Residential Proximity to Toxic Release Sites and the Implications for Low Birth Weight and Premature Delivery

Troylyn Braud, MS
Simonne Nouer, MD, PhD
Kimberly Lamar, MPH, PhD

Abstract
The objective of the study discussed in this article was to evaluate the impact of residential proximity to toxic release sites (TRS) and potential implications for low birth weight (LBW) and premature delivery in Shelby County, Tennessee, women. The sample (N = 369) included pregnant women who participated in the Blues Project (2007–2009). ArcGIS was used to map the mother’s residence at delivery and distance from each of the 10 TRS. Multivariate logistic regression was used to predict LBW and prematurity based on proximity to TRS, while adjusting for probable confounders and effect modifiers. Proximity to Site 8 (odds ratio [OR] = 4.018, confidence interval [CI] = 1.103–14.643) and Site 10 (OR = 2.667, CI = 1.036–6.862) put mothers at increased risk for preterm births. The authors’ findings suggest that residential proximity to Site 8 or Site 10 may be a risk factor for premature delivery in Shelby County women.

Public Officials’ Perspectives on Tracking and Investigating Symptoms Reported Near Sewage Sludge Land Application Sites

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Steve Wing, PhD
Carolyn Crump, PhD
Pia D.M. MacDonald, MPH, PhD
Chris Heaney, PhD
Michael D. Aitken, PhD
Abstract

A majority of treated sewage sludge (biosolids) from U.S. wastewater treatment plants is applied to farmland as a soil amendment. Residents living close to treated farmland have reported becoming ill following land application of sludge. No systematic tracking or investigation of these reports or of land application practices that could affect off-site migration of chemical and biological constituents of the sludge has occurred, however. In the study described in this article, the authors conducted a web-based survey and phone interviews with officials at federal, state, and local regulatory and health agencies and municipal wastewater treatment plants for input on how to design and implement an investigation protocol for tracking and responding to reports of human illness near land application sites. Officials expressed a need for and interest in implementing a systematic, standardized investigation protocol and offered insights on aids and barriers to its use and collaboration among diverse agencies. Additional opinions and innovative solutions expressed in this article will assist interested users in the implementation of the investigation protocol.

Developing New Hazard Category Language for the Agency for Toxic Substances and Disease Registry’s Public Health Assessment Products

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Jerald Fagliano, MPH, PhD
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Donald Miles, MS
Elizabeth Prohonic
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Susan Robinson, MS
Monique Mitchell Turner, PhD
Judy Berkowitz, PhD

Abstract

The Agency for Toxic Substances and Disease Registry (ATSDR) determines public health implications associated with hazardous waste sites and other environmental releases. Since its inception, ATSDR has continued to improve its approach to evaluating public health hazards in light of evolving science. For example, in response to concerns about the clarity, meaning, and understandability of the five conclusion categories outlined in its Public Health Assessment Guidance Manual (www.atsdr.cdc.gov/HAC/PHAmmanual/index.html), ATSDR established an ad hoc work group to evaluate and recommend changes to the categories based on health and risk communication science.

Compendium: A Study on Bicycle-Related Injuries and Their Costs in Shanghai, China
Li Yan-Hong, MSc, MD
Yousif Rahim, MSc, PhD
Zhou De-Ding, MSc

Abstract

China is known as the Bicycle Kingdom, but the nature, extent, and costs of bicycle-related injuries remain largely unknown. The authors’ findings showed that the bicycle-related mortality rate increased 99% from 1992 to 2004, and it increased with age, from 0.64 per 100,000 population in the 0–14 age group to 5.93 per 100,000 population in the 65 and older age group. Labor force groups represented the majority of fatalities (70.8%) and nonfatal injuries (81.5%). The male mortality rate was 2.4 times higher than the female mortality rate. Head injuries accounted for 71.9% of fatalities and 33.1% of the hospitalizations. People with lower levels of educational had higher injury rates. The poorer districts located in the countryside had the highest mortality rates compared to those located in the central, wealthier regions. The total annual cost of bicycle-related injuries was 1.1 billion CHY (Chinese Yuan) (over $137 million U.S.). To reduce bicycle-related injuries, mandatory helmet legislations, environmental modifications, and representative monitoring systems in China are required.

Compendium: Residential Carbon Monoxide Alarm Use: Opportunities for Poisoning Prevention

Neil B. Hampson, MD
Lindell K. Weaver, MD

Abstract

Prevalence of carbon monoxide (CO) alarm usage in localities where they are not required is poorly defined and the reasons for failing to have a home CO alarm have never been described. In this study, the authors conducted a computer-based survey among employees of similar major medical centers in Seattle, Washington, and Salt Lake City, Utah. Questions were asked about the prevalence of use of residential smoke and CO alarms with regard to home style and structure, ownership status, and energy use. Respondents not using home CO detectors were asked the reasons. Among 1,351 individuals participating in the survey, 98% reported residential use of smoke alarms, while only 51% used CO alarms. CO alarm use was more common among residents of Utah than Washington, among home owners than renters, and among those with single family homes rather than other styles. Reasons for failure to use CO alarms related largely to lack of knowledge about the devices and motivation.

