalized individuals. Results of Chi-square tests of independence, one-way analysis of variance, and the Kruskal-Wallis test showed that norovirus and *Salmonella* were more strongly associated with group gatherings; *Staphylococcus* outbreaks were more associated with festivals; norovirus was more frequent during winter; and *Salmonella* was more associated with summer and autumn events. Location and impact were significant for outbreaks associated with group gatherings, resulting in more hospitalizations than outbreaks associated with festivals. No statistically significant difference occurred between the numbers of reported illnesses stemming from festivals versus group gatherings nor did a seasonal difference occur in the total number of individuals who fell ill or were hospitalized.**

Introduction

In 2011, approximately 9.4 million foodborne illnesses caused by 31 known pathogens occurred in the U.S. leading to nearly 56,000 hospitalizations and approximately 1,300 deaths (Centers for Disease Control and Prevention [CDC], 2011). Relatively little previous research has been conducted on foodborne illness in the state of Georgia, and little is known about the influence of factors such as location and season on the pathogen and impact of foodborne illness. The current study contributes to the knowledge base by examining the role of location and season on foodborne illness stemming from mobile food sources at festivals and group gatherings in the state of Georgia in 1998–2010.

I examined the following research questions and hypotheses. First research question: does location (defined as festivals or group gatherings) or season of the outbreak (defined as winter, spring, summer, or autumn) correlate with the etiology (defined as the type of pathogen)? First hypothesis: location correlates with the type of pathogen that causes foodborne illnesses in Georgia. Second hypothesis: the season of the outbreak correlates with the type of pathogen that causes foodborne illnesses in Georgia. Second research question: does the location or the season of the outbreak correlate with the impact (number ill and number hospitalized)? Third hypothesis: a significant difference exists between the festivals and group gatherings for the reported number of illnesses or number hospitalized. Fourth hypothesis: seasonality is associated with the number of reported illnesses or number hospitalized.

Methods

Georgia is a state on the southeastern coast of the U.S. It has a population of nearly 10 million and an area of 59,441 square miles (153,951 km^2), with a humid subtropical climate. Archival data on foodborne illness in Georgia between 1998 and 2010 from the Centers for Disease Control and Prevention's (CDC's) Foodborne Outbreak Online Database were examined. Data included (a) month and year, (b) pathogen, (c) location, (d) total ill, (e) total hospitalizations, (f) total deaths, and (g) vehicle (i.e., food source). I used a retrospective correlational methodology to examine possible relationships between the independent variables of location (limited to mobile food trucks and group gatherings) and season (defined as winter: December–February, spring: March–May, summer: June–August, and autumn: September–November), and the dependent variables of pathogen and impact (number of ill and the number of hospitalized individuals). Festivals included events such as mobile food sources at fairs, carnivals, and rodeos. Group gatherings included picnics, private homes, or wedding receptions.

TABLE **1**

Descriptive Statistics for Categorical Study Variables (*N* = 244)

Variable	#	%
Location		
Festivals	6	2.5
Group gatherings	56	23.0
Other		
Restaurants	71	29.1
Miscellaneous[a]	67	27.5
Unknown, unreported	44	18.0
Season		
Winter	59	24.2
Spring	65	26.6
Summer	69	28.3
Autumn	51	20.9
Pathogen		
Norovirus	94	38.5
Salmonella	73	29.9
Staphylococcus	27	11.1
Clostridium	17	7.0
E. coli	12	4.9
Other	21	8.6

[a]Banquet halls, schools, workplaces, churches/temples, nursing homes, hospitals, prisons/jails, camps, and daycare centers.

TABLE **2**

Cross Tabulation of Location and Pathogen (*N* = 244)

Pathogen	Location			Total
	Festivals	Group Gatherings	Other	
Norovirus	0 (0.0%)	15 (26.8%)	79 (43.4%)	94 (38.5%)
Salmonella	3 (50.0%)	26 (46.4%)	44 (24.2%)	73 (29.9%)
Staphylococcus	3 (50.0%)	2 (3.6%)	22 (12.1%)	27 (11.1%)
Clostridium	0 (0.0%)	1 (1.8%)	16 (8.8%)	17 (7.0%)
E. coli	0 (0.0%)	6 (10.7%)	6 (3.3%)	12 (4.9%)
Other	0 (0.0%)	6 (10.7%)	15 (8.2%)	21 (8.6%)
Total	6 (100.0%)	56 (100.0%)	182 (100.0%)	244 (100.0%)

Note. $\chi^2(10, N = 244) = 33.96$, $p < .001$.

An *a priori* power analysis was conducted by means of G*Power 3.10 (Faull, Erdfelder, Lang, & Buchner, 2007) on the most conservative statistical approach to be used, which suggested a minimum sample size of 210 cases. The final sample consisted of 244 cases.

Results

Table 1 shows descriptive statistics for the variables of location, season, and pathogen. The most common pathogen was norovirus, followed by *Salmonella*, *Staphylococcus*, *Clostridium*, and *E. coli*. Twenty-one cases (8.6%) had relatively rare pathogens, with no more than three cases with the same pathogen in this sample. For seasonality, number of cases varied from 51 in autumn to 69 (28.3%) in summer. Group gatherings were the most common location at 56 (23.0%) with an additional six cases (2.5%) occurring at festivals. One hundred eighty-two cases occurred in other locations.

Restaurants were the most common source of illness, followed by group gatherings. Six cases (2.5%) were attributable to festivals. The remaining cases with identified locations (27.5%) occurred across banquet halls, schools, workplaces, churches/temples, nursing homes, hospitals, prisons/jails, camps, and daycare centers.

The first hypothesis was tested using a Chi-square test of independence, with location (festival, group gathering, or other) as the independent variable and pathogen as the dependent variable. Results were statistically significant, $\chi^2(10, N = 244) = 33.96$, $p < .001$ (Table 2). At group gatherings, 46.4% of the cases were the result of *Salmonella*, and an additional 26.8% were the result of norovirus. For festivals, 50.0% of the cases resulted from *Salmonella*, and the other 50.0% from *Staphylococcus*. At the other events, the most common pathogens were norovirus (43.4%), *Salmonella* (24.2%), and *Staphylococcus* (12.1%).

The second hypothesis was tested using a Chi-square test of independence, with season as the independent variable and type of pathogen as the dependent variable. Results were statistically significant, $\chi^2(15, N = 244) = 26.63$, $p = .032$, indicating that season and pathogen were related (Table 3). In winter, 55.9% of cases were caused by norovirus, compared to 43.1% in spring, 29.0% in summer, and 25.5% in autumn. *Salmonella* accounted for a higher percentage of summer and autumn cases than winter or spring cases.

Before conducting statistical tests of the third and fourth hypotheses, I examined the distribution of scores of the dependent variables, the number of illnesses, and the number of hospitalized individuals for normality. Scores were standardized (to have a mean of 0 and standard deviation of 1) for the examination of normality; both distributions were positively skewed, with a few outbreaks having very large standard scores in excess of the absolute value of 3 typically used to define outliers. Four such outbreaks existed for each variable (total of ill and total of hospitalized individu-

als). I removed these outliers from the analyses in the second research question, resulting in 240 cases instead of the 244 cases included in the analyses of the first research question. Levene's test assessed the homogeneity of variances assumption (Howell, 2010). For the analysis of total ill as a function of case location, Levene's test was not statistically significant, $F(2, 237) = 0.81$, $p = .444$. For the analysis of total ill as a function of season, Levene's test was not statistically significant, $F(3, 236) = 0.16$, $p = .924$. For the analysis of total hospitalized individuals as a function of season, Levene's test was not statistically significant, $F(3, 189) = 1.84$, $p = .141$ (the assumption of the homogeneity of variances was met in these three instances). For the analysis of total hospitalized as a function of case location, however, Levene's test was statistically significant, $F(2, 190) = 11.42$, $p < .001$ (the assumption of homogeneity of variances was violated). Therefore, for the analyses of total ill individuals as a function of location, total ill individuals as a function of season, and total hospitalized individuals as a function of season, the planned one-way analyses of variance (ANOVAs) were performed. For the analysis of total hospitalized individuals as a function of location, I performed a Kruskal-Wallis test in place of the planned one-way ANOVAs because the assumption of the equality of variances is not required for the Kruskal-Wallis test (Howell, 2010). In the analysis of hypothesis 3 (Table 4), total ill individuals by location, the ANOVA was not statistically significant, $F(2, 237) = 0.55$, $p = .579$. In the analysis of total hospitalized individuals as a function of location, the Kruskal-Wallis test was statistically significant, $\chi^2(2, N = 197) = 18.42$, $p < .001$. The number of individuals hospitalized was higher for group gatherings ($M = 6.50$, $SD = 9.71$) than for festivals ($M = 2.00$, $SD = 2.45$) or other types of events ($M = 2.14$, $SD = 6.02$).

In the analysis of hypothesis 4, total ill individuals as a function of season, the ANOVA was not statistically significant, $F(3, 236) = 0.19$, $p = .902$, as was the case for total hospitalized individuals as a function of season, $F(3, 189) = 0.52$, $p = .671$. Thus, no significant difference occurred in the number of reported illnesses or number hospitalized during winter, spring, summer, or autumn.

TABLE **3**

Cross Tabulation of Season and Pathogen (*N* = 244)

Pathogen	Season				Total
	Winter	Spring	Summer	Autumn	
Norovirus	33 (55.9%)	28 (43.1%)	20 (29.0%)	13 (25.5%)	94 (38.5%)
Salmonella	14 (23.7%)	13 (20.0%)	28 (40.6%)	18 (35.3%)	73 (29.9%)
Staphylococcus	7 (11.9%)	7 (10.8%)	6 (8.7%)	7 (13.7%)	27 (11.1%)
Clostridium	3 (5.1%)	7 (10.8%)	3 (4.3%)	4 (7.8%)	17 (7.0%)
E. coli	0 (0.0%)	4 (6.2%)	6 (8.7%)	2 (3.9%)	12 (4.9%)
Other	2 (3.4%)	6 (9.2%)	6 (8.7%)	7 (13.7%)	21 (8.6%)
Total	59 (100.0%)	65 (100.0%)	69 (100.0%)	51 (100.0%)	244 (100.0%)

Note. $\chi^2(15, N = 244) = 26.63$, $p = .032$.

TABLE **4**

Mean Scores for Total Ill and Total Hospitalized Individuals as a Function of Location (*N* = 240)

Variable	Location			Total
	Festivals	Group Gatherings	Other	
Total ill individuals ($N = 240$)	38.33 ($SD = 48.64$)	44.4 ($SD = 63.88$)	35.88 ($SD = 49.08$)	37.90 ($SD = 52.71$)
Total hospitalized individuals ($n = 193$)	2.00 ($SD = 2.45$)	6.50 ($SD = 9.71$)	2.14 ($SD = 6.02$)	3.18 ($SD = 7.24$)

Note. For total ill individuals as a function of location, the analysis of variance was not statistically significant, $F(2, 237) = 0.55$, $p = .579$. For total hospitalized individuals as a function of location, the Kruskal-Wallis test was statistically significant, $\chi^2(2, N = 197) = 18.42$, $p < .001$.

Discussion

In the existing literature, very little research has addressed the topic of the current study, which focused on exploring differences in etiologies of foodborne illness outbreaks as a function of location and season. In terms of seasonality, two studies have demonstrated that outbreaks are more common in the warmer summer months (Ackerman, 2011; U.S. Department of Agriculture [USDA], 2011). A possible reason for this is that outdoor temperatures in the summer are closer to the temperatures at which the bacteria that most likely cause illness thrive (e.g., 90°F–110°F, or 32°C–43°C). Additionally, people spend more time outside or in large groups during the summer months, and more people cook outside during the summer months (USDA, 2011).

Despite these past studies showing that foodborne illness outbreaks are more common during the summer months, studies on the differences between the types of outbreaks that occur at various times of year were sparse.

In the current study, norovirus was found to be more of a problem in Georgia in winter, while *Salmonella* was found to be more of a problem in summer and autumn than in winter or spring. This finding extends the results of past studies by providing more detailed information on seasonality, suggesting that all types of foodborne illness outbreaks may not be equally common in the summer months. Current results indicate that in Georgia, norovirus is an apparent exception to research indicating outbreaks were more common during the summer months. Different types of outbreaks will have unique origins, prevention measures, and prognoses.

Measures to prevent cross contamination of foods being consumed in mobile food areas or outside the home include cleaning and sanitizing of food contact surfaces, effective hand washing, and the separation of raw

animal foods from ready-to-eat foods. Further research is needed to explore different organisms and the association with seasonality in order to provide the most beneficial recommendations for prevention and control.

The results from this study showed that in Georgia, norovirus and *Salmonella* outbreaks were more commonly associated with group gatherings and less commonly at festivals or other venues, while *Staphylococcus* outbreaks were more commonly associated with festivals than group gatherings or other venues. Prevention strategies specific to these pathogens should be targeted at the venues most likely to see outbreaks. Current results suggest that in Georgia, a focus on norovirus and *Salmonella* prevention at group gatherings and on *Staphylococcus* prevention at festivals could reduce the number of outbreaks and reported illnesses. Similarly, the finding that norovirus is more of a problem in winter while *Salmonella* is more of a problem in summer and autumn suggests that prevention efforts and education in Georgia should be increased and aimed appropriately at the pathogens more commonly causing illness during these times of year.

Several limitations were present in this study, the first being its reliance on archival data. Only the variables collected and provided by CDC were used in the analysis. Since the dataset did not contain information on how commonly people eat at these locations, I was not able to analyze the total exposed, which would have given me a stronger epidemiological measure.

The data were limited to 1998–2010. Using data up to 14 years old may have affected the results by presenting a view of foodborne illness outbreaks based on outdated information. The nature of foodborne illnesses in Georgia has possibly changed in the past decade, making the older data in this study misleading or making the lack of data from the most recent several years misleading. The extent to which this is true may present an inaccurate reflection of the current dangers posed by foodborne illnesses.

This analysis focused on foodborne illness outbreaks occurring from mobile food sources at festivals as well as group gatherings. Therefore, the extent to which the results from this study would apply to all foodborne illness outbreaks in Georgia is unknown.

This study was significant because of the frequency and impact of foodborne diseases. CDC (2011) estimated that foodborne outbreaks cause 76 million illnesses, 325,000 hospitalizations, and 5,200 deaths each year in the U.S. According to CDC, foodborne illnesses result from a lack of understanding of the hazards by food handlers and failure to use adequate controls. The results from this study can be used to reduce the number of incidents stemming from festivals and group gatherings.

I analyzed data from Georgia only. Whether the results of this study apply to foodborne illness outbreaks in other states is unknown. Given the availability of data from other states through the CDC Web site, updates and replication of this study using national data or data from other states could be accomplished relatively easily, as updates are posted to the CDC Web site each year. Research on the generalizability of the findings to other states and expansion of the scope of the study to a national scale to include foodborne illness outbreaks that occurred in a wider variety of locations are recommended. I also recommend analyzing total exposed, as it would be helpful to know actual incidence and prevalence rates in future studies.

Conclusion

This study has several strengths. Few prior researchers have discussed seasonality or location as predictors of pathogen for foodborne illness outbreaks. The results from this study have extended this past research. Findings from the current study that norovirus is more strongly associated with outbreaks in winter contradict other findings that foodborne illness outbreaks are more common in the summer months (Ackerman, 2011; USDA, 2011). The reason for this contradiction may lie in the specificity of these findings for norovirus and locations in particular. Further research into the role of these factors is required.

Most foodborne outbreaks go largely undiagnosed because of incomplete or lack of prompt and accurate reporting by individual states (CDC, 2011). Many states lack the technology or expertise to identify foodborne outbreaks and pathogens involved so that proper treatment can be provided. The results of this study identified the degree to which factors of setting and season were important in the transmission of foodborne illness in Georgia, revealing directions for future research and improving the ability of both state health departments and the federal government to prevent outbreaks. The results from this study underscore the importance of a deeper analysis of foodborne illness outbreaks in terms of season and location.

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An Exploratory Analysis to Determine Priority Areas for Lead Poisoning Prevention Education Programs in Missouri

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Abstract **Lead is a strong poison and toxic to many vital organs and body systems especially in the central nervous system of children, who are more vulnerable to lead poisoning than adults. The purpose of the study described in this article was to examine the relationship between elevated blood lead level (BLL) cases of children in the state of Missouri and pre-1980 home construction, lead mine proximity, and median household income and to determine counties and areas for statewide prevention education. Results of the regression analysis indicated that these combined variables were significant predictors ($F[3,111] = 19.106$, $p < .05$, $R^2 = .341$), accounting for 34.1% of the explained variance in the number elevated BLL cases. Number of houses built prior to 1980 ($\beta = .606$, $p < .05$) and median household income ($\beta = -0.186$, $p < .05$) were specifically revealed to be significant predictors of elevated blood lead cases. In addition to screening in identified counties, Missouri's statewide plan should expand to include prevention education in all low-income counties.**

Introduction

Lead, which is a heavy, soft, bluish-gray metal that occurs naturally in the rocks and soil of the Earth's crust, has no distinctive taste or smell and today is used in the production of batteries, ammunition, pipes, tank linings, construction materials, glazes, and glassware (Missouri Department of Health and Senior Services [MDHSS], 2012). Lead is a strong poison and toxic to many vital organs and body systems especially in the central nervous system of children, who are more vulnerable to lead poisoning than adults. No safe blood lead level (BLL) exists for children. Even a small amount of lead (a chip of paint smaller than a dime) can affect blood as well as slow growth and development, and larger exposures may potentially lead to brain damage, anemia, kidney damage, colic, and muscle weakness (Agency for Toxic Substances and Disease Registry, 2011). Repeated low levels of exposure to lead can alter a child's normal mental and physical growth and result in learning or behavioral problems (MDHSS, 2012).

Children in about four million U.S. homes today are being exposed to high levels of lead (Centers for Disease Control and Prevention [CDC], 2013). Although lead-based paints for homes, toys, and furniture have been banned in the U.S. since 1978, lead-based paint is still found on the walls of many older homes. In addition, lead pipes, brass plumbing fixtures, and copper pipes soldered with lead can release lead particles into tap water (National Institutes of Health [NIH], 2012). Lead poisoning is linked to the more than six million substandard housing units in this country, and our national health goals call for a 52% reduction in the number of these units (CDC, 2013).

The risk of exposure is exceptionally high for children in Missouri as the state produces more lead than any other state in the U.S. Missouri's major lead-producing area is known as the New Lead Belt, a 35-mile long ore-producing area in Iron County, southeast Missouri. Mining waste from the New Lead Belt includes high levels of lead in dust, air, and soil that may contaminate places in which children frequent such as yards and play areas (MDHSS, 2011). In addition, 65% of Missouri homes were built prior to 1978 and contain leaded paint (MDHSS, 2002). In 62 of the 115 Missouri counties, including the New Lead Belt, at least 24% of homes were constructed before 1950 (MDHSS, 2011).

A little over 1% of Missouri children possess elevated BLLs (MDHSS, 2012). According to recent Missouri BLL testing data, 712 children under six years of age were identified with elevated BLLs. Fortunately, lead poisoning is both a preventable and treatable condition, and Missouri's statewide screening plan calls for providing BLL screening and primary prevention for patients six years of age and younger in both high-risk and targeted testing areas and counties: Kansas City, Jackson County, St. Louis County, and southeast Missouri (MDHSS, 2011). Therefore, the purpose of our study was to examine the relationship between elevated BLL cases of children in the state of Missouri

TABLE **1**

Report of Independent Regression Variables Used to Predict Elevated Blood Lead Levels

Variable	*B*	Standard Error	β
Houses built prior to 1980	0.017	0.002	.606*
Number of lead mines	-0.018	0.389	-0.004
Median household income	-0.024	0.010	-0.186*

*$p < .05$.

and pre-1980 home construction, lead mine proximity, and median household income and to identify counties and areas in need of lead poisoning prevention education.

Methods

Data Sources and Procedure

The main data source for our study was a comprehensive, ongoing collection of data about environmental hazards, exposures, and health effects for the state of Missouri: Missouri's Environmental Public Health Tracking System (EPHT). The public portal can be found at http://ephtn.dhss.mo.gov/EPHTN_Data_Portal/. A Centers for Disease Control and Prevention partner, Missouri's EPHT has collaborated with national and state system partners to protect communities by providing them with information to identify and reduce environmental public health exposures. By conducting studies using EPHT (identifying clusters of noninfectious health effects, tracking conditions, and taking actions to control environmentally related diseases), health care and public health professionals can promote health and prevent disease. Privacy of the data including both the public and secure portals is maintained by public health agencies, and all requests for information from the secure portal must first be reviewed using a strict procedure (MDHSS, 2002).

The other data source for our study was a comprehensive collection of statewide GIS data, the Missouri Spatial Data Information Service (MSDIS), which can be found at www.msdis.missouri.edu/index.html. Operating under the guidance of the Missouri Geographic Information System Advisory Committee, MSDIS is a spatial data retrieval and archival system for GIS data and is also responsible for data standardization, compilation of metadata, and statewide GIS user information networks (Missouri Spatial Data Information Service [MSDIS], 2011).

During spring and summer 2013, data from the Missouri EPHT public portal metadata bank (MDHSS, 2002) and the Missouri Spatial Data Information Service Web site (MSDIS, 2011) were collected and analyzed. The specific variables analyzed included lead mines in Missouri (inventory of mines, occurrences, and prospects), elevated BLL cases in 2001–2012 (noted the number of children 71 months and younger, in all Missouri counties, with an elevated BLL), housing before 1980, and median household income. All metadata were downloaded to Microsoft Excel for ease of viewing, double-checked during analysis, and stored in a password-protected site.

Analysis

A multiple regression was conducted to predict the number of recorded elevated BLL cases (2001–2012) from the number of houses in each county built before 1980, the number of lead mines (active and inactive) in each county, and the median household income for each county.

