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Volume 77, No. 2 September 2014

LIFE IS HARD

Experiences of a Rail Yard Community



—
violence and
unemployment
ripple effect

—
health as an
unattainable
value



—
air quality
challenges

—
rail yard pros
and cons





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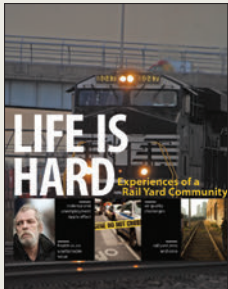
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ABOUT THE COVER



The people who live near San Bernardino Railyard (SBR) in San Bernardino, California, struggle with a myriad of issues. As our cover points out, crime, lack of employ-

ment opportunities, and air pollution as well as noise are major challenges for the people who live near SBR, a busy transportation hub due to its proximity to Los Angeles ports. The noise and air pollution caused by SBR are environmental justice issues and the authors of our cover feature, "Experiences of a Rail Yard Community: Life Is Hard," interviewed residents to understand their challenges more specifically and explore possible solutions. See page 8.

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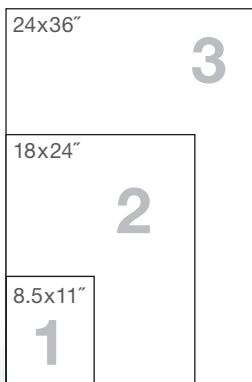


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- Online pre-published article: Boys, Not Girls, Are Negatively Affected on Cognitive Tasks by Lead Exposure

Erratum

In the December 2013 issue (76[5]), the article "Public Health Implications of Animals in Retail Food Outlets" listed one of the authors incorrectly. The third author's name is Rahel Lynes, MPH, not "Rachel Lynes, MPH," as was printed.

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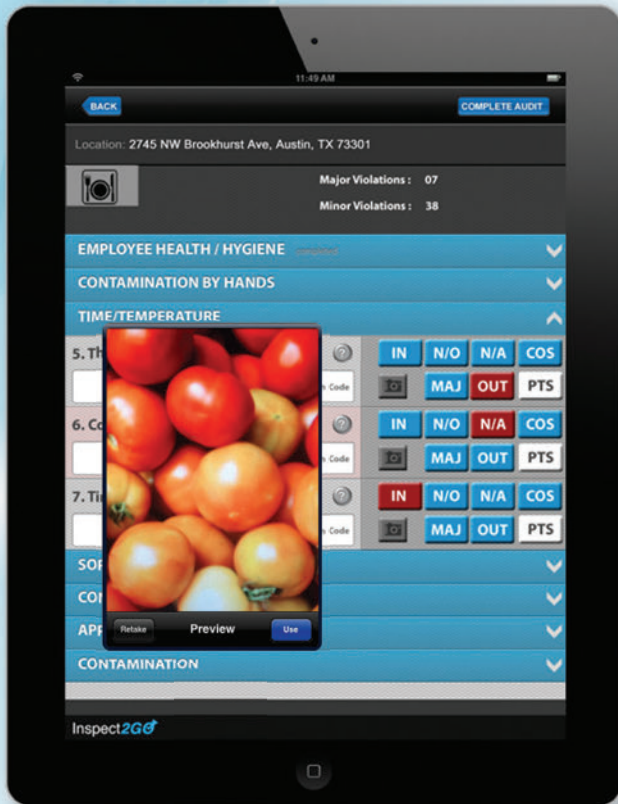


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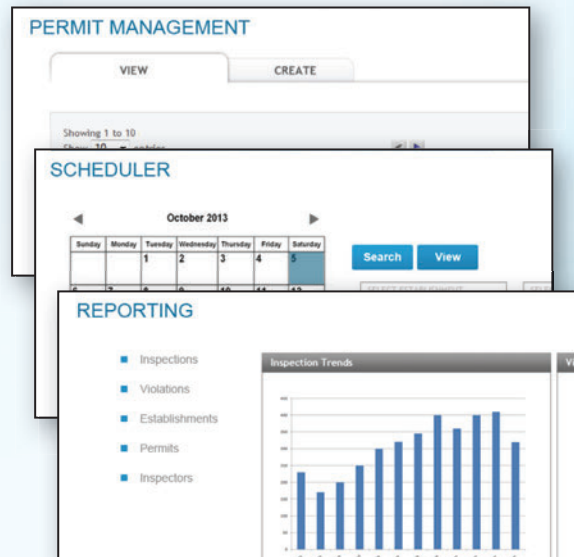


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► PRESIDENT'S MESSAGE



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

Back From the AEC and in Search of the New NEHA Executive Director

I have just returned from NEHA's 78th Annual Educational Conference (AEC) & Exhibition in Las Vegas, Nevada. This was one of our most successful AECs with over 1,000 attendees. The AEC's President's Banquet was attended by one of the largest crowds in recent memory. Additional tables were needed to seat everyone. The excitement of the crowd was amplified by members of NEHA and the International Federation of Environmental Health (IFEH) talking with old friends and meeting new ones. The week of the AEC was full of new attendees, great technical presentations, students doing posters or presentations, mentoring of new members, and welcoming our NEHA members, guests, and joint attendees from around the world.

The 2014 AEC was held in conjunction with IFEH and the International Faculty Forum. The IFEH attendees were from many countries including England, Denmark, Ireland, Scotland, Uganda, Australia, Jamaica, Malawi, Portugal, Canada, and New Zealand. It was truly an international meeting with our NEHA President Alicia Enriquez attending the IFEH Congress on Saturday and Sunday and IFEH President Peter Davey attending our meetings on Monday and Tuesday. NEHA and IFEH had technical presentations throughout the week. It was interesting to observe the attendees talking about many of the same things. We really are one world of environmental health. I believe having a joint conference with IFEH gave our AEC a new dimension and an excitement that was evident throughout the week. A flag exchange

*We really are
one world of
environmental
health.*

ceremony occurred at the end of the President's Banquet between the countries of the current IFEH Congress meeting and the next Congress meeting in 2016. IFEH has ceremonial traditions that we found interesting and educational.

I think a good time was had by all who attended our joint AEC/IFEH conference. Many new friendships were forged and old ones renewed. I was fortunate to be a part of welcoming both old and new friends in attendance. We anticipate the NEHA 2015 AEC being held in Orlando, Florida, to be even better.

As you are aware our executive director has resigned and has left NEHA effective July 31, 2014. Effective August 1, 2014, NEHA will operate with an interim management team of seasoned managers. The interim management team, which is comprised of Rance Baker, Jill Cruickshank, and Larry Marcum, has been in place for several months and has assumed the duties of the executive director for continued continuity of the organization. Each of these

managers has been with NEHA for many years and each is familiar with the principal areas of entrepreneurial zone projects, operations, and government affairs. They will continue with their current duties and have begun to integrate the executive director duties associated with their areas of expertise. Rance Baker has been chosen as the point person to work with the board to relay information and answer any questions raised by the board. We know they will all do a great job until our new executive director is on board.

At the spring 2014 NEHA board of director's meeting, a selection committee of five people composed of one NEHA staff member, three board members, and one outside industrial member were appointed. Their mission is to 1) determine characteristics needed in a new executive director, 2) select a search firm to seek qualified candidates, 3) define job tasks for the new executive director, 4) present three to five candidates to the board for selection, and 5) hire a new executive director.

Our first meeting via conference call was to draft a request for proposal (RFP) to send to a selection of executive search firms. We established a projected budget (voted on by the board at the July 2014 meeting) for the entire process and developed a timeline for completion of our tasks. Before the next meeting we added two new members to the selection committee: one additional board member and one environmental health science practitioner. At our next meeting we reviewed and revised the RFP, inserting dates congruent with our timeline. A list of search firms was identified and researched and five

of those were chosen to receive the revised RFP. Each of the five members of the committee called one of the firms and inquired if they had an interest in receiving our RFP. Three of the firms responded and were sent an RFP. The firms were to respond by August 1, 2014, with their proposals. We scheduled a meeting to review the proposals and select a firm by late August or early September. I will continue to report to you as we progress through the process in further issues of the *Journal*.

I would like to invite the NEHA membership to e-mail or call me with ideas, comments, or suggestions, as this is an open and transparent search. This is your opportunity to have a voice and be heard in the selection

I need your support and input to ensure we make the best choice for NEHA.

of the new NEHA executive director. I will also post information on the Web site under the byline of the president. We encourage all of our members and colleagues in NEHA to be involved in some way. Many of you are more knowledgeable and better qualified for administering this process and we welcome your expertise. I need your support and input to ensure we make the best choice for NEHA. This is an assignment for you. I encourage you to be involved in helping select a new executive director for NEHA. 🐼

Dr. Carolyn Harvey

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Did You Know?

A wrap-up summary of the NEHA 2014 AEC will be printed in the October *Journal*. You can read about the amazing events, phenomenal education offered, and all the other happenings that took place in Las Vegas. And, if you attended, you might even see a photo of yourself.

STUDENTS Don't Miss This Opportunity!

Applications for the 2015 **National Environmental Health Association/American Academy of Sanitarians (NEHA/AAS) Scholarship Program** are now available. Last year, \$4,000 was awarded to two students who demonstrated the highest levels of achievement in their respective environmental public health degree programs. If you would like an application or information about the NEHA/AAS Scholarship, do one of the following before the deadline:

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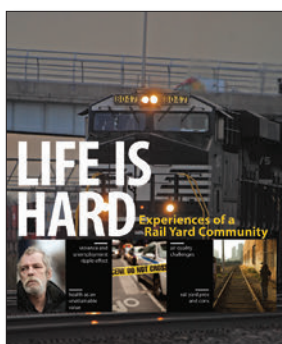
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Experiences of a Rail Yard Community: Life Is Hard

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Abstract Community groups and local air pollution control agencies have identified the San Bernardino Railyard (SBR) as a significant public health and environmental justice issue. In response, the authors conducted a comprehensive study with community members living in close proximity to the rail yard. The purpose of this article is to share the community's perceptions about the rail yard and ideas on sustainable change. A qualitative study using key informant interviews and focus group discussions was conducted and resulted in four emerging themes. Themes emerged as follows: "health as an unattainable value," "air quality challenges," "rail yard pros and cons," and "violence and unemployment ripple effect." Community participants expressed concern for poor air quality, but other challenges took priority. The authors' findings suggest that future mitigation work to reduce air pollution exposure should not only focus on reducing risk from air pollution but address significant co-occurring community challenges. A "Health in All Policies" approach is warranted in addressing impacted communities in close proximity to the goods movement industry.

Introduction

The transportation of goods can both promote and adversely impact health. Goods movement activities can promote health, for example, by enabling access to employment and better services. Transportation of goods, however, can also degrade quality of life and be health damaging because of various environmental and societal impacts such as air pollution, climate change, injuries, noise, landscape disruption, loss of sense of community, stress, and anxiety (Mindell, Watkins, & Cohen, 2011). Environmental health scientists are beginning to elucidate the linkages between the air pollution from interna-

tional trade and goods movement and health (Hricko, 2006, 2008).

Mounting research indicates that persons living near transportation hubs and corridors are exposed to higher levels of airborne pollutants, including diesel exhaust and other emissions. The U.S. Environmental Protection Agency (U.S. EPA) has determined that diesel exhaust is "likely to be carcinogenic to humans by inhalation (National Environmental Justice Advisory Committee, 2009)." Health impacts from the air pollution associated with goods movement include respiratory illnesses, increased premature death, risk of heart disease, cancer risk, adverse birth out-

comes, effects on the immune system, multiple respiratory effects, and neurotoxicity (Attfield et al., 2012; Brauer et al., 2007; California Air Resources Board [CARB], 2005; Chen, Schreier, Strunk, & Brauer, 2008; Edwards, Walters, & Griffiths, 1994; Hoffmann et al., 2009; Jerrett et al., 2005; Mack, 2004; Salam, Islam, & Gilliland, 2008; Silverman et al., 2012). Furthermore, the strengths of associations described for traffic-related exposures are directly related to the proximity to major roadways (Margolis et al., 2009; Newcomb & Li, 2008). Children are especially vulnerable and those living near freeways have shown to have substantial deficits in lung function and development as well as asthma exacerbations (Gauderman et al., 2007; Gruzieva et al., 2013; Perez et al., 2009; Schultz et al., 2012; Spira-Cohen, Chen, Kendall, Lall, & Thurston, 2011); others have linked traffic exposure to increased risk of low birth weight and premature birth (Brauer et al., 2008).

Growing emissions from trucks and trains in regions that contain major segments of the goods movement network can add to existing air quality problems and impact specific local communities. In the city of San Bernardino, California, one such community is located in close proximity to a major freight rail yard. We identified this as the San Bernardino Railyard (SBR). The SBR is one of the busiest facilities of its kind in California and a major inland hub for goods shipped from the ports of Los Angeles (Figure 1). The city of San Bernardino and the railroads have been interlinked throughout the nearly 200-year history of the city, with railroad operations changing to predominately freight-based operations since the 1990s. With operations running 24/7,

FIGURE 1

Aerial Map of the San Bernardino Railyard and Surrounding Community



the SBR is a crucial hub for freight and shipping for the entire U.S. Given the nature and intensity of the work performed at the SBR, it is not unrealistic to think air pollution levels in the immediately surrounding areas would be higher relative to other locations within the city. The potential health impacts could also be significant since the facility is in close proximity to residential neighborhoods and other sensitive receptors such as daycare facilities and an elementary school located within 500 yards of the rail yard.

Based on the risk assessments conducted by the California Air Resources Board (CARB), the SBR facility ranks among the top five most polluting rail yards in California and first in terms of community health risk due to the large population living in the immediate vicinity (CARB, 2008). Table 1 summarizes the key sociodemographic indicators of the community members residing within one half-mile of the surrounding rail yard, obtained through Census 2010 data and modeled with GIS software. The population immediately around the SBR is defined primarily by young (including a large proportion of children), low income, and largely Latino members. Available health outcomes data suggest tremendous health disparities between the region's African-Americans and Latinos and the Caucasian population. While the overall county's poverty rate is 15.8%, the rate for Latinos stands at 34.9%, which far exceeds the overall poverty rate for the

state (14.2%), the nation (12.4%), and even California's Latino poverty rate of 28% (U.S. Census Bureau, 2010). Further limiting available support for community members was the 2012 bankruptcy of the city of San Bernardino, which made this one of the area's poorest municipalities, with a disproportionate number of neighborhoods facing a host of economic, educational, health, and environmental challenges.

Fueled by the CARB report on the potential health effects for residents, some community members voiced an urgent call to action to the city's mayor, politicians, and local researchers to address these environmental justice issues. In response, researchers, in collaboration with residents and a local community-based organization, formed the Environmental Railyard Research Impacting Community Health (ENRRICH) Project. Using a community-based participatory research (CBPR) agenda, ENRRICH aimed to explore the health risks of residents living in close proximity to the rail yard and to support the development of a community response plan. While the overall study goals involve quantitative community and child assessments, the initial research phase used qualitative methods to better understand the context of risk experienced by the residents. As a CBPR study, ENRRICH emphasizes the significant role of community input, ownership, and concerted actions in risk reduction to produce appropriate, innovative, and practical solutions that are cost-effective

TABLE 1

Sociodemographic Characteristics of the Community Residing Within One-Half Mile Surrounding the San Bernardino Railyard

Sociodemographic Variable	Value
Total population	7,172
Households	1,895
% African-Americans	9.0
% Hispanics	82.3
% Children <5 years of age	11.7
% Children 5–17 years of age	27.5
Median age (yrs.)	25.2
Average household size (persons)	3.9
Median household income	\$28,214

and sustainable (Israel, Eng, Schulz, Parker, & Satcher, 2005). We therefore conducted a qualitative study to gain community member's perspectives about life near the rail yard.

Methods

We conducted this qualitative inquiry using inductive grounded theory (GT) methods that included participant and site observations that were carefully documented. A GT approach was selected because this method gives participants a "voice," allowing them to share their reality and in fact creating a "theory of their lives," grounded in their self-described reality. Rather than following up on our own "expert" thoughts, this approach best enabled discovery of the participants' main concerns and how they try to solve the challenges, without any prior preconceived hypothesis influencing the results. Founded on GT methods, we collected resident feedback about their perceptions on life near the rail yard through the conduct of semistructured key informant interviews ($N = 12$) that were coded and themed. The results were then used to design the validation focus groups ($N = 5$ with 8–13 participants each). The focus groups were conducted by trained bilingual facilitators and lasted 60–90 minutes. Participants were selected using theoretical sampling to assure triangulation to present a broad variety of perspectives (politicians, community organizers, business owners, and community members representing the local

community makeup and in ethnicity breakdowns). More specifically we asked residents about their lives, exploring their perceived quality of life and health challenges, including their perceptions of the potential effects of air pollution on themselves and their children, and their thoughts on the nearby rail yard. Four of the focus groups (two in Spanish with monolingual Latino residents, one each in English with Latino and African-American residents) were conducted at a community center near the SBR, while one (conducted in English) was convened at a nearby homeless shelter. Each participant signed informed consent forms that were approved by the Loma Linda University's institutional review board. All interviews and focus groups were audiotaped and transcribed verbatim. Once transcribed, the text was coded for emergent codes and a final codebook was developed. Transcripts were read and coded independently by several research assistants, using the coding in conjunction with a constant comparison method; emergent themes were then determined.

Results

A total of 65 adults participated in the key informant interviews and focus groups. Participants included male and female community members ranging in age from 18 to 60+. Four major themes emerged and are described below: 1) violence and unemployment ripple effect, 2) air quality challenges, 3) rail yard pros and cons, and 4) health as an unattainable value. Further analysis of themes led to the integration of all four into one core concept: *Experiences of the rail yard community: Life is hard*. Table 2 includes a sample of quotes from the community members surrounding each of the identified themes.

Violence and Unemployment: the Ripple Effect

Even though we discussed other community issues and challenges in the context of air pollution and concerns regarding the rail yard it is noteworthy that the high levels of violence, homelessness, and unemployment experienced by many members in this community emerged as a primary issue. At numerous points during the group discussions, the conversation turned to these topics as they clearly affected almost everyone in the community. Drug use and distribution, gang violence, and

TABLE 2

Community Participant Responses on the Thematic Topics Regarding Life Near A Major Rail Yard

Violence and Employment Challenges

Community violence and unemployment rates affected residents' feelings about their exposure to polluted air, ranking it lower than other, more immediate priorities related to day-to-day survival.

- 1) *"Oh. There's a little bit of everything.... People trying to rob you.... You just can find yourself in the wrong place, who knows...you might come up on a nice pair of shoes and this dude comes along with a gun and they will be his." —Male*
- 2) *".... There's more to worry about than the actual air."—Hispanic Male*
- 3) *"We were at the park...next thing you know, my girls are seeing a stabbing and they, they don't need to see that...."—Female*
- 4) *"....Trust me, I want good health, I want good air, I want the city to be awesome by the time my great-grandkids live here, you know what I mean? But by the same token, I think other things need to be fixed beside that."—Male*
- 5) *"...If you're in San Bernardino and you're in the slum ain't nothing gonna change."—Male*

Participants reported feeling powerless to reduce the level of violence in their area, and high levels of concern for their children's safety.

- 6) *"I'm worried about the safety of my children...you can't just have them outside...."—Female*
- 7) *"I think for the youths, they don't have nothing to do...there's a lot of youngsters from all different areas that hang out right there...these kids need something to do with their lives."—Female*

Empty lots with overgrown weeds and businesses that have relocated out of the city: these are some of the factors negatively impacting the health and vitality of their community.

- 8) *"...There is just too many abandoned buildings..."—Female*
- 9) *"I've seen this community go from a family neighborhood to run-down or abandoned houses, empty lots, and growing weeds."—Male*
- 10) *"Most of the businesses are leaving San Bernardino for other cities in the area. We used to have a mall down the street; it's all gone now."—Male*

Community members said they would like to move out of the area, but couldn't afford to.

