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### January/February 2007

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#### **Assessing and Improving Bioterrorism Preparedness Among First Responders: A Pilot Study**

Atiera Abatamarco, M.P.H., C.H.E.S., John Beckley, M.P.H., Marija Borjan, M.P.H., and Mark Robson, Ph.D., M.P.H., A.T.S.

#### Abstract

Following the September 11 terrorist attacks, the vulnerability of the United States became apparent. It also became evident that there was a need for respiratory protection. The purpose of this study was to determine the prior knowledge and perceptions of emergency medical technicians with respect to bioterrorism and to enhance their current knowledge to better prepare them for possible future events. The study was also designed to create a certified pool of trainers who would be capable of fit-testing all squad members with N-100 respirators. Representatives were recruited from each of the Hunterdon County, New Jersey, rescue squads. Participants attended a train-the-trainer session. Before the session and after, they were tested on knowledge and perceptions about relevant bioterrorism issues and were given an educational presentation on bioterrorism, threatening agents, respiratory health, and proper protection, along with being introduced to the fit-test steps for N-100 respirator masks. The response rate for the training was 94 percent. The authors measured and compared responses on the pre-test and the post-test with respect to knowledge, behaviors, and perceptions, and the results indicated a change following the training. The study thus provided evidence that the train-the-trainer program is an effective method of providing public health preparedness training to members of community organizations and agencies.

#### **Methyl Bromide Fumigant Lethal to *Bacillus anthracis* Spores**

Margaret A. Juergensmeyer, Ph.D., Bruce A. Gingras, Ph.D., Rudolf H. Scheffrahn, Ph.D., and Mark J. Weinberg

#### Abstract

Methyl bromide (MB), an agricultural fumigant used in the United States, is capable of reducing or eliminating *Bacillus anthracis* spores. In the event of a bioterrorist attack, MB might serve as an excellent decontaminating agent because it leaves no residue and does not damage furnishings and commodities.

#### **Say What? Who? Me? Right Here in the Trenches? Collaborate on What?— Seeking Common Ground in Regional All-Hazards Preparedness Training**

Adenike Bitto, M.D., M.P.H., Dr.P.H., C.H.E.S., F.R.I.P.H.

#### Abstract

Heroic responses to the events surrounding September 11, 2001, and Hurricane Katrina in 2005, as well as to other catastrophes, underscore the need for genuine collaboration within communities and among environmental health professionals, public health agencies, first responders from various professions, and other organizations. Because of competing organizational agendas, however, interdisciplinary training is needed to help ensure that communities and various first responders will operate in tandem. This article suggests types of responders who might benefit from such training, lists selected courses from a new curriculum, and shares lessons learned during the development of a regional all-hazards preparedness training program.

#### **The Introduction and Expansion of GIS into a Small Local Health Department Drinking-Water Program**

Chris Miller, M.S., R.E.H.S.

#### Abstract

Around the world, local health departments are using geographic information systems (GIS) on a daily basis. Although small health departments as well as large ones may have the capability to use GIS, more care is required in planning projects, selecting software and hardware, training staff, and data maintenance. A drinking-water program in a small local health department in Whatcom County, Washington, offers several GIS case studies, including source mapping for public and private water systems, delineation of wellhead protection areas, and related emergency response examples. The author recommends ways in which GIS users and researchers in small local health departments can better collaborate, use the Internet, and avoid pitfalls.

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**March 2007**

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#### **Children's Exposure to Pesticides Used in Homes and Farms**

Jeremy Saller, Priscilla Reyes, Pedro A. Maldonado, Shawn G. Gibbs, Ph.D., and Theresa L. Byrd, Dr.P.H.

## Abstract

Commercial and residential use of pesticides is common in El Paso, Texas, especially in agricultural areas. Recently, concerns have arisen about the type of pesticides used by residents because of the ease with which methyl parathion can be obtained from the neighboring border city of Juarez in Chihuahua, Mexico. Survey data were collected regarding residents' perceptions about pesticide safety and use of pesticides, and their preferred source of health information. The authors assessed the number of respondents who were using the illegal pesticide methyl parathion, known locally as *polvo de avion* (airplane dust) as well as their beliefs concerning the safety and efficacy of pesticides. The study found that 88.7 percent (133 of 150) used some type of pesticide, and of these, 9.8 percent (13 of 133) reported using methyl parathion. Biological/environmental testing would be useful to assess use of methyl parathion and to determine the types of pesticides used by local farmers.

## **A Risk-Based Food Inspection Program**

Michelle A. Hoag, M.P.H., Corwin Porter, M.P.H., R.E.H.S., Padma P. Uppala, Ph.D., and David T. Dyjack, Dr.P.H., C.I.H.

## Abstract

The inspection of food facilities is a crucial public service designed to prevent foodborne illnesses among retail food consumers. To enhance the existing food inspection process in San Bernardino County, California, a risk-based food inspection program and assessment instrument has been developed and proposed. A literature review and interviews with health professionals were conducted to establish a baseline understanding of various inspection procedures currently being employed throughout the nation. San Bernardino subsequently developed an assessment instrument and attendant inspection schedules that reflect best practices. The proposed inspection model categorizes food facilities as high, moderate, or low risk according to food properties, service population characteristics, facility history, and predefined operational risks. The San Bernardino model supports health department decision making with respect to inspection resource allocation and also makes possible sliding permit fees that reflect the relative risk associated with each facility.

## **A Comparison of Ozone Exposure in Fresno and Shaver Lake, California**

Ricardo Cisneros, M.P.H., and Miguel A. Perez, Ph.D., C.H.E.S.

## Abstract

Ground-level ozone is a pollutant that has been found to have detrimental effects on plants as well as in humans. Few studies, however, have measured ozone exposure in mountainous regions downwind from highly polluted urban centers, despite the popularity of these regions as summer destinations. The study reported here evaluated ozone levels in Fresno, California, and the downwind community of Shaver Lake, California, during the summer months of June, July, and August from 1997 to 2001.

Findings from the study suggest that if Fresno is considered one of the most polluted cities in the nation, then Shaver Lake should be considered one of the most polluted rural sites. Continuing and expanded monitoring of surface ozone concentrations at remote and rural locations is needed, because it is important to assess the risk for humans, animals, and plants.

### **The Health Effect of Odor Emission from Domestic Renovation on Household Residents in Tianjin, China**

Hong-Liang Liu, M.D., Lawrence T. Lam, M.App.Psy., M.P.H., Ph.D., Ting Wang, M.D., Chang-Chun Hou, M.S., Qiang Zeng, M.S., Li-Hong Feng, and Xue-Min Chen, M.D.

#### **Abstract**

The health effects of odors emitted from the human environment have received some discussion in the literature. Little has been written, however, about the health effects of odor emissions from renovation. The authors therefore conducted a cross-sectional study with a simple randomized sampling design. The sample was selected from a building-and-construction registry that registered all building and domestic renovation applications in Tianjin, China. Information on demographics, physical symptoms, and health status was collected via personal interviews. Air samples were also collected from each household for chemical analysis. Data were analyzed with weighted logistic-regression models.

A significant association was found between exposure to odor emission and unspecific physical symptoms. After potential confounders were adjusted for, it was found that people who had been exposed to moderate-to-strong odor emissions from renovations were about four times more likely to report experiencing unspecific discomfort than were people who had been exposed to weak odor emissions (odds ratio = 4.05; 95 percent confidence interval = 1.49–11.03). The results indicate that odor emissions from domestic renovation have a detrimental effect on human physical health. This effect seemed to be independent from that generated by chemicals. Implications and prevention strategies are discussed.