Compendium: Dioxin Furan Blood Lipid and Attic Dust Concentrations in Populations Living Near Four Wood Treatment Facilities in the United States

L. Feng
C. Wu
L. Tam
A.J. Sutherland
J.J. Clark
P.E. Rosenfeld

Abstract
To evaluate historical exposure from wood treatment facilities, attic dust samples were collected from residential structures and blood samples were collected from current and past residents of four communities surrounding wood treatment facilities throughout the United States. The pattern of dioxin/furan congeners detected in both attic dust and blood samples was found to be consistent with exposure to contaminants generated during the wood treatment process. Levels in the U.S. population of 2,3,7,8-tetrachloro-p-dibenzodioxin toxic equivalents (2,3,7,8-TCDD TEQs) for all 17 carcinogenic dioxin/furan congeners as well as octa-chlorinated dibenzo-p-dioxin (OCDD) adjusted to its TEQ value and 1,2,3,4,6,7,8-hepta-chlorinated dibenzo-p-dioxin (1,2,3,4,6,7,8-HpCDD) adjusted to its TEQ value were compared to the TEQ levels in the combined data set for all four communities and in the data sets for each individual community. TEQ concentrations in these communities were found to be significantly greater than in the general U.S. population. The levels of dioxins in attic dust were compared to the U.S. Environmental Protection Agency’s regional screening levels and found to far exceed the levels that are regarded as safe for the general population. These findings reveal that a very significant potential for contaminant-related health risks exists in communities surrounding wood treatment facilities.

Compendium: Sulfide Tails Management Within the Framework of Sustainable Development in Mineral Sand Mines—The Case Study of Sierra Rutile Ltd.

Senesie B. Kallon, MSc
Ansu M. Jabati, MSc
Alusine Samura, MSc

Abstract
The study discussed here assessed Sierra Rutile Ltd.’s (SRL’s) water-cover sulfide tails management method. Monthly and quarterly water samples from SRL’s Sulfide Tails Pond (STP), Total Tails Pond (TTP), and the Titan Domestic Pond (TDP) were analyzed for 15 months. Results indicated acceptable quality for the STP. From Student’s t-test analysis, it was found that the mean pH of the TTP was significantly lower than that of the TDP (p < .05). Results did not indicate pollution of the TDP by SRL’s tailings management. The water-cover method significantly suppressed sulfide oxidation in the STP. Concerns to be addressed, however, include potential overtopping of the pond, water level fluctuations, and the need for periodic reinforcement of the tailings embankments. A dedicated environmental monitoring campaign that includes other proximate water bodies is suggested; this should inform timely mitigation of any environmental contamination and promote sound environmental and public health outcomes.

Compendium: Air Pollution and Vulnerability: Solving the Puzzle of Prioritization
Caradee Y. Wright, PhD  
Roseanne Diab, PhD

Abstract

While ambient air pollution levels in excess of prescribed health standards are generally unacceptable, the exceedance is even more serious in areas where people reside. Vulnerability caused by poverty, disease, lack of education, and poor living conditions exacerbates the problem. Air quality management plans identify prioritized strategies for improved air quality independent of consideration of vulnerability. A population exposure and vulnerability risk prioritization framework comprising five themes (air pollution sources and levels; air pollution potential; community awareness, observations, perceptions, and actions; and vulnerability factors) was proposed and applied to the eThekwini Municipality (Durban, South Africa). Data were scored according to predetermined risk threshold values to ascertain at-risk communities. While those urban wards located in a known air pollution hotspot had the highest air pollution levels, a periurban ward with moderate exposure levels was most vulnerable. This framework will prove invaluable for the development of focused interventions to reduce vulnerability and air pollution–associated adverse health impacts.

Compendium: Evaluation of a Local Health Department’s Food Handler Training Program

Ellen Averett, MHSA, PhD  
Niaman Nazir, MPH, MBBS  
John S. Neuberger, MPH, MBA, DrPH

Abstract

The impact of a food handler training (FHT) program was measured by comparing rates of total and critical violations from routine inspections of food service establishments before (2001–2004) and after (2005–2007) the implementation of an FHT program. A quasiexperimental design compared rates of inspection violations related and unrelated to the responsibilities of food handlers. A subset analysis focused on establishments in business for the entire time period. Violation rates decreased for total and critical food handler–related violations and in practically all individual categories of food handler–related violations. The rate of control violations, however, decreased even more (e.g., critical violations decreased by 4.9% in the food handler group and 24.7% in the control group). Results were similar in the subset analyses. Compared to the control group, no measurable benefit was seen from the FHT program. Improved training through the use of multiple teaching methods and process and qualitative evaluations are recommended.