Results

Results of the regression analysis (Table 1) indicated that these combined variables were significant predictors of elevated BLL cases in Missouri ($F[3,111] = 19.106$, $p < .05$, $R^2 = .341$), accounting for 34.1% of the explained variance in the number of elevated blood lead cases. More specifically, the number of houses built prior to 1980 ($\beta = .606$, $p < .05$) and median household income ($\beta = -0.186$, $p < .05$) were revealed to be significant predictors of elevated BLL cases. The number of lead mines in the state of Missouri was not a significant predictor.

Discussion

This initial exploratory analysis was conducted to clarify and help to define the nature of the problem of lead exposure risk in Missouri children as well as to determine counties and areas in need of lead poisoning prevention educational programming. Results of the current study are consistent with previous research and provide support to suggest that living in substandard older homes may predict a child's risk for elevated BLLs (MDHSS, 2002, 2011). Because Missouri is the number-one lead-producing state in the nation, Missouri children are already at heightened risk for lead exposure, especially in the New Lead Belt counties where most lead is produced (MDHSS, 2011).

In order to focus more specifically on where lead poisoning prevention educational programs should be targeted, however, all high-risk counties and conditions need to be identified. Homes built before 1980 and median household income were significant predictors of total elevated BLLs and accounted for 34% of the explained variance in our study. Sixty-five percent of Missouri homes were built prior to 1978 with numerous homes built prior to 1950 (MDHSS, 2002, 2011). Because of the possibility of lead-based paint as well as older fixtures that may leach lead, these homes should be considered high risk (NIH, 2012). Risk is also increased in homes where lead-based paint is on deteriorated surfaces such as windows and window trim that are easily accessible to children. Opening and closing of these windows wears away the paint and creates lead dust that may increase lead exposure in children (CDC, 1991).

Median household income was also a predictor, as it would be expected that those with lower incomes may only be able to afford older less expensive homes. Many of these types of homes would possibly be substandard and contain lead in paint or fixtures. In addition to concentrating on the lead-belt counties and BLL screening of children in designated high-risk counties and areas (MDHSS, 2011), other counties that contain an abundance of pre-1980 home construction and especially all lower socioeconomic status counties should also be identified for educational prevention programming.

Conclusion

The risk of lead exposure is exceptionally high for children in the number-one lead-producing state in the nation. Because the number of houses in each county built before 1980 and the median household income for each county were found to be significant predictors of elevated BLL cases, all counties and areas with low socioeconomic status levels need to be identified for educational prevention activities. Our study may be limited as other variables may lend themselves to further exploration such as older homes with or without more recent renovations and number of children who have previously received screenings and education in schools or through state or county programs (MDHSS, 2011). Further research using Missouri EPHT is recommended as it may lead to other actions or expanded conditions to control environmentally related diseases such as lead poisoning (MDHSS, 2002).

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Analyses of the Contributing Factors Associated With Foodborne Outbreaks in School Settings (2000–2010)

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Abstract **State-reported school foodborne outbreaks account for about 3.8% (*n* = 464) of all outbreaks and 8.2% (*n* = 20,667) of all illnesses reported to the Centers for Disease Control and Prevention's Foodborne Disease Outbreak Surveillance System. Of 464 school foodborne outbreaks, 122 (26%) outbreaks, 7,603 illnesses, and 301 reported food safety errors met the criteria for inclusion in the analyses. The purpose of the authors' study was to examine the role of contributing factors in school foodborne outbreaks. Contamination factors accounted for the greatest proportion (49.2%) of outbreaks involving some level of food handling interaction by a school food service worker, followed by proliferation (34.9%) and survival factors (15.9%). Over 56% of all illnesses were associated with norovirus and food service worker practices. The results of these analyses highlight the importance of effective food safety education programs that focus on the role of contributing factors and prevention of foodborne disease from food safety errors.**

Introduction

Contributing Factors and Foodborne Disease

The health burden posed by foodborne disease is significant. The Centers for Disease Control and Prevention (CDC) estimate that viral, bacterial, and parasitic foodborne disease strikes about 48 million individuals resulting in 128,000 hospitalizations and 3,000 deaths on an annual basis (Painter et al., 2013; Scallan et al., 2011). Foodborne disease surveillance reports highlight the significant health burden particularly among children, who are one of the most vulnerable segments of the population to the effects of foodborne disease (Centers for Disease Control and Prevention [CDC], 2012a; McCabe-Sellers & Beatte, 2004).

According to foodborne surveillance data, contributing factors play a significant role in foodborne disease in school settings (Daniels et al., 2002). Contributing factors are defined as "food safety practices and behaviors that most likely contributed to a foodborne illness outbreak (Bryan, Guzewich, & Todd, 1997)." Contributing factors associated with foodborne outbreaks fall into three broad categories with associated subcategories of food safety errors:

- contamination (C1 to C15), i.e., food safety practices that contribute to the introduction of pathogens into food (e.g., bare-hand or gloved-hand contact with food by an infected food worker);
- proliferation (P1 to P12), i.e., improper food preparation practices that allow pathogens to proliferate while food is being prepared (e.g., improper temperature control during hot or cold holding); and
- survival (S1 to S5), i.e., failure of processes intended to eliminate or inhibit the survival of a microbial contaminant (e.g., insufficient time/temperature control during cooking, reheating, or freezing) (CDC, 2012b, 2013a; Gould, Walsh et al., 2013).

Contributing factors are typically identified during the environmental health assessment phase of a foodborne outbreak investigation, which is initiated at the start of an outbreak investigation (Todd, Guzewich, & Bryan, 1997). Identification of contributing factors can be both challenging and complex. The value of an environmental health assessment relies heavily on the quality, completeness, and accuracy of epidemiological information from the outbreak investigation (CDC, 2012c; Council to Improve Foodborne Outbreak Response [CIFOR], 2009). Environmental health assessments are not conducted for all outbreaks, however, which is one major obstacle in identification of contributing factors.

The U.S. Department of Agriculture Food and Nutrition Service administers the National School Lunch Program (NSLP) and the School

TABLE **1**

Contamination Contributing Factors

Contributing Factor	Food Safety Errors # (%)
C12: Other mode of contamination (excluding cross contamination) by food handler/worker/preparer who is suspected to be infectious	62 (41.9)
C6: Contaminated raw product—food was intended to be consumed after a kill step	19 (12.8)
C10: Bare-hand contact by a food handler/worker/preparer who is suspected to be infectious	16 (10.8)
C11: Glove-hand contact by food handler/worker/preparer who is suspected to be infectious	14 (9.5)
C13: Foods contaminated by non-food handler/worker/preparer who is suspected to be infectious	11 (7.4)
C15: Other source of contamination	9 (6.1)
C7: Contaminated raw product—food was intended to be consumed raw or undercooked/underprocessed	5 (3.4)
C9: Cross contamination of ingredients (not involving ill food workers)	5 (3.4)
C14: Storage in contaminated environment	3 (2.0)
C3: Poisonous substance accidentally/incidentally added	2 (1.4)
C5: Toxic container	1 (0.7)
C8: Foods originating from sources shown to be contaminated or polluted (such as growing field or harvest area)	1 (0.7)
Total food safety errors	148 (100)

Breakfast Program (SBP) through state education, health, or agriculture agencies. As of fiscal year 2012, the NLSP and the SBP served over 101,000 (93%) schools throughout the U.S. with 32 million lunches and 12 million breakfasts daily (U.S. Department of Agriculture Food and Nutrition Service, 2013). The potential for foodborne outbreaks to occur in a closed setting such as schools and to affect a large segment of the school-aged population is significant (Daniels et al., 2002). Based on this potential, preventing foodborne disease is a major goal. The purpose of our study was to examine the role of contributing factors and the spread of foodborne disease in school foodborne outbreaks.

Methods

Data Sources and Analyses

State-reported outbreak surveillance data from the CDC's Foodborne Disease Outbreak Surveillance System spanning 2000 through 2010 (CDC, 2013b) were used in the analyses. Criteria for inclusion in the analyses were restricted to foodborne outbreaks of confirmed etiologic agent(s), reported contributing factor(s), implicated food(s) if reported, and school-associated outbreak (i.e., food either eaten or prepared in any type of school setting was defined as school associated). Food safety errors were grouped into specific categories based on similarity and genus, species, and serotypes were merged into pathogenic and nonpathogenic groups. Food safety errors and pathogenic groups associated with the largest number of illnesses per outbreak and implicated food(s) were further analyzed. Reported contributing factor(s) associated with food safety error was the unit of analysis. Descriptive statistics were calculated and analyzed using STATA v. 10.0 and Microsoft Office Excel 2007.

Results

Contributing Factors Associated With Foodborne Outbreaks

State-reported foodborne outbreaks in school settings accounted for 3.8% (n = 464) of all outbreaks and for 8.2% (n = 20,667) of all foodborne illnesses when compared to all other settings. Laboratory-confirmed foodborne outbreaks in school settings accounted for 45.3% (n = 210) of all outbreaks and for 56.6% (n = 11,698) of all illnesses when compared to other settings. Of 464 school-associated foodborne outbreaks and 20,667 associated foodborne illnesses, 122 (26%) met the criteria for inclusion. The 122 outbreaks consisted of 301 reported food safety error entries. The range of food safety errors was 1–10 (median = 2; interquartile range = 2). At least one food safety error was reported in 54 (44%) outbreaks. Reported contamination contributing factors accounted for 49.2% (n = 148) of all reported food safety errors followed by proliferation (34.9%; n = 105) and survival factors (15.9%; n = 48).

Contamination Factors

Individual analyses of contamination factors indicated that C12 accounted for 41.9% (n = 62) of reported food safety errors followed by C6 (12.8%, n = 19), C10 (10.8%, n = 16), and C11 (9.5%, n = 14) (Table 1).

Proliferation Factors

Individual analyses of the proliferation factors indicated that P1 accounted for 27.6% (n = 29) of reported food safety errors followed by P2 and P4 (19.1%, n = 20 and 19.1%, n = 20) and P6 (15.2%; n = 16) (Table 2).

Survival Factors

Individual analyses of the survival factors indicated that S1 accounted for 41.7% (n = 20) of reported food safety errors followed by S2 (35.4%; n = 17) and S5 (16.7%; n = 8) (Table 3).

Pathogenic and Nonpathogenic Groups and Associated Foodborne Illnesses

The total number of illnesses associated with all contributing factors for 122 outbreaks was 7,603 (95% confidence interval: 5,944–9,261; mean: 62; range: 2–510). Foodborne illnesses were most often associated with the pathogenic groups norovirus (56.4%; n = 4,285) followed by *Salmonella* spp. (16.2%; n = 1,234) and *Clostridium perfringens* (12.2%; n = 925). Foodborne illnesses were less often associated with pathogenic and nonpathogenic Shiga toxin–producing *E. coli* spp. (STEC) (5.1%; n = 386), *Staphylococcus aureus* (4.2%; n = 320), *Campylobacter* spp. (1.7%; n = 132), chemicals (1.5%; n = 115), *Shigella sonnei* (1.4%; n = 104), *Bacillus* spp. (1.0%; n = 79), heavy metals (0.3%; n = 21), and hepatitis A (0.03%; n = 2).

Pathogenic Groups and Associated Contributing Factors Categories

In order to determine the proportion of pathogenic groups associated with contributing factors, 11 interrelated food safety errors were further merged into one of three categories: 1) contamination due to school food worker practices (C10, C11, and C12); 2) pathogen growth due to insufficient time/temperature control (P2, P3, P4, P6, P7, and P8); and 3) pathogen survival due to insufficient time/temperature control (S1 and S2). Analyses of the resultant 199 food safety errors associated with specific bacterial and viral pathogen groups indicated that errors were most often associated with norovirus (35.7%; *n* = 71), *C. perfringens* (29.2%; *n* = 58), *Salmonella* spp. (13.1%; *n* = 26), and *S. aureus* (8.5%; *n* = 17). Food safety errors were less often associated with STEC (5.0%; *n* = 10), *Campylobacter* spp. (3.5%; *n* = 7), *Bacillus* spp. (2.5%; *n* = 5), *S. sonnei* (2.0%; *n* = 4), and *Streptococcus* spp. (0.5%; *n* = 1).

Further analyses of the food safety errors indicated that C10, C11, and C12 accounted for 98.6% (*n* = 70) of norovirus food safety errors; P2, P4, and P6 accounted for 58.6% (*n* = 34) and S1 and S2 accounted for 27.6% (*n* = 16) of *C. perfringens* food safety errors; S1 and S2 accounted for 42.3% (*n* = 11) of *Salmonella* spp. food safety errors; and S1 and S2 accounted for 29.5% (*n* = 5) of *S. aureus* food safety errors.

TABLE **2**

Proliferation Contributing Factors

Contributing Factor	Food Safety Errors # (%)
P1: Food preparation practice that supports proliferation of pathogens (during food preparation)	29 (27.6)
P2: No attempt was made to control the temperature of implicated food or the length of time food was out of temperature control (during food service or display of food)	20 (19.1)
P4: Improper cold holding due to malfunctioning refrigeration equipment	20 (19.1)
P6: Improper hot holding due to malfunctioning equipment	16 (15.2)
P3: Improper adherence of approved plan to use time as a public health control	8 (7.6)
P8: Improper/slow cooling	4 (3.8)
P7: Improper hot holding due to improper procedure or protocol	3 (2.9)
P12: Other situations that promoted or allowed microbial growth or toxic production	3 (2.9)
P9: Prolonged cold storage	2 (1.9)
Total food safety errors	105 (100)

TABLE **3**

Survival Contributing Factors

Contributing Factor	Food Safety Errors # (%)
S1: Insufficient time or temperature control during the initial cooking/heat processing	20 (41.7)
S2: Insufficient time or temperature control during reheating	17 (35.4)
S5: Other process failure that permit pathogen survival	8 (16.7)
S4: Insufficient or improper use of chemical processes designed for pathogen destruction	3 (6.3)
Total food safety errors	48 (100)

Discussion

Contributing Factors Associated With Foodborne Outbreaks

Only 26% of the outbreaks had reported contributing factors and of those reported, 56% percent of outbreaks involved multiple reported food safety errors, illustrating the challenge during outbreak investigations in identifying the root cause. Contamination contributing factors (49.2%) accounted for the greatest proportion of reported food safety errors when compared to proliferation (34.9%) and survival factors (15.9%).

Contamination Factors, Proliferation Factors, Survival Factors

The most commonly reported contamination food safety errors were C12 (other mode of contamination [excluding cross contamination] by food handler/worker/preparer who is suspected to be infectious), C6 (contaminated raw product—food was intended to be consumed after a kill step), C10 (bare-hand contact by a food handler/worker/preparer who is suspected to be infectious), and C11 (glove-hand contact by food handler/worker/preparer who is suspected to be infectious). Three of the most commonly reported contamination factors (i.e., C10, C11, and C12) involved contamination due to food safety practices by an infected school food service worker.

The most commonly reported proliferation food safety errors were P1 (food preparation practice that supports proliferation of pathogens [during food preparation]), P2 (no attempt was made to control the temperature of implicated food or the length of time food was out of temperature control [during food service or display of food]), and P4 (improper cold holding due to malfunctioning refrigeration equipment) and P6 (improper hot holding due to malfunctioning equipment), which both involved improper equipment holding temperatures. P1 and P2 involved pathogen growth due to insufficient time/temperature control during preparation or holding prior to service and P4 and P6 involved improper equipment holding temperatures or inadequate temperature control due to faulty equipment during food preparation, holding, service storage or cooling, and subsequent pathogen growth. The most commonly reported survival food safety errors were S1 and S2. S1 and S2 involved pathogen survival due to insufficient time and temperature control during cooking and reheating resulting in the production of heat-resistant spores in food.

Pathogenic Groups and Associated Foodborne Illnesses

Approximately 94% of all foodborne illnesses were associated with the pathogenic groups norovirus, *Salmonella* spp., *C. perfringens,* STEC, and *S. aureus*. Although many outbreaks involve sporadic cases and a smaller number of illnesses per outbreak, norovirus outbreaks frequently result in larger clusters of cases due to the virulent nature and high infectivity of the pathogen (Painter et al., 2013). Norovirus outbreaks involved ready-to-eat foods that had been handled by an ill food service worker (e.g., cheesecake, 329 illnesses; salad bars, 425 illnesses; deli sandwiches, 130 illnesses). *Salmonella* spp. outbreaks involved undercooked foods such as poultry (e.g., turkey and gravy, 77 illnesses) and raw produce (e.g., tomatoes, 510 illnesses). *C. perfringens* outbreaks involved cooked spore-forming foods. Spores can survive and multiply in foods that have been temperature abused (e.g., stews and chili, 100 illnesses) and roast turkey and gravy (87 illnesses). STEC outbreaks involved undercooked meats (e.g., venison, 29 illnesses) and unpasteurized dairy products (e.g., unpasteurized milk, 202 illnesses). *S. aureus* outbreaks involved prepared foods that had heat-stable toxins and had undergone extensive handling and preparation prior to consumption (e.g., turkey with stuffing, 53 illnesses; barbecued pork, 89 illnesses) (Food and Drug Administration [FDA], 2012).

Pathogenic Groups and Associated Contributing Factors Categories

Norovirus, *Salmonella* spp., *C. perfringens,* STEC, and *S. aureus* pathogenic groups were associated with about 92% of food safety errors. Norovirus was exclusively associated with contamination due to school food worker practices: C10, C11, and C12. The virus is generally transmitted by an infected food worker via bare-hand or gloved-hand contact with food or by other means of food contact. The infected food service worker acquires the infection and transmits the virus by way of the fecal-oral route (i.e., lack of or improper hand hygiene and transference of the virus to food) resulting in the contamination of food. The virus can also be transmitted by way of aerosolized vomitus or contact with a contaminated surface. *C. perfringens* was most often associated with pathogen growth due to insufficient time/temperature control: P2, P4, and P6 and pathogen survival due to insufficient time/temperature control: S1 and S2. *Salmonella* spp. was most often associated with pathogen survival due to insufficient time/temperature control: S1 and S2. *S. aureus* was most often associated with pathogen survival due to insufficient time/temperature control.

Conclusion

One challenge to identifying the root cause of foodborne outbreaks lies in the failure to identify contributing factors during the outbreak investigation. Complete and accurate environmental health assessments and epidemiological investigations must be conducted in tandem in order to identify contributing factors (CIFOR, 2009; Gould, Rosenblum et al., 2013).

School food service workers must have a thorough understanding of the role of contributing factors in the spread of foodborne disease (Gould, Walsh et al., 2013). Effective food safety education programs must focus on contributing factors, how factors cause foodborne disease, and how to prevent food safety errors. Time/temperature control is an important intervention to prevent bacterial growth or toxin production and survival in foods (FDA, 2009). Effective food safety education programs must focus on time/temperature control compliance procedures for foods and food holding equipment as well as the importance of taking corrective actions when foods or food holding equipment temperatures are not in compliance. Although school-associated outbreaks generally involve school food service workers, it is also important to recognize that other individuals not formally trained in food safety may be involved in food preparation in the school environment (e.g., teachers, parents, students, etc.). Effective food safety education programs must also target the broader school community in training all individuals involved in school food preparation (i.e., food service workers, teachers, parents, students, etc.) as well as the variety of settings and activities where food may be prepared and served to school-aged children (e.g., field trips, class parties, fund-raisers, etc.).

The results of these analyses are similar to other research studies (Gould, Rosenblum et al., 2013; Hedberg et al., 2006; Lee & Greig, 2010; Todd, Greig, Bartleson, & Michaels, 2007). Infected food service workers were involved in 65% of outbreaks and bare-hand contact was associated with 35% of outbreaks in retail settings (Hedberg, 2006). Sixty-four percent of foodborne outbreaks involved food safety errors related to food service worker health and hygiene in restaurant settings (Gould, Rosenblum et al., 2013). Food safety errors associated with school food service worker health and hand hygiene are significant factors in school-associated foodborne outbreaks and yet involve the simplest and most preventable counter measures in preventing foodborne disease.

Future research efforts should examine barriers to reporting contributing factors and explore potential corrective measures. In addition, research should focus on examining the uniqueness of the school food service environment in order to assess the conditions and circumstances in which food safety errors occur (e.g., specific contributing factors, language barriers, faulty equipment, sick leave policies, and adequate hand washing facilities) (Todd et al., 1997).

Limitations of the surveillance data include underreporting and accuracy as well as the small number of the outbreaks represented in our study and must be considered when interpreting surveillance data analyses.

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Evaluation of the Children's Environmental Health Network's Environmental Stewardship Checklist Responses

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Abstract **Children are subject to multiple hazards on a daily basis, including in child care facilities. Research has shown that children in the child care setting may be exposed to lead, radon, pesticides, and multiple chemicals that are associated with known or suspected adverse health effects. The authors' study used an existing environmental health endorsement program to describe current practices of child care facilities as related to environmental health and safety. The facilities varied greatly in size and were located mainly in the U.S. with a few from Canada and Australia. A few checklist items had nearly a 100% positive response rate; however, some of the items had more than 10% of the facilities answer "false" or "don't know." Although many areas exist in which these sampled child care facilities are being environmentally responsible, further education is needed, particularly as related to the use of wall-to-wall carpeting, radon testing, aerosols, and air fresheners.**

Introduction

Childhood is a time of rapid physical and developmental growth. Chemical exposures during this time period can disrupt normal growth and development, causing damage that may last a lifetime and could even affect future generations (Bearer, 1995; Landrigan, Kimmel, Correa, & Eskenazi, 2004). According to the National Association of Child Care Resources and Referral Agencies (NACCRRA), "Nearly 11 million children under age five in the U.S. are in some type of child care setting every week. On average, the children of working mothers spend 35 hours a week in such care. About one-third of these children are in multiple child care arrangements so that parents can meet the need for child care during traditional and nontraditional working hours (NACCRRA, 2013)." In order to decrease childhood exposures to harmful substances, efforts must be made at home, in school, and in child care centers, which was the focus of our study.