### **Municipal Solid Waste Management in Kurdistan Province, Iran**

Mohammad Ali Abdul, Ph.D., and Touraj Nasrabadi, M.Sc.

#### **Abstract**

Kurdistan Province, with an area of 28,203 square kilometers, is located in a mountainous area in the western part of Iran. From 1967 to 1997, the urban population in the major eight cities of the Kurdistan Province—namely, Baneh, Bijar, Divan Darreh, Saghez, Sanandaj, Ghorveh, Kamyaran, and Marivan—increased from 102,250 to 705,715. The proportion of the population residing in urban areas increased 90 percent during this period. In most of the cities, solid waste handling remains primitive, and well-organized procedures for it have not been established. Traditional methods of disposal,

with marginal inclusion of modern conveniences, appear to be the common practice. In general, the shortcomings of the prevailing practices can be summarized as follows:

- The municipal solid waste management systems (MSWMSs) in this province include unsegregated collection and open dumping of municipal solid wastes.
- Separation of municipal solid waste in this province is in the hands of scavengers.
- The MSWMSs in this province lack essential infrastructure.

Thus, design and implementation of modern MSWMSs in this province are essential. Principal criteria for and methods of implementing these systems are as follows:

1. rationally evaluating all functional elements so that they operate in a steady-state or equilibrium manner;
2. creating all support elements for the MSWMS in each city;
3. introducing gradual privatization of MSWMS activities;
4. creating guidelines, regulations, and instructions for all elements of MSWMSs; and
5. giving priorities to source separation and recycling programs.

This paper reviews the present status of MSWMSs in eight major cities of Kurdistan Province and outlines the principle guidelines and alternatives for MSWMSs.

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**April 2007**

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### **Comparisons of Mosquito Populations Before and After Construction of a Wetland for Water Quality Improvement in Pitt County, North Carolina, and Data-Reliant Vectorborne Disease Management**

Alice L. Anderson, Ph.D., Kevin O'Brien, Ph.D., and Megan Hartwell, M.S.E.H.

#### **Abstract**

Wetlands serve an important purpose in flood control and water quality, but constructed-wetland sites also provide habitats for mosquito breeding. Communities near constructed-wetland sites often raise a "mosquito" objection when constructed wetlands are proposed. Wildlife and wetland advocates can confuse the public by making unsubstantiated claims about natural predators eliminating or controlling mosquito problems in a constructed wetland.

Management of constructed-wetland mosquito habitat, with adequate mosquito surveillance and data analysis, can help lead to a successful project and satisfied citizens. The cooperative project described in this paper, was conducted in the town of Simpson, North Carolina, and was designed to determine the mosquito population impact of wetland construction at Mill Branch Stream, a small tributary of the Tar River in Eastern North Carolina.

In the authors' analysis of three years of mosquito surveillance data, month (time of year standing in for temperature and day length), but not rainfall, was a significant factor in regression analysis for mosquito numbers, but rainfall was not. Numbers of mosquitoes were not found to be significantly higher after construction than before construction.

## **California's County and City Environmental Health Services Delivery System**

David T. Dyjack, Dr.PH., C.I.H., Paola Case, M.P.H., Harold J. Marlow, M.S, Ph.D., Samuel Soret, Ph.D., and Susanne Montgomery, Ph.D., M.P.H.

### **Abstract**

The purpose of the authors' research was to assess the current status of county and city environmental health service delivery in California with the aim of providing a foundation for informed decision making about environmental health service delivery. Standardized interviews were conducted from March 2005 to May 2005 with 55 (88 percent) of the 62 county and city directors of environmental health; their jurisdictions represented 90 percent of the state's population and 94 percent of the landmass. Relevant databases and other publicly available information germane to project goals were also evaluated. The directors who were interviewed reported a total of 2,477 professional environmental health staff employed in county and city agencies, complemented by 520 support personnel. Percentages of respondents reporting technical-training needs were greatest for Certified Unified Program Agency (CUPA) activities (60 percent), dairy programs (57 percent), and septic-system programs (55 percent), while nontechnical training was desired in conflict resolution (55 percent), written/oral communication (49 percent), and problem solving (49 percent). Sixty-seven percent (67 percent) of directors reported difficulty in recruiting qualified applicants. Fifty-six percent (56 percent) were familiar with the 10 essential services of environmental health, while only 11 percent collected and reported health outcome measures to demonstrate agency effectiveness. The study team concluded that at the local level, environmental health services are largely provided as a reflection of local need; however, this tendency towards customization leads to stakeholder confusion about the purpose and value of environmental health services. The authors offer seven recommendations for improving environmental health services in California. Many of these recommendations can be generalized to the nation at large.

## **Eco-Friendly Control of Mosquito Larvae by *Brachytron pratense* Nymph**

S.N. Chatterjee, M.Sc., Ph.D., A. Ghosh, M.Sc., Ph.D., and G. Chandra, M.Sc., Ph.D.

### **Abstract**

The study reported here revealed the biocontrol efficacy of aquatic nymphs of the dragonfly *Brachytron pratense* against larvae of the mosquito *Anopheles subpictus*. It was found that during a 24-hour study period, a nymph of *B. pratense* would consume (mean value of three observations) 66 fourth-instar *An. subpictus* larvae released in a water bowl containing 3 liters of pond water. The consumption rate was significantly higher ( $p < .05$ ) during the lights-on phase of the experiment than during the lights-off phase ( $t = 2.15$ ). Under field conditions, a significant decrease ( $p < .05$ ) in larval density in dipper samples was observed 15 days after the introduction of dragonfly nymphs (10 individuals) in concrete tanks. The biocontrol potential of the nymphs under field conditions was also indicated by a significant increase ( $p < .05$ ) in the density of

mosquito larvae 15 days after the removal of nymphs. In the control tanks (where no nymphs were introduced), mean larval-mosquito density did not differ significantly throughout the study period ( $p > .05$ ).

### **Sharing Environmental Health Practice in the North American Arctic: A Focus on Water and Wastewater Service**

Troy L. Ritter, R.E.H.S., M.P.H., D.A.A.S.

#### **Abstract**

While providing water and wastewater services in rural Alaska has traditionally been difficult, the task has become even more challenging in the new millennium. A combination of factors has increased the cost and complexity of water and wastewater systems while leaving residents with diminished ability to pay for services. Alaskans may be better able to meet these challenges by learning more about and adopting some approaches used in similar regions. In March 2005, the author visited six communities in the Canadian Northwest Territories (NWT). Made possible by NEHA's Sabbatical Exchange Ambassador Award, these visits provided the author an opportunity to learn about the NWT approach to providing water and wastewater services. He then compiled comprehensive descriptions of each region's service delivery model. Comparisons were made, and features of interest were identified and used to develop recommendations for improving service delivery in rural Alaska.

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**May 2007**

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### **Beneficial Effects of Implementing an Announced Restaurant Inspection Program**

Kimberly A. Reske, M.P.H., Timothy Jenkins, R.S., M.P.H., Curt Fernandez, David VanAmber, and Craig W. Hedberg, Ph.D.