- 11) *"I do not like this place, but we chose it because it was the place we could afford. I have lived here for seven years and the city is cheap; we are here because we don't have more resources to be in another area."—Caucasian Female*
- 12) *"Unfortunately this is one of the most economical places to live, but the consequences for living here is too great, not for what you pay financially, but that your health is seriously affected."—Hispanic Female*

Air Quality Challenges

Participants pointed out that children are most vulnerable and voiced a growing concern that poor air quality may be affecting their children's health.

- 13) *"I have a nephew and he has allergies awfully bad and it's like blowing his nose and stuff 24 hours a day; every time I see him he blowing his nose and it seems like the air is more toxic and makes it worse."—Hispanic Female*
- 14) *"The people more affected are the kids because they go to school and are breathing contaminated air inside and outside the classroom...here we have one school, less than half a mile from the rail yard, and the number of asthma cases is increasing."—Hispanic Female*

Some community participants noted the difference in air quality at different times of the day and seasons.

- 15) *"I'll wake up in the mornings, like, I can't breathe."—Hispanic Female*
- 16) *"When the weather is the hottest, that is when we have the most kids that are sick, with little kids getting sick with a horrendous cough, like a smoker's cough."—Hispanic Female*

robberies were cited as daily occurrences, and the safety of family and friends was a top priority. Associated with high unemployment and prominent in the conversations were reports

of increasing numbers of individuals and entire families that were homeless. Together these reports paint a picture of a struggling community plagued with violence and poverty, con-

TABLE 2 continued

Community Participant Responses on the Thematic Topics Regarding Life Near A Major Rail Yard

Rail Yard Challenges

Members understand that semitrailer truck movement around the rail yard is necessary but are frustrated by spotty enforcement of truck idling laws.

- 17) "... They're idling in their trucks and there are signs out there saying 'do not park your vehicles there.'"—African-American Female
- 18) "They'll park their trucks wherever they wanna park it, and there is nothing to be said about it. You got to go to the right places and get to the right people to respond, because if you don't, they ain't gonna do nothing about it."—African-American Male

Noise pollution causes sleep disturbances and other stressors, including physical "rattling and shaking" of nearby homes caused by rail yard activities.

- 19) "I guess it was naïve of me to think that when the traffic dies down so will the noise, but there is still a lot of noise happening within the night. I know that it's affecting me and it's also affecting others in the community because they report hearing this especially when they are sleeping."—Hispanic Female
- 20) "Yeah it's pretty loud. You hear it in the middle of the night, BOOM it wakes you up. I live about two blocks away and you can still hear it real loud."—African-American Female
- 21) "The noise bothers me too much. I live in a mobile home and when the train passes by my house, the whole house shakes. That's where I live and it's a house that I am paying for and that is the sacrifice we are all doing."—Hispanic Female

Participants felt that they have sacrificed overall quality of life for the benefit of the rail yard, and are concerned about health impacts on their families, especially their children.

- 22) "I think we like the package from where we live, what we do not like is that the railway is so close because that affects us. My husband has symptoms of asthma, and then allergies follow. My youngest daughter also gets the flu and bronchitis. We would like for the rail yard to be more careful."—Hispanic Female
- 23) "I want to say that the contamination that the train brings and the type of fuel that it uses is reflected in the kids' health; for me it is obvious that they go hand in hand."—Hispanic Female
- 24) "...because they continue to use dirty equipment, then that pollutes the air, which harms the neighbors. So all we want is really for them to be good neighbors; to be responsible."—Hispanic Female
- 25) "Companies are the masters of the nation and they do not listen to our concerns because for all the calls that have been done to tell them to maintain and update their equipment it appears that we have not done the petition correctly."—Caucasian Female

Health Care Challenges

Community participants view health and access to health care as an unattainable value for themselves, but haven't given up hope of obtaining it for their children.

- 26) "The community worries me, but first I have to worry about my family. Many of us have no health insurance and these diseases, tumors, asthma, having to constantly go to the doctor is expensive, that worries the mom, dad, children, and the whole family."—Hispanic Female
- 27) "I am a grandmother to six kids and I don't matter much, but the little ones do."—Hispanic Female
- 28) "The situation with children in this community is very bad. My granddaughter was not sick so often, but since she moved and lives with me she constantly gets sick."—Hispanic Female

ditions that some participants felt would not improve. Indeed, this affected the way many residents felt about their exposure to polluted air; while they recognized it as negative, they clearly placed it further down their list of priorities compared to daily survival.

Adding to concerns about these pressing community problems was the fear that their children would become just another violence

statistic. Participants said that families are increasingly headed by a single parent who must provide for the entire family, and as a result the children and youth often do not have the necessary supervision required. Many saw this as a contributing factor to an increase in youth-related crime and gang violence. Interviewees expressed a concern about the lack of alternatives and programs

for young people in the community. The local community center was identified as the one remaining safe and fun place to take their kids; the lone asset. Overall, safety for themselves and their families was found to be a top priority for participants, with many expressing desperation and a general lack of control over improving the level of community violence.

Community infrastructure was cited as a contributing factor in the level of violence. Since the economic downturn, the few remaining community businesses in the area included liquor and convenience stores, auto shops, bail bondsmen, payday loan stores, and nightclubs, most of which were not viewed as supportive of a healthy lifestyle or environment by the community members. Participants also reported serious problems in the city's infrastructure, such as the lack of sidewalks, faulty or nonexistent street lights, increasing numbers of abandoned houses, empty lots with overgrown weeds, poorly maintained parks and community centers, and businesses that increasingly relocated out of the city, all of which negatively impacted their already struggling community.

As mentioned earlier we had conducted ethnographies and observed community life as part of our qualitative inquiry. When comparing the neighborhoods surrounding the rail yard with other nearby communities, a tangible difference existed in the environment. The area is eerily gray and dusty and feels abandoned despite its high population density. This, in combination with the ever-present clanging noises of the rail yard, creates a feeling of an industrial desert in which residents are somewhat hidden, quickly entering and exiting their homes that provide them some respite from the dust, heat, and noise. Many community members considered moving away from the area because of this, but the low cost of living compared to surrounding communities keeps them there. Residents felt torn between keeping their families in an area that exposes them to many health and safety hazards they can afford living in versus moving to a healthier but more costly area beyond their financial means.

Air Quality Challenges

A second emergent theme, air quality, was woven into the experiences of people living in the area already known for its poor air

quality. The majority of participants reported that their adult families or friends often experience poor health and disease, but few saw a potential link between the air pollution and poor health. For children, respiratory illnesses such as asthma, allergies, and chronic cough were reported as common ongoing health problems, with many acknowledging that the surrounding environment likely affects their child's condition. Some community participants pointed out children's particular vulnerability, voicing growing concerns that poor air quality may be affecting their children's health. Even so, during the discussion about air quality, the conversation often returned to the issue of violence and safety as more urgent. Many interviewees acknowledged the air quality was not the best but felt that poor air quality was the least of their worries. They seemed resigned to their lack of control on the air quality issue, and that they are simply trying to "get by" and coexist with the problem.

Rail Yard Pros and Cons

A third emergent theme, rail yard pros and cons, was centered on interviewees' shared perceptions about life near a major rail yard. For them, the rail yard was seen as both an asset and a barrier to their ability to live a better life. Participants felt that the rail yard had a positive reputation and was highly valued for the jobs and economic growth it provides. It was also perceived, however, as a major contributor to both the surrounding poor air quality as well as the noise pollution. Several participants believed that living in such close proximity to the rail yard had caused ailments in family, friends, and neighbors, as well as themselves. Despite the fact that none of our respondents reported working, having worked, or having a relative or a friend work for the rail yard, however, none of the community members participating in our study wanted the rail yard to close or relocate. Their own experience with unemployment made them value the potential for jobs for others even if they themselves couldn't benefit. Many expressed a strong desire for the rail yard to "step up," be a good neighbor and make reasonable changes to help protect the surrounding community from the noise and air pollution it generates. Attendees felt that the rail yard did not listen to suggestions (e.g., alter-

nate routes, more updated equipment) from residents about ways to reduce the impact their facility has on the surrounding community. Some participants felt that they have sacrificed for the benefit of the rail yard and were concerned about the health impact of life near such a busy rail yard, especially for their children.

More noted than air pollution, a recurring comment from community members was the unrelenting noise emanating from the rail yard, where operations are conducted 24/7. Community members voiced annoyance with the noise, specifically citing the noise of trains and associated semitrailer trucks, whistles sounding in the night, and boxcars crashing up against one another. Community members reported that the noise affected their sleep, causing side effects such as tiredness and lack of concentration at school for the kids and on the job for themselves. Many also noted that in addition to the noise, the physical "rattling and shaking" has affected them as well as their homes.

In addition, the semitrailer trucks driving in and out of the rail yard to load and unload freight were seen as major contributors to rail yard pollution. Residents noted that despite posted signs for parking prohibition and idling in residential areas, trucks continue to do so near homes and the community park. They report that little to no enforcement of these posted rules occurs, a fact that was validated during our ethnographies.

Health as an Unattainable Value

Our final theme centered on the idea that our participants felt that for them personally as adults, achieving optimal personal health and gaining access to health care are for the most part out of their reach—"unattainable"—as they are far from what they can realistically expect for themselves. They have, however, not yet given up hope that their children will live a better and healthier life that includes access to routine medical services. The reality for our participants is that despite their needs for medical care, few have health insurance or the financial resources to take their children to the physician for either regular exams or when they are sick. Many parents interviewed reported that they saw their children and a large proportion of the children in the community as chronically ill, especially with

respiratory illnesses, and that they saw it as inevitable that more and more will develop chronic respiratory illnesses.

Interrelationships Among the Themes

Our four emergent themes, while separate, are also clearly interwoven into a single core concept—*Experiences of the rail yard community: Life is hard*. The "life is hard" theme sums up the experiences of the residents who live adjacent to the rail yard. While no one raised the issue of fairness, the residents seem somewhat resigned to their situation, especially for themselves as adults; the only resistance to the status quo came when discussing their children's health. The theme of violence and unemployment was directly linked with the theme of health as an unattainable value, since many community participants reported that lack of jobs translates into a lack of health care access for themselves and their families. Adding to the challenge of not having access to health care is the fact that living in close proximity to the rail yard negatively impacts the respiratory health of children, exacerbating problems and further increasing the need for health care services, clearly a less than ideal situation for raising a healthy family.

Discussion

Our findings indicate that members residing near the rail yard live in a community that has multiple significant barriers to their quality of life, with many factors interrelated and stemming from the economic downturn. The major concerns voiced by our participants centered on the high level of community violence; serious economic problems; homelessness; rail yard-related noise exposure; and lack of access to health care, especially for their children, many of whom suffer from poor respiratory health. Public health scientists are beginning to point to the linkages between the way that goods and services are accessed and distributed across the nation and various environmental and societal impacts such as air pollution, noise, stress and anxiety, and loss of land and planning blight that can burden local communities (Mindell et al., 2011). Increasing evidence mentioned by the governor's environmental action plan, that communities near goods movement ports are subsidizing the movement of goods with their own health, highlights the need for con-

tinued intervention and policy advancement aimed at diesel exposure reduction to protect the health of the public (Hricko, 2006).

The health of this community, particularly the more vulnerable subpopulations (e.g., children and elderly), is of great concern given the environment in which they live, their lack of access to health care, and stresses related to violence. It has been well documented that neighborhood-level conditions have a strong impact on individual health status including morbidity and mortality (Cubbin, LeClere, & Smith, 2000; Sampson, Raudenbush, & Earls, 1997; Schulz et al., 2000). Additionally, research suggests that disadvantaged populations who suffer from chronic stressors experience even greater susceptibility to environmental hazards (Gee & Payne-Sturges, 2004). In our target community, 27.6% of residents live below the poverty line and FBI crime statistics report a per capita violent crime rate nearly 2.5 times the national average. This “double jeopardy” of life stress and pollution-related stressors points to an even greater potential vulnerability for this underserved and overlooked community.

Researchers have identified a strong association between ambient air pollution and other sociodemographically related stressors and adverse health outcomes. Clougherty and co-authors (2007) have reported the synergistic effect of traffic-related air pollution and exposure to violence on urban asthma etiology. Chen and co-authors (2008) have reported that chronic traffic-related air pollution and stress interact to predict biologic and clinical outcomes in asthma that are stronger than either factor alone. Research conducted in Southern California indicates that children from stressful households are more susceptible to the negative effects of traffic-related air pollution on respiratory health (Islam et al., 2011; Shankardass et al., 2009). Clearly, living in an area in which the adverse health effects associated with air pollution are magnified in the presence of other non-pollution-related stressors highlights a critical need for routine medical services and additional support for positive community change.

In our inquiry it became clear that many of the community members felt overwhelmed with the day-to-day challenges of simply surviving and providing for their families in

this challenged community; everyday challenges often outweighed their concern about the poor air quality that all acknowledged as existing. Indeed, a few times during the focus groups some members were irritated with the discussion of air quality and suggested focusing on more pressing issues. Only a small number of participants were vocal about the health effects associated with air pollution while many others had resigned themselves to coexisting with the poor air quality. The internal pressures of day-to-day living for a person can greatly influence their perception of the surrounding community environment and their subsequent behavior, especially given the severity of the daily burdens just to survive (Balcetis & Dunning, 2007). In light of the daily challenges faced by the residents, it is not difficult to understand why air quality might rank lower on their list of priorities.

One notable exception was the parents' deep concern for the health of their children. Some awareness existed that the number of asthma cases are increasing and many believed that most children in the area either already have asthma or will develop it in the future. Only a few parents, however, connected increased asthma incidence with exposure to pollution from the nearby rail yard. As this line of discussion continued, it became apparent that some parents were angry that air pollution from the rail yard may be jeopardizing their children's health or the health of children in their community. They found it deeply upsetting that rail yard-related air pollution may not only increase their child's risk of developing asthma, but may exacerbate the asthma symptoms of children already diagnosed with the condition, in essence increasing the need for medical services that many families already find difficult or impossible to access. During the discussions it became evident that their children's health was a unifying issue for the community and potential mobilization point.

Implications for Change

In addition to the participant feedback about their experiences we were also able to identify suggestions for improvements for this dire situation that involved things that could be done by the rail yard and by other local agencies, businesses, institutions, and medical centers. The suggestions focused on

improvements that included increased access to medical services and routine health screenings, development of a more extensive vegetation barrier and community-wide tree planting campaign, relocation of the entry gate to the rail yard to remove truck traffic and related idling, and provision of safe and pollution “freer” places for children to play in. Other efforts discussed included bringing upgraded air filters to local schools and implementation of community noise and pollution reduction programs. Table 3 describes the suggested changes for the area in promoting a healthier community. A report by the National Environmental Justice Advisory Council (NEJAC) to the U.S. EPA titled, “Reducing Air Emissions Associated With Goods Movement: Working Towards Environmental Justice” contains advice and recommendations about how U.S. EPA can most effectively promote strategies in partnership with federal, state, tribal, and local government agencies and other stakeholders to identify, mitigate, or prevent the disproportionate burden on communities of air pollution resulting from goods movement (NEJAC, 2009). The NEJAC report encourages a sense of urgency in developing strategies and taking action and advocates for additional research with strong community involvement and community capacity building. For this underserved community an immediate and great need exists for sustainable community improvements that address the air quality issues but also consideration for the other pressing needs identified by community participants as well (Bell & Standish, 2005).

The health and environmental challenges faced by this community are most likely a common phenomenon faced by communities in close proximity to major goods movement facilities across the nation. Given the gravity of the situation and their challenges, the needs of this community and similar communities should be addressed by policy leaders and advocates taking a Health in All Policies Approach (HiAP). According to the National Association of County and City Health Officials (NACCHO), HiAP is a change in the systems that determine how policy decisions are developed and implemented to ensure that policy decisions do not negatively impact determinants of health, but rather strive for beneficial effects

(NACCHO, 2013). HiAP is an innovative and strategic approach through which policies are created and implemented, emphasizing the need for input and collaboration across industry and sectors to ultimately achieve common health goals. The enormity and complexity of the desperate conditions faced by the community residents call for the use of a HiAP approach in addressing their health and environmental challenges. Only through a coordinated effort from numerous surrounding key government, business, and institutional agencies will positive improvements be implemented and sustained. Linking community planning to goals of increasing population health and decreasing exposure to harmful risk factors can be successfully implemented and sustained (Morland, Wing, Diez Roux, & Poole, 2002; Pucher & Dijkstra, 2003). A combined approach focusing on the goods movement communities and prevention that addresses the multitude of factors determining their health will get at the heart of the problem that is drastically and negatively influencing the health trajectory of the community members (Bell & Standish, 2005).

Limitations

Given the qualitative nature of our study, some noteworthy limitations are present. The information we gained is the opinions of a sample of our target community and may not represent the views of all community members. We conducted systematic, theoretical sampling to recruit participants from each community stratum to accurately represent community demographics, however. As a result we managed to recruit an ethnically diverse group of community participants, from varying educational backgrounds and work profiles, including the unemployed and homeless.

Conclusion

Our inquiry was successful in providing important insights into the life of community members who live adjacent to a rail yard that has been identified as a major source of pollution. Our findings suggest that future efforts to reduce exposure to air pollution must take into consideration other major community challenges, including increased access to health care and a reduction in community violence. Most importantly a need exists for a coordinated effort

TABLE 3

Community Challenges and Suggestions for Positive Change

Community Challenge	Suggestions for Improvement
Noise	<ul style="list-style-type: none"> • Our research team suggests that a larger vegetation border surrounding the entire rail yard perimeter would help to reduce noise pollution and strategic plant selection has been proven effective for noise reduction (Fan, Zhiyi, Zhujun, & Jiani, 2010; Onder & Kockbeker, 2012). The rail yard has contributed funding for a vegetation border on a nearby street, and a larger border would be even more beneficial. • Better insulation and thicker windows would reduce noise, especially for those residents living within a few blocks of the rail yard. Quiet Solutions, a California-based soundproofing manufacturer, has developed a product line that can be applied to existing walls to reduce transmission of sound (Manuel, 2005). Since most noise complaints were associated with close residential proximity to the rail yard, one recommendation was that the San Bernardino Railyard (SBR) support and assist nearby residents with the cost of improved insulation and new windows for their homes. • Participants requested that the rail yard consider adjusting rail yard schedules to decrease overnight traffic, when most residents are sleeping. • Our research team suggested universities and research institutions possibly conduct systematic assessments to monitor noise pollution around the rail yard and throughout the community and identify steps to mitigate impact and improve community health and quality of life.
Poor air quality	<ul style="list-style-type: none"> • Currently a small vegetation border exists between the rail yard and some homes. To improve air quality and reduce noise, a carefully planned, robust vegetation border should be planted to surround the perimeter of the rail yard, especially in areas where homes share a retaining wall with the rail yard. With strategic planning, urban vegetation has been shown to reduce atmospheric pollutants (Morani, Nowak, Hirabayashib, & Calfapietraa, 2011; Nowak, 2000; Nowak, Crane, & Stevens, 2006). • Community members suggested moving the entrance of the SBR to a location farther away from homes. Community participants reported that this has been requested many times but has not been implemented. The relocation of the entrance to the SBR should be reevaluated and a top priority. • Community participants suggested that the rail yard should take an active role in monitoring and reducing the idling of semitrailer trucks in residential areas. • Participants requested increased use of less polluting, “clean engines” at SBR. Though these engines are increasingly used at the SBR, they rotate through all the company’s facilities nationwide, potentially spending less time at SBR, which is the rail yard most closely located to a densely populated residential area. No official reporting on their use is available. The National Environmental Justice Advisory Committee (NEJAC) report to the U.S. Environmental Protection Agency advocates for accelerated introduction of existing cleaner technologies and systems by providing needed resources using incentives, regulatory actions, and technical assistance (NEJAC, 2009). • The research team recommends an increase in air quality monitoring throughout the residential area near the SBR and additional health research to better understand exposures and to inform strategies for exposure mitigation. The NEJAC report advocates for additional research with strong community involvement to accelerate exposure reduction activities (NEJAC, 2009). • Policy development and exposure mitigation strategies are needed for schools and child care facilities currently residing in close proximity to a major goods movement source.

of governmental and private entities to strategically address these challenges and provide support for this truly underserved and isolated community. A systematic approach

should be taken by policy leaders and advocates with policy development grounded in a HiAP addressing communities across the nation that are impacted by the goods move-

TABLE 3 continued

Community Challenges and Suggestions for Positive Change

Community Challenge	Suggestions for Improvement
Lack of health services	<ul style="list-style-type: none"> Local medical institutions and the county public health department should help provide care specifically targeting the rail yard community. One recommendation is to provide more regular and long-term mobile clinics offering free services, especially for children. Even reduced or sliding scale fees may cost more than many families can afford. Of note, recent efforts by our collaborative have brought a mobile clinic to the community on a regular basis, and though this is a step in the right direction, it does not fully address the health needs of local residents. Mobile clinics are effective in reaching underserved communities and providing cost-effective preventive health services (Hill et al., 2012).
Violence	<ul style="list-style-type: none"> Participants have requested the community center offer more programs to provide young people with activities and recreation, reducing the time they spend on the streets. With San Bernardino's bankruptcy filing, however, it will take major outside funding to support the infrastructure changes needed (i.e., more community programs, repaired sidewalks, increased lighting, etc.). Participants suggested increased lighting as a way to reduce crime and make people feel more comfortable in their surroundings. Researchers have identified positive effects in use of lighting to reduce crime (Painter & Farrington, 2001). Participants suggested a tree planting campaign to help encourage people to spend more time outside, making their community aesthetically pleasing and providing much-needed shade. Published studies suggest a potential association between trees in public areas and lower crime rates as well as reduced stress levels (Donovan & Prestemon, 2010; Kuo & Sullivan, 2001; Roe et al., 2013).

ment industry. As we all are the beneficiaries of inexpensive goods shipped through this and other container yards, we have an ethical obligation to support positive community improvements for those who carry an undue health burden as a side effect of our access to inexpensive goods. 🙏

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A Community Outbreak of *Salmonella enterica* Serotype Typhimurium Associated With an Asymptomatic Food Handler in Two Local Restaurants

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Abstract Between January and April 2012, the city of Long Beach Department of Health and Human Services investigated an outbreak involving 19 case patients who had tested positive for *Salmonella enterica* serotype Typhimurium with indistinguishable pulsed-field gel electrophoresis patterns. All cases were residents of or traveled to the city of Long Beach, California, during their incubation period, and the majority of patients reported eating at one of two restaurants in Long Beach. This article describes the outbreak investigation that traced the source to an asymptomatic food handler working at both restaurants and highlights the importance of maintaining a high index of suspicion for food handlers when faced with local outbreaks of diarrheal illness.