Multiple harmful exposures have been detected in child care facilities. Studies of exposures in these facilities have found elevated levels of pesticides, which are associated with adverse neurodevelopmental and reproductive effects, as well as childhood cancers and cancers that develop later in life (Cohen, 2007; Cohen Hubal, Egeghy, Leovic, & Akland, 2006; Morgan et al., 2011; Tulve et al., 2006). Lead exposure is also a problem in child care facilities (Greenway & Gerstenberger, 2010). Lead may cause irreversible damage to the liver, kidneys, cardiovascular system and has been found to affect neurologic development in children, even at low levels of exposure (Bellinger, 2008; Greenway & Gerstenberger, 2010). Other chemicals, including brominated flame retardants and polychlorinated biphenyls, have been detected in child care facilities (Harrad et al., 2010). These chemical exposures have been associated with cancer and neurodevelopmental problems and may adversely affect reproduction in the form of decreased spermatogenesis (Harrad et al., 2010). Radon, one of the leading causes of lung cancer, can also be found in child care facilities (Laquatra, Maxwell, & Pierce, 2005). Finally, children in child care facilities are exposed to various asthmagens, including volatile organic compounds (Zuraimi & Tham, 2008), mold (Laquatra et al., 2005), and other triggers (Salo, Sever, & Zeldin, 2009).

Despite the research being done to identify exposures in the child care setting, little is known about the current practices of child care facilities to decrease harmful exposures. This information is necessary to guide the development of education programs aimed at management and staff in the child care field and to inform policy changes at the center, state, and federal levels. The purpose of our study was to describe current levels of envi-

FIGURE **1**

EcoHealthy Child Care Checklist

Eco-Healthy Child Care® Checklist

30 easy-to-follow steps that will immediately benefit the health and well-being of the children in your care.

Follow these instructions to get started on creating a healthier environment!

1. Answer all 30 questions on the checklist.

2. Comply with at least 24 of 30 items, including #1, #6 and #11, which are required.

3. If you can't answer "true" to 24 items, take steps to make improvements. Visit **www.cehn.org/ehcc** for tips and tools.

4. Fill out all parts of the Endorsement Form, and obtain both required signatures.

5. Send the completed checklist and $25 payment to the address indicated.

All EHCC checklist items comply with *Caring for Our Children: National Health and Safety Performance Standards, 3rd Edition.*

TRUE FALSE ?

Pesticides and Pest Prevention

❍ ❍ ❍ **1.** We use non-toxic techniques both inside and outside the facility to prevent and control pests (both insects and weeds). If a serious threat remains and pesticide application is the only viable option, parents and staff are notified in advance and a licensed professional applies the least toxic, effective product at a time when children will have the least exposure to the application area for at least 12 hours (see manufacturer's instructions to ensure 12 hours is enough time). **REQUIRED**

❍ ❍ ❍ **2.** We thoroughly wash all fruits and vegetables to avoid possible exposure to pesticides, and we take the opportunity to educate children about the importance of doing so.

Air Quality

❍ ❍ ❍ **3.** We avoid conditions that lead to excess moisture, because moisture contributes to the growth of mold and mildew. We maintain adequate ventilation (suitable fans or open screened windows). We repair water leaks and keep humidity within a desirable range (30-50%).

❍ ❍ ❍ **4.** We do not allow cars or other vehicles to idle in our designated parking areas.

❍ ❍ ❍ **5.** We do not use scented or unscented candles or man-made air fresheners.

❍ ❍ ❍ **6.** During operating hours, we do not permit smoking anywhere on the premises or in sight of children. (Note: For the healthiest environment for children and staff, smoking should not be allowed on the premises at any time). **REQUIRED**

Household Chemicals

❍ ❍ ❍ **7.** We use unscented, biodegradable, non-toxic cleaning products and least-toxic disinfecting and sanitizing products. When disinfectants and sanitizers are required, they are used only for their intended purpose and in strict accordance with all label instructions.

❍ ❍ ❍ **8.** We use chlorine bleach only when and where it is required or recommended by state and local authorities. We use it prudently and never use more than necessary.

❍ ❍ ❍ **9.** We do not use aerosol sprays of any kind.

❍ ❍ ❍ **10.** We use only low-VOC (Volatile Organic Compounds) household paints and do not paint when children are present.

Lead

❍ ❍ ❍ **11.** To avoid possible lead exposure from water lines, we have our water tested. We use only cold water for drinking, cooking and making baby formula. We run the water for 10-30 seconds or until it feels noticeably colder. **REQUIRED**

OVER

continued on page 24

ronmental stewardship practices by child care facilities and to identify areas for which additional education or technical assistance may be warranted.

Methods

A secondary data analysis was conducted using data provided by the Children's Environmental Health Network (CEHN). CEHN is a national nonprofit organization that focuses on education, research, and policy to protect the developing child from environmental hazards and promote a healthy environment. CEHN provides an Eco-Healthy Child Care® (EHCC) checklist to help child care facilities assess their level of environmental stewardship.

The EHCC checklist (Figure 1) is a self-report checklist focusing on stewardship areas of pesticides, air quality, household chemicals, lead, mercury, furniture and carpets, art supplies, plastics and plastic toys, treated playground equipment, radon, recycling/garbage storage, and education and awareness. Each item consists of a statement that describes an environmentally safe practice; if the facility currently adheres to the practice then the respondent will answer "true." Otherwise the respondent will choose "false" or "?" (don't know). The current version of the checklist lists 30 items; the original version of the checklist, used until October 2010, included 25 items.

The checklist was originally developed by the Oregon Environmental Council (OEC) in 2005 and was based on best practices of school and home assessment tools and research supported by the U.S. Environmental Protection Agency (U.S. EPA), the Centers for Disease Control and Prevention (CDC), and the Indiana Five Star Environmental Recognition program. In 2010, the entire EHCC program, including the checklist, was transferred to CEHN for management and leadership. The EHCC program was also modified to incorporate aspects of CEHN's earlier program, Healthy Environments for Child Care and Preschool. The checklist has been peer-reviewed by CEHN's science committee, the EHCC national advisory committee, the EHCC science task force, and four regional pediatric environmental health specialty units (an academically based regional network of experts in children's environmental health issues).

Child care facilities can use the checklist in two ways: as an internal tool to determine their level of environmental stewardship or to gain endorsement from EHCC in recognition of their commitment to environmental health. Facilities will obtain endorsement if they submit the nominal fee of $25 to cover processing costs and materials, have gathered the two required validation signatures, and at least 20 out of 25 or 24 of the 30 checklist items (80%) are met with positive responses. Additionally, positive responses on certain mandatory questions are required to receive the endorsement. On the original 25-item checklist, the questions on pesticides and no smoking were mandatory. On the 30-item checklist, running tap water before use to reduce lead exposure was added to the other two mandatory items. Facilities would not receive an endorsement without a "true" to these items.

The sample for our study consisted of child care facilities that submitted checklists to either OEC or CEHN from August 2008 through November 2011, which means that some of the facilities submitted 25-item checklists. The data were provided to independent researchers in January 2012 for analysis. SPSS v. 19 was used to analyze the data. The data were screened for missing or out-of-range values and were analyzed for general descriptive information, including frequencies and measures of central tendency.

Results

A total of 398 checklists were submitted from child care facilities but since two did not contain any checklist data they were not included in the final analysis, leaving 396 for analysis. Less than 3% were missing data. The child care facilities came from a diverse range of locations. Forty states plus one territory in the U.S., three Canadian territories, and two locations in Australia were represented in the data (Table 1). Oregon had the highest percentage of facilities (n = 74, 18.7%). The smallest child care facilities served three children, while the largest served 391 children. The median quartile served 8–29 children (n = 105, 26.5%). Fifty-one (13%) facilities submitted the older 25-item checklist.

Table 2 shows the number of positive checklist responses by checklist type. The positive responses ranged from 17 to 22 for the 25-question checklist and 17–27 for the 30-question checklist. Less than two-thirds (60%) of the facilities that completed the 25-item checklist achieved a score of at least 80% positive responses, the score required by EHCC to gain endorsement. Seventy percent of the facilities that completed the 30-item checklist scored at least 80% positive responses. This difference was not significant, χ^2 (1) = 2.069, p = .150. The maximum percentage of positive responses was nearly identical, with 88% being the maximum for the 25-item checklist and 90% for the 30-item checklist. The average number and percentage of positive responses for the 25-question checklist was 19.94 (79.8%); for the 30-question checklist, it was 24.57 (81.9%).

Data were analyzed to determine items that were frequently checked "false" or "don't know." More than 10% of the facilities chose "false" or "don't know" for 10 of the checklist items (Table 3). Table 4 contains a complete list of items with corresponding answers. Three items had 100% completion from all child care facilities. Those items were no pesticides, no smoking, and the use of furniture in good condition (items 1, 6, and 18, respectively). The rest of the items, except for the items listed in Table 3, had at least 90% of the facilities answer "true."

FIGURE **1** *continued from page 23*

EcoHealthy Child Care Checklist

TRUE	FALSE	?	
❍	❍	❍	**12.** Our facility was built after 1978 — OR — our facility was built before 1978, and we have tested our paint (indoors and outdoors) for lead. We keep the building free of flaking or peeling paint and regularly wash all areas around doors and windows. We use lead safe practices when painting or renovating our facility, and we have visited **www.epa.gov/lead** to learn more.
❍	❍	❍	**13.** To avoid possible lead exposure, we do not use imported, old or handmade pottery to cook, store or serve food or drinks.
❍	❍	❍	**14.** To reduce possible exposure to lead-contaminated dirt, we supply a rough mat at the entrance of our facility and encourage the wiping of shoes before entering — or — we are a shoe-free facility.
❍	❍	❍	**15.** We screen our toys for lead by searching **www.cpsc.gov** or **www.healthystuff.org/departments/toys/** or by purchasing lead testing kits at a local home improvement store.
			Mercury
❍	❍	❍	**16.** We do not use any mercury-containing thermometers or thermostats. Instead we use digital options.
❍	❍	❍	**17.** We securely store and recycle all used batteries and fluorescent and compact fluorescent light bulbs.
			Furniture and Carpets
❍	❍	❍	**18.** To avoid possible exposure to flame retardants, we ensure furniture is in good condition without foam or inside stuffing exposed. Stuffed animals, matting, pillows and other foam items are also intact.
❍	❍	❍	**19.** Furniture is made of solid wood or low-VOC (Volatile Organic Compounds) products, with few items made of particleboard. When purchasing furniture or renovating, we choose either solid wood (new or used) or products that have low VOCs.
❍	❍	❍	**20.** We do not have wall-to-wall carpeting where children are present.
❍	❍	❍	**21.** Area rugs are vacuumed daily and cleaned at least twice a year and as needed using biodegradable cleaners.
			Art Supplies
❍	❍	❍	**22.** We use only non-toxic art supplies approved by the Art and Creative Materials Institute (ACMI). Look for ACMI non-toxic seal 'AP' at at **www.acminet.org**.
			Plastics and Plastic Toys
❍	❍	❍	**23.** We avoid toys made out of soft plastic vinyl (such as vinyl dolls, beach balls, and "rubber ducky" chew toys). We buy only those labeled "PVC-free" and "phthalate-free".
❍	❍	❍	**24.** When using a microwave, we never heat children's food in plastic containers, plastic wrap or plastic bags.
❍	❍	❍	**25.** We never use baby bottles or sippy cups made with BPA (Bisphenol A). Instead, we use bottles made of glass, or plastic that is labeled 'BPA free'.
			Treated Playground Equipment
❍	❍	❍	**26.** We do not have playground equipment made of CCA treated wood (pre-2006) — or — if we do, we apply 2 coats of waterproof stain or sealant at least once a year. When building new playground equipment, we only use CCA treated wood if necessary – and only for the wood touching the ground.
			Radon
❍	❍	❍	**27.** We have tested our facility for radon. If elevated levels of radon are found, we take action to mitigate. We have visited **www.epa.gov/radon** for resources, and have researched state requirements and guidelines to learn more.
			Recycling and Garbage Storage
❍	❍	❍	**28.** We recycle all paper, cardboard, glass, aluminum and plastic bottles.
❍	❍	❍	**29.** We keep our garbage covered at all times to avoid attracting pests and to minimize odors.
			Education and Awareness
❍	❍	❍	**30.** We create opportunities to educate the families we serve on eco-healthy practices.

For more information on any checklist items, visit **www.cehn.org/ehcc/resources**

Discussion

The purpose of our study was to describe environmentally healthy actions that are currently being taken by child care facilities. Although many facilities in this sample reported adequate levels of environmental stewardship and obtained the EHCC program endorsement, the analysis uncovered subject areas for which further education aimed at child care facilities may be necessary. For

TABLE **1**

Number and Percentage of U.S. States, Territories, and Other Countries in the Checklist Data, *N* = 396

State/Territory	# of Facilities	% of All Facilities	State/Territory	# of Facilities	% of All Facilities
Alaska	5	1.3	Nevada	2	0.5
Alberta, Canada	1	0.3	New Hampshire	1	0.3
Arkansas	1	0.3	New Jersey	10	2.5
California	42	10.6	New Mexico	1	0.3
Colorado	14	3.5	New South Wales, Australia	1	0.3
Connecticut	1	0.3	New York	38	9.6
Florida	11	2.8	North Carolina	4	1.0
Georgia	8	2.0	Ohio	7	1.8
Hawaii	1	0.3	Ontario, Canada	5	1.3
Illinois	6	1.5	Oregon	74	18.7
Indiana	7	1.8	Pennsylvania	10	2.5
Iowa	2	0.5	Puerto Rico	1	0.3
Kansas	2	0.5	Quebec, Canada	1	0.3
Kentucky	4	1.0	South Australia	1	0.3
Louisiana	1	0.3	South Carolina	2	0.5
Maine	11	2.8	Tennessee	2	0.5
Maryland	16	4.0	Texas	24	6.1
Massachusetts	12	3.0	Vermont	5	1.3
Michigan	5	1.3	Virginia	5	1.3
Minnesota	12	3.0	Washington	17	4.3
Mississippi	1	0.3	Washington, DC	16	4.0
Missouri	3	0.8	West Virginia	1	0.3
Nebraska	1	0.3	Wisconsin	1	0.3

example, almost 30% of facilities reported having wall-to-wall carpeting. The presence of dust and dirt trapped in wall-to-wall carpeting can instigate wheezing in young children (Herr et al., 2012). If facilities are unable to remove the carpeting, they could be educated on the importance of frequent cleaning using a vacuum with a high efficiency particulate air filter. The analysis also showed that over 25% of the facilities may not have been appropriately tested for elevated radon levels. Do-it-yourself radon tests are easy and inexpensive to do, or a qualified radon contractor could be hired. Radon mitigation in child care centers should cost about the same as normal home repair procedures and may be required in some states.

Changes in daily actions could also prove beneficial. Almost 10% of the facilities answered "false" regarding the use of baby bottles without bisphenol A (BPA), but with education and suggested alternatives and parent involvement (asking parents to supply BPA-free bottles and sippy cups), this percentage could be easily decreased. Additionally, almost 10% also answered "false" to having a recycling program. The incorporation of recycling into a child care setting would not be difficult to implement given the cooperation and coordination of the jurisdiction and could be cost-effective as well. The most challenging task might be getting staff and teachers to commit to the practice and retraining them on safe places to store recyclables. Staff could then pass on the knowledge by encouraging families to utilize reusable items, such as Thermoses and lunch containers instead of plastic sandwich bags and drink boxes. Eliminating the use of air fresheners or aerosols (at least 16.7% and 14.9% of facilities use these types of products, respectively) is easily attainable by the facilities, given further education on why this change is important. All education aimed at changing behaviors should be accompanied by suggestions that include safer alternatives. Finally, child care facilities should be congratulated on the things that they are doing well, and should be encouraged to continue with those eco-healthy actions. These are all actions reinforced in the 4.5-hour EHCC trainings and easily accessible online via the fact sheets on CEHN's Web site.

Our study was limited by the voluntary nature of the checklist. Only facilities that were aware of the program and felt they could meet the criteria were likely to apply. Additionally, most facilities have not applied

for reendorsement since the certification lasts for two years, so sustainability of the practices has not been measured. It is also not known if the reported environmental stewardship practices have an effect on the overall exposures and health of the staff and children at the facility or if parents and guardians seek out facilities with the endorsement. Additional research is needed to determine if these practices result in lower levels of exposure in child care facilities.

Conclusion

Environmental exposures in the child care setting have profound effects on the health of children. Programs to improve the daily and long-term behaviors of child care workers and modifications at the facilities could lead to safer and healthier child care environments, but first an understanding of current practices must be obtained.

This data analysis was the first step in evaluating the environmental stewardship practices of child care facilities. We found multiple topics that should be addressed through outreach and education. For example, education is needed around removal of wall-to-wall carpeting; obtaining radon testing; eliminating soft plastic toys, scented candles, air fresheners, and aerosols; testing toys for lead; increasing the use of solid wood furniture, safer baby bottles, and safer play equipment; and recycling. Further research is needed to determine the long-term impact of increasing environmental stewardship practices on health and satisfaction of staff and parents/guardians.

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TABLE **2**

Number and Percentage of Facilities by Total Number of Positive Responses[a] and by Checklist Type, *N* = 396

Total # of Positive Responses	Facilities Completing 25-Item Checklist (*n* = 51)		Facilities Completing 30-Item Checklist (*n* = 345)	
	#	%	#	%
17	3	5.9	1	0.3
18	6	11.8	0	
19	11	21.6	1	0.3
20	12	23.5	0	
21	9	17.6	20	5.8
22	10	19.6	35	10.1
23	–	–	44	12.8
24	–	–	57	16.5
25	–	–	64	18.6
26	–	–	50	14.5
27	–	–	73	21.2
80% or higher	31	60.7	244	70.8
79% or lower	20	39.3	101	29.3
	Min	**Max**	**Min**	**Max**
% of positive responses	68	88	57	90
	Mean	***SD***	**Mean**	***SD***
# of positive responses	19.94	1.49	24.57	1.90
% of positive responses	79.76	5.955	81.90	6.345

[a]Positive response for a checklist item indicates adherence to an environmentally safe practice.

TABLE **3**

Number and Percentage of Facilities That Participate in Most Common Environmentally Unsafe Practices, *N* = 396

Item	Facilities	
	#	%
20: Have wall-to-wall carpet	116	29.3
27: Do not do radon tests	64	18.6
23: Have soft plastic toys	60	15.2
5: Use scented candles or air fresheners	66	16.7
9: Use aerosols	59	14.9
15: Do not test for lead toys	45	13.0
19: Furniture is not solid wood	42	10.6
28: Do not have a recycling program	39	9.8
25: Baby bottles are not guaranteed safe	32	9.3
26: Play equipment not guaranteed safe materials	32	8.1

TABLE **4**

Complete Checklist With Frequency Data

Item	False		True		Don't Know		Missing	
	#	%	#	%	#	%	#	%
1: Less toxic pesticides	0		396	100.0	0		0	
2: Wash fruits/vegetables*	1	0.3	340	98.6	2	0.6	2	0.6
3: No excess moisture	2	0.5	388	98.0	6	1.5	0	
4: No idling vehicles	12	3.0	379	95.7	4	1.0	1	0.3
5: No air fresheners	66	16.7	318	80.3	9	2.3	3	0.8
6: No smoking	0		396	100.0	0		0	
7: Nontoxic cleaning products	9	2.3	378	95.5	8	2.0	1	0.3
8: No bleach	1	0.3	395	99.7	0		0	
9: No aerosols	59	14.9	321	81.1	11	2.8	5	1.3
10: Use of safe indoor paint	7	1.8	381	96.2	5	1.3	3	0.8
11: Use cold water	1	0.3	394	99.5	1	0.3	0	
12: No lead paint	1	0.3	391	98.7	2	0.5	2	0.5
13: No old pottery	1	0.3	393	99.2	0		2	0.5
14: Wipe feet	8	2.0	385	97.2	1	0.3	2	0.5
15: No lead toys*	45	13.0	278	80.6	14	4.1	8	2.3
16: Use digital thermometers	12	3.0	384	97.0	0		0	
17: Safe batteries and light bulbs	18	4.5	370	93.4	6	1.5	2	0.5
18: Good furniture	0		396	100.0	0		0	
19: Wood furniture	42	10.6	339	85.6	12	3.0	3	0.8
20: No carpet	116	29.3	272	68.7	6	1.5	2	0.5
21: Frequent vacuuming	11	2.8	377	95.2	5	1.3	3	0.8
22: Nontoxic art supplies	10	2.5	374	94.4	7	1.8	5	1.3
23: No soft plastic	60	15.2	310	78.3	23	5.8	3	0.8
24: No plastic in microwave	21	5.3	367	92.7	6	1.5	2	0.5
25: Safe baby bottles*	32	9.3	295	85.5	14	4.1	4	1.2
26: Safe play equipment	32	8.1	350	88.4	13	3.3	1	0.3
27: Had radon checked*	64	18.6	240	69.6	31	9.0	10	2.9
28: Recycle	39	9.8	351	88.6	6	1.5	0	
29: Cover trash	5	1.3	389	98.2	2	0.5	0	
30: Educate families*	6	1.7	333	96.5	2	0.6	4	1.2

*n = 345 for these items because they were not included in the 25-item checklist.

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GUEST COMMENTARY

2013 NEHA/UL Sabbatical Exchange Award to Canada: Comparing Undergraduate Environmental Health Education in Canada and the United States

Charles Hart, PhD, CIH, CSP, RS

I was recently given the opportunity to start an environmental health science (EHS) program in the brand new College of Public Health at Kent State University in Kent, Ohio. As I spent my first year developing the curriculum, I ran across the NEHA sabbatical ad in the *Journal*. I thought, what better time for me to apply for the Canada trip and explore the EHS educational system in Canada? What could I learn that I might be able to bring back to the U.S. to help shape our new program? Amazingly, I won and was given this wonderful opportunity! My hope now is to encourage and motivate other EHS professionals in NEHA to take advantage of this opportunity to broaden their horizons and advance their careers.