#### **Abstract**

Announced inspections are being incorporated into restaurant inspection programs to support active managerial control; however, their effectiveness is unknown. The study reported here examined the results of 1,314 inspections conducted from June 2001 through August 2003 in Minneapolis, Minnesota. Of these, 343 were routine inspections that preceded and 157 were routine inspections that followed an announced inspection, and 501 were routine inspections of restaurants that did not undergo an announced inspection. Significant reductions in frequency of citations for critical violations in two food safety categories—1) the person-in-charge demonstrates knowledge of foodborne-disease prevention and 2) prevention of cross-contamination—were seen in establishments that had undergone an announced inspection (relative risk [RR] of 0.7,  $p = .007$ , and RR of 0.4,  $p = .001$ , respectively). The frequency of citation for these critical violations did not decline in establishments that did not undergo an announced

inspection. Announced inspections appear to be effective in supporting active managerial control and represent a promising approach to improving food safety in restaurants.

### **Revisiting a Hazardous Waste Site 25 Years Later**

Glenn Harris, Ph.D., and Leah Nelson

#### **Abstract**

The starting point for this research was a case study of illegal hazardous waste disposal published 25 years ago in the *Journal of Environmental Health*. The site, located in rural upstate New York, would eventually be managed under county, state, and national remediation programs. For this paper, the authors conducted a historical analysis of reports published about the site. They also interviewed federal, state, and local officials, as well as nearby residents. Drawing on the data obtained in these ways, the paper reviews remedial efforts and community involvement. Despite considerable time and resources invested by stakeholders, groundwater pollution persists at the site. As responsibility for remediation moved through higher levels of government, the character of community involvement shifted from proactive to reactive to quiescent. Today, neighboring residents perceive health problems and demonstrate feelings of powerlessness. Remedial activity has required greater investigation over time, resulting in more documents detailing a larger number of parameters with increasing scientific sophistication. This approach has boosted understanding of groundwater pollution. At the same time, recent remediation has been deprived of useful knowledge that could have been provided by greater local participation in decision making.

### **Health, Safety, and Ecological Implications of Using Biobased Floor-Stripping Products**

Ephraim Massawe, M.S., Sc.D., Kenneth Geiser, M.C.P., Ph.D., Michael Ellenbecker, M.S., Sc.D., and Jason Marshall, M.S.

#### **Abstract**

The main objective of the study reported here was to investigate the ecological, health, and safety (EHS) implications of using biobased floor strippers as alternatives to solvent-based products such as Johnson Wax Professional (Pro Strip). The authors applied a quick EHS-scoring technique developed by the Surface Solution Laboratory (SSL) of the Toxics Use Reduction Institute (TURI) to some alternative, biobased products that had previously performed as well as or close to as well as the currently used product. The quick technique is considered an important step in EHS assessment, particularly for toxics use reduction planners and advocates who may not have the resources to subject many alternative products or processes at once to detailed EHS analysis. Taking this step narrows available options to a manageable number. (Technical-performance experiments were also conducted, but the results are not discussed or reported in this paper.) The cost of switching to biobased floor strippers was assessed and compared with the cost of using the traditional product, both at full strength and at the dilution ratios recommended by the respective manufacturers.

The EHS analysis was based on a framework consisting of five parameters: volatile organic compounds (VOCs); pH; global-warming potential (GWP); ozone depletion potential (ODP); and safety scores in areas such as flammability, stability, and special hazards, based on ratings from the Hazardous Material Classification System (HMIS) and the National Fire Protection Association (NFPA). Total EHS scores were calculated with data derived from the material safety data sheets. For most cleaning products previously investigated by the TURI SSL, the investigators have demonstrated that the five key parameters used in the study reported here can successfully be used for quick screening of the EHS impacts of cleaning alternatives.

All eight biobased, or green, products evaluated in the study had better EHS-screening scores than did Pro Strip. One product, Botanic Gold, had a screening score of 49 out of a possible 50. This score was much higher than the score of 26 achieved by Pro Strip. The other biobased floor strippers had EHS-screening scores of  $\geq 37$ , which is the average value of solvent-based cleaning solutions. These results indicate that biobased cleaning products capable of floor stripping are potentially better than traditional products with respect to the five EHS parameters used.

The cost of switching to biobased floor strippers at their full strength ranged from a minimum of U.S. \$15.50 per gallon (\$4.10 per liter) for Eco Natural Floor Stripper (WPR) to about \$59.00 per gallon (\$15.61 per liter) for Botanic Gold. At 25 percent volume by volume (v/v), the recommended dilution ratio for the traditional product, the cost of the Botanic Gold was \$14.75 per gallon (\$3.90 per liter), or about five times more than that of Pro Strip, which was \$2.48 per gallon (\$0.65 per liter). Since these figures do not reflect all of the EHS costs, such as disposal and recycling fees, it is likely that use of Botanic Gold could be cost-effective in the long run.

The authors therefore recommend that detailed EHS analysis be conducted on this alternative biobased floor stripper. It is also recommended that large field trials be conducted and that janitors' or consumers' perceptions be determined. For detailed assessment of eco-toxicological properties of the biobased floor strippers, investigations of the common additives in the Botanic Gold formulation should be conducted through use of databases on the World Wide Web such as Toxnet. Finally, the current policies, regulations, and standards that promote biobased products should be investigated to determine their strengths and weaknesses. This would encourage a broader public debate about the future of the biobased industry in the context of sustainability.

## **Potential for Parasite and Bacteria Transmission by Paper Currency in Nigeria**

C.J. Uneke, M.Sc., and O. Ogbu, M.Sc., Ph.D.

### **Abstract**

The authors assessed the potential of Nigerian currency notes to act as environmental vehicles for the transmission of pathogenic parasites and bacteria. Currency notes obtained from four major cities in Nigeria were evaluated according to standard techniques. Fifty-four (21.6 percent [95 percent CI: 16.50–26.70]) of the first batch of 250 notes, which underwent parasitological analysis, were contaminated with enteric parasites; 133 (53.2 percent [95 percent CI: 47.02–59.39]) of the second batch of 250 notes, which underwent bacteriological analysis, were found to be contaminated with

bacteria. Parasites that were isolated from the notes included *Ascaris lumbricoides* (8.0 percent), *Enterobius vermicularis* (6.8 percent), *Trichuris trichiura* (2.8 percent), and *Taenia* species (4.0 percent). Bacteria that were isolated were *Streptococcus* species (21.6 percent), *Staphylococcus* species (12.8 percent), *Escherichia coli* (13.2 percent), and *Bacillus* species (5.6 percent). Among dirty/mutilated currency notes, parasite contamination and bacterial contamination were both significantly ( $p < .05$ ) more pervasive (30.6 percent and 73.8 percent, respectively) than they were among clean and mint currency notes. Lower-denomination notes were more likely to be contaminated than were higher-denomination notes, although the difference was not statistically significant ( $p > .05$ ). Parasite contamination and bacteria contamination were both most frequent in notes obtained from butchers and beggars. These results suggest that currency notes may be contaminated, especially with bacteria and enteric parasites, and may serve as sources of infection. Personal hygiene to reduce risk of infection is recommended.

### **Occupational Hygiene in Two Combined-Drum-and-Tunnel Composting Plants Managing Source Separated Biowaste and Sludge**

Outi K. Tolvanen, Ph.D., and Kari I. Hänninen, Ph.D.