Introduction

On February 24, 2012, the California Department of Public Health (CDPH) notified the Long Beach Department of Health and Human Services (LBDHHS) of three culture-confirmed cases of *Salmonella enterica* serotype Typhimurium with indistinguishable pulsed-field gel electrophoresis (PFGE) patterns. Two cases were siblings aged three and one with symptom onsets of January 20 and January 24, respectively. The third patient was an 83-year-old male with an onset of February 2 who was hospitalized and had since recovered. Between January and April 2012, a total of 19 case patients who were residents of or traveled to the city of Long Beach, California, were identified as having indistinguishable PFGE patterns to the original three cases. A detailed investigation

among the Epidemiology, Laboratory, and Environmental Health Food Programs at the LBDHHS along with CDPH revealed that the source was likely due to consumption of food prepared by an infected food handler working at two local restaurants. This article describes the details of the investigation that led to the infected food handler.

Methods

The LBDHHS requires that both laboratories and health care providers report all laboratory-confirmed *Salmonella* cases involving Long Beach residents. The Epidemiology Program then investigates each case by contacting the patient and administering a standard questionnaire based on possible exposures for the given incubation period. If any obvious exposures arise, the case is referred to the Environ-

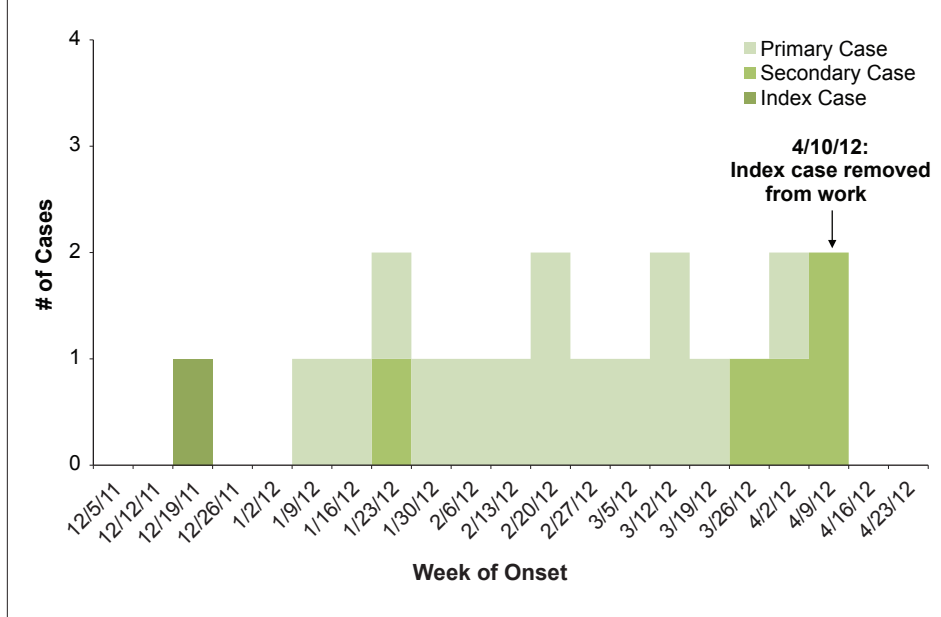
mental Health Food Program for follow-up of any suspect food establishments. All positive *Salmonella* isolates submitted to the LBDHHS Public Health Lab (PHL) are strain typed and then sent to CDPH Microbial Diseases Laboratory (MDL) for PFGE analysis.

When the third case of *S. Typhimurium* with the matching PFGE pattern was reported, an outbreak investigation was initiated. Outbreak cases were defined as having laboratory-confirmed *S. Typhimurium* with XbaI pattern JPXX01.1129. Probable cases were defined as diarrhea or gastrointestinal illness in a person who was epidemiologically linked to a previously confirmed case. A 300-question hypothesis-generating questionnaire was developed and administered to outbreak cases as they were reported to LBDHHS.

Initial analysis of cases associated with the outbreak showed several common grocery stores and restaurants due to the fact that many cases reported dining and shopping in the same neighborhood of Long Beach. All interviewed cases either lived in or had visited Long Beach during their incubation period. The Environmental Health Food Program inspected food establishments that had been named by five or more cases. No significant findings were reported. On February 27, a neighboring jurisdiction reported a case with a PFGE match to that of the outbreak. The case had eaten at a Restaurant A in Long Beach within 24 hours of her onset of symptoms. Restaurant A is located in the same neighborhood that many other cases had reported frequenting, and several of these other cases had reported eating at Restaurant A during their incubation periods.

FIGURE 1

Number of Primary and Secondary Cases (Confirmed and Probable) Including the Index Case, by Week of Illness Onset, Long Beach, California, 2011–2012



On March 20, 2012, an environmental health specialist performed an onsite consultation with the owner of Restaurant A. The owner was asked several questions about symptomatic employees, food suppliers, and any knowledge of employees working at other food facilities. In addition, food temperatures were taken and general sanitation practices were evaluated. Initially, no significant findings occurred.

An Internet search of a popular Web site used to rate local restaurants revealed the owner of Restaurant A also owned another local restaurant (Restaurant B). During the investigation, Restaurant B was named by two cases. On March 26, an environmental health inspection of Restaurant B identical to that of Restaurant A showed no significant findings. Upon further questioning, the owner stated that two of his employees worked as cooks at both Restaurants A and B.

On April 3, questionnaires were administered to the employees of Restaurant A about recent diarrheal illness, job responsibilities, and other potential exposures. All employees ($n = 16$) were asked to submit stool samples. Several slow-moving food items were col-

lected and submitted to LBDHHS PHL for *Salmonella* testing. On April 5, employees at Restaurant B ($n = 25$) were also asked to complete the same questionnaire and submit specimens, and several food items were collected for testing.

Results

This outbreak totaled 15 confirmed cases (14 primary, 1 secondary) and 4 probable cases. The median age was 19 years (range: 1–93 years). Onset of symptoms ranged from January 10, 2012, to April 2, 2012. The median incubation period was three days (range: 0.5–8 days) and median duration of illness was seven days (range: 4–30 days). Two hospitalizations were reported with zero deaths.

The LBDHHS administered hypothesis-generating questionnaires to 12 (86%) of the primary cases ($n = 14$). Nine (75%) cases reported eating at Restaurant A and two (17%) had an association with Restaurant B. No common menu items were reported at either location.

On April 10, the LBDHHS PHL reported that one of the two employees who worked at both Restaurants A and B had tested posi-

tive for *Salmonella*. He was immediately notified and excluded from work. CDPH MDL found the employee's *Salmonella* PFGE pattern to match that of the outbreak strain. All other employees at both Restaurant A and B tested negative for *Salmonella*. All food items sampled from both restaurants were also negative.

The results of the employee questionnaire at Restaurant A showed that five (31%) employees recalled experiencing diarrheal illness in the last six months, and 15 (94%) reported eating the restaurant's food on a weekly basis. None of the employees at Restaurant B reported diarrheal illness, yet 100% reported eating the restaurant's food. Of all employees at both locations, 27% had a second job that required food handling at another location.

No new cases have been reported since the exclusion of the index case. The Environmental Health Food Program followed up with employees at both restaurants to reinforce proper hand washing and food safety practices. The index case submitted weekly stool specimens and was cleared to return to work after producing two consecutive stool specimens that were negative for *Salmonella*. Testing of employees, regardless of history, is an important means to end transmission of salmonellosis to customers and other employees in food facility outbreaks (Hedican et al., 2010).

Discussion

An estimated 48 million illnesses occur each year in the U.S. that are attributed to contaminated food (Scallan et al., 2011). Nontyphoidal *Salmonella* is the second most common pathogen (after norovirus) and the leading cause of hospitalizations and deaths involving foodborne illness (Centers for Disease Control and Prevention, 2011). Food handlers have been implicated as sources of past *Salmonella* outbreaks, yet this particular outbreak differs in that the infected employee worked at two separate food establishments.

This outbreak involved an asymptomatic food handler infected with *S. Typhimurium* and employed as a food handler at two local restaurants (Restaurant A and B), infecting 19 people over four months (Figure 1). The burden of this outbreak was likely higher, as it is estimated that for every case of lab-

oratory-diagnosed *Salmonella*, 38.6 cases are unreported because of failure to seek medical care or underreporting by doctors and laboratories (Voetsch et al., 2004). If that number were attributed to these cases, it would bring the potential number of people infected to 733 over a four-month period.

Case numbers remained low over a period of four months, averaging one case per week. Outbreaks involving infected food handlers can often be difficult to detect due to their slow-moving nature and lack of implicated food items due to the variety of food ingredients a food handler contacts during any given shift (Greig, Todd, Bartleson, & Michaels, 2007). The role of PulseNet and PFGE typing by CDPH MDL was crucial in detecting the outbreak and monitoring its progression and has proven vital in detecting past foodborne outbreaks (Swaminathan et al., 2006).

This outbreak demonstrates the importance of considering multiple venues when a food handler is suspected as the source of a foodborne outbreak. It is common for those working in food service to be employed at more than one food establishment. In fact, 27% of employees interviewed in this outbreak reported working at an additional location that required food handling.

Foodborne outbreaks involving an implicated food handler are often due to a combination of asymptomatic shedding and poor hand washing practices, as was the case here (Craig et al., 1991). In retrospect, the employee had recalled acute gastrointestinal illness in December 2011 but became asymptomatic soon after. California law mandates that those diagnosed with *Salmonella* and employed in sensitive occupations (e.g., restaurants, daycare centers) must be restricted or excluded from work until cleared by the local health officer or local enforcement agency. While this protects the public from medically diagnosed food handlers who may be asymptomatic shedders, it does not account for the vast majority of people who contract *Salmonella* but never seek medical care (Voetsch et al., 2004).

The implicated employee in this outbreak did not receive medical care when he was ill; thus, no opportunity existed for public health intervention. In addition, five other employees at Restaurant A were asymptomatic upon questioning but recalled acute gastrointestinal illness in the past six months. None sought medical care during their illness. It is possible that they too had been infected with the outbreak strain and could have been sources of earlier cases involved in the outbreak.

Conclusion

Without being declared negative for *Salmonella* by a public health laboratory, an infected food handler returning to work may be asymptomatic but still shedding bacteria. Since it would be nearly impossible to account for asymptomatic shedders, strictly enforced hand washing practices and self-reporting of gastrointestinal illness are imperative to prevent further spread of disease in these cases. 🍌

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Application of the Pearl Model to Analyze Fecal Coliform Data From Conditionally Approved Shellfish Harvest Areas in Seven Texas Bays

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Abstract The U.S. National Shellfish Sanitation Program (NSSP) 14/43 standard states that conditionally approved shellfish growing areas must be closed for harvest when the geometric mean of fecal coliform concentration exceeds the NSSP limit of 14 most probable number (MPN)/100 mL, or the estimated 90th percentile of fecal coliform concentrations exceeds 43 MPN/100 mL for a five-tube test. The authors hypothesized that the NSSP 14/43 standard is not sufficient to protect the public from risks from consumption of biologically contaminated shellfish and the standard should be modified to 8/26 MPN/100 mL. To verify this hypothesis, the authors analyzed fecal coliform data from conditionally approved shellfish harvest areas of seven Texas bays using the Pearl sanitation model. Results showed that the shellfish closure rules mandated by the Texas Department of State Health Services actually enforced the “Pearl” limits of 8/26 MPN/100 mL, and not the NSSP limit of 14/43 MPN/100 mL.

Introduction

The U.S. bivalve industry produces oysters, clams, and mussels, which are filter feeders that concentrate potentially harmful constituents (e.g., metals, pathogens). To protect the public from consumption of contaminated shellfish the Interstate Shellfish Sanitation Conference, a national organization of state health regulators from coastal shellfish-producing states and inland shellfish-consuming states, along with the Food and Drug Administration establish regulations for uniform application of shellfish regulations under the National Shellfish Sanitation Program (NSSP) (NSSP, 2009).

NSSP mandates that shellfish authorities close shellfish harvest if growing area water quality drops below food safety levels (NSSP, 2009). NSSP uses an indicator group of bacteria, fecal coliform, to assess the potential that

human pathogens may be present due to fecal contamination. Bacterial contaminations are expressed using the units of most probable number per 100 milliliters (MPN/100 mL) (Clem, 1994). NSSP uses a “14/43” standard for fecal coliform concentration. This means that the fecal coliform median, or geometric mean, must not exceed 14 MPN/100 mL; the estimated 90th percentile should not exceed 43 MPN/100 mL; and no more than 10% of fecal coliform samples taken may exceed 43 MPN/100 mL for a five-tube test.

The Texas Department of State Health Services (TDSHS) regulates shellfish harvest in “approved” or “conditionally approved” areas of 19 bays (TDSHS, 2010). This article’s focus is on conditionally approved shellfish areas located in Galveston, Trinity, Matagorda, Carancahua, Lavaca, Tres Palacios, and San Antonio bays. We used the Pearl sani-

tation model to analyze fecal coliform data sets maintained by TDSHS to determine if the shellfish closure rules actually use the NSSP standard of 14/43 MPN/100 mL, or the Pearl limits of 8/26 MPN/100 mL for a five-tube test. Previous studies in Oakland Bay, Washington (Conte & Ahmadi, 2012), and in Humboldt Bay, California (Conte & Ahmadi, 2013), support the hypothesis that the NSSP limit of 43 MPN/100 mL is not an adequate safeguard against consuming biologically contaminated shellfish. The NSSP 43 MPN/100 mL limit should be reduced to the Pearl limit of 26 MPN/100 mL established by the Pearl model.

In our study, our objectives were to use the Pearl model to analyze TDSHS fecal coliform data sets to determine if the shellfish closure rules actually use the NSSP 14/43 standard or the Pearl limits of 8/26 MPN/100 mL for a five-tube test, and to use the Pearl model to determine which of the two parameters (geometric mean or estimated 90th percentile) is a more sensitive tool to detect the contamination status of shellfish growing areas.

Materials and Methods

The sites used for our study are conditionally approved shellfish areas of Galveston and Trinity bays (Galveston Bay complex); Matagorda, Carancahua, Lavaca, and Tres Palacios bays (Matagorda Bay complex); and San Antonio Bay (National Wildlife Federation, 2004) (Figure 1).

Closure Rules

Under a conditionally approved closure rule, an area is open for harvest unless a predefined event occurs, which can elevate fecal coliform concentrations above acceptable levels (e.g., rainfall or river stage). At that time, harvest

FIGURE 1

Map of Texas Showing Galveston Bay Complex, Matagorda Bay Complex, and San Antonio Bay

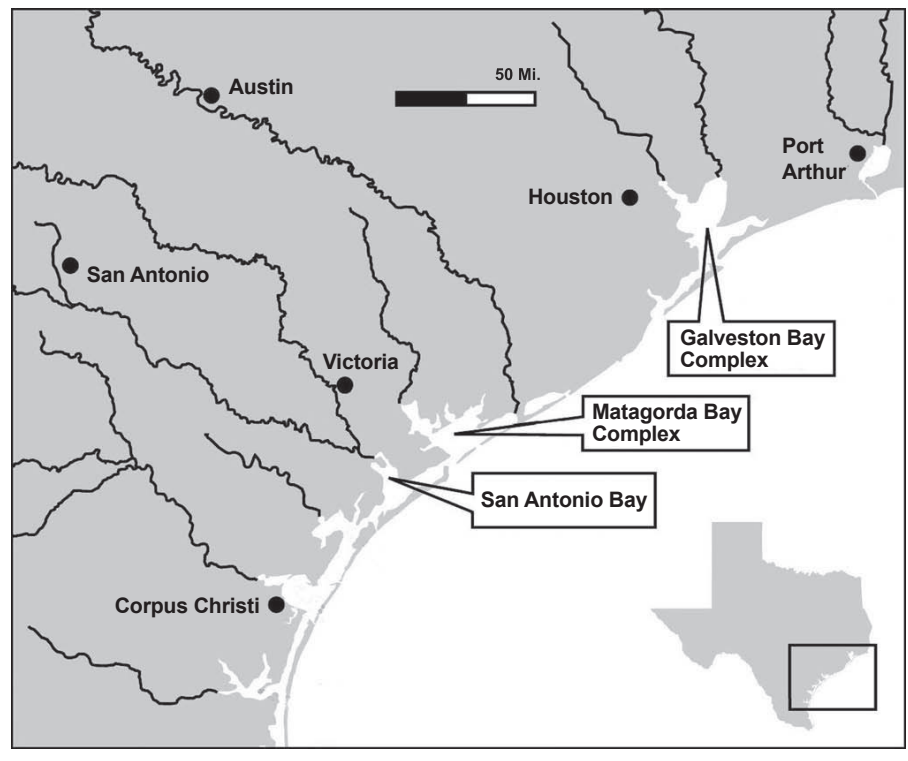


TABLE 1

Shellfish Sanitation Closure Rules for Conditionally Approved Shellfish Harvest Areas in Texas Bays

Growing Area	Closure Rule
Galveston Bay area 1	7-day cumulative rainfall > 70 mm (2.75 in.) at San Leon municipal utility district (MUD).
Galveston Bay area 2	7-day cumulative rainfall > 70 mm (2.75 in.) at Baytown West MUD or Trinity River > 7.32 m (24 ft.) at Liberty gauge.
Galveston Bay area 3	7-day cumulative rainfall > 70 mm (2.75 in.) at Baytown West MUD or Trinity River > 7.32 m (24 ft.) at Liberty gauge.
Galveston Bay area 4	7-day cumulative rainfall > 70 mm (2.75 in.) at Anahuac or Trinity River > 7.32 m (24 ft.) at Liberty gauge.
Matagorda Bay	Colorado River stage > 4.27 m (14 ft.) at Bay City gauge.
Tres Palacios Bay	7-day cumulative rainfall > 32 mm (1.25 in.) at Palacios Airport.
Carancahua Bay	7-day cumulative rainfall > 63.5 mm (2.5 in.) at Port Lavaca rain gauge.
Lavaca Bay area 1	7-day cumulative rainfall > 32 mm (1.25 in.) at Port Lavaca rain gauge or Lake Texana release > 12,613 hectare/m/day (9,500 acre feet per/day).
Lavaca Bay area 2	7-day cumulative rainfall > 32 mm (1.25 in.) at Port Lavaca rain gauge or Lake Texana release > 12,613 hectare/m/day (9,500 acre feet per/day).
Lavaca Bay area 3	7-day cumulative rainfall > 51 mm (2.00 in.) at Port Lavaca rain gauge.
San Antonio Bay	Guadalupe River stage > 7.32 m (24 ft.) at DuPont gauge.