Only five undergraduate degree programs in Canada that lead to certification as a Public Health Inspector (PHI) are certified by the Canadian Institute of Public Health Inspectors (CIPHI) (CIPHI, n.d.). CIPHI accredits these five academic programs just as the National Environmental Health Science and Protection Accreditation Council (EHAC) does for academic EHS programs in the U.S.

I was also very interested in the certification or registration process in Canada. CIPHI certification is equivalent to the Registered Environmental Health Specialist/Registered Sanitarian (REHS/RS) credential in the U.S. We made sure our program at Kent State would comply with the RS educational requirements in Ohio during development.

Initially, I had planned to visit all five programs in Canada, but due to scheduling conflicts, I was only able to go to British Columbia Institute of Technology (BCIT), Vancouver/Burnaby, British Columbia (BCIT, n.d.); Concordia University College of Alberta, Edmonton, Alberta (Concordia University, 2015) (see photo above); and First Nations University (FNU), Regina, Saskatchewan (FNU, n.d.). I was able to get an introduction and contact information for the programs through Phi Phan, president of CIPHI. After a flurry of e-mails and phone calls, itineraries were set with my hosts.

BCIT

The first week was spent at BCIT in Burnaby, a suburb of Vancouver. BCIT offers a bachelor's of technology in environmental health degree. I was able to look at both the EHS program and the occupational health and safety (OHS) program. These programs share lab space, equipment, and a lab manager.

On the first day I met my host, Lorraine Woolsey, who is director of the environmental health program. Lorraine spent time giving me my first orientation to the Canadian EHS educational system and involvement with CIPHI. I quickly found out that although the curriculum and course work were very similar to ours, the "system" and the type of student in the program were quite different in Canada.

Unlike the U.S., CIPHI has direct control over the PHI certification process and accreditation of the EHS programs at the five universities. Certification with CIPHI is a national credential. CIPHI also has extensive practicum requirements and learning objectives that academic programs must adhere to (CIHPI, n.d.). CIPHI works directly with

universities to place students in practicums (internships) with the many health authorities in Canada. The more direct control of these processes by CIPHI may be partially due to their narrower focus on educating just PHIs/environmental health officers (EHOs) for health authorities. Our programs in the U.S., and certainly ours at Kent State University, have a much broader EHS employment focus. We educate EHS students not only for public health agencies, but also for environmental protection agencies, universities, consulting companies, facility operations, research facilities, and industry. Unlike the U.S., in Canada an environmental health degree is required from one of the five certified programs to practice at an agency.

Another interesting aspect of the BCIT program was that it is an "after degree" program. This means that their students generally come to the two-year EHS program after they already have a four-year degree, including a certain amount of science. This was important, I think, in understanding what I observed in the classroom discussions compared to those I attended in the U.S.

During the week I was able to meet with a number of faculty and attend a number of classes, since this was the last week of their semester. Faculty reported that they did not have major issues with basic science knowledge or writing skills because their students were older, had college degrees, and had some college and life experiences already.

In the courses that I observed, one thing that was very striking was the level of engagement and discussion that took place among the students and with the faculty. As I learned more, I began to see the likely reasons for these differences, and the effects of the Canadian system on student learning and engagement listed here.

1. PHI learning objectives are directly tied to getting a job because of CIPHI's close participation in the academic programs.
2. The students are a little older, more mature, and have college and life experience.
3. Most students already have college degrees, with previous science and college writing experience.
4. Students are highly motivated because they have experienced some degree of difficulty getting a job with their degree and have elected to take two more years of schooling for specific job skills and promise of a good job and career. A CIPHI-certified EH degree is required to work in the field.
5. This is a "cohort program." The students go through the program as a group and know each other fairly well and are comfortable with each other. All students are EH majors.
6. A C grade or below is a failing grade in their program.
7. All courses I observed used group tables. No long tables or individual classroom seats were observed. Some had dedicated EH classrooms (see photo above).
8. The program had a specific focus on PHI training and specific job-related projects and coursework.
9. Academic preparation for certification exams included not only a paper test, but a panel interview with impromptu questions, "thinking on your feet," and submission of sample inspection reports.

As a mature program that has been around since 1999, BCIT has developed an impressive lab program. I was able to tour their lab facilities with Fred Shaw. BCIT has at least five large labs for just the EHS and OHS programs. They have a vast array of equipment for course work and labs. They have a full-time lab coordinator to maintain the labs and equipment, set up/tear down the labs, and generally assist with hands-on learning and demonstrations. Our program is new and I was particularly envious of their facilities and equipment.

The last afternoon of the week, I was able to visit the Vancouver Coastal Health Authority (VCHA). British Columbia is broken up into five regional health authorities like VCHA; Alberta is consolidated into one; and Saskatchewan has 13. This is in stark contrast to the roughly 125 local health departments in Ohio! Much of their work is the same as ours, but they do more inspections of private housing and what they call "personal services" establishments. This includes not only tattoo parlors and piercing, but can include body art, beauty shops, pedicure operations, float center sensory deprivation tanks, and so forth. They took me to a tattoo shop and float center with operators who were especially professional and willing to walk me through their operations' health and safety programs. I had never heard of a float center. It is essentially a private room and a covered tank with a small amount of Epsom-salted water so that you float easily. You get inside and float in the dark, with minimal sensory input. This is done for relaxation and stress relief. The tanks have issues similar to swimming pools in terms of sanitation, disinfection, etc.

Concordia University College of Alberta

At Concordia, my host was Dr. Karen McDonald. The Concordia EHS program is a newer program. It was more like our program at Kent State. They take quite a few field trips and do field work. It is also a two-year "after degree" program like BCIT. They offer a bachelor's of environmental health (after degree).

I attended several courses and met with faculty. I was able to work with Carla Eskow and Nelson Fok. Again, I found the curriculum to be very much like ours in the U.S., but the students and system differ. I again found students much more engaged in their work.

I began to learn more about the relationships among the profession, CIPHI, and the

universities. CIPHI dictates the learning objectives that the academic programs must address as part of their curriculum. This does not happen in the U.S. Again, our employment focus is so much broader in scope than just PHIs. CIPHI prescribes some 488 instructional objectives in 16 categories that universities must try to address throughout their curriculum to get accredited.

I was able to meet with the university president and members of his senior staff and with a group of former students who are now out working in health authorities. What they found most important about their education was what they learned about "people skills": communications, writing that reflected real-world situations they would be in, learning to work with a group, giving a talk, etc. They also stressed the value of real-world experiences, field trips, and their practicums. Their enthusiasm for the profession was evident. Next, I spent some time with three officers from the CIPHI Alberta branch who helped fill me in on the role of CIPHI in university EHS programs, their accreditation board, and about CIPHI in Alberta.

Toward the end of the week, I was able to meet with environmental health practitioners from Health Canada (federal) and Health Alberta (provincial) as I learned more about environmental health operations in Canada. Alberta was a little unique in that they were consolidated into only one health authority and did not have the province broken down into separate regional health authorities. One of the very interesting areas that I was able to learn about was the First Nations environmental health operations and the separation of the Health Authorities and their jurisdictions. Health issues are generally provincial operations, with the exception of First Nations programs, which are federal. Otherwise the federal role is predominantly to provide funding. All EHOs working on First Nations lands must be CIPHI-certified PHIs. Interest exists in training First Nations students in environmental health to become certified, especially at my last host institution, First Nations University in Regina, Saskatchewan.

My last stop was to see Bill Hone, environmental health director for Alberta Health Services. Bill helped me understand the provincial health operation in Alberta, their operational standards, and the province in general. The health authority has produced a document, "A Common Reference System and Operational Standards for Albert Regional Health Authority Environmental Health Programs" (The Blue Book) that guides their programs. Interestingly, the document references a University of Alberta study that cites "difficulties in recruiting qualified professionals" as an issue. The three universities that I visited are helping to address this need.

FNU

My last week was at FNU on the campus of the University of Regina in Regina, Saskatchewan. It attempts to preserve the First Nations cultures and provide regular and indigenous education for students. The university is open to all students. The design of their building itself was a tribute to First Nations culture and beliefs. The building is striking! It incorporates a teepee-like atrium and was built with no exterior corners to represent the continuity of life. My host was Carmen Buschow, the EHS program director. First Nations offers a Bachelor of Science in applied science in environmental health and science degree.

Like the other two schools, I found the curriculum to be very much like ours. They are developing online coursework because of the distance to many of the First Nations communities (reserves) that they are trying to target for their program. Besides the First Nations orientation of the institution, another significant difference from the other two institutions was that FNU brings in four-year students after high school like our university. It is not an "after degree" program. School was out, so I was not able to attend any classes at FNU, but I was able to meet with some faculty. I regret that I was not able to attend any classes at FNU and compare the level of student engagement under both "after degree" and regular four-year programs. Carmen filled me in on their program and indicated that they use a number of practicing EHS professionals as adjunct faculty and have a few full-time faculty. It is a cohort program and all EHS courses are required in the program.

I was able to do some document review, which I did not have as much time to do at the other institutions. In particular, I was able to review their CIPHI accreditation documents and learning objectives. This was very helpful, as I am just beginning the process of seeking EHAC accreditation in the U.S. for our program. I reviewed the schedule for their CIPHI site visit to help me think about this for us going forward. The Canadian institutions must address the 488 learning objectives specified by CIPHI for the program. I was also able to review course syllabi and some of the online courses in order to compare with our program and get ideas for consideration back at home.

Afterwards, I had a chance to talk with one of the part-time adjunct faculty, Rob Shuba, from Regina Qu'Appelle Health Region, about how the online water and wastewater courses are working out and ideas he has for the future. I spent an entire day with the Regina Qu'Appelle Regional Health Office and Rob organized the visit. Rob's unit is one of 13 regional health districts in Saskatchewan and serves a population of about 200,000. We discussed the operation of health units and although generally like ours in Ohio, I found again that they too do much more in the area of "personal services" and housing inspections in private homes. Rob and I also discussed his course and some of the things he does.

During the afternoon I had the opportunity to go out in the field on some housing inspections. Inspections are based on requests or complaints and often involve rental housing. In my experience, we generally do not get involved in housing inspection much in private homes, especially inside the homes, unless specific local regulations or programs require it.

One house we went to in particular was a good example of why this program is important in a community. Concerns from a renter about her house came in as she was moving her family out of the house. Upon inspection, a number of serious concerns were documented. The house had water damage apparently caused by roof gutters that were separated from the house by a few inches. Large cracks were in the basement walls, bowing walls in a few areas, and evidence of structural problems needed to be looked at. In addition, the basement had badly damaged asbestos pipe lagging on the ceiling and a possible venting hazard from the gas boiler to the outside, which could allow carbon monoxide to enter the basement. The basement was used to do laundry and the kids played down there. The PHIs took some pictures and made arrangements to take another look at the place to prepare some orders.

My last visit in Regina was with Tim Macaulay, director of environmental health at the Saskatchewan Ministry of Health. Environmental health is in the population health branch of the ministry. In their province they have 13 regional health authorities, 101 PHIs, and 15 medical offices. They are predominantly involved with funding the regional health authorities, disease surveillance over the province, and consulting. Tim had several of his staff give me an overview of their programs and issues in the province. This was very helpful in trying to understand the relationships among several levels of Health Authorities in Canada.

Conclusion

This international experience was an opportunity not to be missed. Both the educational experience and the chance to witness this beautiful country as I traveled around were spectacular! I learned a lot and benefited from the sharing of ideas, common problems, and comparing the ability of our systems to address health and environmental problems in our communities.

I found that some of the issues that we are all trying to address in our coursework are similar as well. We are all looking to do a better job integrating such topics as risk assessment and communication techniques, land use planning and smart growth principles, healthy communities programs, writing and communications skills, applied science education, emerging diseases and emerging ways of contracting them (tattoos, body piercing, float tanks, etc.), more outcome-based programming within the regulatory scheme, computerization and surveillance systems, etc.

To summarize undergraduate EHS program differences between Canada and the U.S., I would include the following.

1. Student readiness differences were seen in after-degree cohort programs listed in this report.
2. Their EHS courses are generally all required (as opposed to selecting from a number of electives).
3. A closer association exists between CIPHI and the professional and academic accreditation programs and universities. That makes our programs different in terms of curriculum, employment focus, associated educational knowledge, skills development, and field practice. We have more of a separation of the professional associations from state professional and academic credentialing or accreditation processes in the U.S.
4. The Canadian educational process is much more focused on training PHIs, where our programs focus on training a broader range of EHS professionals.
5. Environmental health agency structure is not unlike the U.S. structure, but is part of a different total health care system. Some states here have many, much smaller health departments than in Canadian provinces. What does this mean for quality health services?

I would like to thank all my hosts in Canada for making this trip possible for me. I learned a lot and I hope the trip was beneficial for all of us. I would like to sound a "call to action" to EHS professionals and NEHA members who have ever thought about applying for the Sabbatical Exchange Program and to those who haven't yet considered it. Talk to your supervisor about it. Do it now! You gain so much. International experiences can change your life and your career. They help give you perspective and appreciation for our profession, instill renewed energy, offer new ideas, and allow you to make many new professional colleagues and friends. As a two-time winner of the award, I can tell you that these experiences have made me a better EHS professional. I am grateful to NEHA, UL, CIPHI, and those who have made this wonderful opportunity possible for NEHA members across the U.S. for the last 23 years. It is much appreciated.

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Did You Know?

You can read several of the past Sabbatical Exchange award winner reports at www.neha.org/about/Awards/SabbaticalExchangeAward.html. And don't miss out on the 2015 Sabbatical Exchange opportunity! Although the deadline is fast approaching, you can still take advantage of this award program by submitting your application by March 2.

DIRECT FROM AEHAP

Anne Marie Zimeri, PhD

Professional Training Agreement Development for Undergraduate Environmental Health Internships Required by EHAC-Accredited Program

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 and Protection Accreditation Council (EHAC) to accredit, market, and promote EHAC-accredited environmental health degree programs. AEHAP focuses on increasing the environmental health workforce, supporting students and graduates of EHAC-accredited degree programs, increasing diversity in environmental health degree programs, and educating the next generation.

This column will provide AEHAP with the opportunity to share current trends within undergraduate and graduate environmental health programs, as well as their efforts to further the environmental health field and available resources and information. Furthermore, professors from different EHAC-accredited degree programs will share with the *Journal's* readership the successes of their programs and the work being done within academia to foster the growth of future environmental health leaders.

Dr. Anne Marie Zimeri is an assistant professor in the environmental health sciences department at the University of Georgia. She has been the internship coordinator for the program for eight years and enjoys placing students in internships that will be stepping stones to the next step in their careers.

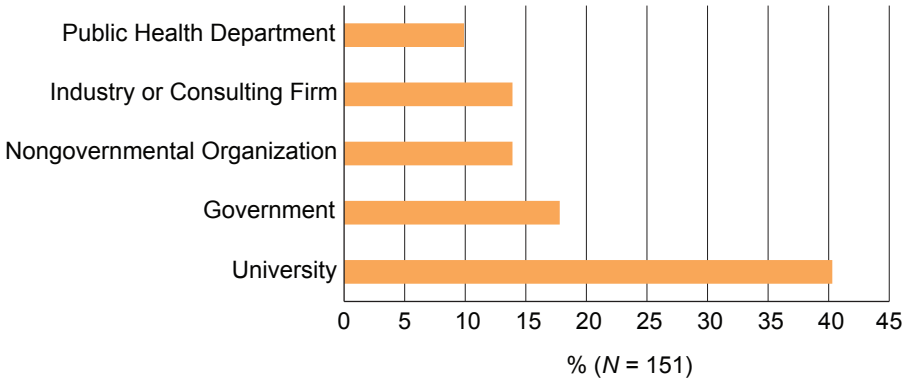
Environmental health science students from the National Environmental Health Science and Protection Accreditation Council (EHAC)-accredited programs must complete internships as part of their degree programs. This is certainly beneficial to the student because it can give them the hands-on experience that can boost them above competitors in the selection process for jobs. It can also be extremely beneficial, however, for internship providers as well. Students can be trained in specific skills that can be used independently many times before the internship is completed, thus providing 1) low-cost or sometimes no-cost staff (in the case of voluntary internships) to the employer, 2) valuable skills to employees who learn how to train interns, and 3) a "test" period in order to determine whether an intern should be hired full time upon graduation.

Getting the most out of an intern, however, relies heavily on the organization of the provider and can be successful by first discussing the additions to the intern's resume that will be accomplished by the completion of the internship. This can be facilitated with a "professional training agreement" (PTA), which is a document that should be discussed and signed by both parties prior to the start of the internship. This document will solidify the expectations for the employer and the intern and can be used as the basis for evaluating an intern's performance. Presented here is the development of a PTA document with contents that have been derived from surveyed internship providers and interns from government agencies, industry, academia, and nongovernmental organizations (NGOs).

Since 2007, 151 University of Georgia (UGA) undergraduates in the bachelor of science in environmental health (BSEH) program have completed internships with a variety of providers, the majority of which (54) were at UGA (Figure 1). Six internships were at universities other than UGA. These internships included laboratory/bench work, computer modeling, and industrial hygiene experiences with environmental safety divisions. Twenty-seven interns had experiences with government agencies, seven of which were with the Atlanta-based Centers for Disease Control and Prevention and two were with the Junior Commissioned Officer Student Training and Extern Program within the Indian Health Service. NGOs, industry, and consulting firms

FIGURE **1**

Internship Providers by Category



The main University of Georgia environmental health science internship providers by category from 2007 to 2013, all of which require varying degrees of professionalism. Many interns must interact not only with the provider but also with the public at large or outside clients. This professionalism may not be exhibited in students who have not had a professional experience prior to their internship. A professional training agreement can alleviate these issues.

TABLE **1**

Items Included on the Checklist of the Developed Professional Training Agreement in Order of Importance

Item to be Ranked	Mean	*SD*
Orientation and training	2.55	2.38
Safety	3.18	2.23
Supervision/independent work	4.91	3.05
Compensation	5	3.95
Policy for missing work (due to illness or vacation)	6.18	1.94
Dress code	6.91	2.12
Transportation	7.36	2.69
Confidentiality	7.45	3.59
Policy for late arrival	7.73	2.1
Downtime activities	7.91	3.11
Items to be added to student's resume upon completion of internship	9.45	4.52
Overtime	11	1.55
How to address supervisors (first name, Dr., Mr., Ms., etc.)	11.36	2.11

played a large role in internships as well. Internships in the "other" category included a state aquarium, a commercial composting company, hospital systems, and a sustainable community-supported agriculture farm. Four students completed international internships.

Because of these diverse experiences, creating a unified checklist that would benefit each was established using a survey of internship providers from 2010 to 2013 that ranked a list of potential points of discussion (see PTA web link at the end of this column). These points were developed from previous discussions with internship providers who commented that students had a lack of professional knowledge. At UGA, the overwhelming majority of BSEH students are funded by the lottery-based HOPE scholarship, which provides full tuition for students maintaining a "B" average. Therefore many students do not have to work nor have they had any previous job experience, according to a survey. Establishing professional expectations is key in order to foster a beneficial internship experience for both the intern and the provider. These points of discussion were ranked in the survey by internship providers (Table 1).

The survey also asked whether providers would like to see a completed report and resume required at the end of the internship. Because the response was 60% in favor of seeing these items, the questions were included on the PTA so that only those providers with interest would receive copies of these items.

In addition, 71% of survey respondents would like to revisit the PTA periodically throughout the internship. When given the option of how frequently (weekly, monthly, or at the midpoint and the end), 67% of respondents wished to revisit it at the midpoint and the end. For UGA interns, this coincides with a midpoint and final evaluation completed by the internship providers. Interns will be asked to provide a copy of the agreement to their supervisors during the evaluation process.

The PTA developed from this work is a Word document (so that users can modify it to fit their specific needs) and can be found at www.publichealth.uga.edu/ehs/student-resources/forms.

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DIRECT FROM CDC ENVIRONMENTAL HEALTH SERVICES BRANCH

Geoffrey P. Whitfield, MEd, PhD

Arthur M. Wendel, MPH, MD

Modeling Health Impacts of the Transportation Built Environment: Challenges and Opportunities

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 a column from the Environmental Health Services Branch (EHSB) of the Centers for Disease Control and Prevention (CDC) in every issue of the *Journal*.

In this column, EHSB and guest authors from across CDC will highlight a variety of concerns, opportunities, challenges, and successes that we all share in environmental public health. EHSB's objective is to strengthen the role of state, local, tribal, and national environmental health programs and professionals to anticipate, identify, and respond to adverse environmental exposures and the consequences of these exposures for human health.

The conclusions in this article are those of the author(s) and do not necessarily represent the views of CDC.

Dr. Whitfield and Dr. Wendel are with the National Center for Environmental Health, Healthy Community Design Initiative at CDC. More information on the Healthy Community Design Initiative can be found at www.cdc.gov/healthyplaces.

When most people hear "models," they probably think about people, not transportation. Models—the people version—help predict how clothes will look when we wear them. Models—the transportation version—help predict how our transportation system will function based on current and future infrastructure investments. Neither type of model is entirely accurate; they attempt to predict the future, and the future rarely fully cooperates. Despite this, models can provide useful information for planning and predicting health outcomes.

Environmental health practitioners already utilize model predictions. Prediction of disease risk, such as West Nile virus, may be based on models of vector spread (Harrigan, 2014). The risk of flooding in a given area is predicted based on historical stream-flow records (U.S. Geological Survey, 2008). In transportation, opportunities for environmental health professionals may arise as transportation models expand beyond predicting congestion and air pollution to predicting health impacts of walking and bicycling.

The well-established health benefits of increased physical activity have created much interest in health impacts of the transportation built environment related to walking, bicycling, and public transit (Besser, 2005). Ideally, models could predict changes in health outcomes such as mortality or disease prevalence for a given built environment change, such as a bike path or complete street initiative. This process has two steps: first, predicting changes in travel behavior (e.g., mode shift or total distance walked/bicycled) following an environmental or policy change; second, predicting health outcomes following the change in travel behavior. In practice, the former is currently more difficult than the latter. Each is explained below.