#### **Abstract**

Occupational hygiene was investigated in two Finnish combined-drum-and-tunnel composting plants, Plant A (composting sewage sludge) and Plant B (composting source-separated biowaste), in 1998–2000. The concentrations of viable mesophilic and thermophilic microbes (fungi, bacteria, and actinomycetes), the total number of microbes (viable + dead), endotoxin concentrations, and noise level were determined for each plant. In addition, dust concentrations were investigated in Plant B. In Plant A, working areas were aired before the measurements were taken. Differences in microbe concentrations between the plants were statistically significant. There were more problems with microbes in Plant B, where the working areas were not aired. Also, endotoxins were a problem in Plant B; the threshold value of 200 endotoxin units per cubic meter was exceeded in several measurements.

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**June 2007**

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### **Food Workers' Perspectives on Handwashing Behaviors and Barriers in the Restaurant Environment**

Aimee S. Pragle, M.S., Anna K. Harding, Ph.D., R.S., and James C. Mack, M.P.A., R.E.H.S.

#### **Abstract**

Food handler focus groups in two Oregon counties discussed knowledge, practices, and barriers related to handwashing in the restaurant environment. Current knowledge-based handwashing training programs do not address the internal and external

barriers that affect handwashing practice. According to the focus groups, important barriers were time pressure, inadequate facilities and supplies, lack of accountability, lack of involvement of managers and coworkers, and organizations that were not supportive of handwashing. Because barriers to handwashing are multi-dimensional in nature, the authors recommend that future educational and training programs include 1) a hands-on training program that orients new employees to correct handwashing practice and more advanced education about foodborne illness; 2) involvement of both managers and coworkers in the training; 3) easily accessible handwashing facilities stocked with necessary supplies; 4) continued handwashing training and support involving the food service industry, managers, and coworkers; and 5) involvement of health departments and inspectors in providing managers and food workers with advice and consultation on improvement of handwashing practice.

### **Investigation of a Cluster of Multiple Sclerosis in Two Elementary School Cohorts**

Judy P. Henry, Ph.D., Dhelia M. Williamson, Ph.D., Randolph Schiffer, M.D., Laurie Wagner, Jeffrey Shire, M.S., and Matthew Garabedian, M.D., M.P.H.

#### **Abstract**

The authors investigated a cluster of multiple sclerosis (MS) among people who had attended two elementary schools in El Paso, Texas, from 1948 through 1970. The community was concerned about the possibility of childhood exposure to heavy metals from a large nearby smelter because historical environmental and biological sampling data demonstrated the potential for study cohort members to have been exposed to heavy metals during their pre-adolescent years. One cohort had no reported cases of MS. In the second cohort, 22 members self-reported a diagnosis of MS, and 16 of these cases were confirmed as MS by an independent board-certified neurologist. The crude MS prevalence estimate was 411 per 100,000 (95 percent confidence interval [CI] = 197–603). Prevalence estimates from four different populations were used for calculation of standardized morbidity ratios (SMRs). At the extremes, the study cohort represents a deficit of cases (SMR= 0.9; 95 percent CI = 0.51–1.44) or a fourfold excess (SMR = 4.0; 95 percent CI = 2.29–6.5).

### **Prevalence of Multiple Sclerosis in 19 Texas Counties, 1998–2000**

Dhelia M. Williamson, Ph.D., Judy P. Henry, Ph.D., Randolph Schiffer, M.D., and Laurie Wagner

#### **Abstract**

The study reported here determined the prevalence of multiple sclerosis (MS) between January 1, 1998, and December 31, 2000, for a 19-county study area surrounding Lubbock, Texas. The primary data source for case ascertainment was medical records from the offices of neurologists practicing in the study area. The study found that the overall prevalence for the 19-county study area was 42.8 per 100,000 population (95 percent CI = 36.8–49.5). The prevalence estimate for females was 68.6 per 100,000 (95 percent: CI = 58.0–80.6), and for males it was 16.6 per 100,000 (95

percent CI = 11.6–23.1). The prevalence estimate for non-Hispanic whites was 56.0 per 100,000 (95 percent CI = 47.1–66.1); the next highest prevalence was among non-Hispanic blacks at 22.1 per 100,000 (95 percent CI = 8.1–48.1), and Hispanics at 11.2 per 100,000 (95 percent CI = 6.4–18.2). This project generated the first Texas-specific population-based MS prevalence estimates, including prevalence estimates specific to Hispanics and blacks in Texas. The results underscore the need for additional epidemiologic information on the distribution of MS in other areas of Texas and the United States, as well as information on the underlying etiology of the disease.

### **Bacterial Pathogens Recovered from Vegetables Irrigated by Wastewater in Morocco**

K. Ibenyassine, D.E.S.A., R. Ait Mhand, Ph.D., Y. Karamoko, Ph.D., B. Anajjar, Ph.D., M. Chouibani, and M.M. Ennaji, Ph.D.

#### **Abstract**

The authors obtained 50 vegetable samples from various regions in Morocco and examined them to determine the microbiological quality of these products. Aerobic count, coliform, enterococci, and *Staphylococcus aureus* were evaluated. This analysis revealed high levels of enterococci, fecal coliforms, and total coliforms. No coagulase-positive *Staphylococcus aureus* was detected in any of the samples analyzed. Biochemical identification of *Enterobacteriaceae* showed the presence of *Citrobacter freundii* (28 percent), *Enterobacter cloacae* (27 percent), *Escherichia coli* (16 percent), *Enterobacter sakazakii* (12 percent), *Klebsiella pneumoniae* (17 percent), *Serratia liquefaciens* (11 percent), and *Salmonella arizonae* (0.7 percent). The results clearly demonstrate that vegetables irrigated with untreated wastewater have a high level of microbiological contamination. Consequently, these vegetables may be a threat for the Moroccan consumer and may be considered a serious risk to Moroccan public health.

### **Enterovirus Circulation in Wastewater and Behavior of Some Serotypes During Sewage Treatment in Monastir, Tunisia**

Khaoula Belguith, Ph.D., C.I.H., Abdennaceur Hassen, Ph.D., R.E.H.S., Lamjed Bouslama, Sdiri Khira, and Mahjoub Aouni

#### **Abstract**

Enteroviruses were monitored in three wastewater plants that used activated-sludge, trickling-filter, and oxidation-ponds processes, respectively, from October 2000 to September 2001 in the region of Monastir, a tourist zone situated in the center of the Tunisian coast. Isolation and serotyping were conducted as recommended by the World Health Organization. Enteroviruses were present during the whole period of investigation. From February to June, however, enterovirus titers decreased (cytopathic effect < 45 percent); they increased during summer and autumn and at the beginning of winter.

Among the isolates in the 120 wastewater samples that were collected, eight were found to be poliovirus vaccine-related, 30 were echoviruses, and 8 were untypable. Echovirus Type 6 was the serotype most frequently isolated (in 49 percent of samples)

during all seasons. Some serotypes appeared occasionally (echovirus types 11, 25, and 13). Isolation of serotypes varied according to the step of wastewater treatment. Poliovirus 1 and Echovirus 6 were the most resistant serotypes.

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**July/August 2007**

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**Using 10-Essential-Services Training to Revive, Refocus, and Strengthen Your Environmental Health Programs**

Carl S. Osaki, R.S., M.S.P.H., Deborah Hinchey, M.P.H., and Joy Harris, M.P.H.

Abstract

The 10 essential services of environmental health, which are based on the 10 essential public health services, can guide environmental health practitioners in systematically organizing and managing environmental public health programs and activities. The National Center for Environmental Health of the Centers for Disease Control and Prevention has used the 10 essential services of environmental health as a basis for its six goals for the revitalization of environmental health in the 21st century. Nevertheless, studies indicate that very few environmental health practitioners are aware of the 10 essential services. This article discusses how essential-services training has increased the awareness and knowledge of environmental health practitioners about the development, value, and use of the essential services. Examples of training outcomes are offered to illustrate how the use of the essential-services framework has improved environmental health performance and practice.