Note: Triggers must exceed these values for closure process to begin. Closure of an area is effective at 12:01 a.m. the following day. Example: exceed criteria on Tuesday, can close effective 12:01 a.m. on Wednesday. Texas Parks and Wildlife Department personnel enforce closure, but must be informed before 12 p.m. or closure may be postponed an additional day. Preferable prior notice is between 12 and 24 hours.

ceases for a predetermined period or after subsequent sampling (fecal coliform) shows the area is safe to reopen (Jensen & Su, 1992). Table 1 shows the closure rules for the 11 conditionally approved growing areas located in the seven study bays. Closure triggers must exceed these values for closure processes to begin. Closure of an area is effective at 12:01 a.m. on the following day. For example, if the triggers exceed the thresholds for a growing area on Tuesday, the closure will start at 12:01 a.m. on Wednesday.

Inputs

Two kinds of data are required for input to the Pearl model: fecal coliform data and closure journals.

Fecal Coliform Data Set

The fecal coliform data set consists of 6,865 fecal coliform samples collected by TDSHS from 52 shellfish sampling stations in the seven Texas bays from April 30, 2001, to December 9, 2010. Four sampling stations did not have the required minimum of 30 samples and therefore were excluded from the analysis.

Each record in the Texas database has 21 fields. We used seven essential fields for this analysis: location, growing area, sampling station, date, time, fecal coliform concentration in MPN/100 mL, and closure status (open/closed).

Closure Journal

Pearl uses a closure journal, which is a list of closure periods for a specific growing area. A record in the closure journal has six essential fields: location, growing area, closure starting date, closure starting time, duration in days, and comments (reason for triggering the closure). Instead of a separate closure journal, TDSHS adds a special field (closure status) to the fecal coliform data set to indicate the closure status of the shellfish growing area at the time of sampling. The Pearl model has the ability to use such embedded closure data instead of separate closure journals.

Calculation

Before performing calculations, Pearl divided the fecal coliform data set into three subsets: open subset (3,268 samples), collected when the areas were open under the existing closure rules; closed subset (3,597 samples), collected when the areas were closed for har-

vest under the existing closure rules; and the original data set (6,865 samples), maintained as the combined set. Fecal coliform samples for each sampling station are organized into continuous groups, each with 30 samples, as required by NSSP (NSSP, 2009). For each continuous group, four statistics (geometric mean, estimated 90th percentile, upper limit of geometric mean, and upper limit of estimated 90th percentile) are calculated using the Pearl equations (Conte & Ahmadi, 2012, 2013). Using the four statistics, the Pearl model calculates the Pearl limit for estimated 90th percentile, which is 23 MPN/100 mL for a five-tube test (Conte & Ahmadi, 2013).

For each sampling station, growing area, or bay an additional parameter (percent true negative index) is calculated using the following equation:

$$100 * TN / T$$

TN (true negatives) denotes the number of estimated 90th percentile values below the Pearl limit of 26 MPN/100 mL and T (Total) denotes the total number of estimated 90th percentile values.

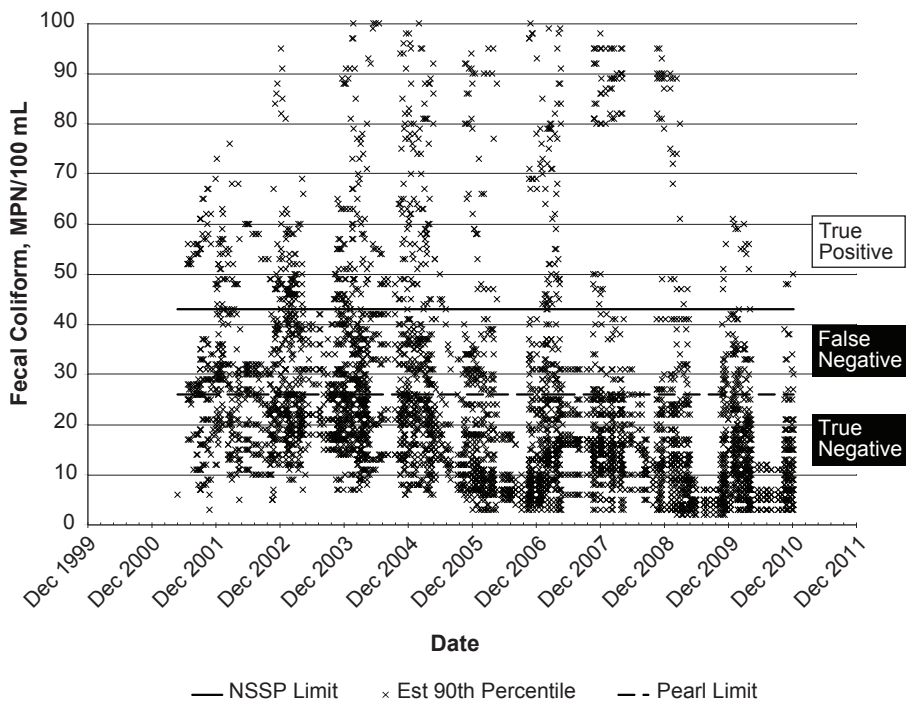
The percent true negative index is a value between 0% and 100%. A value of 100% means all the estimated 90th percentile values are below the Pearl limit of 26 MPN/100 mL and harvesting and consuming shellfish is safe. A value of less than 100% means some of the estimated 90th percentile values are above the Pearl limit of 26 MPN/100 mL and consumption of shellfish is potentially unsafe.

Results and Discussion

We first used the Pearl model to detect harvest areas at risk for fecal coliform contamination by applying the model's estimated 90th percentile Pearl limit of 26 MPN/100 mL in place of the NSSP limit of 43 MPN/100 mL. Using Pearl's new parameter, shellfish growing areas in which the estimated 90th percentile values of fecal coliform concentrations exceed the Pearl limit are not considered safe for harvest, and a correctional option is to tighten the closure rules. Shellfish growing areas whose fecal coliform concentrations fall below the Pearl limit are safe for harvest. If the values are substantially lower, relaxing the closure rules may be possible. The numerical value of the Pearl limit is determined by sample size, significance level, and the NSSP limit, as discussed in Conte and Ahmadi (2013).

FIGURE 2

Scattergram of the Estimated 90th Percentile of Fecal Coliform Concentrations During Both the Open and Closed Periods in Seven Texas Bays



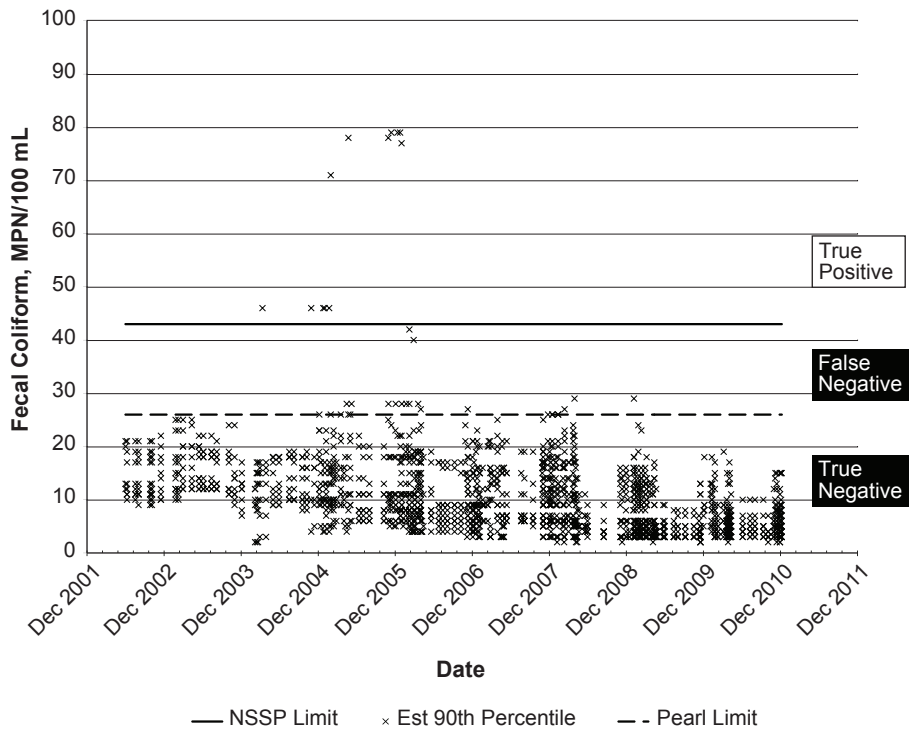
The bays are Galveston, Trinity, Matagorda, Carancahua, Lavaca, Tres Palacios, and San Antonio, from April 30, 2001, to December 9, 2010, when no closure rules are applied.

Pearl's outputs are produced in a series of scattergrams and bar graphs, which can be used to identify sanitation problems, the magnitude of the problems, when the problems occur, and specific sampling stations where problems occur. Figure 2 shows a scattergram of the estimated 90th percentile values of fecal coliform concentrations collected from conditionally approved areas in all seven bays during both the open and closed periods from April 30, 2001, to December 9, 2010. In the creation of this scattergram, no closure rules were applied. This demonstrates the necessity for closure rules, as numerous data points of the estimated 90th percentile values of fecal coliform concentrations appear above the NSSP limit and the Pearl limit throughout the study period. Without closure rules, a substantial number of harvested shellfish would have been unsuitable for human consumption as demonstrated by the position of these data points in the scattergram.

Figure 3 shows a scattergram of the estimated 90th percentile values during open periods in all seven study bays during the study period and when closure rules were in effect. Of note, during the study period and currently, no changes were made to the NSSP guide for the control of molluscan shellfish about methods, standards, frequency of collecting and analyzing fecal coliform samples, or the equations used in the statistical analysis of data sets. Although NSSP regulations allow shellfish growing areas to be open for harvest when the estimated 90th percentile of fecal coliform concentrations is in the range of 0 to 43 MPN/100 mL as shown by Figure 3, about 97% of the estimated 90th percentile values were in the true negative zone below the Pearl limit of 26 MPN/100 mL. Figure 3 also shows the magnitude of the problems and specifically a period between 2003 and 2005 when estimated 90th percentile samples appear in the true positive zone (exceeded

FIGURE 3

Scattergram of the Estimated 90th Percentile of Fecal Coliform Concentrations During the Open Periods in Seven Texas Bays



The bays are Galveston, Trinity, Matagorda, Carancahua, Lavaca, Tres Palacios, and San Antonio, from April 30, 2001, to December 9, 2010, when closure rules are in effect.

the NSSP limit) and between 2004 and 2008 when some samples exceeded the Pearl limit.

Pearl was used to isolate and identify specific sampling stations in which estimated 90th percentile values of fecal coliform concentrations exceeded the Pearl limit of 26 MPN/100 mL (Table 2). Forty-two stations show percent true negative values of 100%, indicating that all estimated 90th percentile values of fecal coliform concentrations of these stations appear in the true negative zone, representing no fecal-contaminated shellfish. Six stations show percent true negative values less than 100%, indicating potential health risk from shellfish. Stations in Galveston Bay (0016, 00329, and 0308A), Trinity Bay (0058), and Lavaca Bay (00006 and 00007) have less than 100% true negative values. The range of percent true negative values for these six stations is from 40% to 96.10%.

Figures 4a through 4f are Pearl output scattergrams showing the estimated 90th percen-

tile values of fecal coliform concentrations and their upper limits during open periods of the six problematic stations located in three of the bays during our study.

Figure 4a, an analysis of Galveston Bay Station 00116 open periods, shows the estimated 90th percentile values of fecal coliform concentrations exceeding the Pearl limit from 2004 to 2006, and their corresponding upper limits exceeded the NSSP limit of 43 MPN/100 mL during the same period. The estimated 90th percentile values located just below and above the Pearl limit from 2006 into 2007 and their corresponding upper limits reflected the same pattern relative to the NSSP limit. Beginning in 2007 through 2009, the estimated 90th percentile values drop below the Pearl limit and their corresponding upper limits all appear in the false negative zone between 26 and 43 MPN/100 mL. By 2010 the estimated 90th percentile values appear less than 10 MPN/100 mL, indicating

the potential for relaxing the closure rule, depending on bay circumstances not apparent in our study.

Figure 4b shows the estimated 90th percentile values of fecal coliform concentrations and their upper limits in an analysis of Galveston Bay station 00329 open periods. Using Pearl parameters, station 00329 showed only one potential troubling period, in 2002 when the estimated 90th percentile values and their upper limits were close to the Pearl limit and the NSSP limit, respectively. From mid-2002 through mid-2004 both estimated 90th percentile and upper limit values appeared well within the Pearl safety zones. From mid-2004 through mid-2007 and mid-2007 and 2010 two adjustments appeared, in either the closure rules or bay circumstances, that dropped the values substantially below the Pearl limit. This suggests the potential for rule relaxation, depending on circumstances not apparent in our study.

Figure 4c shows a scattergram of the open periods at station 0308A of Galveston Bay during our study. A pattern similar to that of station 00329 was revealed except the problem period appeared in the first part of 2004. A two-stage drop in the estimated 90th percentile of fecal coliform concentrations and their upper limits appeared from mid-2005 through mid-2007 and between mid-2007 through mid-2010. The latter drop in both the estimated 90th percentile and corresponding upper limits below 10 MPN/100 mL suggest the potential for relaxing the closure rule for this area.

Figure 4d shows a scattergram of the open periods at Trinity Bay station 0058F during our study. Applying Pearl parameters, the scattergram reveals problems from early 2007 and extending into early 2008, where the estimated 90th percentile values were at or exceeded the Pearl limit, and their corresponding upper limits exceeded the NSSP limit. A marked improvement appeared in early 2009, when both the estimated 90th percentile and their upper limits appeared below the Pearl limit.

Figure 4e shows a scattergram of the open periods in Lavaca Bay station 00006 during our study. Sanitation conditions began well in December 2004, as demonstrated by the positions of the data points for the estimated 90th percentile and their upper limits positioned below the Pearl limit. Using Pearl parameters,

TABLE 2

Percent True Negative Indices for Fecal Coliform Samples Collected During Open Periods From 48 Stations in Seven Bays in Texas

#	Region	Station	TP ^a	FN ^a	TN ^a	Total	TN% ^a
1	Carancahua Bay	CAR:00001	0	0	35	35	100.00
2	Carancahua Bay	CAR:00002	0	0	35	35	100.00
3	Carancahua Bay	CAR:00003	0	0	34	34	100.00
Total			0	0	104	104	100.00
4	Galveston Bay	GAL:00116	0	15	10	25	40.00
5	Galveston Bay	GAL:00251	0	0	74	74	100.00
6	Galveston Bay	GAL:00263	0	0	76	76	100.00
7	Galveston Bay	GAL:00284	0	0	76	76	100.00
8	Galveston Bay	GAL:00286	0	0	77	77	100.00
9	Galveston Bay	GAL:00312	0	0	75	75	100.00
10	Galveston Bay	GAL:00326	0	0	76	76	100.00
11	Galveston Bay	GAL:00329	0	3	74	77	96.10
12	Galveston Bay	GAL:00332	0	0	77	77	100.00
13	Galveston Bay	GAL:00349	0	0	75	75	100.00
14	Galveston Bay	GAL:0308A	0	3	74	77	96.10
Total			0	21	764	785	97.32
15	Lavaca Bay	LAV:00003	0	0	36	36	100.00
16	Lavaca Bay	LAV:00006	0	5	38	43	88.37
17	Lavaca Bay	LAV:00007	12	2	29	43	67.44
18	Lavaca Bay	LAV:00024	0	0	37	37	100.00
19	Lavaca Bay	LAV:00041	0	0	14	14	100.00
20	Lavaca Bay	LAV:0016A	0	0	43	43	100.00
Total			12	7	197	216	91.20
21	Matagorda Bay	MAT:00012	0	0	28	28	100.00
22	Matagorda Bay	MAT:00013	0	0	27	27	100.00
23	Matagorda Bay	MAT:00014	0	0	28	28	100.00
24	Matagorda Bay	MAT:00018	0	0	7	7	100.00
Total			0	0	90	90	100.00

#	Region	Station	TP	FN	TN	Total	TN%
25	San Antonio Bay	SAN:00011	0	0	28	28	100.00
26	San Antonio Bay	SAN:00019	0	0	28	28	100.00
27	San Antonio Bay	SAN:00100	0	0	28	28	100.00
Total			0	0	84	84	100.00
28	Tres Palacios Bay	TRP:00005	0	0	47	47	100.00
29	Tres Palacios Bay	TRP:00009	0	0	46	46	100.00
30	Tres Palacios Bay	TRP:00011	0	0	47	47	100.00
31	Tres Palacios Bay	TRP:00014	0	0	46	46	100.00
32	Tres Palacios Bay	TRP:00017	0	0	47	47	100.00
33	Tres Palacios Bay	TRP:00019	0	0	47	47	100.00
34	Tres Palacios Bay	TRP:00027	0	0	46	46	100.00
Total			0	0	326	326	100.00
35	Trinity Bay	TRI:00058	0	0	20	20	100.00
36	Trinity Bay	TRI:00060	0	0	15	15	100.00
37	Trinity Bay	TRI:00061	0	0	19	19	100.00
38	Trinity Bay	TRI:00065	0	0	18	18	100.00
39	Trinity Bay	TRI:00070	0	0	21	21	100.00
40	Trinity Bay	TRI:00073	0	0	19	19	100.00
41	Trinity Bay	TRI:00081	0	0	19	19	100.00
42	Trinity Bay	TRI:00088	0	0	27	27	100.00
43	Trinity Bay	TRI:00100	0	0	19	19	100.00
44	Trinity Bay	TRI:00108	0	0	19	19	100.00
45	Trinity Bay	TRI:0023A	0	0	20	20	100.00
46	Trinity Bay	TRI:0058B	0	0	20	20	100.00
47	Trinity Bay	TRI:0058F	0	5	15	20	75.00
48	Trinity Bay	TRI:1316B	0	0	15	15	100.00
Total			0	5	266	271	98.15
Grand total			12	33	1831	1876	97.60

Note: Collection from April 30, 2001, to December 9, 2010. The indices are calculated for individual stations, individual bays, and all of the shellfish bays.

^aTP = true positive values; FN = false negative values; TN = true negative values; TN% = percent true negative index.

sanitation conditions worsened abruptly in early 2005, as data points for the estimated 90th percentile appear at the Pearl limit, but their upper limits appearing above the NSSP limit. Conditions improved slightly from 2005 through 2006. Beginning in the winter of 2007, three distinct improvements in sanitation conditions appeared as observed by the pattern of the estimated 90th percentile values and their corresponding upper limits. The data point values dropped beginning in about April and continuing through August 2007. A second drop occurred in February and continued through June 2008. A final drop occurred in June 2008 through December 2010. These

drops may reflect changes in the closure rules or environmental circumstances at this station.