Modeling Travel Behavior

Predicting changes in travel behavior for transportation projects is limited by a lack of high-quality longitudinal data. Current modeling efforts are typically limited to using cross-sectional evidence of associations between built environment characteristics and walking and bicycling. For example, modelers may predict walking volumes after sidewalks are added to a neighborhood based on walking levels in comparable neighborhoods with existing sidewalks. This method is less reliable than information on behavior change after construction. Consider a pedestrian bridge that will link a neighborhood to an employment center. Proper evaluation of changes attributable to the bridge requires three elements. First, preconstruction travel habits of those living and working near the bridge serve as a baseline. Second, travel habits after bridge construction indicate changes potentially attributable to the bridge. Third, comparable measures from residents unaffected by the bridge determine if observed changes are due to general trends versus bridge-specific effects. This type of evaluation design allows transportation projects to be treated as "natural experiments" that provide needed information to modelers.

Environmental health practitioners may play important roles in this evaluation process. Obtaining preconstruction travel data requires quick action while planning transportation projects, which is a key period of involvement for environmental health professionals. Environmental health practitioners may also liaise between engineering and public health groups to foster communication and collaboration on evaluation efforts. Such efforts will prove valuable as they augment the evidence base on behavior and the built environment.

Modeling Health Impacts

Compared to the evidence linking behavior change to changes in the built environment, much better evidence is available linking travel-related exposures to health outcomes. For example, participation in moderate-intensity physical activity (like walking and bicycling) is known to protect against several chronic diseases, including but not limited to coronary artery disease, diabetes, and colon cancer (Physical Activity Guidelines Advisory Committee, 2008). Further, modelers know and can use the dose-response relationship between activity and disease to predict health outcomes.

Perhaps because of the large evidence base for physical activity and health, some health impact models, such as the Health Economic Assessment Tool (World Health Organization, 2014), focus solely on the health effects of increasing population physical activity. Such an approach may oversimplify the potential health consequences of increasing these behaviors by failing to account for changes in ambient air pollution, increased accident rates, sex- and age-specific effects, and underlying disease prevalence. Other models, such as the Integrated Transportation and Health Impact Modeling Tool (Center for Diet and Activity Research, 2014) utilize multiple areas of research to account for these factors but require extensive data for calibration to a specific geographic area and may require special software to handle complex calculations.

Future Directions

Health impact modeling will likely increase in importance as bicycling and walking are accepted as transportation alternatives. Already, air pollution modeling related to transportation projects helps to promote health; other areas of public health interest could follow its lead. One key to continued growth is expanding the evidence base on built-environment-associated behavior change. These data are crucial to creating accurate and cohesive models that estimate both changes in behavior and changes in health outcomes for transportation projects. Additionally, incorporating health impact modeling into larger city and regional transportation models will provide stakeholders and decision makers with important information about the future health of their communities.

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DIRECT FROM CDC ENVIRONMENTAL PUBLIC HEALTH TRACKING NETWORK


Preston Burt Shannon DeWitt

Environmental Information for Everyone

Editor's Note: As part of our continuing effort to highlight innovative approaches and tools to improve the health and environment of communities, the *Journal* is pleased to publish a bimonthly column from the Centers for Disease Control and Prevention's (CDC's) Environmental Public Health Tracking Network (Tracking Network). The Tracking Network is a system of integrated health, exposure, and hazard information and data from a variety of national, state, and city sources. The Tracking Network brings together data concerning health and environmental problems with the goal of providing information to help improve where we live, work, and play.

Environmental causes of chronic diseases are hard to identify. Measuring amounts of hazardous substances in our environment in a standard way, tracing the spread of these over time and area, seeing how they show up in human tissues, and understanding how they may cause illness is critical. The Tracking Network is a tool that can help connect these efforts. Through these columns, readers will learn about the program and the resources, tools, and information available from CDC's Tracking Network.

The conclusions of this article are those of the author(s) and do not necessarily represent the views of CDC.

Preston Burt is a health communications specialist as a contractor to the Environmental Public Health Tracking Branch in CDC's National Center for Environmental Health (NCEH). In his current position, he designs the user experience for the Tracking Network's web and print products. Shannon DeWitt is an information technology specialist and the security steward for the Environmental Public Health Tracking Branch in CDC's NCEH. He is responsible for the Info-By-Location application as well as the public facing web query system.

Our coworkers at CDC's Environmental Public Health Tracking Program (Tracking Program) come from a variety of disciplines and backgrounds. They include epidemiologists, statisticians, database developers, contract specialists, health communicators, and more. If you look closer at the people within those specialties, you will find an even wider array of skills. We have medical doctors, a veterinarian, educators, graphic designers, and former military personnel, among others. Every day, each member brings unique talents, personalities, and backgrounds to produce, maintain, and expand the National Environmental Public Health Tracking Network (Tracking Network).

Because of the staff's diversity, the "one size fits all" mentality clearly doesn't apply to the Tracking Program. When the Tracking Network launched in 2009, only one way really existed to look at the important environmental and health data within the Network. While the Network was groundbreaking at the time as the first surveillance system to provide environmental data and public health data together in one place, we knew we could improve it, especially the way we communicated data and information to our different user groups.

Communicating data effectively to groups as varied as environmental professionals, policy makers, teachers, and concerned parents is challenging. Choosing to be everything to everyone creates many bumps in the road and often fails at being perfect for anyone. We addressed this challenge by offering a wide array of resources to meet the needs of different groups.

For example, we use the term particulate matter (PM), and more specifically PM_{10} and $PM_{2.5}$ when we present data and information about outdoor air quality. Some Tracking Network user groups have no problem with these terms, but some groups are less familiar with them. In a commonly adopted effort to make PM_{10} and $PM_{2.5}$ more relatable, we use an easy-to-interpret comparison chart contrasting the size of particulate matter with the thickness of human hair, which is something familiar to everyone (Figure 1).

We also try to address problems with accessing the data. Some users with limited time or skills need help navigating the nearly one bil-

FIGURE **1**

$PM_{2.5}$ Size Comparison Chart

µm = micrometer

FIGURE **3**

Info By Location (Demographics Section Screenshot)

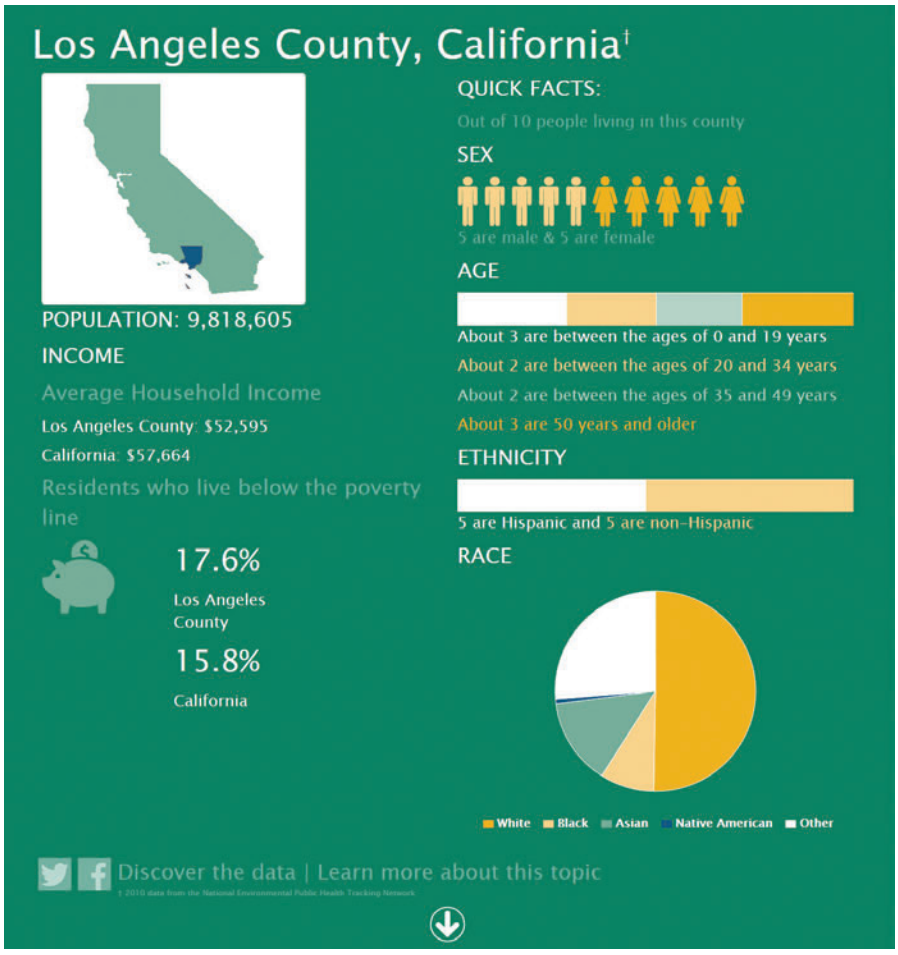

FIGURE **2**

Asthma and Air Pollution Infographic

lion rows of data, 1.4 million unique maps, and numerous pages of useful content housed on the Tracking Network. Our solution: infographics. Creating and displaying infographics allows the user to consume complex information fairly quickly (Figure 2).

With this in mind, we recently redesigned the "Info by Location" Tracking Network feature to make Tracking data more accessible using infographics (Figure 3). The intent of Info by Location is to present information to Tracking Network users who want to see quick facts about a county or state without having to delve into the data query system themselves. This method allows our creative, multifaceted staff to take a new approach to data display.

After thorough research, review of several design concepts, and many rounds of revisions, we produced a much improved version of Info by Location. Now, users enter a county name or zip code and click "submit" to see data for that area in an infographic-style display. Users can view demographic,

Tracking Network Resources

- Info By Location: http://ephtracking.cdc.gov/InfoByLocation
- Infographics: http://ephtracking.cdc.gov/showInfographics.action
- Tracking in Action success story videos: http://ephtracking.cdc.gov/showTrackingInAction.action
- Fine particulate matter size comparison: http://ephtracking.cdc.gov/images/content/PM2-5_5.jpg
- Animated timeline maps: http://ephtracking.cdc.gov/showAnimatedMaps.action
- New features demonstration: http://youtube/0P6ymfSqy6E

health, and environmental information and data. They have the option to share what they see via social media, explore the data further using the Tracking Network's data query system, or learn more about health and environmental topics on the Tracking Network.

Info by Location appears to be a feature of interest for network users. We have measured a 150% increase in user traffic in the first 30 days following the launch. Though our first release was well received, we will continue to find ways to improve the feature's content and design using feedback from user testing. Plans for adjustments to the application this year are already underway.

In addition to the items geared more toward users who are not public health or environmental health professionals, the Tracking Program aims to meet the needs of our data query system users by expanding the features and functionality for the Tracking Network. Additions have included enhanced display options for maps and benchmarks for certain datasets.

The digital public health landscape is always changing and advancing, and CDC's Tracking Program continues to work hard to develop meaningful content and resources highlighting the data contained within the Tracking Network. Whether through mapping applications, data query systems, infographics, or face-to-face interactions, we continue to recognize and embrace differences within the population by relying on those differences within our team to make the most impact in environmental health.

Using social media, infographics, success story videos, animated timeline maps, or quality web page content, we have developed a wide array of tools for various audiences (See Sidebar).

To learn more about the Tracking Network, please visit us online at cdc.gov/ephtracking. To stay up-to-date on our latest tools and resources, join our LISTSERV by sending an e-mail to epht@cdc.gov.

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Did You Know?

NEHA is putting together a Buyer's Directory. This new service to our members and credential holders will keep them informed on our latest vendors, products, and resources available to the environmental health profession. Look for the Buyer's Directory on our Web site at www.neha.org.

DIRECT FROM NCSL

Doug Farquhar, JD

2014 Environmental Health Legislation

Editor's Note: The NEHA Government Affairs program has a long and productive association with the National Conference of State Legislatures (NCSL). The organizations have worked together on any number of legislative and policy areas that directly impact the environmental health profession. One of the keys to the successes of the NEHA/NCSL collaboration has been the recognition of the fact that often some of the most significant legislation and policy initiatives related to environmental public health occur in state legislatures. The states have, in a very real sense, been the innovators in developing new programs and practices. In recognition of this fact, we have asked NCSL to provide occasional overviews of state environmental public health legislative activity, covering topics that are of the most pressing public concern.

Doug Farquhar, program director for NCSL's Environmental Health Program, has worked with NCSL since 1990. Mr. Farquhar directs development, management, and research for the Environmental Health Program. These projects encompass consultation and policy analysis of state and federal policies and statutes, regulations, and programs regarding environmental and related topics for state legislatures and administrative programs.

Overview

For the 2014 legislative sessions, environmental health issues garnered 2,794 pieces of legislation with several being carried over from the 2013 legislative sessions. Half of the states allow bills introduced in 2013 to carry over into 2014; in the other half all bills die at the end of session.

By the end of December 2014, the legislatures in the 46 states, the District of Columbia, and Puerto Rico introduced a total of 2,794 bills related to environmental health, with 559 bills being enacted into law. Every state in legislative session in 2014 enacted at least one bill about environmental health. (Montana, North Dakota, Nevada, and Texas were not in legislative session in 2014.)

For purposes of this report environmental health legislation addresses environmental factors that may adversely impact human health or the ecological balances essential to long-term human health and environmental quality, whether in the natural or human-made environment. Although this term encompasses a wide variety of issues, the National Conference of State Legislatures (NCSL) limits its research to specific environmental health issues. Because of the drinking water issues in Charleston, West Virginia, and Toledo, Ohio, NCSL decided to track legislation addressing drinking water. The increase in popularity with body piercings and other forms of body art led NCSL to begin tracking that issue in 2013. Food safety legislation was incorporated into the legislative database in 2014.

The NCSL environmental health legislative database is available to the public at http://www.ncsl.org/research/environment-and-natural-resources.aspx.

Body Art and Modification

Body art and modification is gaining in popularity, but many of the new trends are not covered by state law. Most states regulate tattoos and piercings but may not have the authority to regulate tongue splitting (where the tongue is cut one or two times to create multiple tips) and subdermal implants (a kind of body jewelry that is placed under the skin to create a raised design).

Fifty bills were introduced in 23 states related to body modification. Of these, Illinois, Kansas, Nebraska, Utah, and Vermont enacted laws in 2014. Illinois H 5858 (Act No. 936) allows for the removal of a tattoo on a minor who is a victim of trafficking. Kansas H 2154 (Act No. 2014-130) modifies the licensure requirements of cosmetologists (including body artists). Vermont H 656 (Act No. 0138) created an Office of Professional Regulation, which covers body art.

Drinking Water

Of the 182 bills introduced, 37 laws and 7 resolutions were adopted related to pollution, storage, conservation, treatment and testing,

and administrative procedures related to drinking water.

California explored several laws dealing with drinking water and droughts (Acts No. 349, 188, 463, 828). California A 2738 (Act No. 828) requires a special compliance procedure and proof of compliance for businesses that discharge specified chemicals into water sources.

Illinois amended the Public Water Supply Operations Act to ensure every community water supplier has an operator on staff (S 2770, Act No. 856). Ohio now includes recycled water as part of a private water system subject to regulation (S 179, Act No. 91). Virginia H 674 (Act No. 333) addresses human consumption in context of water supplies and waterworks, and H 1177 (Act No. 599) allows for local governments to establish reasonable drinking water testing requirements to ensure compliance with current standards, including private wells.

In response to the chemical spill in Charleston, West Virginia, in January 2014, the legislature adopted S 373 (Act No. 187), which requires the registration and annual inspection of all above-ground storage tanks. It also requires the state Bureau for Public Health to work with federal agencies to address any health effects from the chemical spill.

Food Safety

Food safety remains the most active area of environmental health, with 491 bills introduced and 87 enacted or adopted. Most states have only introduced a few bills on food safety, but certain states have introduced several. Hawaii had 102 active bills on food safety. New York had 73. New Jersey had 27, and Massachusetts had 25. Maine and California each had 21.

Several bills from Arizona, California, Hawaii, and Louisiana sought ways to comply with food safety requirements and the federal Food Safety Modernization Act (FSMA); other states, namely Idaho and New Hampshire, actively sought the repeal of FSMA.

Arizona adopted H 2436 (Act No. 210) requiring that county food handler training and certificates meet accreditation standards. California amended the Retail Food Code to exclude beer tasting facilities (S 1235, Act No. 927).

A couple of bills on hand washing in California caused some issues. The Legislature passed A 1252 (Act No. 556) in 2013 that required utensils or gloves in all food preparation (and caused issues for certain food handling operations). This year the legislature countered with A 2130 (Act No. 75) that modified hand washing requirements for food handling, making the requirements less onerous.

Louisiana enacted HCR 168 and SCR 178, which creates a study committee to make recommendations regarding the implementation of FSMA.

The Minnesota legislature passed S 2060 (Act No. 163), which accomplished the following:

- set standards for farmer's markets, community events, and food product sampling and demonstrations by requiring persons to provide certain information to regulatory authorities and comply with food safety and equipment standards;
- addressed seasonal temporary food stands; and
- addressed fundraisers conducted by community-based nonprofit organizations.

In New York, the legislature adopted S 2375 (Act No. 529), which requires public food services establishments to post their department of health inspection results from the past three years.

Tennessee enacted Act No. 182, the Tennessee Retail Food Safety Act, by rewriting the Retail Food Store Inspection Act of 1986, replacing the law concerning quick fast food establishments, revising and reorganizing other food safety laws, and allowing the Commissioner of Agriculture to regulate food establishments.

Utah adopted the Food Handler Permits and Food Safety Manager Act (H 176; Act No. 327), which amends provisions of the health code related to food handler permits and food safety managers, exempts an individual from food handler permit requirements and food safety manager requirements at charitable events, and makes technical amendments.

Cottage Foods

Cottage food bills were introduced in 11 states leading to the enactment of eight laws, mostly providing exemptions for certain producers from state food safety requirements for nonhazardous foods. Alabama enacted S 159 (Act No. 180), which provides exemptions to people selling baked goods and candies, as long as they label the foods and receive food safety training. The law also allows regulation by county health departments. California's Retail Food Safety Act (Act No. 556) also provides exemptions for cottage food operations.

The council in the District of Columbia adopted B 168 (Act No. 63), which permits cottage food businesses in the district, allowing the Department of Health to define cottage food operations. Georgia adopted H 101 (Act No. 242), which excludes charitable events from state food safety provisions. Illinois H 5657 (Act No. 660) prohibits local public health departments and other units of local government from creating guidelines for farmers' markets that are more stringent than state guidelines. Louisiana H 1270 (Act No. 542) allows for the preparation of low-risk foods at home for public sale and consumption.

Massachusetts H 3680 (Act No. 230) exempts potluck events from state and local food safety requirements. Oklahoma H 1418 (Act No. 339) authorizes the taking home of foods from senior nutrition sites, and requires the Department of Education to promulgate rules to prevent school lunch food waste and to redistribute leftover food to students in need.

In Missouri, S 525 was enacted that allows cottage food production operations an exemption from state health and food codes, requiring local governments to maintain records of complaints against such operations and requiring notification to consumers that such food has not been inspected by the state.

Hawaii also struggled with the cottage food issue, reviewing six bills (SCR 50, SCR 97, HCR 137, H 1992, H 2153, S 2561) that addressed everything from requiring food safety workshops for temporary food establishments to complete exemptions for the industry. In the end, only a bill convening a study committee made up of representatives from the cottage food industry and the department of health passed (HI SCR 97).

Food Labeling

From bills requiring the labeling of genetically modified (GM) foods to labeling of allergens, state legislatures have been active on food labeling—38 bills in 33 states. Since the beginning of 2014, 52 bills have been introduced on the labeling of GM foods, with two passing in 2014: Maine H 490 and Vermont H 112 (Connecticut's H 6527 [Act No. 183] was adopted during the 2013 session); and two resolutions being adopted: Hawaii SR 85 and Utah SJR 20.

Milk and Raw Milk

In 2014, 63 bills relating to raw milk were introduced. Bills providing consumer access to raw milk were introduced in 26 states.

California A 1390 Pasteurization of Goat Milk (Act No. 107) was enacted to exempt the requirement that goat milk be pasteurized. Hawaii passed the Milk Control Special Fund (Act No. 176) to ensure funds for the Milk Control Act. Illinois S 3157 (Act No. 958) expands the definition of milk to include milk from sheep, water buffalo, and other hoofed animals. Indiana enacted H 1300 (Act No. 186) to revise and update the dairy products law. Maine passed S 444, which would exempt "homestead foods" and raw milk from state oversight, but the Governor vetoed the bill.

Vermont passed S 70 (Act No. 0149) which permits the sale of raw milk at farmers' markets. Utah adopted SJR 20, which will study private sales of raw milk.

Indoor Air Quality

For purposes of this section, laws related to indoor air quality relate to carbon monoxide, radon, or mold. Under these categories, a total of 26 laws and 9 resolutions in 22 states were passed in 2014.

Carbon Monoxide

Laws regarding carbon monoxide detectors are becoming more popular. Many state statutes require carbon monoxide alarms to be installed in homes and rental units. Utah S 58 (Act No. 074) requires that buildings or structures used for educational purposes for students through grade 12 be equipped with carbon monoxide detection. Virginia S 490 (Act No. 632) requires a landlord to maintain any carbon monoxide alarm that has been installed in a dwelling unit, requires a landlord to install such alarm at the request of the tenant, authorizes the landlord to charge the tenant a reasonable fee to recover the costs of installation, and requires the installation to be in compliance with the Uniform Statewide Building Code.