**Building Capacity of Environmental Health Services at the Local and National Levels with the 10-Essential-Services Framework**

Lynn Schulman George, Mark Fulop, M.A., M.P.H., and Lila Wickham, R.N., M.S.

Abstract

The authors present a case study on the use of the 10-essential-services framework to build capacity in a local environmental health agency. The framework can be applied to conduct an environmental health assessment, make organizational change, and expand environmental health capacity at the local level in a way that has a national impact. Examples of environmental health capacity-building efforts include vector surveillance, community education and outreach, workforce development, and research. The case study highlights the lessons learned from use of the 10-essential-services framework to improve environmental health services in Multnomah County, Oregon.

## **The Boston Safe Shops Project—Preliminary Findings of a Case Study in Applying the 10 Essential Services of Public Health to Building Environmental Health Capacity**

Paul A. Shoemaker, M.P.H., Tiffany Skogstrom, John Shea, M.S., and Leon Bethune, M.P.H.

### **Abstract**

Boston's more than 500 automotive shops, located primarily in low-income communities of color, are a source both of well-paying jobs and of potential hazardous exposures to employees and residents. The Safe Shops Project works to reduce occupational and environmental health hazards without having to close these businesses. Combining inspections, in-shop trainings, outreach, and technical/financial assistance, it brings shops into compliance with laws and promotes use of safer practices and alternative products. After 18 months, 254 workers at 61 of 124 participating shops had received training. Surveys showed improved worker knowledge: Pre-training, 24.2 percent of the worker survey respondents stated that they knew what an MSDS was, and post-training 75 percent stated that they knew. The surveys also found improvement in work practices: Pre-training, 48 percent of workers indicated that they used safety goggles in their work, while post-training, 70 percent indicated proper use of safety goggles. The results also showed shops investing in capital improvements such as replacement of PCE-based brake cleaners with aqueous cleaners. The Safe Shops Project has a successfully modeled application of the 10-essential-services framework to the building of public health capacity and community collaboration, and this model can be adapted to other locations and industries.

## **The Use of the National Public Health Performance Standards to Evaluate Change in Capacity to Carry Out the 10 Essential Services**

G. Barron, M.P.H., J. Glad, M.P.H., and C. Vukotich, M.S.

### **Abstract**

Nationally, environmental public health programs have been struggling to find ways to measure their capacity to carry out the 10 essential public health services. The ability to make this kind of measurement is crucial to showing the benefits of local, state, and federal funding of environmental public health programs. It is also crucial to the continuation of this funding. One local health department in Pennsylvania, the Allegheny County Health Department, implemented use of the National Public Health Performance Standards as a mechanism for measuring current performance in carrying out the 10 essential services as well as to set a benchmark for improving capacity in areas of environmental health practice. By using these standards as a tool for assessing current performance, the health department was able to focus on strengthening areas in which little or no capacity was reported. This process made it possible to set priorities and allocate resources to improve the delivery of environmental health services. The tool was re-used two years later to measure the impact this capacity-building activity had on

improving the ability of the environmental health program to carry out the 10 essential services.

### **Enhancing the Maryland Environmental Public Health Workforce: A Collaborative Approach**

Beth Resnick, M.P.H., Joanna Zablotsky, M.P.H., Olivia Farrow, R.S., J.D., Rodney Glotfelty, R.S., M.P.H., Philip Heard, M.D., M.P.H., Susan Kelly, R.S., Clifford Mitchell, M.D., M.P.H., Frances Phillips, R.N., M.H.A., and Thomas Burke, M.P.H., Ph.D.

#### **Abstract**

The practice of environmental public health (EPH)—ensuring food, water, and sanitation protection—is the traditional cornerstone of public health. Demands on the EPH infrastructure have broadened, however, to involve issues such as chemical and physical hazards in the environment, the role of the built environment in health, and disaster preparedness. Maryland, with its varied geography and population densities, faces many of the EPH challenges that are present elsewhere throughout the nation. A strong and stable EPH workforce is an essential ingredient in addressing these challenges. Yet significant workforce obstacles exist, including recruitment shortfalls, inability to retain qualified staff, impending retirements, inadequate training opportunities, insufficient compensation, and the absence of a robust career advancement pathway.

Recognizing the importance of EPH protection for Maryland's future, state and local agencies and academic institutions are working collaboratively to address EPH challenges. Much progress has been made: Communication and interaction between state and local agencies have been strengthened; practitioners and academic institutions have collaborated to improve EPH training opportunities; and workforce development efforts have been made to address recruitment and retention challenges.

Although there have been significant accomplishments, much work remains. It is imperative that these efforts continue and that they be supported at all levels of government. Coordination and communication, as well as the training, recruitment, and retention of the workforce, are critical to a strong and responsive EPH infrastructure.

### **Using the PACE EH Model to Mobilize Communities to Address Local Environmental Health Issues—A Case Study in Island County, Washington**

Keith Higman, Celine Servatius, R.E.H.S., Whitney L. Webber, M.S., and Tim McDonald, R.S., M.P.H.

#### **Abstract**

The Island County Environmental Health Initiative (ICEHI) is a demonstration project in the use of the Protocol for Assessing Community Excellence in Environmental Health (PACE EH) to build capacity in the 10 essential services of environmental health. The PACE EH methodology systematically applies the 10 essential services of environmental health through the completion of 13 tasks derived from a community-based environmental health assessment process. The ICEHI has successfully engaged

community members, identified environmental health issues important to the community, and led to the implementation of action plans aimed at reducing environmental health risks through use of community resources. This paper describes the methodology utilized by the ICEHI to address locally important environmental health issues so that other local and state environmental health agencies may replicate the process in their communities.

### **The Great Lakes Center's Health Hazard Evaluation Program: Promoting Community Environmental Health Through Partnerships Between Academic and Public Health Departments**

Salvatore Cali, M.P.H., C.I.H., Peter Scheff, Ph.D., C.I.H., Amy Mucha, Ph.D., Leslie Nickels, M.Ed., Irene Oliynyk, M.P.H., and Daniel Hryhorczuk, M.D., M.P.H.

#### **Abstract**

The Great Lakes Center of Excellence in Environmental Health (GLCEEH), an innovative capacity-building component of the University of Illinois, performs health hazard evaluations in collaboration with the Illinois Department of Public Health and local health departments. GLCEEH has provided state and local health departments with faculty, industrial-hygiene expertise, and research expertise to help them investigate a variety of environmental health issues. This article describes health hazard evaluations performed with support from the National Center for Environmental Health, lessons learned, and recommendations for successful collaboration between academic and public health departments. From the academic perspective, health hazard evaluations are beneficial because they provide faculty and students with the opportunity to engage in public health practice and encounter new issues that advance the science of environmental health through research. From the perspective of a public health department, health hazard evaluations are beneficial because they address priority environmental health concerns and build the capacity of department personnel to conduct health hazard evaluations with internal resources. A collaborative health hazard evaluation program increases public health capacity by developing new approaches to environmental health problems and by sharing limited resources.