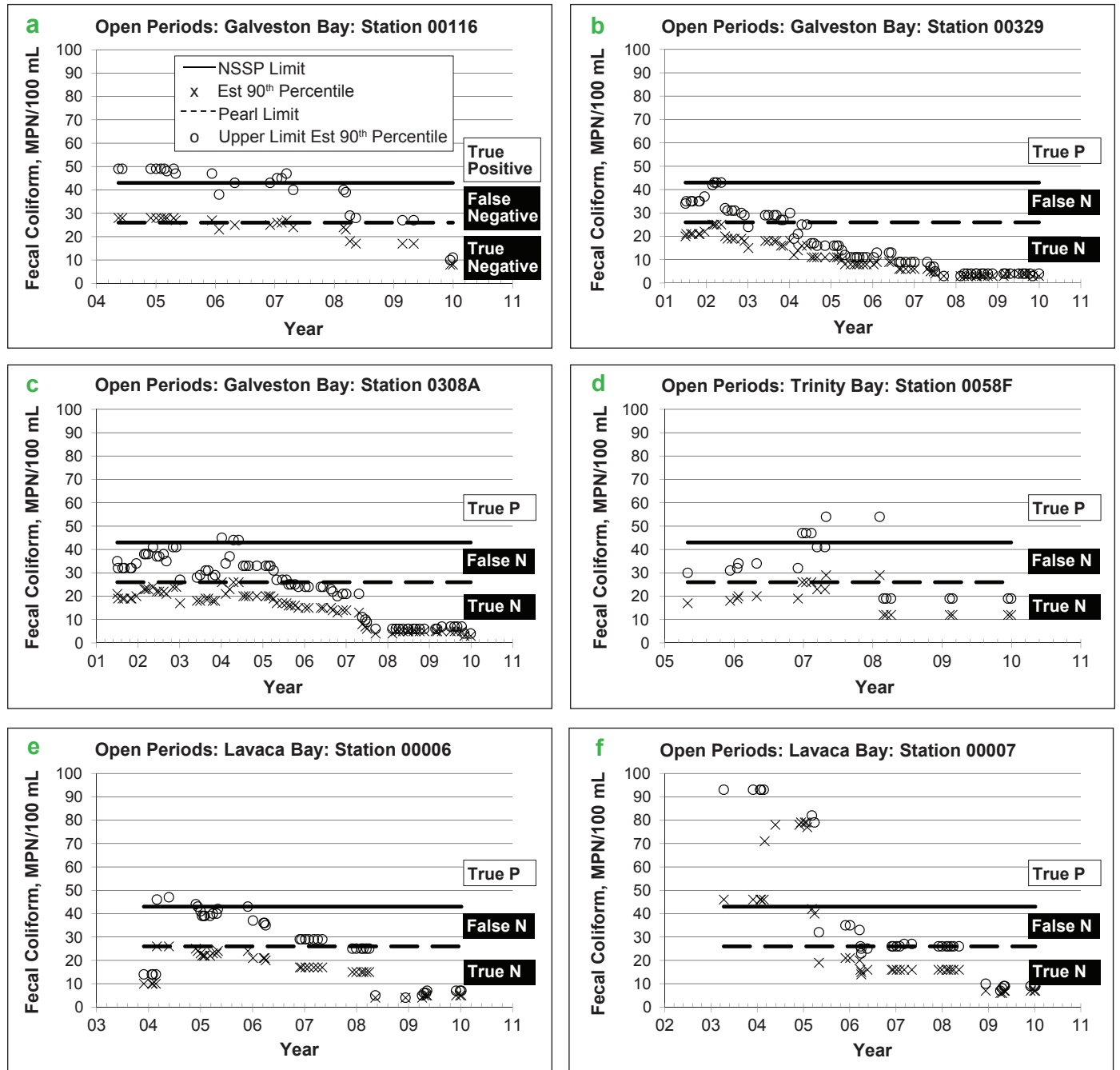
Figure 4f shows a scattergram of the open periods at station 00007 of Lavaca Bay during the study period. The pattern of estimated 90th percentile values of fecal coliform concentrations and their upper limits show contaminated conditions from mid-2003 until the spring of 2005. From the spring of 2005 through 2010, the position of the data points demonstrate that sanitation conditions met both the NSSP standard and the Pearl parameters, as the estimated 90th percentile values appeared below the Pearl limit of 26 MPN/100 mL, and their corresponding upper

limits appeared at about the Pearl limit. The appearance of the estimated 90th percentile fecal coliform value data points appearing below 10 MPN/100 mL indicates potential for relaxing the closure rule if other bay circumstances allow.

Figures 4a through 4f show that although the six problem stations identified by the percent true negative index had sanitation problems in the initial periods of our study, TDSHS either made adjustments to their bay management programs that were reflected in the improvement of sanitation conditions during the latter periods or environmental conditions improved in the production bays.

FIGURE 4

Scattergram of the Estimated 90th Percentile of Fecal Coliform Concentrations and Their Upper Limits



During the open periods from April 30, 2001, to December 9, 2010, at the following problematic stations: stations 00116, 00329, and 0308A of Galveston Bay; station 0058F of Trinity Bay; and stations 00006 and 0007 of Lavaca Bay.

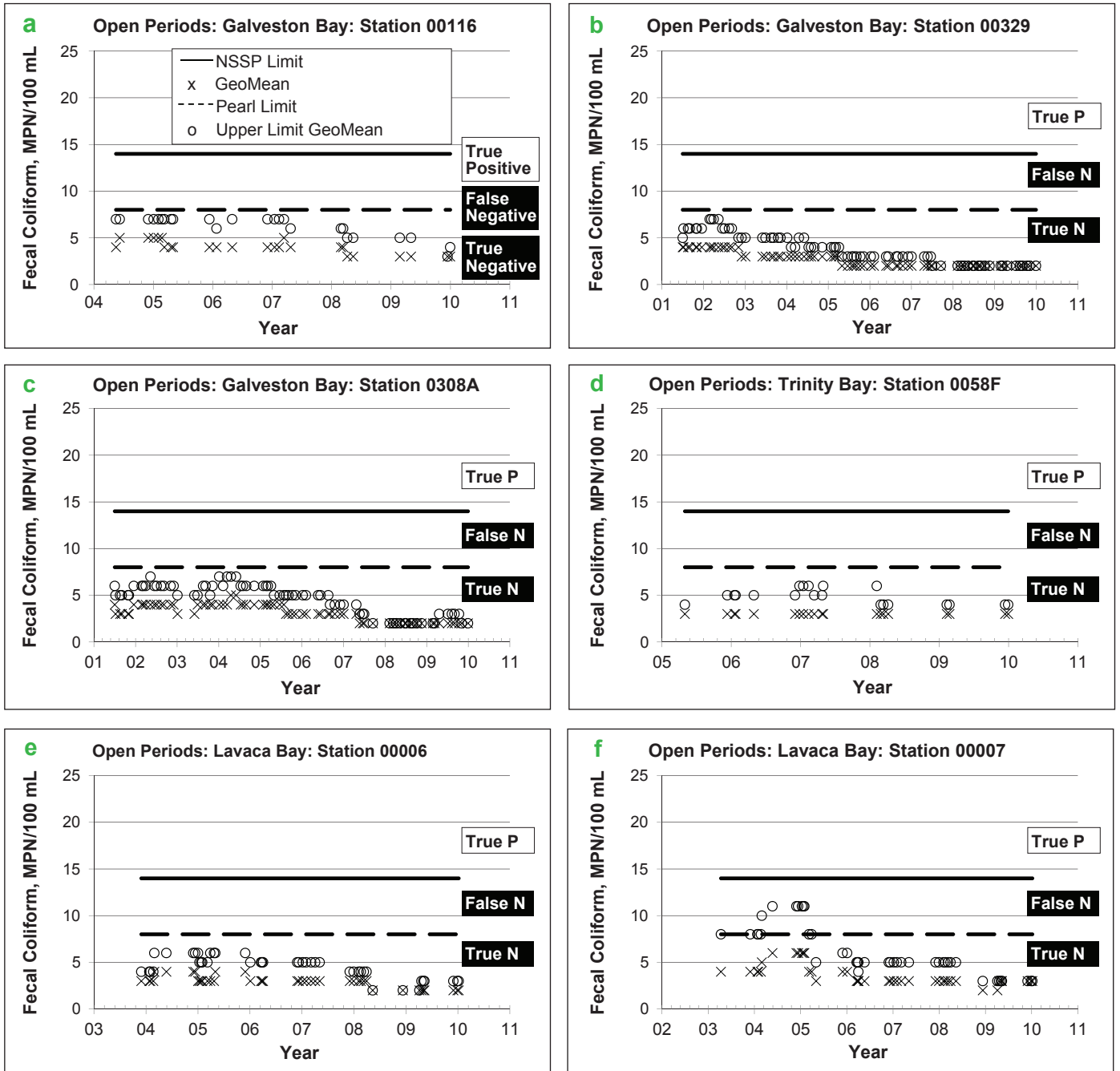
To determine which of the two parameters (geometric mean or estimated 90th percentile) is a more sensitive tool to determine the fecal contamination status of shellfish grow-

ing areas, we also used the Pearl model to analyze the geometric mean of the fecal coliform concentrations. Using the same six problematic stations detected by the percent true

positive index (estimated 90th percentile), we compared the analysis of geometric mean during open periods for each station against results of the analysis of estimated 90th per-

FIGURE 5

Scattergram of the Geometric Mean of Fecal Coliform Concentrations and Their Upper Limits



During the open periods from April 30, 2001, to December 9, 2010, at the following problematic stations: stations 00116, 00329, and 0308A of Galveston Bay; station 0058F of Trinity Bay; and stations 00006 and 0007 of Lavaca Bay.

centile for the same stations. In all six problem stations, the resulting scattergrams (Figures 5a–5f) illustrated that all the geometric mean values of fecal coliform concentrations

and their upper limits appear below the NSSP limit of 14 MPN/100 mL during the study period. Hypothetically, using geometric mean analysis alone would result in no closure

periods during the study period. When compared to results of an analysis of estimated 90th percentile fecal coliform values (Figures 4a–4f), results show that each problem

station area should have been closed during part of the study period, and identify the specific period when the area should have been closed. Figures 5a–5f also illustrate that all the geometric mean values of fecal coliform concentrations appear below the Pearl limit of 8 MPN/100 mL in the six bays throughout the study period. Their upper limits also appear below 8 MPN/100 mL except in Figure 5f, in which the upper limits appear at or above 8 MPN/100 mL until early 2006.

Conclusion

The Pearl analyses of the Texas fecal coliform data sets for conditionally approved areas in the seven bays demonstrate a strikingly similar pattern to results observed in both Oakland Bay, Washington (Conte & Ahmadi, 2012), and in Arcata Bay, California (Conte & Ahmadi, 2013). In all three studies, the vast majority of fecal coliform data points for the estimated 90th percentile values appear below the Pearl limit of 26 MPN/100 mL for a five-tube test, and their upper limits appeared below the NSSP limit of

43 MPN/100 mL. The shellfish closure rules applied by TDSHS resulted in 97.6% of the estimated 90th percentile values of fecal coliform data points appearing below 26 MPN/100 mL, and 100% of the geometric mean values appearing below 8 MPN/100 mL for a five-tube test, demonstrating that TDSHS inadvertently employs the Pearl limits of 8/26 MPN/100 mL and not the NSSP standard.

In applying the Pearl model, resulting scattergrams graphically illustrate that analysis of the estimated 90th percentile is the more sensitive tool. In every analysis using geometric means alone, scattergrams plotted the values of geometric mean concentrations limits below the NSSP limit of 14 MPN/100 mL. Hypothetically, if used as a sole indicator of fecal coliform contamination, geometric mean analyses might encourage opening the bays to harvest during the entire study period, whereas analyses of the estimated 90th percentile analyses indicate some closures are justified. Analysis of geometric mean alone is not sensitive enough to be used as a sole closure tool.

We propose that the existing NSSP 14/43 standard does not adequately protect the public from consuming contaminated shellfish, and the existing NSSP standard should be adjusted to 8/26 MPN/100 mL for a five-tube test. 🐚🐚

Acknowledgements: Our thanks are extended to Gary B. Heideman, ES VI, Seafood and Aquatic Life Group, Texas Department of State Health Services, for his assistance in providing the fecal coliform data sets for Texas. Funding was provided in part by the Western Regional Aquaculture Center through grant number 2008-38500-19230 from the U.S. Department of Agriculture National Institute of Food and Agriculture.

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Comments on the U.S. Environmental Protection Agency's Clean Power Plan are due by October 16. The plan will protect public health, move the U.S. toward a cleaner environment, and fight climate change while supplying Americans with reliable and affordable power. Learn more at www.epa.gov/cleanpowerplan.

▶ GUEST COMMENTARY

In Defense of Emergency Plans

Jeff Rubin, PhD, CEM
Tualatin Valley Fire & Rescue

One of this century's many trends (to date) has been the mantra that emergency plans have little value. Although this is not a new concept, the perspective came into particular vogue in the immediate aftermath of Hurricane Katrina in 2005 and has popped up after other notable disasters. Pundits rolled out military quotations from Moltke ("No plan survives first contact with the enemy") to Eisenhower ("Plans are worthless; planning is everything"), and the U.S. Department of Homeland Security (DHS) reflexively piled on numerous planning requirements for local and state agencies. The fact that most of these mandated plans had no connection to hazard profile, vulnerability, or local need—much like many of the required batch related to terrorism—simply amplified what for many was an underlying sense of futility and typified DHS's continued lurching between terrorism and hurricanes, not to mention seemingly proving the pundits' point.

I'm actually not a big fan of most plans, especially the ones so long that they make one wax nostalgic for a "short" Russian novel. The general skepticism toward plans has ample justification but it has some serious flaws as well, so let's look at where the true problems lie.

Lee Clarke (1999) used the term "fantasy documents" to discuss the societal roles that emergency plans have had. By providing the (illusory) impression of control and safety, and at least an implicit guarantee of a post-catastrophe return to normalcy, the existence of such plans is meant to reassure us even though the assumptions on which they are based have no connection to reality. Examples include many mass evacuation plans (particularly those around nuclear reactors) and the assumptions underlying much of our civil defense program during the Cold War.

There is absolutely no question that effective planning is priceless, but it is a false choice between an effective *process* and a functional *product*: both serve useful purposes if done appropriately. One of the biggest differences between the two is that the process can be accomplished largely by showing up, whereas the product requires commitment toward producing something tangible. That's an admitted oversimplification—having the right representatives continue to show up to build the necessary trust and networks is in itself a demonstrable commitment of resources—but the point is that a lot fewer functional plans seem to be out there than networks. Trust and effective networks are indeed critical for realistic plans, but only go so far by themselves. In addition, military plans are based on projecting the behavior of a sentient, adaptive opponent; most civilian emergency management plans (based on hazards other than terrorism) address considerations related to inanimate "opponents."

The response to Hurricane Gustav, which made landfall in Louisiana three years after Katrina, was widely acknowledged to have been effective. Florida's responses to repeated storm hits in the summer of 2004 (and in other years) were effective, and the fact that this is unremarkable is itself noteworthy. The coordinated response to the I-35W bridge collapse in Minneapolis in August 2007 (a tragedy and a mass-casualty incident but not a true disaster) was not only effective, it displayed the fruit of years of planning, training, and targeted grant acquisition in the absence of a "motivating" disaster. More recently, the coordinated effective response to the Boston Marathon bombings in 2013 demonstrated the value of the combination of inclusive planning, targeted training and exercises, and "practicing the way we play." Was all of this due to luck or improvisation?

Both are surely involved in every successful response, and such things as no-win scenarios exist, regardless of how good a plan is. The mobilizations at every level of government for the 2009 H1N1 pandemic tested the plans that had been developed over the previous several years and demonstrated the importance of having such plans in place. They weren't perfect (military aphorisms or not, there is no such thing as a perfect plan), but they did what plans are supposed to do: they kept decision makers from having to make everything up as they went along, as well as from having to make all of the difficult decisions under crisis conditions. *That* is what plans are for.

So what gives a plan extrinsic and durable value?

- **Scope:** clearly define whether the plan stops at coordination or is focused on operations; assess hazards nonideologically and focus on how they can affect the organization's ability to carry out its critical functions, which themselves should be defined.
- **Realism:** describe relevant capabilities that actually exist and identify gaps where they exist; make realistic assumptions based on as much evidence as possible (e.g., don't assume that a major metropolitan area can be evacuated based on daily commuting behavior, or that withholding information from the public will prevent panic and improve results); solid assumptions do not in themselves make a plan, but ill-conceived assumptions will absolutely break one—more than any other single factor.
- **Flexibility:** don't try to list every capability or possible scenario (remember that Russian novel), but design the plan to provide a flexible, scalable response organization, identifying thresholds and mechanisms for activating or escalating the response.

- **Delineation:** clearly identify roles and responsibilities within the organization before, during, and after major emergencies and disasters, including any special authorities requiring an internal or external declaration of emergency; take the opportunity to lay out the organizational philosophy and priorities and ensure the plan and associated procedures are consistent with them.
- **Maintenance:** keep it current and keep it relevant, which means testing and updating it based on exercise and actual incident results.

Committing to making the plan as useful as the planning is as much a statement of organizational values as it is prudent practice. A good plan is really just another tool: it won't make a response work by itself

and will never have all of the answers, nor should it be seen to do so. A bad (or absent) plan may indeed be overcome by luck, skill, and improvisation, all of which are always necessary to some degree. Making a plan an end in itself, e.g., solely to meet compliance, to be able to point to a document to assuage the public, or just to create an organizational sense of completion, is a good recipe for a worthless document and an inferior response. In apparent response to the sentiments expressed earlier, the quote gallery offers the perspective of former Federal Emergency Management Agency Director James Lee Witt: "In a crisis, you do what you have to do, but it's better to do what you *planned* to do." 🐻

Acknowledgement: Much of this commentary's content was initially published online in *Homeland1* (Rubin, 2010). It has been updated and otherwise revised.

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Yalonda Sinda

Strategies for Enhancing the Environmental Health Workforce: An Update on the Health of Accredited Environmental Health Degree Programs

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.

Yalonda Sinda is the executive director of both AEHAP and EHAC.

We all know that a well-trained and diverse environmental health workforce is essential to delivering quality environmental health services. But how do we work to ensure that environmental health professionals have the skills necessary to meet increasingly complex environmental health challenges? One answer is to support accredited environmental health degree programs. Since 1999, the Association of Envi-

ronmental Health Academic Programs (AEHAP) has been the support, administrative, and recruitment arm of environmental health degree programs accredited by the National Environmental Health Science and Protection Accreditation Council (EHAC).

AEHAP was founded in response to a major shortage of highly trained environmental health professionals. AEHAP works to increase the workforce and the number of col-

leges and universities offering degrees in environmental health science primarily through various recruitment efforts such as marketing campaigns, exhibiting, and presentations. AEHAP also supports students, faculty, and graduates of EHAC-accredited programs by providing links to funding resources, internships, scholarships, and job openings in environmental health.

EHAC was established in 1967 as a result of recommendations from NEHA committees and other stakeholders working to define the educational needs of sanitarians and the curricula to meet those needs. The purpose of EHAC is to enhance the education and training of students who intend to be environmental health science practitioners/professionals. EHAC has established guidelines that uphold a standard of quality and excellence in accredited programs. The EHAC guidelines are upgraded every six to eight years to ensure that graduates have skills and competencies necessary to address new and emerging environmental health issues and changes in environmental health practice.

EHAC accredited its first undergraduate program in 1969 at East Tennessee State University. Since that time the council has accredited 49 undergraduate and graduate programs in both public and private institutions across the U.S.