Radon

Two laws were enacted and two resolutions were adopted related to radon. Iowa S 366 (Act No. 1116) requires the department of education to notify each school district and accredited nonpublic school in this state of the risks associated with radon gas and radon progeny at such attendance centers. New Hampshire S 405 (Act No. 2014-325) requires certification of airborne radon mitigation system installers with the National Radon Proficiency Program or the National Radon Safety Board. Utah S 109 (Act No. 093) requires the Department of Health, in consultation with the Division of Radiation Control, to develop an awareness campaign to educate the public regarding radon gas in buildings, including health risks, testing options, and remediation. Pennsylvania HR 640 commemorates the month of January 2014 as "Radon Awareness Month."

Mold and Mildew

Georgia SR 953 created the Senate Mold and Mildew Remediation Contractor Study Committee. Louisiana enacted two bills on mold: S 66 (Act No. 572) and H 802 (Act No. 258). S 66 relates the Board of Home Inspectors to provide a written inspection report regarding the presence of mold growth. H 802 establishes the Toxic Mold Task Force.

Toxics and Chemicals

State legislatures are becoming more active on toxics and chemicals policy, with a total of 606 bills being introduced and 92 being enacted or adopted. Legislatures sought to address environmental health threats from specific chemical agents, from specific sites, to protect vulnerable populations, or to promote certain health and safety needs.

Illinois HR 886 urges the strengthening of the state's chemical management status. S 2727 (Act No. 638) prohibits the sale of any product containing microbeads.

Michigan H 5005 (Act No. 24) exempts diverted waste from the definition of solid waste, regulates collection centers, and provides that diverted waste include hazardous waste, liquid, pharmaceuticals, electronics, batteries, light bulbs, pesticides, thermostats and switches containing mercury, medical waste, and other approved wastes that can be easily separated from solid waste for diversion to preferred methods of management and disposal.

Vermont enacted S 239 (Act No. 0188), which provides for the designation of chemicals of high concern to children, requires the commissioner of health to review the list to determine if other chemicals should be added, and creates the chemicals of high concern to children working group. Oregon also had a bill on High Priority Chemicals (S 1569), but it was not adopted. North Carolina had a bill in 2013 on Toxic Chemicals in Children's Products, requiring the state to establish a list of chemicals of concern and high priority, but it did not pass.

Cadmium

Connecticut H 5305 (Act No. 14-140) specifies the amount of cadmium that is allowed in children's jewelry.

Lead Hazard Reduction and Poisoning Prevention

Connecticut's H 5537 (Act No. 14-231) concerns public health statutes and addresses lead-based paint poisoning, among other things. Illinois H 5410 (Act No. 690) relates to lead poisoning, making changes to regulated facilities and prohibiting persons from acting as lead contractors, workers, or supervisors unless licensed by the state. New Hampshire raised the maximum administrative fine for lead-based paint removal violations (S 368 [Act No. 2014-157]). Pennsylvania amended the Plumbing System Lead Ban and Notification Act (P.L. 207, No. 33) (S 1254).

Rhode Island enacted S 2562 (2014-446) which provides for a longer licensing period for lead removal workers, and revises the penalty authority to come into compliance with U.S. Environmental Protection Agency (U.S. EPA) standards.

Mercury

Kansas H 2551 (Act No. 2014-112) directs the secretary of health and environment to establish a statewide atmospheric mercury deposition monitoring network. Minnesota S 2192 (Act No. 277) prohibits placing mercury or a mercury-containing device or product in solid waste, wastewater disposal system, solid waste processing facility, or solid waste disposal facility.

Washington H 2246 (Act No. 119) addresses mercury-containing lights, providing for the stewardship and disposal of such lights.

Tracking, Surveillance, and Biomonitoring

Eleven bills in five states were introduced on issues related to tracking, surveillance, and biomonitoring. Only Minnesota H 1863 (Act No. 286) passed, confirming that the state's

Environmental Health Tracking and Biomonitoring Advisory Panel is continued.

Other bills include Massachusetts H 1953, establishing a high containment biological research laboratory health and safety program. New York S 243 sought to develop an Environmental Health Tracking System within the state. S 3431 sought to require the state to include pesticide exposures in its breast cancer research.

Wastewater

Wastewater naturally incurs environmental health concerns. From regulation of sewage, to dumping, to storm water regulations, 41 states reviewed 335 bills, enacting or adopting 76.

Florida's S 272 and H 1321 (Act No. 2014-68) authorizes the state public service commission to revoke a certificate of authorization of a water utility, requires the utility to meet with its customers to discuss the costs and benefits of plausible solutions if the utility has failed to meet water standards, prohibits a customer from petitioning to revoke the certificate of authorization, and provides for water testing. S 536 (Act No. 2014-79) requires the department of environmental protection to conduct a study in coordination with the stakeholders on the expansion of the beneficial use of reclaimed water, storm water, and excess surface water.

Indiana's H 1132 and H 1187 (Acts No. 209 and 213) addresses the administration of water and wastewater services. Oklahoma S 1187 (Act No. 364) requires the environmental quality board to develop and promulgate rules relating to water reuse projects.

Virginia adopted amendments to their storm water management program: S 423, Act No. 303 authorizes the state water control board to adopt regulations that create a procedure for approving permits for individual parcels in a common plan of development. H 1173 allows for storm water management plans to be optional for some localities (Act No. 598).

Missouri HCR 38 urges Congress to decrease the U.S. EPA's authority to regulate water quality and the use of coal and wood as energy sources. Utah SJR 20 creates a study committee to look at recycled water and wastewater. West Virginia SCR 27 urges the president and Congress to prevent and respond to chemical spills in state and national waters.

Environmental Health Management

Environmental health management refers to those policies that serve to manage environmental factors that may impact human health. Each of these bills is associated with one of the other categories listed. But they address the management of a program to address the issue more than the issue itself.

A total of 517 bills were introduced in almost every state, with 102 being either enacted or adopted. This high rate of adoption reflects the fact that most of these bills modify policies or practices to make the agency perform better or alleviate any outdated policies.

Most of the bills enacted in this section have been discussed before, but a few of the 102 bills adopted will be highlighted.

Because Alabama adopted provisions to allow for cannabidiol oil from marijuana for certain medical conditions, it needed to amend its law to exempt patients and medical staff from laws regarding drug possession (S 175, Act No. 2014-277). California adopted the used mattress recycling and recovery program, authorizing an industry-sponsored mattress recycling program certified by the department of resources recycling and recovery (S 254, Act No. 388). The state also adopted S 1458 (Act No. 544), repealing the provisions that authorized the department of toxic substances control to exempt hazardous waste management activities from those standards. It provides that those exceptions adopted prior to that date shall remain valid, unless repealed. A 2738 (Act No. 828) requires notification by a business that discharges a specified chemical.

Iowa H 225 (Act No. 12) amends the waste management assistance provisions by updating pollution prevention policy to include reuse and combustion with energy recovery.

Maryland H 1259 (Act No. 649) requires the board of environmental health specialists to establish a seasonal training program, the licensing and reinstatement status of environmental health specialists, and conditions for participating in a training program.

Rhode Island S 2137, H 7120 (Acts No. 2014-331 and 2014-275) create a division of agriculture within the department of environmental management. H 8284 (Act No. 2014-435) establishes a procedure for the initial payment and renewal registration fees for the operation of a food business.

Health Impact Assessments (HIAs)

Although few bills discussed HIAs, some were introduced and adopted. California's S 436 (Act No. 416) Port Hueneme beach shoreline protection requires a public scoping meeting to address health impact issues.

Minnesota S 2775 and H 3175 sought to provide funds for the state to perform HIAs. In New Mexico, S 48 would have created an HIA program within the state's department of environmental health. Vermont H 832 sought to study the public health impacts of mobile phones. West Virginia looked to studying the health impacts of shale gas development (H 2062).

Disclaimer: The above summarizes state law or legislation and is the property of NCSL. It is intended as a reference for state legislators and their staff. NCSL makes no warranty, expressed or implied, or assumes any legal liability or responsibility for third party use of this information, or represents that its use by such third party would not infringe on privately owned rights. The report submitted by NCSL was edited by *Journal* staff for space limitations. The original report, as submitted to the *Journal*, can be found at www.neha.org/pdf/2014-EH-Legislation-NCSL.pdf.

Did You Know?

National Groundwater Awareness Week is March 8–14. More information on the week and how to get involved can be found at www.ngwa.org.

DEMYSTIFYING THE FUTURE

Thomas Frey

You Will Be a Different Person by the Time You Reach the End of This Article

Editor's Note: Significant and fast-paced change is occurring across society in general and our profession in particular. With so much confusion in the air, NEHA is looking for a way to help our profession better understand what the future is likely to look like. The clearer our sense for the future is, the more able we are to both understand and take advantage of trends working their way through virtually every aspect of our lives today. To help us see what these trends are and where they appear to be taking us, NEHA has made arrangements to publish the critical thinking of the highly regarded futurist, Thomas Frey.

The opinions expressed in this column are solely that of the author and do not in any way reflect the policies and positions of NEHA and the *Journal of Environmental Health*.

Thomas Frey is Google's top-rated futurist speaker and the executive director of the DaVinci Institute®. At the Institute, he has developed original research studies enabling him to speak on unusual topics, translating trends into unique opportunities. Frey continually pushes the envelope of understanding, creating fascinating images of the world to come. His talks on futurist topics have captivated people ranging from high-level government officials to executives in Fortune 500 companies. He has also authored the book *Communicating with the Future*. Frey is a powerful visionary who is revolutionizing our thinking about the future.

Whatever happened to that young child you were not so many years ago?

As a baby, life was all about eating, sleeping, and dry diapers. Even though you were learning new things quickly, not much else really mattered. By the time you entered grade school, you had learned to walk, talk, feed yourself, and have fun with your friends. Mom and Dad were very important and playtime was a central part of every day.

Entering high school you grew much taller—in most cases, doubling your height from when you were two. Your eyes and facial features had many similarities and looked familiar, but you were very different. You were fascinated by music and television, and any time you spotted a passing smile by someone of the opposite sex, it became heart stoppingly important.

Relationships mattered. Every new day had you seeking a different set of experiences. You took pride in whatever you were good at and became enamored with things you enjoyed. Every personal relationship brought with it a different set of involvements. Your first kiss set the stage for your second, and your first intimate moments became cemented into the very fabric of your being.

As you entered your 30s and 40s, your skill sets change dramatically. With age came perspective, big problems became little ones, and over time, even the little ones faded away. In so many ways, you could now see the bigger picture.

In your 60s and 70s you begin to feel time is running out. One moment of urgency gets replaced by the next, but urgency also comes with a new outlook. Your greatest memories become like gardens of eternal beauty, a place where you graciously linger whenever they show up.

It is in this progression that we begin to realize that the future has changed us every step of the way. Even though continuations exist in our personality and genetic structure, we are constantly changing. One cell gets replaced by another until we bear little resemblance to that person we were so many years ago.

And yes, you are now a different person than you were, even a few seconds ago when you first started reading this column. So why does this matter? Here are 18 reasons why the person you were still matters, and another 18 reasons why it doesn't.

The Ball Dropping Experiment

Take a ball, preferably one that bounces, and hold it in the air above your head. As you drop the ball, consider the implications of what happens.

During the 2–3 seconds it takes to reach the ground, several things are happening. The ball at six feet above the ground is younger and different than the ball at four feet, two feet, and the one that impacts the floor. At each of these intervals, the ball is represented by distinctly different space and time coordinates, and in perhaps a million different ways, the ball changes as atoms are rearranged, electrons shift, and the chemical composition is slightly altered.

So is the ball at four feet and two feet a continuation of the ball being dropped, or something else? From a digital thinker's perspective, every microsecond of time requires all of our surroundings be visually refreshed, just like the computer display on our desk.

Does this mean that the dropping ball is actually 10,000 individual ball scenes organized is some cosmic way to represent the fluid motion associated with it moving towards the ground?

Probably not, but it also does not answer the fact that everything around us is constantly in motion, changing every microsecond of every day.

18 Reasons Why the Person You Were Still Matters

The former you has set the stage for the present you, and the person you are today will become critically important to the person you become in the future.

1. Memories: Every memory helps crystallize who you are today.
2. Shared experiences: Every long-term relationship is built around shared experiences, and these shared experiences provide the foundation for future ones.
3. Emotional values: Everything around you is constantly being emotionally rated on a subconscious level. That is why your car will generally hold more value than things like a skateboard or power drill.
4. Skills: Learning how to perform a task efficiently ties directly into a combination of short-term, long-term, and muscle memory. While some skill will fade over time, their influence will remain for years to come.
5. Your body: Your present body came from your former body.
6. Derivative talents: Every talent you have is a derivative of some other talent, interest, or tendency.
7. Physical improvements and physical impairments: Every time you work out, it causes both short- and long-term changes to your body and health. On the flip side, every time you injure yourself, it causes residual effects that linger over time.
8. The personality equation: Every individual is a combination of attributes, tendencies, desires, interests, and about 20 more ingredients we don't have names for yet. Some will change significantly over time, but others less so.
9. Secrets: Hidden deep beneath the subfloor of human consciousness are our secrets that can come back to haunt us if we don't deal with them somewhere along the way.
10. Struggles: Our struggles are what make our accomplishments valuable.
11. Obsession: Determination becomes obsession and then it becomes all that matters. But from my vantage point, obsession is underrated.
12. Possessions: Yes, it is possible to simply walk away from all of our possessions, but few people do. Not only do we own our possessions, they own us. And the things we own very often influence our future decisions.
13. Connections and networks: We forge our weak and strong relationships through our connections. But today's social networks give us the tools to amplify those connections in a massively powerful way.
14. Inner voice: Our most intimate of all intimate relationships takes place in the rarely audible space inside our head. We have a constant love-hate relationship with our inner voice, and even though we argue with ourselves, it will continue to influence who you are in the future. No, it won't! Y.e.s., i.t. w.i.l.l.!
15. Hopes and desires: Inside every great person is the hope and aspiration to become something better—more meaningful, more influential, more passionate.
16. Reputation: If we're doing things correctly, our reputation will enter the room before we do. Our reputation involves a multitude of variables, and is one of the most influential aspects of who we are.
17. Quirkiness: Today's foibles can become tomorrow's most admired qualities if we know how to leverage them.
18. Legacy: For many of us, the disturbance we leave in the force field of life is the most significant accomplishment we can possibly make.

18 Reasons Why Your Former Self No Longer Matters

The voice of the fatalist inside often gives us little room for hope. If we believe that change is not possible, then it certainly isn't. But at the same time, we are being inundated with constant examples of how different we are today than we were, say 20 years ago.

Here are 18 of these examples.

1. You look different. You're nearly unrecognizable to people you hung out with 20 years ago.
2. You've forgotten. The vast majority of your life has disappeared into the ether, leaving little more than a faint residue of the imprint you made along the way.
3. Your physical abilities have changed.
4. Your income is different.
5. Your friends are different.
6. Your clothes no longer fit, and if they still fit, they fit differently.
7. The things you valued most in the past now hold little meaning. (Note to self—shag carpeting should never have been invented.)
8. Your favorite sports team today has none of the same players you remember from 10 years ago.
9. New friends may be more valuable than old friends.
10. Your ability to make brilliant decisions today is far greater than the person you left behind.
11. Past mistakes can only haunt you if you're still you.
12. Bad memories can be replaced by good ones, and old dreams can be replaced by more inspiring, more infectious, more exciting new dreams.
13. New skills will make you a different person.
14. Every significant shift in your life can be broken down into a series of baby steps that can be repeated, modified, redirected, or recalibrated.
15. You are only one relationship away from being the person you want to be.

16. A path out of your current dilemma always exists.
17. The only thing holding you back is you.
18. Personal wisdom has no limits.

Final Thoughts

Each morning, as I brush my teeth, I barely recognize the person in the mirror staring back at me. If I'm the same person I was 20 years ago, then why do I look so different and think so different, and why has my path of progress been so unpredictable?

When people are sent to prison, the person coming out is dramatically different than the person who went in. The set of experiences on the inside, with every possible influencer being a capital "L" loser in the game of life, has a massively deleterious influence on the person leaving prison life behind.

Our best and brightest have but a brief moment to shine, and even the most gifted and most privileged bear the scars of human existence.

Some of you who read this will find it depressing and, in so many ways, discouraging. Yet others, reading the exact same words, will find inspiration and reasons for hope. As for me, I continue on my never-ending journey to discover the great truths about what lies ahead. For me, that is my calling, a calling that I do not take lightly.

Interested in sharing your thoughts? Go to www.FuturistSpeaker.com.

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The following colleges and universities offer accredited environmental health programs for undergraduate and graduate degrees (where indicated). For more information, please contact the schools directly, visit the National Environmental Health Science and Protection Accreditation Council (EHAC) Web site at www.ehacoffice.org, or contact EHAC at ehacinfo@aehap.org.

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Interested applicants can send their resume to: Bill Flynn at Fax: 818-865-0465. E-mail: Bill.Flynn@ul.com.

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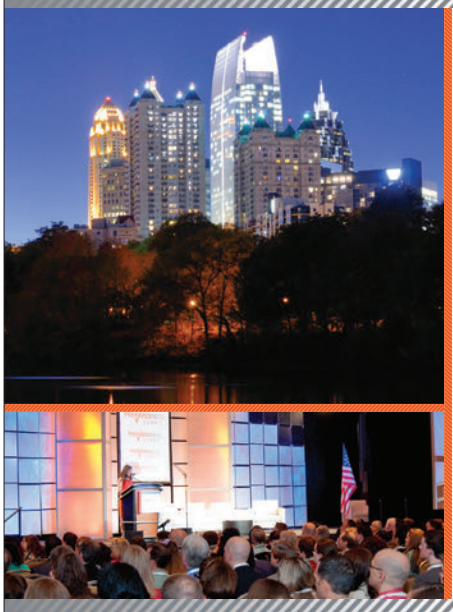

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EH CALENDAR

UPCOMING NEHA CONFERENCE

July 13–15, 2015: NEHA's 79th Annual Educational Conference & Exhibition, Renaissance Orlando at SeaWorld, Orlando, FL. For more information, visit www.neha2015aec.org.

NEHA AFFILIATE AND REGIONAL LISTINGS

Arizona
March 11–12, 2015: Annual Spring Conference, hosted by the Arizona Environmental Health Association, Phoenix, AZ. For more information, visit www.azeha.org/Conferences.html.

California
April 13–16, 2015: Annual Educational Symposium, hosted by the California Environmental Health Association, San Diego, CA. For more information, visit www.ceha.org.

Idaho
March 18–19, 2015: Annual Education Conference, hosted by the Idaho Environmental Health Association, Boise, ID. For more information, visit www.ieha.wildapricot.org.

Indiana
April 16, 2015: Annual Spring Educational Conference, hosted by the Indiana Environmental Health Association, Indianapolis, IN. For more information, visit www.iehaind.org.

Kentucky
July 29–31, 2015: 69th Annual Interstate Environmental Health Seminar, hosted by the Kentucky Association of Milk, Food, and Environmental Sanitarians, Corbin, KY. For more information, visit www.wvdhhr.org/wvas/IEHS/index.asp.

Michigan
March 18–20, 2015: Annual Educational Conference, hosted by the Michigan Environmental Health Association, Traverse City, MI. For more information, visit www.meha.net.

Missouri
March 31–April 3, 2015: 2015 Annual Education Conference, hosted by the Missouri Milk, Food, and Environmental Health Association, Lake Ozark, MO. For more information, visit www.mmfeha.org.

New Jersey
March 1–3, 2015: Educational Conference & Exhibition, hosted by the New Jersey Environmental Health Association, Atlantic City, NJ. For more information, visit www.njeha.org.

Ohio
April 23–24, 2015: Annual Education Conference, hosted by the Ohio Environmental Health Association, Dublin, OH. For more information, visit www.ohioeha.org.

Utah
May 13–15, 2015: Spring Conference, hosted by the Utah Environmental Health Association, Bicknell, UT. For more information, visit www.ueha.org/events.html.

Virginia
April 17, 2015: Spring Educational Session, hosted by the Virginia Environmental Health Association, Daleville, VA. For more information, visit http://virginiaeha.org/educational-sessions/.

Wisconsin
April 21, 2015: Spring Education Conference, hosted by the Wisconsin Environmental Health Association, Oshkosh, WI. For more information, visit www.weha.net/professionaldevelopment.php.

TOPICAL LISTINGS

Hazardous Materials/Toxic Substances
March 30–April 1, 2015: Urban Soils and Metal Contamination: Issues–Remedies, hosted by the Society for Environmental Geochemistry and Health and the University of Texas Arlington, Arlington, TX. For more information, visit www.uta.edu/ees/segh.

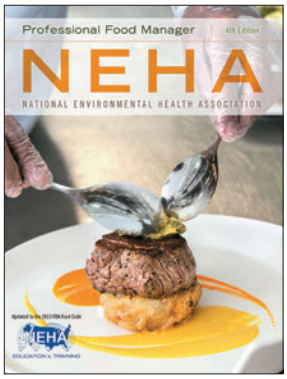
RESOURCE CORNER

Resource Corner highlights different resources that 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!

NEHA BOOKSTORE
www.neha.org/store

Professional Food Manager (Fourth Edition)

National Environmental Health Association, Inc. (2015)
Skillsoft, Inc. (Portions) (2015)

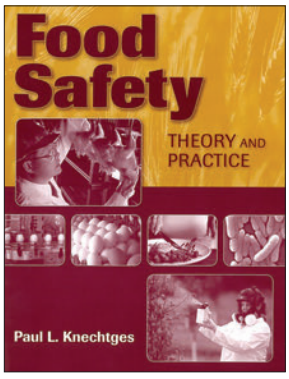


New! Building on the success of previous editions, the new edition is written in an easy-to-read style that prepares current and soon-to-be managers for the many food safety challenges encountered in the workplace. Updated to FDA's *2013 Food Code*, the book provides vital information on topics such as the key principles of food safety management and how to use these principles to create a food safety culture. Current and prospective managers needing food safety manager certification as well as those who are already certified and seeking a refresher on best practices in food safety will find this book an invaluable resource.