### **Association of Food Premises Inspection and Disclosure Program with Retail-Acquired Foodborne Illness and Operator Noncompliance in Toronto**

Tino Serapiglia, M.H.Sc., C.P.H.I.(C), Erin Kennedy, M.H.Sc., Sylvanus Thompson, M.Sc., C.P.H.I.(C), and Ron de Burger, C.P.H., C.P.H.I.(C)

#### **Abstract**

In 2001, the city of Toronto was the only health unit in Canada to have implemented a multi-component disclosure system as part of its provincially mandated food safety program. To measure the impact on the ultimate goal of preventing foodborne illness, the authors of the study reported here assessed directly the association of Toronto Public Health's program with the specific incidence of retail-acquired foodborne illness by analyzing secondary data on reportable local enteric disease. In addition, the study indirectly measured prevention of retail-acquired foodborne illness by assessing existing

data on regulatory compliance in Toronto food premises as an inherent performance indicator. Results of the statistical analysis show that although there has not been a significant difference in the overall incidence rate of retail foodborne illness (Chi-squared = 0.009,  $p = .93$ ), certain key diseases, such as *Campylobacter* infection, have decreased significantly since the implementation of the disclosure program in Toronto. There has also been a significant trend in the reduction of operator noncompliance rates ( $Z = 32$ ,  $p < .0001$ ). Further analysis shows that the decrease in operator non-compliance is positively correlated with a decrease in retail foodborne illness ( $r = .73$ ,  $p < .0001$ ). These results suggest that the Food Premises Inspection and Disclosure Program is an effective intervention for reducing retail-acquired foodborne illness and decreasing operator noncompliance in the city of Toronto. Programs of this type may assist other local health units to achieve similar results.

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**September 2007**

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### **Food Safety Perceptions and Behaviors of Participants in Congregate-Meal and Home-Delivered-Meal Programs**

Mary G. Roseman, Ph.D., R.D., L.D.

#### Abstract

The study reported here examined the food safety perceptions, food safety behaviors, and emergency food preparedness of elderly people participating in congregate-meal and home-delivered-meal (HDM) programs as influenced by demographic and socioeconomic variables. Interviewers surveyed elderly people participating in a congregate-meal and HDM program in nine counties in central Kentucky in April 2004 and May 2005. Participants' perceptions of food safety issues showed statistically significant differences by meal site location, age, marital status, and household composition. Participants' self-reported food safety behaviors showed statistically significant differences by marital status, meal site location, age, gender, household composition, race/ethnicity, and level of education. In addition, significant differences were found in seniors' self-reported emergency food preparedness by race and level of education. The study found that some elderly people participating in the Elderly Nutrition Program (ENP) have disconcerting food safety perceptions, engage in risky food-handling behaviors, and lack emergency food and water preparation. Since many elderly people participating in the ENP program are vulnerable, these findings indicate that support and assistance by providers is warranted to protect elderly people from unsafe situations.

## **Learning from Katrina: Environmental Health Observations from the SWCPHP Response Team in Houston**

Brenda L. Elledge, Dr.P.H., R.T., Daniel T. Boatright, Ph. D., Paul Woodson, Ph.D., Rodney E. Clinkenbeard, Ph.D., and Michael W. Brand, Ph.D.

### **Abstract**

Hurricane Katrina provided an opportunity to observe the public health and medical care response system in practice and provided vital lessons about identifying and learning critical response measures as well as about ineffective investments of time and effort. The Southwest Center for Public Health Preparedness (SWCPHP) response team, while working among evacuees housed at Reliant Park in Houston, Texas, made a number of observations related to environmental public health. This summary reports firsthand observations which are, to a great extent, supported by the *Federal Response to Hurricane Katrina: Lessons Learned* report, and it provides a contextual backdrop for improvement in the areas of volunteer and citizen preparedness training and education. Katrina provided an opportunity to see public health in a highly stressed practice setting and to identify and reinforce the fundamental tenets of public health with which all individuals responding to an event should be familiar. Knowledge gained from Katrina should be integrated into future efforts related to disaster response planning; specifically, it is imperative that volunteers receive standardized training in the areas of incident command systems (ICS), basic hygiene, transmission of disease, and food and water safety principles.

## **Acute Pesticide Poisoning Among Cut-Flower Farmers**

Jinky Leilanie Lu, Ph.D.

### **Abstract**

The study reported here looked at adverse health effects associated with pesticide exposure among cut-flower farmers in La Trinidad, Benguet. Survey questionnaires and detailed physical and laboratory examinations were administered to 114 and 102 respondents, respectively, to determine pesticide exposure, work and safety practices, individual and family illnesses, and cholinesterase levels. Results showed that pesticide application was the activity most frequently associated with pesticide exposure, and entry was mostly ocular and dermal. Involvement of the skin was noted, with 21 percent of farmers having integumentary abnormalities. Upon physical examination, 90 respondents, or 88.2 percent of those examined, were found to have abnormal peak expiratory flow rate (PEFR). Abnormal temperature was found in 81.3 percent, and the next most frequent finding was abnormal general-survey results, at 75.5 percent. In 51 percent, cholinesterase levels were below the mean value of 0.7  $\Delta$  pH/hour. (The unit of measure  $\Delta$  pH/hour refers to the change in cholinesterase activity as measured by the difference between the initial pH and the final pH when acetylcholine solution has been added to the red blood cell for 1½ hours. A decrease in cholinesterase activity will produce a low  $\Delta$  pH/hour level.) In 25.5 percent, a more than 10 percent depression in the level of RBC cholinesterase was found. Certain hematological parameters were also

abnormal, namely hemoglobin, hematocrit, and eosinophil count. Using Pearson's  $r$ , the author found that factors strongly associated with illness due to pesticides include use of a contaminated piece of fabric to wipe off sweat ( $p = .01$ ) and reuse of pesticide containers to store water ( $p = .01$ ). Recycling of containers poses great health hazards and risks of contamination, and the current recommendation is that used containers should be buried. There was a moderate relationship between illness and average number of years of pesticide use ( $p = .05$ ), and between illness and re-entering a recently sprayed area ( $p = .05$ ). Those with motor scale scores of  $\leq 15$ —normal values—were less likely to be sick. The greatest adverse effect in those exposed was an abnormal cholinesterase level, a finding that confirms results from earlier studies on the effect of pesticides on the body.

### **Iron and Copper Release in Drinking-Water Distribution Systems**

Baoyou Shi, Ph.D., and James S. Taylor, Ph.D., P.E.

#### **Abstract**

A large-scale pilot study was carried out to evaluate the impacts of changes in water source and treatment process on iron and copper release in water distribution systems. Finished surface waters, groundwaters, and desalinated waters were produced with seven different treatment systems and supplied to 18 pipe distribution systems (PDSs). The major water treatment processes included lime softening, ferric sulfate coagulation, reverse osmosis, nanofiltration, and integrated membrane systems. PDSs were constructed from PVC, lined cast iron, unlined cast iron, and galvanized pipes. Copper pipe loops were set up for corrosion monitoring. Results showed that surface water after ferric sulfate coagulation had low alkalinity and high sulfates, and consequently caused the highest iron release. Finished groundwater treated by conventional method produced the lowest iron release but the highest copper release. The iron release of desalinated water was relatively high because of the water's high chloride level and low alkalinity. Both iron and copper release behaviors were influenced by temperature.

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**October 2007**

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### **Newly Recognized Pathways of Exposure to Lead in the Middle-Income Home**

Laurel Sharmer, Ph.D., M.P.H., C.H.E.S., Kathlynn Northrup-Snyder, Ph.D., R.N., C.N.S., and WenYen Juan, Ph.D.