EHAC is the only national accreditation organization for baccalaureate and graduate programs in environmental health science. EHAC is run by a 21-member council that includes environmental health practitioners and faculty from EHAC programs. As of June 2014, 31 undergraduate and eight graduate programs are accredited by EHAC. EHAC-

FIGURE 1

Undergraduate Enrollment Trends and Graduation Rates Over 10-Year Period

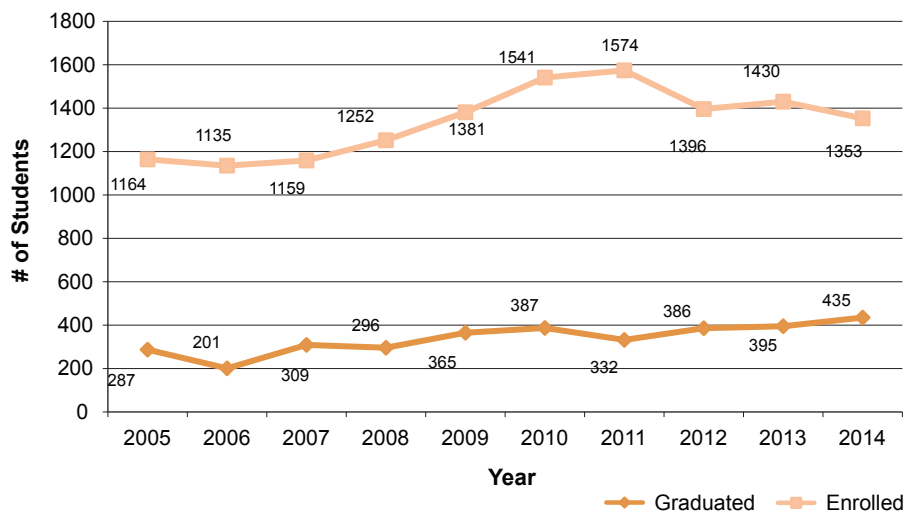
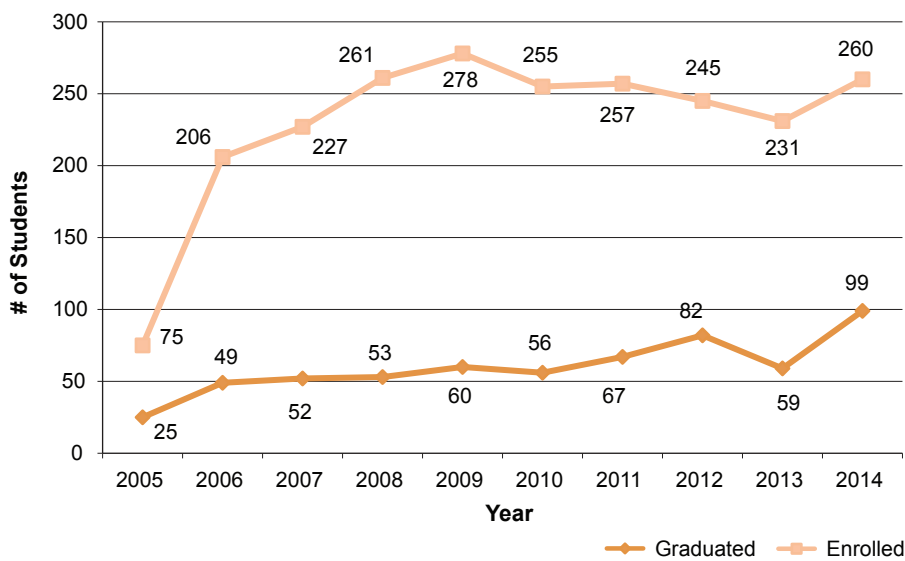


FIGURE 2

Graduate Enrollment Trends and Graduation Rates Over 10-Year Period



accredited programs are recognized as providing the training and preparation necessary to meet many state requirements for environmental health practitioners.

Each year environmental health programs accredited by EHAC are required to complete an annual update survey. This survey covers

topics that will allow EHAC and AEHAP to better understand the health of individual programs as well as the overall strength of EHAC-accredited programs. The survey also helps AEHAP learn how we can best support accredited programs.

The data in the 2013–2014 academic year report represent 40 accredited programs. This includes 32 undergraduate programs and eight graduate programs. In 2013, EHAC gained two undergraduate programs at Central Michigan University and University of Wisconsin, Oshkosh.

This report provides information on student and faculty diversity; the health of individual programs; changes in programs and student recruitment; and enrollment, retention, and graduation rates. Additionally, it includes information on faculty degree requirements, faculty salary information, the origin of international students, public- vs. private-sector employment rates of graduates, outreach strategies, program needs, and suggestions from faculty on how AEHAP can best support their programs. The data in this report are crucial to ensuring a well-qualified and diverse workforce.

Key Findings in the Annual Update of Accredited Programs Report

- Undergraduate enrollment decreased from 1,430 in 2013 to 1,353 in 2014, a 5% decrease (Figure 1).
- For the 2013–2014 academic year, 1,353 undergraduate students and 260 graduate students were enrolled for a total of 1,613 students, which is a decrease of 3% as compared to 1,661 students enrolled in the 2012–2013 academic year (Figures 1 and 2).
- The 2013–2014 undergraduate enrollment rate is just 1% below the 10-year enrollment average.
- Graduate student enrollment increased by 13% from 231 graduates in the 2012–2013 academic year to 260 graduates in 2013–2014. The graduation rate increased by 68% from the 2012–2013 academic year (Figure 2).

Explanations for Increases and Decreases in Enrollment and Graduation Rates

The loss of programs greatly impacts enrollment and graduation rates year to year. Colleges and universities close programs for various reasons such as retiring or departing faculty, college administration decisions, and low student enrollment. AEHAP works to prevent college and university-initiated program closures by writing letters (at the

request of programs) to college administrators expressing the importance of keeping programs intact. Many institutions elect to close programs due to their small size. Most EHAC programs are small programs, making them easy targets for budget cuts. AEHAP educates college administrators on the value of these small programs where students are getting a more intimate learning experience. For programs with the capacity and desire to increase enrollment, AEHAP works with faculty on their recruitment efforts. Some programs are also closed when they are reviewed by EHAC and found to no longer meet EHAC accreditation guidelines. Accredited programs are sometimes put on conditional accreditation status, giving them an opportunity to make improvements needed to meet EHAC standards. If these conditions are not met, EHAC may sometimes elect to close a program. AEHAP does not make accreditation decisions nor can it impact the decisions of EHAC.

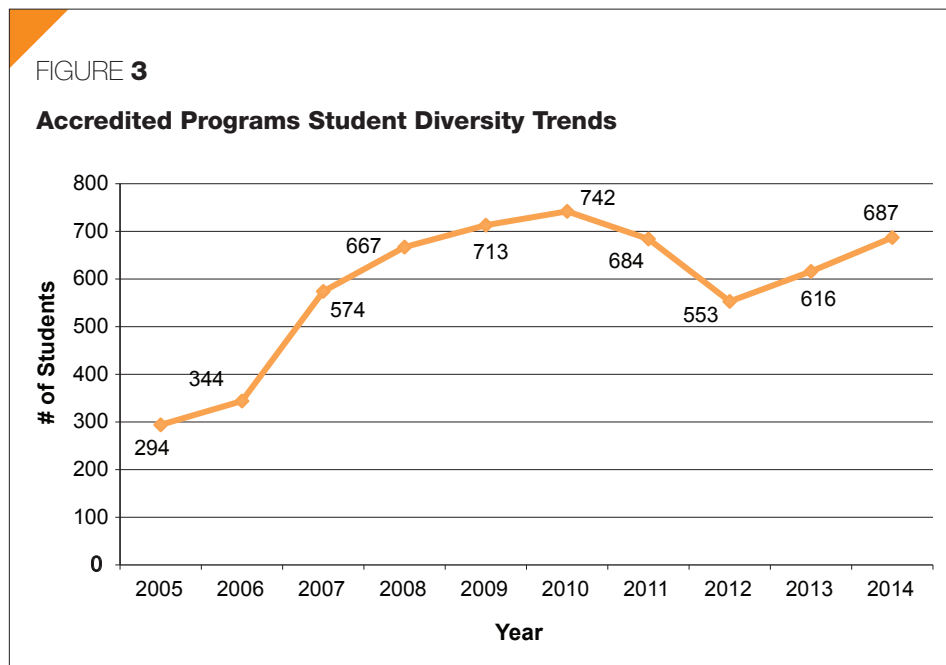
Most EHAC faculty stated in the annual report that “word of mouth” was the primary reason for increases in student enrollment in their programs. AEHAP research shows that students are our best recruiters and that many students learn about EHAC programs from talking to their friends. AEHAP supports student recruitment efforts by providing support to student-led environmental health clubs at EHAC programs. Faculty work hard as well to recruit students into their programs.

Decreases in student enrollment are often attributed to students who opt out due to perceived difficulty of math and science classes in EHAC programs. Lack of visibility of environmental health in general also contributes to lower student enrollment as compared to other degree programs.

Diversity

The student body of accredited programs is showing an increase in diversity. Currently 43% of students enrolled in EHAC-accredited programs are minorities. This represents an increase of 12% as compared to the previous academic year. Overall diversity has increased by 134% since the academic year 2004–2005 (Figure 3).

Diversity in EHAC-accredited programs has been steadily increasing due to the increase in the number of accredited minority-serving institutions and through past AEHAP grants



to programs to partially fund student diversity initiatives. Forty three percent of accredited programs have programs or initiatives to recruit a diverse student body. The following details these programs or initiatives.

Retention

Retaining students is crucial to the success of programs and the report tracks the five-year average retention rates of accredited programs. Thirteen of the programs have retention rates equal to or more than 25%. These programs include Bowling Green State University (43%), California State University Northridge (graduate) (45%), Colorado State University (26%), Dickinson State University (37%), East Central University (26%), Eastern Kentucky University (graduate) (47%), Illinois State University (28%), Indiana University-Purdue University Indianapolis (31%), Old Dominion University (graduate) (44%), The University of Findlay (graduate) (32%), University of Washington (51%), Western Carolina University (27%), and Wright State University (34%).

Full Online Degree Programs

Missouri Southern State University (undergraduate), East Carolina University (graduate), The University of Findlay (undergraduate and graduate), and University of Illinois Springfield (graduate) all have full online degree programs.

Online Courses

Twenty-six of the 40 accredited programs offer online courses. Of those that offer online courses, 14 of them offer to anyone other than students registered at their school.

Conclusion: How Can We Support EHAC-Accredited Programs?

The annual report has additional information that may be of interest to people and the full report is made available on the home page of the EHAC Web site at www.ehacoffice.org. You can view more data on the health of programs by downloading a full copy of the report.

The final section of the report asks faculty how AEHAP can best support their program. The top three responses were AEHAP outreach/marketing materials, AEHAP scholarships, and the AEHAP newsletter. Seventy-two percent said AEHAP outreach materials are helpful, 56% said that AEHAP scholarships are helpful, and 53% said the AEHAP newsletter is beneficial.

Environmental health practitioners can best support the education of future environmental health practitioners by running for a position on EHAC; volunteering to serve as a guest lecturer for EHAC programs; sending AEHAP links to employment, scholarship, and internship opportunities that we can share with faculty, graduates, and students; agreeing to serve on an AEHAP work

group or committee when needed; or agreeing to serve as a mentor by sharing your professional journey with EHAC graduates via AEHAP quarterly webinars with EHAC graduates. If any of these opportunities are of interest to you please contact us at info@aeahp.org or call us at 206-522-5272.

The work of AEHAP is supported by membership dues and through a coopera-

tive agreement with the Centers for Disease Control and Prevention's National Center for Environmental Health. We appreciate the opportunity to share our great work with readers of the *Journal*. You can learn more about AEHAP and EHAC at www.aehap.org and www.ehacoffice.org. You can also join our e-mail list by sending us a message at info@aeahp.org. You can also help spread the

word about environmental health careers by sending our Web site, www.careersenvhealth.com, to members of your network. 🐼

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ACCREDITED ENVIRONMENTAL HEALTH SCIENCE AND PROTECTION PROGRAMS

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@aeahp.org.

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▶ DIRECT FROM ATSDR



CDR Mary Anne Duncan,
MPH, DVM, Dipl. ACVPM

Assessment of Chemical Exposures: Epidemiologic Investigations After Large-Scale Chemical Releases

Editor's Note: As part of our continuing effort to highlight innovative approaches to improving the health and environment of communities, the *Journal* is pleased to publish a bimonthly column from the Agency for Toxic Substances and Disease Registry (ATSDR). ATSDR, based in Atlanta, Georgia, is a federal public health agency of the U.S. Department of Health and Human Services and shares a common office of the Director with the National Center for Environmental Health at the Centers for Disease Control and Prevention (CDC). ATSDR serves the public by using the best science, taking responsive public health actions, and providing trusted health information to prevent harmful exposures and diseases related to toxic substances.

The purpose of this column is to inform readers of ATSDR's activities and initiatives to better understand the relationship between exposure to hazardous substances in the environment and their impact on human health and how to protect public health. We believe that the column will provide a valuable resource to our readership by helping to make known the considerable resources and expertise that ATSDR has available to assist communities, states, and others to assure good environmental health practice for all is served.

The conclusions of this article are those of the author(s) and do not necessarily represent the views of ATSDR, CDC, or the U.S. Department of Health and Human Services.

CDR Mary Anne Duncan is an officer in the U.S. Public Health Service assigned to the Environmental Health Surveillance Branch at ATSDR. She coordinates the Assessment of Chemical Exposures program, which assists state and local health agencies in epidemiologic responses after large-scale chemical releases.

When a large-scale chemical incident occurs and large numbers of people are seeking care for chemical exposure at local hospitals, personnel at local or state health departments can be overwhelmed and unsure of how to best proceed. The Assessment of Chemical Exposures (ACE) program at the Agency for Toxic Substances and Disease Registry (ATSDR) is available to help public health agencies responding to acute chemical releases.

For over 20 years, ATSDR has partnered with state health departments to perform surveillance for acute chemical releases. From 1990 to 2009, this program was known as the Hazardous Substance Emergency Events Surveillance. Participating state health departments collected detailed data on acute chemical releases and entered them into the surveillance database. Data were used by the state partners for alerting local health departments and other interested parties, situational awareness, supporting policy, and targeting prevention outreach activities.

In 2010, the Hazardous Substance Emergency Events Surveillance program was expanded to be a more comprehensive approach to acute chemical release surveillance and became the National Toxic Substance Incidents Program (NTSIP; Agency for Toxic Substances and Disease Registry [ATSDR], 2014a). The state-based surveillance continued with the addition of national surveillance and large incident investigations. The national surveillance component uses the Department of Transportation (DOT) Hazmat Intelligence Portal to combine chemical release data, including data from the DOT Hazardous Materials Information System, National Response

Center Incident Reporting Information System, and NTSIP state-based surveillance. Using the available data and what is known from NTSIP states, estimates of the number of acute chemical releases are calculated for states not participating in NTSIP surveillance.

The large incident investigation component of NTSIP is known as the ACE program. ACE investigations provide valuable information to health agencies that have large releases of toxic chemicals that expose people in their jurisdictions. This includes assessing the impact of the release on individuals and the community, obtaining information to direct the public health response, targeting outreach to prevent or mitigate the public health impacts from similar incidents occurring in the future, assessing the need to modify emergency response procedures, and identifying an exposed group that can be followed for long-term health effects.

Three main focus areas of the ACE program are (1) assisting state, tribal, regional, and local health departments to perform epidemiologic assessments after large chemical incidents; (2) maintaining a toolkit of customizable surveys, databases, and other resources that can be used for epidemiologic assessments after chemical incidents and preparedness planning; and (3) instructing public health personnel in performing epidemiologic assessments after chemical incidents at ACE training courses, workshops, and conferences.

The ACE program has provided on-site support after large-scale chemical incidents on average once a year. Incidents have included chlorine releases at a metal recycling facility and poultry processing facility, an ammonia release from a refrigeration facility, a vinyl chloride release from a train derailment, and a multiple chemical release that contaminated a municipal water supply system. Since each situation was different, the approach taken to investigate the exposure and health effects and emergency response varied. Approaches included interviewing responders, interviewing staff at hospitals where patients were treated, workplace surveys, community surveys, and medical chart abstractions. After two incidents, the ACE team partnered with the National Institute for Occupational Safety and Health (NIOSH) on the investigation. The ACE team provides support for data management and analysis. The final report is generally an article in the

Centers for Disease Control and Prevention's (CDC's) *Morbidity and Mortality Weekly Report* or a peer-reviewed journal, which is a collaboration between the inviting agency and the ACE team.

Since the goal of each investigation has varied, outcomes have varied, including prevention outreach, policy changes, and follow-up for long term health effects. Examples include the following:

- After the metal recycling facility chlorine release investigation (Centers for Disease Control and Prevention, 2011), the ACE team worked with the state health department to develop a chemical release alert warning of the dangers posed by closed containers being sold for recycling, what to do if one is encountered, and to evacuate upwind in the event of a chemical release; this alert, which was translated into Spanish, was sent to all the recycling facilities in the state and distributed through an industry organization.
- During the investigation of a poultry processing facility incident, the ACE team noted that the health department, whose staff would have been very valuable during the response, was not notified that the incident had occurred. This was because the threshold for alerting the health department was too high. When the ACE team pointed out the excessively high threshold, the state health department worked with the state department of emergency management to modify the procedure for notification of the state health department to include any chemical, biological, radiological, nuclear, or explosive event. Two weeks after the new procedures went into effect, two ammonia releases occurred on the same day and the health department was notified and able to assist.
- The investigation after the ammonia release provides an example of long-term follow-up that was arranged for persons exposed during the release. The majority of the persons exposed during this incident were not employees of the refrigeration facility where the release occurred; they were working at a Deepwater Horizon gulf oil spill cleanup site located downwind of the refrigeration facility. The ACE team arranged for the National Institute for Environmental Health Sciences to include them in the Gulf Long-Term Follow-Up

Study along with a separate questionnaire on the health effects experienced as a result of the ammonia exposure.

The ACE Toolkit (ATSDR, 2014b) contains surveys that are readily customizable to the unique situation that occurred during a chemical incident, including individual surveys with sections for adults (including responders) and children, household surveys, the ATSDR Rapid Response Registry, a hospital survey, and a medical chart abstraction form. Information can be collected on animals to supplement the data obtained about people; the individual survey contains a section for collecting data on household pets and a veterinary chart abstraction form is available. Consent forms are available for use with the surveys. Many of the surveys and consent forms have been translated into Spanish. Epi Info™7 databases are available for the surveys, and an ACE data management guide accompanies them. Training materials are also in the toolkit, including an interviewer training manual and the ACE workbook used during the ACE training courses. The ACE Toolkit is available for use by any health agency. The ACE team is available to provide technical assistance over the phone and through e-mail or on site if needed. The team can include specialized personnel such as an industrial hygienist or medical toxicologist to supplement the skill sets of staff in the inviting agency. The team can deploy within two days of receiving a request for assistance, at no charge to the inviting agency.

Staff members from the ACE team lead courses on performing epidemiologic assessments after chemical incidents as part of disaster epidemiology and environmental health emergency courses. The ACE session in CDC's Environmental Health Training in Emergency Response course introduces the epidemiological perspective on environmental disasters to environmental health practitioners. ACE is one of three tracks in the regional disaster epidemiology training courses being offered by the Council of State and Territorial Epidemiologists, CDC's National Center for Environmental Health, NIOSH, and ATSDR. An online ACE course is in the final stages of development.

When faced with responding to a large-scale chemical incident where large numbers of people are exposed and experience health effects, state and local health agencies can call

on the ACE team (ATSDR, 2014c) to provide expertise, personnel, and tools to assess the situation. The ACE Toolkit's customizable surveys are quickly adaptable for each situation, making for timely information collection. The ACE program provides state and local health agencies with the assistance they require to assess the exposure and health effects experienced as a result of a chemical release. 🐼

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Did You Know?

The U.S. Environmental Protection Agency is seeking comment on potential revisions to its Risk Management Program regulations and related programs (<http://go.usa.gov/5VmB>) to improve chemical facility safety and security; enhance public health and safety; and aid local fire, police, and emergency response personnel to prepare for and respond to chemical emergencies.

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Emmy S. Myszka,
MPH, REHS

Tools to Improve Raw Chicken Handling at Restaurants: Report From San Mateo County, California

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.