141 pages / Paperback/ Catalog #EZ6003
Member: $22 / Nonmember: $26

Food Safety: Theory and Practice

Paul L. Knechtges (2012)

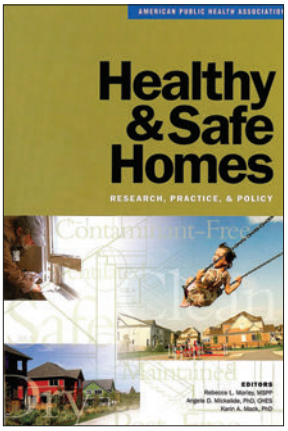


Authored by a NEHA member! Written from a "farm-to-fork" perspective, this book provides a comprehensive overview of food safety and discusses the biological, chemical, and physical agents of foodborne diseases. Topics covered include risk and hazard analysis of goods; the prevention of foodborne illnesses and diseases; safety management of the food supply; food safety laws, regulations, enforcement, and responsibilities; and the pivotal role of food sanitation/safety inspectors. Early chapters introduce readers to the history and fundamental principles of food safety. Later chapters provide an overview of the risk and hazard analysis of different foods and the important advances in technology that have become indispensable in controlling hazards in the modern food industry.

460 pages / Paperback / Catalog #1120
Member: $78 / Nonmember: $83

Healthy & Safe Homes: Research, Practice, & Policy

Edited by Rebecca L. Morley, MSPP, Angela D. Mickalide, PhD, CHES, and Karin A. Mack, PhD (2011)

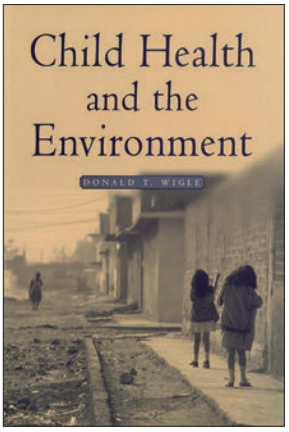


This book marks an exciting advance in the effort to ensure that people across all socioeconomic levels have access to healthy and affordable housing. It provides practical tools and information to make the connection between health and housing conditions relatable to everyone. The book brings together perspectives from noted scientists, public health experts, housing advocates, and policy leaders to fully explain the problem of substandard housing that plagues our nation and offers holistic, strategic, and long-term solutions to fix it. Study reference for NEHA's Healthy Homes Specialist credential exam.

225 pages / Paperback / Catalog #1111
Member: $52 / Nonmember: $55

Child Health and the Environment

Donald T. Wigle (2003)



This textbook focuses on environmental threats to child health. It will interest professionals and graduate students in public health, pediatrics, environmental health, epidemiology, and toxicology. It provides overviews of key children's environmental health issues, addresses the health effects of different environmental contaminants, and summarizes associations between environmental exposures and child health outcomes. It also calls for an improved science base to guide public health decisions and protect child health.

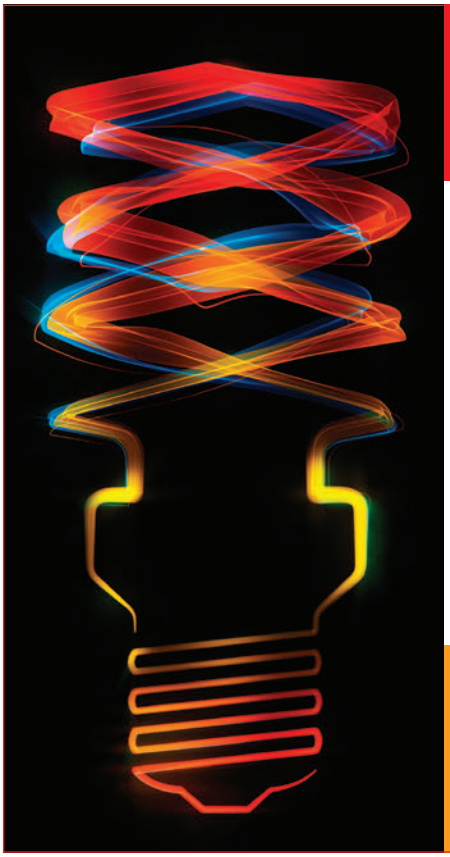
396 pages / Hardback / Catalog #759
Member: $59 / Nonmember: $64

2015 Joe Beck Educational Contribution Award

This award was established to recognize NEHA members, teams, or organizations for an outstanding educational contribution within the field of environmental health. Named in honor of the late Professor Joe Beck, this award provides a pathway for the sharing of creative methods and tools to educate one another and the public about environmental health principles and practices. Don't miss this opportunity to submit a nomination to highlight the great works of your colleagues!

Nominations are due in the NEHA office by March 16, 2015.

For more information, please visit **www.neha.org/about/awardinfo.html**.
Nomination materials can be obtained by e-mailing Terry Osner at **tosner@neha.org**.



2015 NEHA Innovation Award

This award recognizes a NEHA member or organization for creating a new idea, practice, or product that has had a positive impact on environmental health and the quality of life. Innovative change that promotes or improves environmental health protection is the foundation of this award.

This annual award recognizes those who have made an innovative contribution to the field, as well as encourages others to search for creative solutions. Take this opportunity to submit a nomination to highlight the innovations being put into practice in the field of environmental health!

Nominations are due in the NEHA office by March 16, 2015.

For more information, please visit
www.neha.org/about/awardinfo.html.
Nomination materials can be obtained
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JEH QUIZ

FEATURED ARTICLE QUIZ #5

Foodborne Illness and Seasonality Related to Mobile Food Sources at Festivals and Group Gatherings in the State of Georgia

Available to those holding an Individual NEHA membership only, the *JEH* Quiz, offered six times per calendar year through the *Journal of Environmental Health,* is a convenient tool for self-assessment and an easily accessible means to accumulate continuing-education (CE) credits toward maintaining your NEHA credentials.

1. Read the featured article carefully.
2. Select the correct answer to each *JEH* Quiz question.
3. a) Complete the online quiz at www.neha.org (click on "Continuing Education"),
   b) Fax the quiz to (303) 691-9490, or
   c) Mail the completed quiz to
   JEH Quiz, NEHA
   720 S. Colorado Blvd., Suite 1000-N
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   Be sure to include your name and membership number!
4. One CE credit will be applied to your account with an effective date of March 1, 2015 (first day of issue).
5. Check your continuing education account online at www.neha.org.
6. You're on your way to earning CE hours!

Quiz Registration

Name

NEHA Member No.

Home phone

Work phone

E-mail

➔ Quiz deadline: June 1, 2015

1. The Centers for Disease Control and Prevention estimate that approximately __ foodborne illnesses occurred in the U.S. in 2011.
   a. 12.4 million
   b. 10 million
   c. 9.4 million
   d. 6.7 million

2. Group gatherings included
   a. picnics.
   b. private homes.
   c. wedding receptions.
   d. all of the above.
   e. a and b.

3. Festivals included events such as mobile food sources at
   a. rodeos.
   b. carnivals.
   c. wedding receptions.
   d. all of the above.
   e. a and b.

4. Of the 244 cases reviewed in this study, __ occurred at group gatherings.
   a. 2.5%
   b. 15.2%
   c. 23.0%
   d. 29.1%

5. No significant difference occurred in the number of reported illnesses or number hospitalized during winter, spring, summer, or autumn.
   a. True.
   b. False.

6. The number of individuals hospitalized was __ for group gatherings than for festivals or other types of events.
   a. lower
   b. higher
   c. the same

7. __ was the most common pathogen responsible for the 244 cases reviewed in this study.
   a. *Salmonella*
   b. *Staphylococcus*
   c. *Clostridium*
   d. Norovirus

8. At group gatherings, __ of the cases were the result of *Salmonella*.
   a. 50.0%
   b. 46.4%
   c. 26.8%
   d. 3.6%

9. At festivals, 50% of the cases resulted from __ and the other 50% from __.
   a. norovirus; *Salmonella*
   b. *Staphylococcus*; norovirus
   c. *Salmonella; Staphylococcus*
   d. norovirus; *Clostridium*

10. __ was responsible for the highest number of cases in winter.
    a. *Clostridium*
    b. Norovirus
    c. *Salmonella*
    d. *Staphylococcus*

11. __ was responsible for the highest number of cases in summer.
    a. *Clostridium*
    b. Norovirus
    c. *Salmonella*
    d. *Staphylococcus*

12. The highest number of total cases reviewed for this study occurred in __.
    a. spring
    b. summer
    c. autumn
    d. winter

JEH Quiz #3 Answers
December 2014

1. d	4. a	7. b	10. d
2. b	5. c	8. a	11. a
3. a	6. d	9. c	12. c

2015 Walter F. Snyder Award

Call for Nominations

Nomination deadline is April 30, 2015.

Given in honor of NSF International's co-founder and first executive director, the *Walter F. Snyder Award* recognizes outstanding leadership in public health and environmental health protection. The annual award is presented jointly by NSF International and the National Environmental Health Association.

❖ ❖ ❖

Nominations for the 2015 *Walter F. Snyder Award* are being accepted for professionals achieving peer recognition for:

- outstanding accomplishments in environmental and public health protection,
- notable contributions to protection of environment and quality of life,
- demonstrated capacity to work with all interests in solving environmental health challenges,
- participation in development and use of voluntary consensus standards for public health and safety, and
- leadership in securing action on behalf of environmental and public health goals.

❖ ❖ ❖

Past recipients of the *Walter F. Snyder Award* include:

2014 – Priscilla Oliver
2013 - Vincent J. Radke
2012 - Harry E. Grenawitzke
2011 - Gary P. Noonan
2010 - James Balsamo, Jr.
2009 - Terrance B. Gratton
2008 - CAPT. Craig A. Shepherd
2007 - Wilfried Kreisel
2006 - Arthur L. Banks
2005 - John B. Conway
2004 - Peter D. Thornton
2002 - Gayle J. Smith
2001 - Robert W. Powitz
2000 - Friedrich K. Kaeferstein
1999 - Khalil H. Mancy
1998 - Chris J. Wiant
1997 - J. Roy Hickman
1996 - Robert M. Brown
1995 - Leonard F. Rice
1994 - Nelson E. Fabian
1993 - Amer El-Ahraf
1992 - Robert Galvan
1991 - Trenton G. Davis
1990 - Harvey F. Collins
1989 - Boyd T. Marsh
1988 - Mark D. Hollis
1987 - George A. Kupfer
1986 - Albert H. Brunwasser
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1983 - John R. Bagby, Jr.
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1974 - James J. Jump
1973 - William A. Broadway
1972 - Ralph C. Pickard
1971 - Callis A. Atkins

NSF

NATIONAL ENVIRONMENTAL HEALTH ASSOCIATION

The 2015 Walter F. Snyder Award will be presented during NEHA's 79th Annual Educational Conference (AEC) & Exhibition to be held in Orlando, Florida, July 13 - 15, 2015.

For more information or to download nomination forms, please visit www.nsf.org or www.neha.org or contact Stan Hazan at NSF at 734-769-5105 or hazan@nsf.org.

SUPPORT THE NEHA ENDOWMENT FOUNDATION

The NEHA Endowment Foundation was established to enable NEHA to do more for the environmental health profession than its annual budget might allow. Special projects and programs supported by the foundation will be carried out for the sole purpose of advancing the profession and its practitioners.

Individuals who have contributed to the foundation are listed below by club category. These listings are based on what people have actually donated to the foundation—not what they have pledged. Names will be published under the appropriate category for one year; additional contributions will move individuals to a different category in the following year(s). For each of the categories, there are a number of ways NEHA recognizes and thanks contributors to the foundation. If you are interested in contributing to the Endowment Foundation, please fill out the pledge card or call NEHA at 303.756.9090.

Thank you.

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Name in the Journal *for one year and endowment pin.*

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HONORARY MEMBERS CLUB
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Letter from the NEHA president, name in the Journal *for one year, and endowment pin.*

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Name in AEC program book, name submitted in drawing for a free one-year NEHA membership, name in the Journal *for one year, and endowment pin.*

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Peter M. Schmitt
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Dr. Bailus Walker, Jr.
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Metairie, LA

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($5,000–$100,000)

Name in AEC program book, special invitation to the AEC President's Reception, name in the Journal *for one year, and endowment pin.*

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I pledge to be a NEHA Endowment Foundation Contributor in the following category:

❍ Delegate Club ($25)
❍ Honorary Members Club ($100)
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❍ **You have my permission to disclose the fact and amount (by category) of my contribution and pledge.**

I plan to make annual contributions to attain the club level of _____ over the next _____ years.

Signature _____ Print Name _____

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Allegheny County Health Department
www.county.allegheny.pa.us

American Academy of Sanitarians (AAS)
Gary P. Noonan
www.sanitarians.org

Anua
www.anua-us.com

Ashland-Boyd County Health
hollyj.west@ky.gov

Association of Environmental Health Academic Programs
www.aehap.org

ATSDR/DCHI
www.atsdr.cdc.gov/hac

Camelot International Health Organization
www.camelot.gr

CDP, Inc.
www.cdpehs.com

Chemstar Corporation
www.chemstarcorp.com

Chesapeake Health Department
www.vdh.state.va.us/lhd/chesapeake

City of Bloomington
www.ci.bloomington.mn.us

City of Fall River Health & Human Services
(508) 324-2410

City of Houston Environmental Health
www.houstontx.gov/health/environmental-health

City of Milwaukee Health Department, Consumer Environmental Health
http://city.milwaukee.gov/Health

City of San Diego Environmental Services Department
www.sandiego.gov/environmental-services

City of St. Louis Department of Health
www.stlouis-mo.gov/government/departments/health

Coconino County Public Health
www.coconino.az.gov

Colorado Department of Public Health and Environment, Division of Environmental Health, Delegated Programs Unit
Therese Pilonetti
therese.pilonetti@state.co.us

Decade Software Company, LLC
Darryl Booth
www.decadesoftware.com

DEH Child Care
www.denvergov.org/DEH

DeltaTrak, Inc.
Vallierie Cureton
www.deltatrak.com

Digital Health Department, Inc.
www.dhdinspections.com

Diversey, Inc.
Steve Hails
www.diversey.com

DuPage County Health Department
www.dupagehealth.org

Eastern Idaho Public Health District
www.phd7.idaho.gov

Ecobeco
www.ecobeco.com

Ecolab
robert.casey@ecolab.com
www.ecolab.com

EcoSure
charlesa.arnold@ecolab.com

Elite Food Safety Training
www.elitefoodsafety.com

English Sewage Disposal, Inc.
(756) 358-4771

Florida Department of Health
www.doh.state.fl.us

Gila River Indian Community, Environmental Health Services
www.gilariver.org

GLO GERM/Food Safety First
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www.glogerm.com

HealthSpace USA Inc.
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Industrial Test Systems, Inc.
www.sensafe.com

Inspect2Go
www.inspect2go.com

InspekPro LLC
www.inspekpro.com

International Association of Plumbing and Mechanical Officials
www.iapmo.org

Jackson County Environmental Health
www.jacksongov.org/EH

Jefferson County Health Department (Missouri)
Joe Hainline
www.jeffcohealth.org

Jefferson County Public Health (Colorado)
csanders@jeffco.us
http://jeffco.us/health

Kansas Department of Health & Environmental
jrhoads@kdheks.gov

Linn County Public Health
health@linncounty.org

Maricopa County Environmental Services
jkolman@mail.maricopa.gov

Mars Air Doors
www.marsair.com

McDonough County Health Department
www.mchdept.com

Merced County Public Health, Division of Environmental Health
rrowe@co.merced.ca.us

Mesothelioma Lawyer Center
www.mesotheliomalawyercenter.org

Mid-Iowa Community Action
www.micaonline.org

Mitchell Humphrey
www.mitchellhumphrey.com

Mycometer
www.mycometer.com

National Environmental Health Science and Protection Accreditation Council
www.ehacoffice.org

National Registry of Food Safety Professionals
Lawrence Lynch
www.nrfsp.com

National Restaurant Association
www.restaurant.org

National Swimming Pool Foundation
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www.nspf.org

Neogen Corporation
www.neogen.com

New Mexico Environment Department
www.nmenv.state.nm.us

New York City Department of Health & Mental Hygiene
www.nyc.gov/health

North Bay Parry Sound District Health Unit
www.healthunit.biz

Nova Scotia Department of Agriculture
www.gov.ns.ca

NSF International
Stan Hazan
www.nsf.org

Omaha Healthy Kids Alliance
www.omahahealthykids.org

Oneida Indian Tribe of Wisconsin
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Orkin
Zia Siddiqi
www.orkincommercial.com

Ozark River Hygienic Hand-Wash Station
www.ozarkriver.com

PerkinElmer, Inc.
www.perkinelmer.com

Polk County Public Works
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Presby Environmental, Inc.
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Procter & Gamble Co.
www.pg.com

Prometric
www.prometric.com

QuanTEM Food Safety Laboratories
www.quantemfood.com

Racine City Department of Health
www.cityofracine.org/Health.aspx

Remco Products
www.remcoproducts.com

Sacramento County Environmental Management Department
www.emd.saccounty.net

San Jamar
www.sanjamar.com

Seattle & King County Public Health
Michelle Pederson
michelle.pederson@kingcounty.gov

Shat-R-Shield Inc.
Anita Yost
www.shat-r-shield.com

Skillsoft
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Sonoma County Permit and Resource Management Department, Wells and Septic Section
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Stater Brothers Market
www.staterbros.com

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Kevin Thrasher
www.sweepssoftware.com

Target Corp.
www.target.com

Taylor Technologies, Inc.
www.taylortechnologies.com

Texas Roadhouse
www.texasroadhouse.com

The Steritech Group, Inc.
www.steritech.com

Tri-County Health Department
www.tchd.org

Underwriters Laboratories, Inc.
www.ul.com

Waco-McLennan County Public Health District
http://waco-texas/cms-healthdepartment/

Washington County Environmental Health (Oregon)
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www.co.washington.or.us/HHS/EnvironmentalHealth

Waukesha County Public Health Division
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rdeburger@gmail.com

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felix.zemel@gmail.com

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NEHA **NEWS**

NEHA Staff Member Larry Marcum Retires

Consider what 25 years means to you. Is it half of your current life span? The number of years you spent in school? The number of years you've been married? Have you not even lived 25 years? In a world where the average worker today stays at each of his or her jobs for 4.4 years (according to the most recent available data from the Bureau of Labor Statistics), having someone stay at a job for 25 years is a major milestone of dedication and passion for the job.

On December 15, 2014, NEHA's Managing Director of Research and Development and Government Affairs Larry Marcum retired after being with the organization for 25 years. It was with a heavy heart that NEHA said goodbye to Larry as his impact on the association and profession has been profound and far reaching.

Prior to working with NEHA and after completing his master's degree in public administration, Larry worked as a grants administrator with the Wyoming State Health Department. He administered a federal grant program aimed at enhancing the state's emergency medical services program. The job required him to work closely with partners from different agencies, professions, and organizations and would help to establish the collaborative skills he became known for while at NEHA. He stayed in this position for almost six years and left when he was accepted for law school.

Larry attended Creighton University School of Law and graduated with his Juris Doctor. After passing the Colorado Bar Examination and becoming licensed to practice law in Colorado, he went to work for a private law practice in Fort Collins, Colorado. He stayed in this position until he was hired by NEHA in 1990.

Larry was hired as NEHA's manager of the Grants and Contracts program. At that time, the grant program had a budget of less than $100,000 and consisted of two employees. The grant work focused on drinking water and hazardous waste. As Larry remembers, "I was hired with the expectation that I would significantly grow the grants and contracts program. The objective was to increase grant revenue, increase the number of federal agencies NEHA worked with, and to expand the number of environmental health topic areas covered by federal grants."

That expectation was met over the next years as the number of grants, cooperative agreements, environmental health topic areas, and federal partners grew. By early 2000, the grant program was bringing in several million dollars annually and had grown in staff size to nine full-time employees and around seven subcontractors. Due to this growth, NEHA's Grants and Contracts program evolved into its current form as NEHA's Research and Development (R&D) program.

By obtaining and administering federal grants NEHA was able to evolve the program into a true R&D concept that involved using federal grants to capitalize the costs of programs and services that were later turned over to other NEHA programs. For example, four of NEHA's credentials were developed this way and many of NEHA's publications, training products, and support for NEHA's Annual Educational Conference (AEC) & Exhibition were all funded in total or in part through the R&D program.

With the extensive contacts and relationships made through the R&D program, NEHA was able to launch for the first time a separate government affairs and external liaison program. This program enabled NEHA to establish strong relationships with other nongovernmental organizations, take positions on policy impacting environmental health, and develop stronger partnerships with both academic institutions and private industry. Larry managed this program in addition to the R&D program. In 2006, to reflect his management role in both of these programs as well as his increasing responsibilities on NEHA's senior management team, he was given the title of managing director. He held this position until he retired.

When asked about the biggest change he has seen in NEHA over his 25-year career, Larry commented, "I can't overstate the amount and degree to which NEHA changed during my career. The place I left in December 2014 is simply not the same place I came to work for in the fall of 1990. It is not just growth in the number of staff or our budget—it is a change in the kind of organization we have become. NEHA is stronger, more diverse, more influential, more stable, more sophisticated, and more in tune with the profession and our membership than I could have dreamed possible back in 1990. It has been fun, rewarding, and most of all, gratifying to be at least some part of that."

Larry had a great talent for fostering meaningful and lasting relationships with the different agencies NEHA worked with. His impact, both professionally and personally, are reflected in the comments below.

"Larry, it's been a pleasure to work with such a wonderful professional and friend. Your dedication and commitment to the profession will never be forgotten. You will be missed, and that's for sure! Take care, my friend, and enjoy the next phase of your life."—Sharunda Buchanan, MS, PhD, Director, Division of Emergency and Environmental Health Services, National Center for Environmental Health (NCEH), Centers for Disease Control and Prevention (CDC).