#### **Abstract**

Most official childhood lead-poisoning prevention efforts focus on children living in poor neighborhoods in older houses. But a current trend in home decorating that promotes the use of expensive antiques or used artifacts with chipped, chalky, or peeling paint may be exposing a different population of children to lead. The objectives of the

research reported here were 1) to assess the extent to which antiques with damaged paint are promoted in the popular home-decorating print media and over the Internet and 2) to gauge whether a casual shopper is apt to purchase lead-hazardous antiques in the United States. The study found that antiques that tested positive for lead on a qualitative test were easily purchased from antique stores throughout the United States. Many of the items were toys or other items that would be attractive to children.

### **Pennsylvania's Asthma School Project and Descriptive Pilot Investigation: A Focus on Environmental Health Tracking**

James N. Logue, Dr.P.H., M.P.H., Mark V. White, M.D., M.P.H., and David J. Marchetto, C.P.H., M.S.

#### **Abstract**

The authors reviewed asthma prevalence rates from all 501 Pennsylvania public school districts for 1997–1998 through 2002–2003. School nurses collect and report these data to the Pennsylvania Department of Health annually, and the data are aggregated by school district, county, and specified school year. The department initiated a descriptive pilot investigation in 2004 as part of the larger Asthma School Project, targeting all students with asthma in the two districts that had the highest and second highest asthma rates in Pennsylvania. The authors conclude that reporting of asthma by school nurses was a reliable data source, since most participating students had documentation of asthma diagnosis or asthma medication. The department also conducted environmental evaluations at the schools and investigated the occurrences of asthma exacerbations in participating students, but no unusual patterns or links to the schools were identified. The authors encourage other state health departments to consider designing and testing similar approaches to tracking asthma in students.

### **The Outdoor Air Quality Flag Program in Central California: A School-Based Educational Intervention to Potentially Help Reduce Children's Exposure to Environmental Asthma Triggers**

Derek G. Shendell, D.Env., M.P.H., Mary-Michal Rawling, Christine Foster, R.R.T., Alicia Bohlke, Bobbie Edwards, Susie A. Rico, Justina Felix, Sandra Eaton, Stephanie Moen, R.R.T., R.C.P., Eric M. Roberts, M.D., Ph.D., and Mary Beth Love, Ph.D., M.S.

#### **Abstract**

This paper describes a novel school-based, visual environmental public health educational intervention intended to help reduce the exposure of children—and adults—to outdoor air pollution, including known environmental asthma triggers like ozone and particles. The overarching goal was to enhance the learning, recreational, and work environments of students and staff. The specific purpose of the Asthma-Friendly Outdoor (Ambient) Air Quality Flag Program was to establish an education and communication tool for Central California communities that would accomplish two things: 1) Establish permanent local policy change to existing operating procedures in school districts and schools to help reduce the exposure of students, teachers, staff, and nearby communities

to outdoor environmental asthma triggers and 2) provide education on air quality and potential health effects of exposure to air pollutants. Data on the program from its initial years are presented. To date, the following important lessons have been learned: 1) Science-based, simple, visual, low-cost school-based educational interventions to help reduce human exposure to outdoor environmental asthma triggers (i.e., ozone, particles, and pollens) can work in socioeconomically and ethnically diverse urban and rural or agricultural communities, and 2) local health and environmental justice groups such as asthma coalitions can successfully lead school-based environmental interventions to help improve children's quality of life.

### **Climate Change and Disability-Adjusted Life Years**

Ying Zhang, M.B.B.S., M.Med.Sci., Peng Bi, M.B.B.S., Ph.D., and Janet E. Hiller, Ph.D.

#### **Abstract**

The authors conducted a systematic review of the studies of disability-adjusted life years (DALYs) lost because of climate change. The review considered both methodological issues and research results. It found that little is known about DALYs lost because of climate change, except for results based on limited information presented in the World Health Organization (WHO) global-burden-of-disease study in 2002. The measurement of DALYs attributable to climate change presents additional difficulties over measurement of DALYs attributable to other causes. Further studies linking DALYs and climate change should be conducted in various populations and in different ecological regions, including developing countries.

### **Possible Meteorological Influence on the Severe Acute Respiratory Syndrome (SARS) Community Outbreak at Amoy Gardens, Hong Kong**

Cleo Yip, M.Phil., Wen L. Chang, Ph.D., K. H. Yeung, and Ignatius T. S. Yu, M.P.H.

#### **Abstract**

The largest community outbreak of Severe Acute Respiratory Syndrome (SARS) occurred in the Amoy Gardens residential estate in Hong Kong, in March and April of 2003. It affected more than 300 residents, or 1.7 percent of the total Amoy Gardens population.

An airborne pathway has been hypothesized as a possible mode for the spread of the disease. If that hypothesis is correct, meteorological factors may have played a contributory role; the virus-laden aerosols may have been transported between apartment blocks by the ambient wind, low mixing heights may have prevented the efficient dispersion of the aerosols, and a fall in temperature may have fostered the survival of the virus or increased the susceptibility of the exposed population. This information, used in combination with weather forecasts available several days ahead from meteorological services, should be useful for mitigation considerations in the unlikely event of a similar occurrence.

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**November 2007**

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### **Inorganic: The Other Mercury**

John F. Risher, M.S., Ph.D., and Christopher T. De Rosa, M.S., Ph.D.

#### **Abstract**

There is a broad array of mercury species to which humans may be exposed. While exposure to methylmercury through fish consumption is widely known about, the public is less aware of the sources and potential toxicity of inorganic forms of mercury. Some oral and laboratory thermometers, barometers, small batteries, thermostats, gas pressure regulators, light switches, dental amalgam fillings, cosmetic products, medications, cultural/religious practices, and gold mining all represent potential sources of exposure to inorganic forms of mercury. The route of exposure, the extent of absorption, the pharmacokinetics, and the effects all vary with the specific form of mercury and the magnitude and duration of exposure. If exposure is suspected, a number of tissue analyses can be conducted to confirm exposure or to determine whether an exposure might reasonably be expected to be biologically significant. By contrast with determination of exposure to methylmercury, for which hair and blood are credible indicators, urine is the preferred biological medium for the determination of exposure to inorganic mercury, including elemental mercury, with blood normally being of value only if exposure is ongoing. Although treatments are available to help rid the body of mercury in cases of extreme exposure, prevention of exposure will make such treatments unnecessary. Knowing the sources of mercury and avoiding unnecessary exposure are the prudent ways of preventing mercury intoxication. When exposure occurs, it should be kept in mind that not all unwanted exposures will result in adverse health consequences. In all cases, elimination of the source of exposure should be the first priority of public health officials.

### **Acute Hazardous Substance Releases Resulting in Adverse Health Consequences in Children: Hazardous Substances Emergency Events Surveillance System, 1996–2003**

Wendy A. Wattigney, M.Stat., Wendy E. Kaye, Ph.D., and Maureen F. Orr, M.S.