Emmy Myszka is the principal investigator for the San Mateo County Environmental Health Specialists Network and has six years of experience in environmental health research and compliance. She developed, implemented, and evaluated a case-control study involving 700 restaurants to measure an educational intervention.

Did you know that a droplet of raw chicken juice splashed off raw chicken during washing can travel nearly three feet (Everis & Betts, 2008)? If restaurants don't take care to avoid cross contamination, raw chicken juice can also drip or splash onto other foods during preparation. If it gets onto ready-to-eat foods or food contact surfaces, the consumer can ingest harmful bacteria present in the raw chicken juice and get sick with campylobacteriosis, salmonellosis, or other foodborne illnesses.

In 2011, 72% of raw chicken breasts tested in California were infected with *Campylobacter* (National Antimicrobial Resistance Monitoring System, 2011). With nearly three-quarters of chicken infected with *Campylobacter*, the opportunities for cross contamination are numerous. In San Mateo County, the incidence of campylobacteriosis in 2011 was 34.94 per 100,000 persons (California Department of Public Health, 2011), more than twice the national incidence. San Mateo County Environmental Health decided to take action to protect against

Campylobacter infections associated with restaurants. Specifically, we plan to reduce the number of infections by providing restaurants with high-quality training manuals that operators can use to train employees on how to handle raw chicken safely. As part of the Centers for Disease Control and Prevention's Environmental Health Specialists Network (EHS-Net) cooperative agreement, San Mateo County produced a "Campy Training Kit" that includes a training manual, quick reference cards, video, posters, shelving label, and a thermometer (Figure 1). The materials were produced in English, Spanish, and Chinese, the three most prevalent languages spoken in restaurants in San Mateo County.

Campy Training Kit: Description

The Raw Chicken Handling Training Manual for Owners and Managers is a three-ring binder aimed at getting managers directly involved in training food workers. It consists of three parts: management, raw chicken handling, and training and self-inspection checklists. The management section instructs managers on how to use the manual and offers tips to teach food workers effectively. The second section provides an overview of the problem with raw chicken and how to properly store, prepare, and cook it. The last section offers three active managerial control tools to ensure appropriate equipment for safe chicken handling is available, employees are trained, and a safe preparation environment is maintained daily with opening and closing checklists.

The quick reference cards offer a smaller abbreviated version of the content of the

FIGURE 1

Campy Training Kit



Kit contains raw chicken handling training manual, quick reference cards, training video, refrigerator shelving label, and thermometer.

FIGURE 2

Bilingual Posters on Safe Chicken Handling (English/Spanish and English/Chinese)



training manual and can be easily referenced in the kitchen by keeping them in a drawer or in a chef's pocket. The raw chicken handling training video runs approximately 10 minutes and shows how to implement the training. It is designed to be viewed by the manager to increase confidence in his or her ability to train food workers.

The shelving label can easily snap onto a bottom shelf in a walk-in cooler and provides a reminder to employees about where to store raw chicken. The digital thermometer comes with the cooking temperatures for proteins printed on the case in English for easy reference. The safe chicken handling bilingual poster is provided in English-Spanish and English-Chinese versions and highlights the most important points about raw chicken storage, preparation, and cooking (Figure 2).

Campy Training Kit: Evaluation

The effectiveness of the Campy Training Kit is being measured by surveys conducted before and after delivery. The surveys include observation of storage, preparation, and cooking of raw chicken in addition to a food handler and manager interview. Seven hundred restaurants in San Mateo County were selected to receive the kits and were placed into one of three study groups: intervention-full, intervention-lite, or control. Presurveys were conducted by San Mateo County environmental health specialists (EHS) in fall 2013. The intervention-lite group received a hand-delivered Campy Training Kit; the intervention-full group also received a hand-delivered kit, as well as an in-person training with an EHS. This training provided an introduction to the kit and taught managers how they could implement the training with food workers. The postsurveys were conducted in early 2014; at that point, the control group received their kits.

The data are currently being analyzed to measure how effective the Campy Training Kit is at improving how raw chicken is handled to avoid cross contamination. We will also determine if any difference occurred in the effectiveness between study groups. Anecdotal evidence suggests the kits were well received by the restaurants, and employees appreciated having access to free thermometers and other training materials.

A final report will be completed by December 2014 and will be posted on San Mateo County Health System's Web site.

Although all of the material focused on safe handling of raw chicken, the concepts are applicable to other raw proteins. Similarly, the content of this project was focused on the reduction of *Campylobacter*, but reductions in other foodborne illnesses commonly associated with raw chicken, such as *Salmonella* and *E. coli*, are expected. For electronic copies of the training materials, visit <http://www.smchealth.org/campy>. 🐷

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Did You Know?

September is National Food Safety Education Month. NEHA Training & Education has resources to educate your community about the importance of food safety. From credentialing to training certifications and programs to top-notch texts and online courses, NEHA Food Safety Training can meet your food safety education needs. Visit www.nehatraining.org for more information.

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► DEMYSTIFYING THE FUTURE



Thomas Frey

Betting on Your Future Self

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.

Every day we wake up different. Moment by moment, our lives are changing. Much like a strobe light with flashes of memories jumping through our minds, we randomly recall where we've been.

It happens something like this:
 ...and then I woke up
 ...and then I was eating food
 ...and then I was taking a shower
 ...and then I was in the office
 ...and then I was in a meeting

...and then I was driving
 ...and then I was staring at myself in a mirror
 ...and then I was getting on a plane
 ...and then I was speaking in front of a crowd of people
 ...and then I was sleeping again.

Moments come and moments go. We have no idea where they come from, or where they go, but every moment changes us.

The person we were as a baby is different than who we were as teenagers, and that person has morphed and changed a million times along the way. We don't even look the same.

So when we think about ourselves in the future, we have to ask, "Is my future self going to be more valuable than my present self?"

Will the person we become five years from now be more talented, wealthier, healthier, better looking, better educated, or have a better circle of friends to network with?

We can do many things today to improve our future self. We all intuitively know this, but sometimes we need to be reminded. We can read more, exercise more, take a class, find a better job, write a book, start a business, invent something, meet new people, expand our social network, or do many other things.

We are all placing a bet. Each of us is somehow betting on our future self. But here are a few things you may not have thought about.

Communicating With Your Past

If you had five minutes to give advice to the person you were five years ago, what would you say? How would you coach yourself to do and say things differently to improve your life today?

We spend money on expensive food and beauty treatments, to attend seminars, to travel to other countries, and to go to fitness clubs all with the expectation of being somehow better in the future.

So what would your future self recommend you do differently today? What advice would the person you become, 5–10 years in the future, give you today? Perhaps "future-you" would tell you to stop being so lazy, quit watching so much television, stop playing video games, be more outgoing, study harder,

stop eating crappy fast food, stop spending so much money, or start hanging out with people who want to make a difference.

To put that into perspective, what would “present-you” advise “past-you” to do? Wouldn't it be similar?

Return on Investment (ROI)

So exactly how much have you invested in your future self so far? And how much more are you willing to invest?

Will the person you become five years from now be more valuable than you are today, and if so, how will this “value” manifest itself? Will you have more earning capacity? Will you have a higher social status? Will you be better liked, better informed, or better positioned to launch your next career move?

Will you be leading a life that is far more fun than it is today?

Was it worth it?

Is what you're doing today going to pay off?

Colleges today are going to unusual lengths to justify the massive rate increases that have happened over the past couple of decades. For students, the ROI, calculated in traditional ways, has dwindled into the negative territory as a far higher percentage of graduates are forced to accept jobs that don't require a college degree.

But it's not just college. Did the self-help training you went through back in the 1970s give you any meaningful results? Was the last

job you accepted a good career move? Did your marriage counseling pay off? Is the lawyer you hired a net preserver or a net drainer of your personal assets?

It even goes deeper than that. Does my bed help me sleep at night or is it part of the reason why my health is deteriorating? Does my doctor care more about me, or the commissions he makes as kickbacks from the drug companies? Are the politicians we voted for a net positive or a net negative as far as my life is concerned?

For some, it's easier to put everything into perspective by making it about money. Did we make money or lose money? Yet money is such a tiny piece of what our lives are about.

Other ways of calculating ROI might be as follows:

- Did we gain friends or did we lose some?
- Are we generally happier now?
- Do we feel more confident?
- Do we have a higher status in our communities?
- Do we have more influence?
- Are we making progress on the things that matter most to us?

Preparing for the Future Today

Why is it that other people seem to know so many more things than we do?

We all have the same number of hours in a day. So how is it that a simple conversation with one of these people will leave us in awe or inspired, or perhaps bewildered or overwhelmed?

The answer is probably more straightforward than you think. We all have our own blind spots, and those who are great experts in one field know very little about other fields. And yes, some of us are simply wired to operate at a much higher frequency.

But in the end, those who have risen to the top and become the people we most admire have simply wagered a bigger bet on their future self.

They have done whatever it takes to get where they are today.

Final Thoughts

Realistically though, what kind of relationship can we have with our future self?

Should we ask our future self for advice on tough decisions? Since we don't exactly have the ability to Skype call ourselves 5–10 years in the future, how can it possibly matter what “future-me” thinks about “present-me?”

The answer is, it will matter a great deal when you get there. And you'll hate yourself if you haven't paid attention to the future.

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

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Information and opportunities abound behind the research and development (R&D) button on NEHA's homepage. Visit neha.org/research to obtain the latest on the following NEHA federally funded programs, many of which include free or low-cost training and educational opportunities:

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July 13–15, 2015: NEHA's 79th Annual Educational Conference & Exhibition, Renaissance Orlando at SeaWorld, Orlando, FL.

NEHA AFFILIATE AND REGIONAL LISTINGS**Alaska**

October 7–10, 2014: Annual Educational Conference, sponsored by the Alaska Environmental Health Association, BP Energy Center, Anchorage, AK. For more information, visit <https://sites.google.com/site/aeatest/>.

Colorado

September 24–26, 2014: Annual Education Conference & Exhibition, sponsored by the Colorado Environmental Health Association, Steamboat Grand, Steamboat Springs, CO. For more information, visit www.cehawebsite.com/aec.html.

Illinois

October 2–3, 2014: Annual Educational Conference, sponsored by the Illinois Environmental Health Association, East Peoria, IL. For more information, visit <http://iehaonline.org>.

Indiana

September 22–24, 2014: 64th Annual Fall Educational Conference, sponsored by the Indiana Environmental Health Association, Belterra Hotel and Conference Center, Florence, IN. For more information, visit www.iehaind.org.

Iowa

October 14–15, 2014: Fall Conference, sponsored by the Iowa Environmental Health Association, Marshalltown, IA. For more information, visit www.ieha.net.

Minnesota

October 2, 2014: Fall Conference, sponsored by the Minnesota Environmental Health Association, Spicer, MN. For more information, visit www.mehaonline.org/events.

Montana

September 30–October 1, 2014: 2014 MEHA/MPHA Fall Conference: Innovate, Inspire, Integrate—Creating a Healthy Environment, hosted by the Montana Environmental Health and Public Health Associations, Missoula, MT. For more information, visit www.mehawebsite.org.

Nevada

October 21–23, 2014: 2014 “Partnerships” AEC, hosted by the Nevada Environmental Health Association and the Nevada Food Safety Task Force, Las Vegas, NV. For more information, visit www.nveha.org/upcmg_events.html.

New Hampshire

September 3–4, 2014: 52nd Annual Yankee Conference on Environmental Health—Moving Forward by Building Partnerships, Radisson Manchester, NH. For more information, visit www.nhhealthofficers.org.

New Jersey

September 17, 2014: Annual Educational Symposium, sponsored by the New Jersey Environmental Health Association, Sayreville, NJ. For more information, visit www.njeha.org.

North Dakota

October 21–23, 2014: Fall Education Conference, sponsored by the North Dakota Environmental Health Association, Bismarck, ND. For more information, visit <http://ndeha.org/wp/conferences>.

Texas

October 7–10, 2014: 59th Annual Education Conference, sponsored by the Texas Environmental Health Association, Double Tree Hotel, Austin, TX. For more information, visit www.myteha.org.
December 3–5, 2014: Annual Educational Conference, sponsored by the South Texas Chapter of the Texas Environmental Health Association, Isla Grand Beach Resort, South Padre Island, TX. For more information, visit www.facebook.com/TEHASTC.

Utah

September 10–12, 2014: Fall Conference, sponsored by the Utah Environmental Health Association, West Jordan, UT. For more information, visit www.ueha.org/events.html.

Virginia

October 17, 2014: Fall Educational Session, sponsored by the Virginia Environmental Health Association, Henrico, VA. For more information, visit www.virginiaeha.org.

Wisconsin

September 24–25, 2014: Joint Educational Conference, hosted by the Wisconsin Environmental Health Association, Stoney Creek, Rothschild, WI. For more information, visit www.weha.net.

Wyoming

September 9–11, 2014: Annual Education Conference, sponsored by the Wyoming Environmental Health Association and the Wyoming Food Safety Coalition, The Peaks Conference Center, Lander, WY. For more information, visit www.wehaonline.net.

TOPICAL LISTINGS**Food Safety**

September 9–11, 2014: FDA Pacific Region Retail Food Seminar, Phoenix, AZ. For more information, visit www.azeha.org/Conferences.html.
December 4–5, 2014: National Consumer Food Safety Education Conference, hosted by the Partnership for Food Safety Education, Arlington, VA. For more information, visit www.teamfoodsafety.org/2014.

Recreational Waters

October 8–10, 2014: World Aquatic Health Conference, hosted by the National Swimming Pool Foundation, Portland, OR. For more information, visit www.thewahc.org. 🌊

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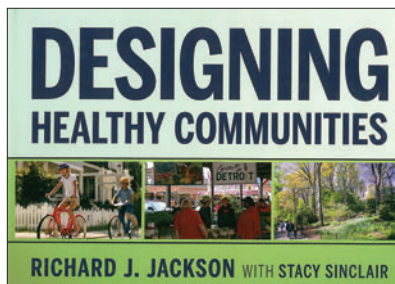
RESOURCE CORNER

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!



Designing Healthy Communities

Richard J. Jackson with Stacy Sinclair (2012)



This book highlights how we design the built environment and its potential for addressing and preventing many of the nation's devastating childhood and adult health concerns. The author looks at the root causes of our malaise

and highlights healthy community designs achieved by planners, designers, and community leaders working together. Ultimately, the author encourages all of us to make the kinds of positive changes highlighted in this book.

230 pages / Hardback / Catalog #1122

Member: \$48 / Nonmember: \$52

Certified Professional—Food Safety Manual (3rd Edition)

National Environmental Health Association (2014)



New edition! The *Certified Professional—Food Safety (CP-FS) Manual* has been developed by experts from across the various food safety disciplines to help candidates prepare for NEHA's CP-FS credential examination. This book contains science-based, in-depth information about causes and prevention of foodborne illness, HACCP plans and active managerial control, cleaning and sanitizing, conducting facility plan

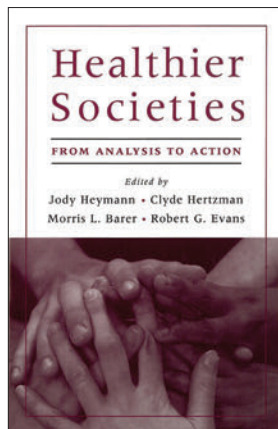
reviews, pest control, risk-based inspections, sampling food for laboratory analysis, food defense, responding to food emergencies and foodborne illness outbreaks, and legal aspects of food safety. Newly revised and updated to include information and requirements from the Food Safety Modernization Act, this manual is the go-to resource for both students of food safety and industry professionals.

358 pages / Spiral-bound paperback / Catalog #EZ9020

Member: \$179 / Nonmember: \$209

Healthier Societies: From Analysis to Action

Edited by Jody Heymann, Clyde Hertzman, Morris L. Barer, and Robert G. Evans (2006)



This book addresses the fundamental questions that need to be answered before countries should invest seriously in improving social conditions as a way of improving the health of the whole population. The book is divided into three parts that address the extent to which health is determined by biological factors or by social factors, examines four case studies that demonstrate the ways in which social change can dramatically affect adults' health,

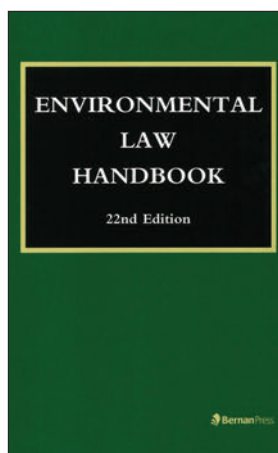
and outlines the challenge of translating into action the research and takes a serious look at what would be involved in meeting this challenge.

417 pages / Hardback / Catalog #758

Member: \$59 / Nonmember: \$64

Environmental Law Handbook (22nd Edition)

Thomas F.P. Sullivan, Editor Emeritus (2014)



New edition! The *Environmental Law Handbook* continues to provide individuals across the country with a comprehensive, up-to-date, and easy-to-read look at the major environmental, health, and safety laws affecting U.S. businesses and organizations. The 22nd edition been thoroughly updated, covering major changes to the law and enforcement in the areas of clean air, clean water, climate change, oil pollution, and pollution prevention. This is an essential reference for environmental

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



Bob Custard,
REHS, CP-FS
President Elect

National Officers

President—Carolyn Hester Harvey, PhD, CIH, RS, DAAS, CHMM, Professor, Director of MPH Program, Department of Environmental Health, Eastern Kentucky University, Disney 220, 521 Lancaster Avenue, Richmond, KY 40475. Phone: (859) 622-6342 carolyn.harvey@eku.edu

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First Vice President—David E. Riggs, REHS/RS, MS, 2535 Hickory Avenue, Longview, WA 98632. Phone: (360) 430-0241 davidriggs@comcast.net

Second Vice President—Adam London, RS, MPA, Environmental Health Director, Kent County Health Department, 700 Fuller NE, Grand Rapids, MI 49503. Phone: (616) 632-7266 adam.london@kentcountymi.gov

Immediate Past President—Alicia Enriquez Collins, REHS enriqueza@comcast.net

Regional Vice Presidents

Region 1—Ned Therien, MPH, Health Policy Analyst, Washington State Board of Health, P.O. Box 47990, Olympia, WA 98501-7990. Phone: (360) 236-4103 ned.therien@sboh.wa.gov Alaska, Idaho, Oregon, and Washington. Term expires 2017.

Region 2—Marcy A. Barnett, MA, MS, REHS, Emergency Preparedness Liaison, California Department of Public Health, Center for Environmental Health, Sacramento, CA. Phone: (916) 449-5686 marcy.barnett@cdph.ca.gov Arizona, California, Hawaii, and Nevada. Term expires 2015.

Region 3—Roy Kroeger, REHS, Environmental Health Supervisor, Cheyenne/Laramie County Health Department, 100 Central Avenue, Cheyenne, WY 82008. Phone: (307) 633-4090 roykroeg@laramiecounty.com Colorado, Montana, Utah, Wyoming, and members residing outside of the U.S. (except members of the U.S. armed forces). Term expires 2015.

Region 4—Keith Johnson, RS, Administrator, Custer Health, 210 2nd Avenue NW, Mandan, ND 58554. Phone: (701) 667-3370 keith.johnson@custerhealth.com Iowa, Minnesota, Nebraska, North Dakota, South Dakota, and Wisconsin. Term expires 2016.

Region 5—Sandra Long, REHS, RS, Inspection Services Supervisor, City of Plano Health Department, 1520 K Avenue, Suite 210, Plano, TX 75074. Phone: (972) 941-7143 ext. 5282; Cell: (214) 500-8884 sandral@plano.gov Arkansas, Kansas, Louisiana, Missouri, New Mexico, Oklahoma, and Texas. Term expires 2017.

Region 6—Lynne Madison, RS, Environmental Health Division Director, Western UP Health Department, 540 Depot Street, Hancock, MI 49930. Phone: (906) 482-7382, ext. 107 lmadison@hline.org Illinois, Indiana, Kentucky, Michigan, and Ohio. Term expires 2016.