"Larry has been a steady and productive NEHA staff representative of the Council to Improve Foodborne Outbreak Response (CIFOR) since the beginning in 2006. Larry provided keen insight, thoughtful ideas and suggestions, and helped get CIFOR through some challenging early days as the collaboration expanded in membership and scope. He was always there to bring logic, experience, and common sense to some very intense discussions. His legal and environmental health knowledge added key insights and information at many critical points in the CIFOR history. We will miss his great intellect and great sense of humor. Great job, Larry, and my best wishes!"—CAPT Donald J. Sharp, MD, DTM&H,

Larry enjoys the scenery of Alaska during the NEHA 2004 AEC UL Event train ride. While selecting a favorite AEC was difficult, Larry did say that the 2004 AEC in Anchorage was most memorable as it "was such a unique setting."

Larry stands with former NEHA staff member Tom Dickey as NEHA is recognized by the U.S. Environmental Protection Agency for its achievements in indoor air quality education and outreach.

Larry speaks to attendees of the NEHA 2015 AEC held in Las Vegas, Nevada. He provided a report on the status of NEHA's R&D and Government Affairs programs during the Town Hall Assembly.

USPHS, Deputy Director, Food Safety Office, National Center for Emerging and Zoonotic Infectious Diseases, CDC.

"I'm going to miss Larry. He had a way of asking the right question during a discussion. He always had a smile and a positive outlook. "—Vince Radke, MPH, RS, CP-FS, DAAS, CPH, Sanitarian, Environmental Health Services Branch, NCEH, CDC.

"Larry, congratulations on your transition to new opportunities! It has been such a pleasure working with you and NEHA over the last 10 years. I still maintain that NEHA is one of the best run associations out there. Your members are fortunate to be so well cared for and represented. I know there are others who will step in when you leave, but it won't be the same! Enjoy the future and best wishes to you!"—Marion Hinners, MS, Food and Nutrition Service, U.S. Department of Agriculture (retired).

Furthermore, Larry is highly regarded among his past and present coworkers in the NEHA office. "Personally speaking, Larry was always a knowledgeable diplomat for NEHA in dealing with people and organizations. He listened with interest and responded with compassion. I was fortunate to learn and grow under his mentorship and I will be forever grateful! And, I am so happy our friendship has continued since my retirement," commented Tom Dickey, former NEHA R&D assistant manager.

"Larry's expertise and insight have been an enormous asset to NEHA—and I'm not sure if they will ever be replaced. His innate ability to know just how and what to say and with finesse will be hard to match. But he trained the R&D staff well and we are up to the challenge—and we hope we make him proud. I know we are all very proud and grateful for all of Larry's guidance over the years. He will be greatly missed," added Vanessa DeArman, NEHA R&D project coordinator.

Nelson Fabian, former NEHA executive director and the person responsible for hiring Larry stated, "Larry is exceptionally smart and effective and quite frankly, NEHA would not be where it is today without his numerous contributions. But the memory that most will long cherish from Larry's wonderful NEHA career will surely be how well he connected with us. Through humor, insights he uses from history, a genuine empathy, and an ability to really hear and understand the other person, Larry built lifelong friendships and not just working relationships. Little wonder that his career is highlighted with numerous achievements, involving many people all inspired by his personal touch."

It is difficult to imagine NEHA or a NEHA AEC (Larry attended 24 of them during his time with NEHA) without Larry. It is felt, however, that his impact on the organization, the mentorship and support he has provided, and his professionalism and high level of work will carry on for many years to come.

"When I submitted my resignation I told the board that it's been a great ride. That more than anything is how I feel at the end of this journey. Over the past few months so many people have reached out to me to say some very nice things and to thank me for what I have done for NEHA. I at least as much owe a huge thank you to our wonderful members, my colleagues on staff (past and present), and the members of the NEHA's board of directors (past and present) for allowing me this truly great experience. The places I have been, the people I have met, and the things that I have learned have enriched my life. For that I am sincerely grateful because my long career at NEHA made those things possible."

In parting, Larry shared these final thoughts: "You are always, I think, almost expected to say that you wish everyone well and success for the organization. I am going to say that—but with a sincerity that I hope everyone knows is there. NEHA has been a big part of my life for nearly 25 years. It will always hold a special place in my heart and I wish the membership, staff, and leadership of this wonderful organization every future success. I will always be rooting for NEHA."

From all of us at NEHA, we thank Larry for his lasting and incalculable impact on our lives, the profession, and the association. We congratulate you for all your accomplishments. You will be greatly missed and we wish you the best of luck on this next chapter in your life!

ENVIRONMENTAL HEALTH EDUCATION & TRAINING

ENVIRONMENTAL HEALTH ADVANCEMENT

ENVIRONMENTAL HEALTH NETWORKING

ENVIRONMENTAL HEALTH POLICY INVOLVEMENT

79th NEHA AEC

JULY 13–15, 2015

79th National Environmental Health Association (NEHA) Annual Educational Conference (AEC) & Exhibition
Orlando, FL

IMAGINE THE NEW NEHA

REGISTER NOW

	Member	Nonmember
Early Full Conference Registration Includes admission for one person to the Networking Luncheon, Exhibition Grand Opening & Party, and Presidents Banquet.	$575	$735
Early Retired/Student Registration Does not include any food functions. Tickets must be purchased separately.	$155	$230
Early One-Day Registration Does not include any food functions. Tickets must be purchased separately.	$310	$365

Registration information is available at neha2015aec.org. For personal assistance, contact customer service toll free at 866.956.2258 (303.756.9090 local), extension 0.

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- Gain the skills, knowledge, and expertise needed to build capacity for environmental health activities.
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- Earn continuing education (CE) credit to maintain your professional credential(s).
- Receive a return on investment (ROI) with both immediate and long-term benefits.

See For Yourself

Visit neha2015aec.org/about for ROI and other information about the NEHA AEC.

NEW TO THE NEHA AEC?

Check out our video from last year's conference to get a peek of what it's all about!

ENVIRONMENTAL HEALTH ADVANCEMENT

PRE-CONFERENCE COURSES AND EXAMS

Schedule is subject to change.

Advance your expertise and career potential by obtaining a NEHA credential or certification at the AEC. You may choose to take just a credential/certification course, just an exam, or both a course and an exam.
Note: Only qualified applicants will be able to sit for an exam.

Certified Professional – Food Safety (CP-FS)

Saturday & Sunday, July 11 and 12, 8 am – 5 pm

This two-day refresher course is designed to enhance your preparation for the NEHA CP-FS credential exam. Participants are expected to have prior food safety knowledge and training equal to the eligibility requirements to sit for the CP-FS exam. The course will cover exam content areas as described in the job task analysis. The instructor will be available during and after the course for questions.

*Cost: $325 for members and $425 for nonmembers. Includes the CP-FS Study Package (*CP-FS manual, *NEHA's* Professional Food Manager *book, and the* 2009 and 2013 FDA Food Codes *on CD), a $235 value.*

Exam: Monday, July 13, 8 – 10:30 am
Separate application and exam fee required. $245 member/$390 nonmember. Deadline to apply to take the exam is May 29, 2015.

Certified in Comprehensive Food Safety (CCFS)

Friday & Saturday, July 10 and 11, 8 am – 5 pm
Sunday, July 12, 8 am – 12 pm

NEHA is pleased to offer the course for the CCFS credential at the 2015 AEC. The CCFS is a strong core credential for food safety professionals with a primary concern of overseeing the producing, processing, and manufacturing environments of the U.S. food supply. It has been designed to meet the increasing need for highly qualified food safety professionals from both industry and the regulatory community that provide oversight in preventing food safety breaches at U.S. production and manufacturing facilities and abroad. The credential course will cover exam content areas as described in the job task analysis. The course will utilize different learning modalities from critical thinking exercises to small group breakouts and videos.

Cost: $375 for members and $475 for nonmembers. Includes NEHA's CCFS Preparation Guide.

Exam: Monday, July 13, 8 – 10:30 am
Separate application and exam fee required. $245 member/$390 nonmember. Deadline to apply to take the exam is May 29, 2015.

Registered Environmental Health Specialist/ Registered Sanitarian (REHS/RS)

Friday & Saturday, July 10 and 11, 8 am – 5 pm
Sunday, July 12, 8 am – 12 pm

This two and a half day refresher course is designed to enhance your preparation for the NEHA REHS/RS credential exam. Participants are expected to have a solid foundation of environmental health knowledge and training equal to the eligibility requirements to sit for the REHS/RS credential exam. This course alone is not enough to pass the REHS/RS credential exam. The class will cover exam content areas as described in the job task analysis. The instructor will be available during and after the course for questions.

Cost: $499 for members and $599 for nonmembers. Includes the REHS/RS Study Guide*, a $179 value.*

Exam: Sunday, July 12, 1 – 6 pm
Separate application and exam fee required. $265 member/$450 nonmember. Deadline to apply to take the exam is May 29, 2015.

HACCP—Managing Hazards at the Retail Level

Sunday, July 12, 8 am – 5 pm

The course is designed to teach the requirements needed for HACCP team/staff and to provide managers, regulators, and frontline food safety personnel in retail food facilities with an understanding of how behavior and active participation in creating, implementing, and maintaining a HACCP plan can greatly impact the likelihood for success. Special emphasis is placed on the process HACCP approach.

Managing Hazards at the Retail Level is offered and certified by NEHA; the course is further accredited by the International HACCP Alliance.

Cost for Course and Exam: $249 for members and $299 for nonmembers.

Exam: Monday, July 13, 8 – 10 am

NETWORKING

Strengthen your business and personal relationships and build a network of colleagues that you can call on at anytime!

NEW FOR 2015!

We are adding a brand new networking opportunity, the Award Winners' Circle! This will be a place where attendees can connect and chat with the award winners recognized at the AEC. Be inspired and hear directly from these outstanding professionals who were nominated by their environmental health peers.

LUNCH IN THE EXHIBIT HALL

This year we've combined the Exhibition and a concession lunch so that you have more chances to network with one another and with our fabulous AEC exhibitors.

ENVIRONMENTAL HEALTH
EDUCATION & TRAINING

NEW SESSIONS!

GAIN A FRESH PERSPECTIVE AND BE INSPIRED

Tools for Success Today and Making a Difference for Tomorrow!

We've stepped up our game from last year and not only are we bringing you sessions that demonstrate innovations in approaches, partnerships, research, and technology, but we're adding sessions that include evidence-based practices with proven track records.

Food Safety & Defense
- Using FDA's Risk Factor Study to Enhance Retail Food Safety Effectiveness
- In a Nut Shell—Need to Know Food Allergen Info
- Verification Times Two: How Do Food Managers Verify Food Safety
- Chemical-Free Cleaning and Sanitizing in Retail Food Establishments
- Merging Public Health and Food Safety Awareness Using a Mobile Application

Emergency Preparedness & Response
- New Role for Environmental Health in Emergency Management
- Environmental Health Training in Emergency Response (EHTER): Building Capacity Through Blended Learning
- Health, Safety, and Security During an Outbreak of Ebola Virus Disease
- Volunteer Engagement Within the Emergency Management Cycle

Hazardous Materials & Toxic Substances
- Heavy Metals, Heavy Conversation
- Are Steam Autoclaves or Incinerators the Only Way of Treating Medical Waste?
- E-waste, E-toxics, E-pressing

Healthy Homes & Communities
- How to Build Capacity for Health Impact Assessment With Little or Nothing
- Reducing Environmental Health Disparities Through Adult Education

Leadership
- "Doing More With Less" Is an Oxymoron (and It's Not Realistic!)
- Changing Your Organization's Direction: Key Steps in Charting a Successful Course
- Achieving Excellence in a Time of Austerity
- Pursuing Public Health Accreditation With Support From Environmental Public Health Programs

Onsite Wastewater
- Hybrid Adsorption and Biological Treatment Systems (HABiTs) for Onsite Wastewater Treatment
- Power to the People: How Environmental Health Professionals Can Help Communities Help Themselves
- Everyone Deserves a Decent Throne: EH Lessons From Sierra Leone, India, and Haiti

Recreational Water
- Demonstration of Knowledge: Making a Real Difference to Safety
- Act on the MAHC
- Swimming Pool Regulations: Both Sides of the Cyanuric Acid Stabilizer Debate
- Geared Towards Compliance: Using Evidence-Informed Strategies to Train Pool and Spa Operators

ENVIRONMENTAL HEALTH
EDUCATION & TRAINING

Sustainability & Climate Change
- Engaging Community Members to Protect Public Health and Vitality of Small Farms
- Join the Discussion: The Importance of Locally-Specific Climate Change-Related Health Outcome Tools
- An Evaluation of the Heat Relief Network Cooling Centers in Maricopa County
- Adaptation in Action

Technology & EH
- Telemetry and Remote Monitoring in Food Safety
- Regulatory Efficiency and Customer Service: Florida Plan Review Centralization and Electronic Initiatives
- Conquering Time and Space: Effectively Using Weather Data to Assess Environmental Health

Vector Control
- Rabies by the Numbers: A Mapping Application to Make Data More Accessible
- Appalachian Mountain Innovative Readiness Training
- Prevention of Zoonotic Infection in Children by *Baylisascaris procyonis*
- Biting Back: Vector Control Program Performance Assessment and Improvement Projects

Water Quality
- Identification and Implementation of Effective Educational Campaigns for Private Well Testing
- What's in Your Drinking Water? A Domestic Well Water Sampling Program
- The Drinking Water Treatment Partnership Project

This is just the tip of the iceberg with the NEHA AEC providing more than 150 presentations exclusively dedicated to the environmental health profession.

You will leave the conference with relevant and practical information that you can apply and implement in your positions and your community!

FIELD TRIPS

Since we are visiting one of the country's—arguably the world's—largest travel destinations, we want to explore how some of these attractions handle the environmental health impacts of millions of visitors. Plan to attend one of these hands-on field trips in Orlando.

Sustainability
Tour a biogas facility to see how bacteria convert food and other organic waste into electricity that powers a theme park.

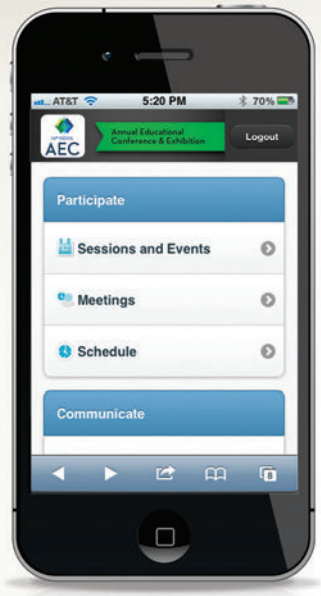
Recreational Water
Go behind the scenes at a water park to see how the equipment, operations, and maintenance of a summer vacation destination can support a healthy swimming environment.

Onsite Wastewater
Visit some onsite wastewater system installation sites where pilot studies are being conducted on denitrification.

***Field trips are tentative and may require an additional registration cost.**

ENVIRONMENTAL HEALTH
VIRTUAL AEC

YOUR AEC MEETING COMPANION



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- **Create your customized conference schedule:** Add sessions and events you want to attend to your schedule. Then, export the schedule to your Outlook or other electronic calendar.
- **Network and converse:** "Meet" other attendees, speakers, and exhibitors via the chat forums. Request meeting connections, swap digital business cards, or connect digitally with others in your area of specialty or geographic region.
- **Learn:** Use the chat feature to ask questions, post comments, and communicate with speakers and other attendees. Discover the latest innovative products and services shared by AEC exhibitors.

Your Continuing Education Resource

After the conference, you can still access the educational sessions, view presentation slides, and obtain supplemental materials through the continuing education resource.

PRELIMINARY SCHEDULE

Schedule is subject to change.

Friday, July 10

Review Courses: REHS/RS, CCFS

Saturday, July 11

Review Courses:
REHS/RS, CP-FS, CCFS

Sunday, July 12

Review Courses: REHS/RS, CP-FS, CCFS, HACCP
Exam: REHS/RS (afternoon)
Events:

- Community Event
- First Time Attendee Workshop
- Annual UL Event

Monday, July 13

Exams: CP-FS, CCFS, HACCP
Events:

- Education Sessions
- Networking Luncheon
- Keynote
- Awards Ceremony
- Exhibition Grand Opening & Party

Tuesday, July 14

Events:

- Education Sessions
- Exhibition
- Lunch in Exhibition

Wednesday, July 15

Events:

- Breakfast & Town Hall Assembly
- Education Sessions
- Field Trips
- Presidents Banquet

ENVIRONMENTAL HEALTH
DESTINATION

ORLANDO

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NEHA AEC DESIGNATED HOTEL

Renaissance Orlando at SeaWorld
Room rate: $129 per night + taxes and fees.
AEC attendees will not have to pay the hotel's resort or Internet fees.

For more information, visit neha2015aec.org and click the "Travel/Hotel" tab.

With dozens of theme parks and attractions, world-class golf courses, and miles of ocean and gulf beaches a short drive away, you will want to plan an extended stay in Orlando before or after (or both!) the conference. Cool off at a water park, visit an orange grove, take an airboat ride, or drive a NASCAR race car!

- SeaWorld Orlando
- Disney's Magic Kingdom, Animal Kingdom, Hollywood Studios, Epcot
- Kennedy Space Center and Visitor Complex
- Discovery Cove
- Legoland
- Universal Studios Florida including the Wizarding World of Harry Potter
- Richard Petty Driving Experience
- Busch Gardens Tampa
- Gatorland and Wild Florida Gator Park

GO AHEAD GIVE IN

VISIT THE ORLANDO ATTRACTIONS YOU'VE ALWAYS WANTED TO SEE!

NEHA SECOND VICE PRESIDENTIAL CANDIDATE PROFILE

NEHA elects its leaders through a ballot that goes to all active and life members prior to the annual conference. Among other things, the ballot features the election for the position of NEHA second vice president. The person elected to this position begins a five-year commitment to NEHA that involves advancing each year to a different national office, eventually to become NEHA's president.

Election policies specify that profiles for the second vice president be limited to 800 words in total length. If a candidate's profile exceeds that limit, the policy requires that the profile is terminated at the last sentence before the 800-word limit is exceeded. In addition, the submitted profiles have not been grammatically edited, but presented as submitted and within the 800-word limitation. This year, NEHA presents one candidate for the second vice president office.

Vince Radke, MPH, RS, CP-FS, DAAS, CPH Sanitarian

Vince Radke has worked in Public Health and Environmental Health for 44 years. Since December, 2001 Vince Radke has worked as a Sanitarian at the Environmental Health Services Branch of the Division of Emergency and Environmental Health at the National Center for Environmental Health of the Centers for Disease Control and Presentation (CDC). Presently, Vince is a member of a ten person team working on food safety issues, and the training of environmental health specialist in the areas of general environmental health, emergency preparedness, response and recovery. During his 13 years at CDC Vince has worked with the Environmental Health Specialist Network (EHS-Net) conducting research on the contributing factors and environmental antecedents of foodborne illnesses. He has co-authored a number of peer reviewed journal articles on the research done by the EHS-Net group.

Based on a survey of NEHA members showing a need for training in vector control, Vince Radke and his CDC colleague, CAPT Michael Herring, developed a three day course for local environmental health specialist entitled, "Biology and Control of Vectors and Public Health Pest: The Importance of Integrated Pest Management". This course has proven to be so popular that there is a waiting list of organization wanting the course. Although the course was designed for the environmental health specialists from state, local and tribal health departments other professionals from the private sector, other government sectors and academia have attended the course.

Prior to coming to CDC, Vince spent 22 years in the environmental health field at the state and local levels in the states of CT, WV, VA and MN. He was Director of Environmental Health for the City of Stamford, CT. During his tenure from 1979 to 1983 he drafted ordinances on noise, personal grooming establishments and public feeding of pigeons. While working in the health departments in Fairfax County, VA and the City of Alexandria, VA Vince led a group of environmental health specialist from the northern Virginia area in reviewing the Food Code and having it adopted in three jurisdictions in northern Virginia. Later he advised the State of Virginia Health Department on adopting the Food Code for the entire state. Prior to his environmental health days, Vince was part of the Smallpox Eradication Program, first as a Peace Corps Volunteer in Ethiopia (1970–74) and then later as a technical advisor with the World Health Organization in Bangladesh (1976) and Kenya (1977–79).

Vince is a Registered Environmental Health Specialist, a Certified Professional in Food Safety, and a Diplomate of the American Academy of Sanitarians. Presently, he is the chair of the American Academy of Sanitarians. Vince became certified (2008) in public health (CPH) and is a member of the Charter Class. Vince received his BS in Biology from Michigan State University in 1970. He holds a Masters of Public Health degree from the University of Pittsburgh, which he received in 1977. Vince was a board member of The National Environmental Health Science and Protection Accreditation Council from 2005-08. Vince has been President of both the National Capital Area Environmental Health Association and Virginia Environmental Health Association. Presently, Vince is a technical advisor to the National Environmental Health Association in the area of Emergency Preparedness and Response.

Vince has received The Order of the Bifurcated Needle from the World Health Organization in 1980 for his work in the Smallpox Eradication Program. He has received the ADM Jerrold M. Michael Award from the National Capital Area Environmental Health Association in 1998 and 1999, the U.S. Department of Health and Human Services, Secretary's Award for Distinguished Service during Hurricanes Katrina, Rita and Wilma in 2005 and the Distinguished Service and Professional Achievement Award from the Environmental Section of the American Public Health Association in 2006. Vince was honored with the 2011 Environmental Protection Agency Bronze Medal Award. In 2012, he was elected into the Omicron Chapter of the Delta Omega Society and is duly enrolled in this honorary public health society. Also in 2012 Vince received a Presidential Citation from the National Environmental Health Association. In 2013, Vince received the Walter F. Snyder Award from NSF International and NEHA, "For achievement in advancing Environmental Health". Also in 2013 he received the NEHA Past Presidents Award "In recognition of longstanding service and contributions to NEHA and to the Environmental Health Profession".

As he has done his entire working career, Vince is committed to advancing the professionals in environmental health in order to improve the health and wellbeing of all people. As a good steward and future NEHA board member, Vince is poised to work with the other NEHA board members and NEHA partners in the public, private and academic sectors to achieve this vision.


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