#### **Abstract**

Because of their small size and ongoing organ development, children may be more susceptible than adults to the harmful effects of toxic chemicals. The objective of the study reported here was to identify frequent locations, released substances, and factors contributing to short-term chemical exposures associated with adverse health consequences experienced by children. The study examined the Hazardous Substances Emergency Events Surveillance (HSEES) system data from 1996–2003. Eligible events involved the acute release of a hazardous substance associated with at least one child

being injured. The study found that injured children were predominantly at school, home, or a recreational center when events took place. School-related events were associated with the accidental release of acids and the release of pepper spray by pranksters. Carbon monoxide poisonings occurring in the home, retail stores, entertainment facilities, and hotels were responsible for about 10 percent of events involving child victims. Chlorine was one of the top chemicals harmful to children, particularly at public swimming pools. Although human error contributed to the majority of releases involving child victims, equipment failure was responsible for most chlorine and ammonia releases. The authors conclude that chemical releases resulting in injury to children occur mostly in schools, homes, and recreational areas. Surveillance of acute hazardous chemical releases helped identify contributing causes and can guide the development of prevention outreach activities. Chemical accidents cannot be entirely prevented, but efforts can be taken to provide safer environments in which children can live, learn, and play. Wide dissemination of safety recommendations and education programs is required to protect children from needless environmental dangers.

### **A Baseline Assessment of U.S. Naval Food Facilities Using the *Food Code's* New Risk-Based Inspection Program**

LT Derek Boyd, M.S.C., U.S.N., M.P.H.

#### **Abstract**

The Food and Drug Administration (FDA) has developed a new method for assessing food safety in retail establishments using a risk factor-based approach for prevention of foodborne illness. The study reported here surveyed facilities in the Navy's San Diego jurisdiction (11 fast-food and 22 full-service facilities) to establish a baseline rate of compliance with FDA risk factor categories. The Navy facility baseline-data compliance rate was compared with FDA baseline data from 1998. Fast-food facilities were less in compliance than they were in the FDA baseline data (59 percent versus 74 percent were in compliance), while full-service establishments were more in compliance than they were in the FDA baseline (73 percent versus 60 percent). The fact that compliance was greater among Navy facility full-service establishments than in the FDA national baseline may be partly due to staffing by military active-duty employees who receive incentives that may encourage compliance. The establishment of this Navy baseline allows comparison with the FDA baseline. Interventions can now be quantified.

### **The Personal and General Hygiene Practices of Food Handlers in the Delicatessen Sections of Retail Outlets in South Africa**

Izanne van Tonder, D.Tech., Jan F.R. Lues, Ph.D., and Maria M. Theron, Ph.D.

#### **Abstract**

This paper presents data on personal- and general-hygiene knowledge and practices among food handlers in the delicatessens of a major retail group in the Western Cape in South Africa. Food handlers were interviewed by means of a structured

questionnaire. Although the majority of food handlers adhered to basic hygiene principles, there is definitely a need for proper and continuous training in personal and general hygiene, not only for food handlers, but also for management. The study reported here is of importance particularly in view of new local regulations governing the application of the hazard analysis and critical control point (HACCP) system. Management is responsible for the implementation of this system, and where supervision is not adequate, the manager of the outlet should intervene to ensure that staff conform to the requirements.

## **Environmental Data Assessment for Use in Public Health Surveillance**

Amanda Sue Niskar, Dr.P.H., M.P.H., B.S.N.

### **Abstract**

Public health surveillance is the ongoing systematic collection, analysis, interpretation, and dissemination of data on health-related events for use in public health action to reduce morbidity and mortality and to improve health. Total trihalomethanes are an example of a chemical in drinking water that is regulated by the U.S. Environmental Protection Agency (U.S. EPA) but is not under public health surveillance. The U.S. EPA database that stores this environmental information is called the Safe Drinking Water Information System (SDWIS). Its purpose is to collect data on noncompliance events in drinking-water utilities in each state. For this discussion, the SDWIS data on TTHMs, which are an example of environmental data, were assessed for public health surveillance system attributes as defined by the Centers for Disease Control and Prevention: simplicity, flexibility, data quality, acceptability, sensitivity, predictive value positive, representativeness, timeliness, and stability.

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**December 2007**

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## **Tracking Health and the Environment: A Pilot Test of Environmental Public Health Indicators**

Erin Dreyling, Ph.D.  
Elizabeth J. Dederick, M.A., M.H.S.  
Ramya Chari, M.P.H.  
Beth Resnick, M.P.H.  
Kristen Chosseck Malecki, M.P.H., Ph.D.  
Thomas Burke, M.P.H., Ph.D.  
Roni Neff, Sc.M., Ph.D.

### **Abstract**

Examining the relationship between health outcomes and environmental exposures requires summary measures, or indicators. To advance the use of indicators,

the Johns Hopkins Center for Excellence in Environmental Public Health Tracking piloted three pairs of indicators: 1) air toxics and leukemia in New Jersey, 2) mercury emissions and fish advisories in the United States, and 3) urban sprawl and obesity in New Jersey. These analyses illustrate the feasibility of creating environmental hazard and health outcome indicators, examining temporal and geographic trends in the indicators, and identifying temporal and geographic relationships. They also show the importance of including appropriate caveats with the findings. The authors' investigations demonstrate how existing environmental health data can be used to create meaningful indicator measures to further understanding of environment-related diseases and to help prioritize and guide interventions. Indicators are the foundation of environmental public health tracking, and increased use and development of them are necessary for the establishment of a nationwide tracking network capable of linking environmental exposures and health outcomes.

### **Microbial Flora on Restaurant Beverage Lemon Slices**

Anne LaGrange Loving, M.S., M(ASCP)

John Perz, M.S., MT(ASCP)

#### **Abstract**

Restaurateurs often place a lemon slice on the rim of a beverage glass, or afloat in the beverage, as a flavor-enhancer or a decorative garnish. The handling of the lemons before their placement in the beverage may not follow sanitary procedures. The study reported here investigated whether beverage lemon slices contain microbial contamination that could be consumed by a restaurant patron.

Swabbed samples of the flesh and rind of lemon slices on the rims of beverage glasses were analyzed for microbial contents. Seventy-six lemons from 21 restaurants were sampled during 43 visits. Fifty-three (69.7 percent) of the lemon slices produced microbial growth. Twenty-three (30.3 percent) of the lemon slices produced no microbial growth. A total of 25 different microbial species were recovered from the samples.

### **Municipal Solid Waste Management on the South Coastline of the Caspian Sea (Golestan, Mazandaran, and Guilan Provinces of Iran)**

Mohammad Ali Abduli, Ph.D.

Gholamreza Nabi Bidhendi, Ph.D.

Touraj Nasrabadi, M.Sc.

Hassan Hoveidi, M.Sc.

#### **Abstract**

The Caspian region (including the Golestan, Mazandaran, and Guilan provinces of Iran) occupies 58,678 square kilometers (22,651 square miles) and has a population of 6,270,192, according to the census of 1996. This part of Iran is attractive to tourists because of its proximity to the Caspian Sea. In addition, the region boasts invaluable

forests and grasslands, and is the exclusive producer in the country of key agricultural crops like rice and tea.

The lack of systematic solid waste management has put this region on the edge of irreparable environmental damage. The large number and dispersion of open-dumping landfills, as well as the faded role of functional elements like waste minimization and processing, have sped up the environmental deterioration.

This article evaluates the current status of solid waste management in the Caspian region and suggests practical alternatives. As a result of a field and desk study, the authors offer some instructions for separation of putrescibles, paper and cardboard, plastics, and so forth.

Finally, after considering all aspects of the environmental impact assessments for different alternatives, the authors recommend the construction of two compost-producing facilities in Golestan province with a combined capacity of 500 metric tons per day and a total cost of \$60,000, and four incineration sites in southern and southwestern parts of the region (Mazandaran and Guilan provinces) with a total capacity of 2,000 metric tons per day and total cost of \$75 million.