Region 7—Tim Hatch, MPA, REHS, Environmental Programs, Planning, and Logistics Director, Center for Emergency Preparedness, Alabama Department of Public Health, 201 Monroe Street, Suite 1310, Montgomery, AL 36104. Phone: (334) 206-7935 tim.hatch@adph.state.al.us Alabama, Florida, Georgia, Mississippi, North Carolina, South Carolina, and Tennessee. Term expires 2017.

Region 8—LCDR James Speckhart, MS, USPHS, Health and Safety Officer, FDA, CDRH-Health and Safety Office, WO62 G103, 10903 New Hampshire Avenue, Silver Spring, MD 20993. Phone: (301) 796-3366 jamesmspeckhart@gmail.com Delaware, Maryland, Pennsylvania, Virginia, Washington, DC, West Virginia, and members of the U.S. armed forces residing outside of the U.S. Term expires 2015.

Region 9—Edward L. Briggs, MPH, MS, REHS, Director of Health, Town of Ridgefield Department of Health, 66 Prospect Street, Ridgefield, CT 06877. Phone: (203) 431-2745 eb.health@ridgefieldct.org Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont. Term expires 2016.

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NEHA NEWS

Note of Thanks to Departing Board Members

We would be remiss if we did not acknowledge the dedication, hard work, and efforts of two members of the NEHA board of directors on the occasion of their departure from the board: Immediate Past President Brian Collins and Region 7 Vice President John Steward.



Immediate Past President Brian Collins leaves the board after 12 years of dedicated service and leadership. In 2009, he was elected second vice president and served as president of NEHA in 2012–2013. Prior to that Brian served as NEHA's Region 5 vice president from 2002 to 2009.

During Brian's tenure, he was appointed to practically every standing presidential committee, authored a number of position and policy statements, and liaised with many national partners, most notably the Food and Drug Administration, in order to promote NEHA and environmental health. Brian was also a principal in reinvigorating NEHA's Student Mentoring program.

Prior to his NEHA service, Brian was president of the Texas Environmental Health Association and Texas Association of Municipal Health Officials. Brian received the American Academy of Sanitarians' Davis Calvin Wagner Award for dedication and accomplishments in leadership, commitment, and resourcefulness in advancing the sanitarian profession at the NEHA 2014 Annual Educational Conference & Exhibition. Retired from active service with the City of Plano, Texas, in January 2014, Brian is now consulting.



Region 7 Vice President John Steward leaves the board after nine years of dedicated service and leadership. John joined the NEHA board in 2005 and served as vice president for both Region 10 (2005–2011) and Region 7 (2011–2014).

John is currently a faculty member in the Division of Environmental Health, School of Public Health, Georgia State University in Atlanta. He teaches graduate courses in environmental and public health and helps to manage and organize research and training around urban health and health disparities. John came to Georgia State eight years ago after a 30-year career in the U.S. Public Health Service (USPHS). He is a member of the USPHS Commissioned Officers Association and the Uniformed Services and Georgia Environmental Health Associations.

As a board member, John represented NEHA members on matters of policy, governance, and oversight of the association. He served on the finance, international fund, food safety, and sustainability committees. He was the board's liaison to the American Public Health Association's Environment Section. He led a work group to develop definitions of the terms environmental health and environmental health practitioner, which were published in the *Journal* (October

2013). In addition to serving on the board, John chaired several of NEHA's technical sections for 15 years, and he serves as a peer reviewer for the *Journal*. He is a recipient of the NEHA Past Presidents' Award and numerous Presidential Citations.

John states, "NEHA is an organization to be proud of. Its members provide a tremendous range of services to both humankind and make our planet a better place for all. NEHA's officers, directors, and staff are dedicated to serving the association and conducting high-quality, high-impact programs for environmental health professionals, agencies, and our nation. It is gratifying to have worked in this field and to have participated in the development of a well-respected and effective association. It's equally important to have made deep friendships along the way."

NEHA Staff Profiles

As part of tradition, NEHA features new staff members in the *Journal* around the time of their one-year work anniversary. These profiles give you an opportunity to get to know the NEHA staff better and to learn more about the great programs and activities going on in your association.

**Erik Kosnar**

I joined NEHA in September 2013, and having come from a background in audio engineering and graphic design, I was very excited to lend my skills to an organization that contributes to the environmental health industry. I've spent the last 15 years working for various audio equipment companies designing products and training people

around the country on how to best use them.

At NEHA I am a learning content developer, and to date I have helped with several projects from credential study materials to classroom and e-learning curriculum design. I'm excited that I can bring a passion for training and development to NEHA, and I'm very excited to be working here. It is very fulfilling to work alongside such a dedicated and passionate group of people.

While I'm not a native of Colorado, I've spent the majority of my life here and I love calling this state home. I enjoy spending my time cooking and trying new cuisines from around the world. I also enjoy writing and playing music, even occasionally performing at venues around Denver with my band.

**Matt Lieber**

I joined NEHA in 2013 as a contract employee in the marketing department to assist in the promotion of NEHA's 2013 Annual Educational Conference & Exhibition. A few months later I was proud to be made a full-time member of NEHA's staff as marketing and communications assistant. Being a part of NEHA has been a fantastic experience as it gives me the

NEHA NEWS

opportunity to apply myself towards goals and projects that truly mean something both to me personally and the world at large.

I'm originally from Michigan, where I received two bachelor's degrees from Michigan State University in journalism and political science before moving to Denver in 2008 to attend graduate school. I ultimately received my master's degree from the University of Denver in media, film, and journalism studies (by writing a 300-page thesis on Batman).

My first few jobs out of school were mainly focused on web marketing strategies, first at an e-commerce firm in Detroit, then at a web marketing solutions firm here in Denver. But it was arriving at NEHA that showed me that the private sector was not for me, and that I'd much rather spend my days working with people and organizations that make a real difference in the world. That is what I have found since becoming a part of NEHA.

Before coming to NEHA, I can honestly say the phrase "environmental health" was not part of my vocabulary. But now, after a year working for NEHA, I take pride in understanding the reach and impacts of environmental health and knowing that I provide a small piece in helping environmental health professionals take on the challenges of keeping our food safe, our water clean, and our planet secure for the future.

NHSPI™: Hatching a Plan for Environmental Health

With the help of NEHA Region 7 Vice President Tim Hatch, the environmental health community is actively engaging in further development of the National Health Security Preparedness Index™ (NHSPI™) (www.nhspi.org). The 2014 NHSPI will feature an expanded focus on the role of environmental health in preparedness.

NEHA and other environmental health partners are championing the charge to bring more measures of environmental health preparedness into NHSPI. Hatch, environmental programs, planning, and logistics director at the Alabama Department of

Public Health's Center for Emergency Preparedness, has been appointed to the NHSPI Environmental Health Task Force as a subject-matter expert representing NEHA. In addition to NEHA, representatives from seven other organizations are adding their voices to the expansion of environmental health in NHSPI including the Association of Public Health Laboratories, the Association of State and Territorial Health Officials (ASTHO), the Centers for Disease Control and Prevention's (CDC's) National Center for Environmental Health, the Council of State and Territorial Epidemiologists, the Environmental Health Partnership Council, the National Association of County and City Health Officials, and the National Alliance for Radiation Readiness.

NHSPI is the first composite measure of the nation's and states' preparedness. The tool brings together the best available evidence to date to reflect the current state of health security preparedness. The inaugural version was released in December 2013.

ASTHO, under a cooperative agreement with CDC, leads the development of NHSPI with over 50 stakeholder partners. In 2014, the second version of NHSPI will grow to include more and better measures in the areas of environmental health and health care.

NHSPI is a resource to

- get a more complete picture of health emergency preparedness nationwide,
- make more informed decisions on the best use of health security preparedness resources,
- show progress and assess changes in preparedness levels over time,
- identify strengths and gaps in health security preparedness, and
- aid continuous quality improvement.

Version 2.0 of NHSPI is slated for release in December 2014. Check out your state's results and share your ideas for ensuring environmental health is integral to the preparedness picture at www.nhspi.org. 🌐

Now Available Wherever You Are!

Starting October 1, NEHA will offer new membership categories that also offer the option to receive an electronic version of the *Journal of Environmental Health (JEH)*. Check it out!

- New Feature: Download as a PDF for offline reading or printing
- Access web links and e-mail addresses found in articles, ads, and listings
- Read it on any computer or mobile device such as a tablet or smart phone
- Quickly find information using the search feature
- View video content
- Bookmark pages and articles for quick reference

As a NEHA member, you will receive the E-Journal in addition to the hard copy—absolutely free—for all issues of the *JEH* through September 2014 while your membership is active!

Look for it in your inbox and be sure to add staff@neha.org to your list of safe senders.



NEHA's Annual Financial Statement



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INDEPENDENT AUDITORS' REPORT

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

REPORT ON THE FINANCIAL STATEMENTS

We have audited the accompanying financial statements of National Environmental Health Association (the "Association") (a Colorado non-profit corporation), which are comprised of the statements of financial position as of September 30, 2013 and 2012, and the related statements of activities and cash flows for the years then ended, and the related notes to the financial statements.

MANAGEMENT'S RESPONSIBILITY FOR THE FINANCIAL STATEMENTS

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

AUDITORS' RESPONSIBILITY

Our responsibility is to express an opinion on these financial statements based on our audits. We conducted our audits in accordance with auditing standards generally accepted in the United States of America and the standards applicable to financial audits contained in *Government Auditing Standards*, issued by the Comptroller General of the United States. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the financial statements are free from material misstatement.

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

To the Board of Directors
National Environmental Health Association
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We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

OPINION

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of National Environmental Health Association as of September 30, 2013 and 2012, and the changes in its net assets and its cash flows for the years then ended in accordance with accounting principles generally accepted in the United States of America.

OTHER MATTERS

Our audits were conducted for the purpose of forming an opinion on the financial statements as a whole. The schedule of expenditures of federal awards, as required by the Office of Management and Budget Circular A-133, *Audits of States, Local Governments, and Non-Profit Organizations*, is presented for purposes of additional analysis and is not a required part of the financial statements. Such information is the responsibility of management and was derived from and relates directly to the underlying accounting and other records used to prepare the financial statements. The information has been subjected to the auditing procedures applied in the audits of the financial statements and certain additional procedures, including comparing and reconciling such information directly to the underlying accounting and other records used to prepare the financial statements or to the financial statements themselves, and other additional procedures in accordance with auditing standards generally accepted in the United States of America. In our opinion, the schedule of expenditures of federal awards is fairly stated, in all material respects, in relation to the financial statements as a whole.

OTHER REPORTING REQUIRED BY GOVERNMENT AUDITING STANDARDS

In accordance with *Government Auditing Standards*, we have also issued our report dated June 5, 2014, on our consideration of the Association's internal control over financial reporting and on our tests of its compliance with certain provisions of laws, regulations, contracts, grant agreements, and other matters. The purpose of that report is to describe the scope of our testing of internal control over financial reporting and compliance and the results of that testing, and not to provide an opinion on internal control over financial reporting or on compliance. That report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering the Association's internal control over financial reporting and compliance.

EKS&H LLP

EKS&H LLP

June 5, 2014
Denver, Colorado

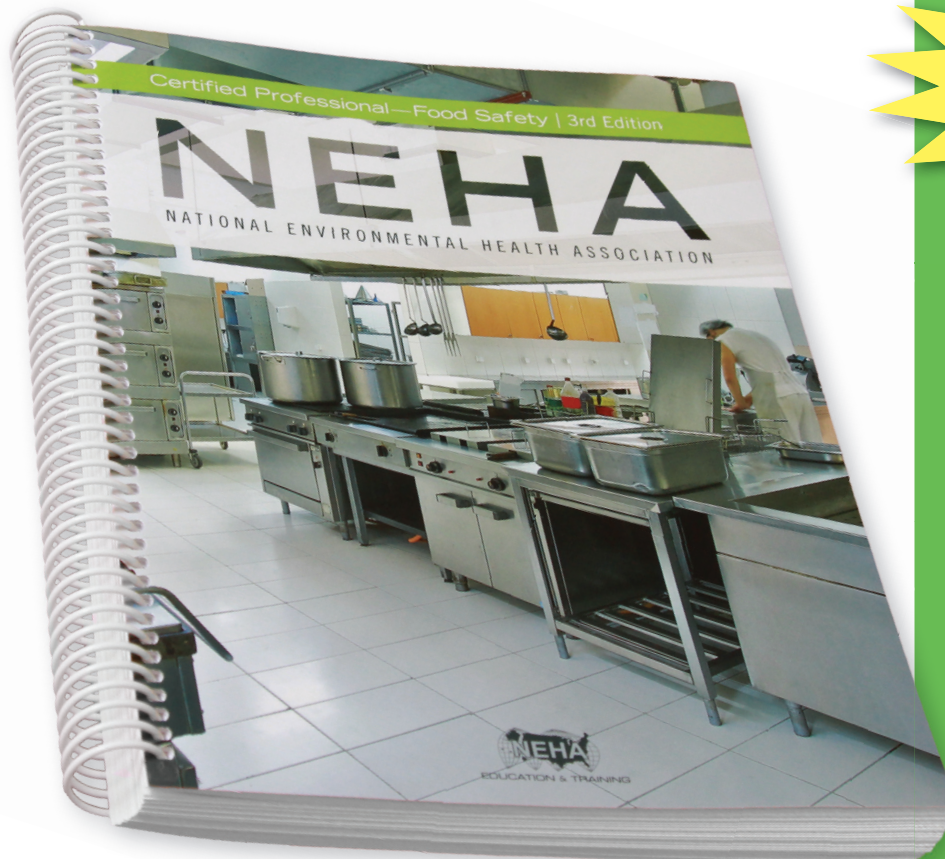
NATIONAL ENVIRONMENTAL HEALTH ASSOCIATION

Statements of Activities

	For the Years Ended					
	September 30, 2013			September 30, 2012		
	Unrestricted	Temporarily Restricted	Total	Unrestricted	Temporarily Restricted	Total
Revenues and gains						
Research and development	\$ 1,892,576	\$ -	\$ 1,892,576	\$ 1,726,699	\$ -	\$ 1,726,699
Annual Educational Conference	486,639	-	486,639	606,501	-	606,501
Credentialing and education	603,713	-	603,713	644,482	-	644,482
Membership dues	321,787	-	321,787	336,311	-	336,311
Journal of Environmental Health	206,141	-	206,141	180,910	-	180,910
Special projects	3,280,923	-	3,280,923	1,669,073	-	1,669,073
Contributions	17,965	-	17,965	750	640	1,390
Publications and module contracts	99,059	-	99,059	78,332	-	78,332
Miscellaneous income	21,324	-	21,324	19,980	-	19,980
Investment income	3,165	254	3,419	950	210	1,160
Total revenues and gains	6,933,292	254	6,933,546	5,263,988	850	5,264,838
Expenses						
Research and development	1,971,835	-	1,971,835	1,744,113	-	1,744,113
Annual Educational Conference	583,730	-	583,730	573,698	-	573,698
Journal of Environmental Health	317,909	-	317,909	283,537	-	283,537
Credentialing and education	492,643	-	492,643	315,290	-	315,290
Membership	233,606	-	233,606	139,442	-	139,442
Publications and module contracts	117,981	-	117,981	93,427	-	93,427
Special projects	2,556,157	-	2,556,157	1,487,490	-	1,487,490
Continuing education	101,304	-	101,304	97,456	-	97,456
ARC	-	-	-	2,834	-	2,834
Administration and general	439,921	-	439,921	284,509	-	284,509
Total expenses	6,815,086	-	6,815,086	5,021,796	-	5,021,796
Change in net assets	118,206	254	118,460	242,192	850	243,042
Net assets at beginning of year	1,285,512	80,022	1,365,534	1,043,320	79,172	1,122,492
Net assets at end of year	\$ 1,403,718	\$ 80,276	\$ 1,483,994	\$ 1,285,512	\$ 80,022	\$ 1,365,534

The information in this statement is derived from audited financials; the entire audited report can be obtained by contacting NEHA.

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79th NEHA

AEC

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

SAVE THE DATES

JULY 13-15, 2015

RENAISSANCE ORLANDO
at SEAWORLD





CALL FOR ABSTRACTS

The National Environmental Health Association presents its 79th Annual Educational Conference & Exhibition in Orlando, FL, July 13-15, 2015.

NEHA IS CURRENTLY...

- Gathering feedback on topics of interest for 2015
- Developing a conference vision
- Researching an improved abstract submission process

COMING IN SEPTEMBER! We will announce these items and officially open the Call for Abstracts by mid-month. Stay tuned to neha.org, e-mails, and the E-News!

AEC Format

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

Types of training and educational sessions at the AEC:

Lectures

- Interactive presentations will be given first consideration
- Single or multiple speaker presentations in traditional lecture or panel formats

Learning Labs

- Hands-on demonstrations
- Tabletop exercises
- Drop-in learning labs
- Roundtable discussions
- Poster presentations
- Other interactive and innovative presentation formats

Ensuring Attendees a Return on Investment

The NEHA AEC is being rationalized according to return on investment (ROI) principles. Emphasis will be given to those abstracts that impart knowledge to attendees, but also enables them to make cost effective program improvements in their workplaces thereby justifying the investment made for their attendance to the NEHA AEC.

2 WAYS to participate in the
Call for Abstracts



Be a speaker.

Be a voice.



The NEHA AEC is designed to train, educate, and advance people who have an interest or career in environmental health and protection, as well as to bring people together to build a professional network of environmental health colleagues, exchange information, and discover new and practical solutions to environmental health issues.

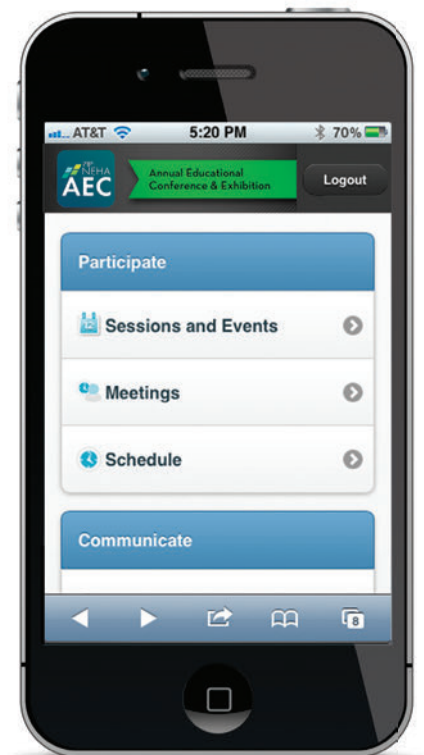
Virtual AEC: Continuing Education Resource from the NEHA 2014 AEC

Though the NEHA 2014 AEC has ended, you can still access valuable educational content from this event using the Virtual AEC. The Virtual AEC provides you with:

- An archive of over 30 educational sessions that were recorded at the 2014 AEC and can be viewed on demand
- Access to speaker presentations, handouts, and other materials
- The opportunity to earn continuing education credits
- A way to connect to a professional network of environmental health professionals, speakers, and exhibitors that attended the AEC

Whether or not you attended the NEHA 2014 AEC in Las Vegas, the Virtual AEC serves as an important resource for you to review valuable educational content over and over again, and to continue networking and conversing with other professionals!

Visit neha2014aec.org for more information.



What is Capacity Building?

It's about time.®

NEHA identified the need to help health agencies increase their capacity to perform in an environment of diminishing resources. Their study recognized that, while new EH regulations and program areas are constantly being added, staffing levels are contracting. The burden of Federal and State reporting mandates overwhelm resources.

As your national organization, NEHA selected a technology partner to advance this initiative. *Building Capacity* is a partnership designed to help professionals confront the changing demands of environmental health across the nation.



Key focus areas include—

- Office workflow, policies, processes, automation, and accountability
- Knowledge and resource gaps
- Data, training, cultural, and leadership issues
- Action plans to address issues and gaps

Decade employs a structured approach that applies program-specific questionnaires, as well as onsite meetings and observation, to help clients assess their capacity and build from there. The result is technology, training, and leadership that's laser-focused on providing the right services.

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