Compendium: Food Safety Education: Child-to-Parent Instruction in an Immigrant Population

Dhitinut Ratnapradipa, PhD, CHES
Daniela Quilliam, MPH, REHS
Lauren Wier, MPH, PhD (c)
Darson L. Rhodes, PhD, CHES

Abstract
A quasi-experimental pretest-posttest design was used to examine increases in food handling knowledge among eastern European refugee restaurant candidates as a result of educational material taught either by the employee’s child or the Salt Lake Valley Health Department. Participants were nonrandomly assigned to a study \( (n=15) \) or control group \( (n=17) \). The study group was taught by their children in their native language. The control group was taught by an SLVHD instructor in English. All participants completed pre- and posttests that measured four areas of food handling knowledge: personal hygiene and hand washing (PHHW), cooking and holding time/temperature (COOKTT), cooling and holding time/temperature (COOLTT), and cross-contamination (CC). Both groups demonstrated a significant increase in knowledge of PHHW, but only the study group demonstrated significant improvements in COOKTT and CC knowledge. These study results suggest that food handling education programs are effective in increasing knowledge and mode of delivery may be an important factor.

**Compendium: Guided-Inquiry Learning in Environmental Health**

Guang Jin
Thomas J. Bierma

Abstract
The field of environmental health requires the knowledge of many facts and terms, and it also requires mastery of an array of concepts that can be difficult for many students to thoroughly comprehend. Guided-inquiry learning is a process by which students “discover” basic concepts through active investigation. In this article, the authors describe several guided-inquiry learning modules used in their undergraduate environmental health program and their experience in using them. Some modules are used in professional courses while others are used in a general education course. Overall, the authors experienced increased student engagement and interest with guided-inquiry learning. Students are able to comprehend some abstract concepts more quickly and seem to retain the concepts longer.

**Compendium: A Survey of Environmental Safety Issues at 20 Medical Clinics**

Susanne M. Savely, MS, DrPH, RBP, CHMM
Winifred J. Hamilton, PhD, SM
Farah Degani, MPH
Armin D. Weinberg, PhD
Paul Muraca, MS
Abstract
In the study described in this article, the authors performed safety walk-throughs or inspections for 20 clinics located both inside a major medical center clinic (onsite) and away from the main clinic site (offsite). A checklist was used to evaluate compliance with institutional, local, state, and federal guidelines and regulations. The results obtained at onsite clinics were compared with the results from offsite clinics. Findings suggested no overall difference in the number of yes (desirable) answers. A marginally significant difference, however, was observed between the onsite and offsite clinics with regard to knowledge of infection control and waste/infection control questions. The walk-throughs helped create an improved working relationship between clinic personnel and environmental safety personnel, allowed for correction of safety issues, enabled an informal training opportunity, and increased institutional compliance with guidelines and regulations.

March 2011

Assessing Bacteriological Contamination in Public Swimming Facilities Within a Colorado Metropolitan Community

Michael Anthony Cappello, MPH, REHS

Abstract
An increase in waterborne disease outbreaks and illnesses related to public swimming facilities in the past few decades prompted a Colorado metropolitan public health and environment division to assess bacteriological contamination of local public swimming facilities and determine if routine bacteriological sampling may be warranted. In the study discussed in this article, 27 chlorinated public swimming facilities were sampled twice within two consecutive weeks for total coliform, fecal coliform, and heterotrophic plate count (HPC) bacteria. Data from this study suggest that 11% of the public swimming facilities were in excess of public health standards for total coliform bacteria and that 18.5% of the public swimming facilities were in excess of public health standards for HPC bacteria. According to the research data and the reviewed literature, the results indicate that the contamination observed in excess of public health standards was most likely the result of inadequate water treatment operations and activities.

Community Built Environment Factors and Mobility Around Senior Wellness Centers: The Concept of “Safe Senior Zones”

Derek G. Shendell, MPH, DEnv
Matthew L. Johnson, MPH
Danna L. Sanders, MPH
Alexandra C.H. Nowakowski, MPH
Jianhua Yang, MS, PhD
Carla D. Jeffries, MPH
Janet E. Weisman
Megan Moulding

Abstract
The authors investigated built environment (BE) factors in urban neighborhoods in DeKalb County, Georgia. Each volunteering, consenting senior was placed into one of two groups: walking tours outside, then discussions (n = 37); and focus group discussions indoors about photographs of BE conditions potentially influencing mobility (n = 43). The authors sought to identify BE factors—both real and perceived by participating seniors—related to their ability to walk around senior wellness centers in a healthy and safe manner. The authors focused specifically on available literature and pilot study data for their concept of “safe senior zones” around senior wellness centers serving urban communities in this article. They also characterized their study population regarding sociodemographic variables and doctor-diagnosed chronic diseases, and types of walking aids reported used to help prevent falls. Their results can inform future applied practice and research on traffic-related exposures and BE factors concerning seniors, and support policy and planning to benefit community environmental public health.

Occurrence of Heterotrophic and Coliform Bacteria in Liquid Hand Soaps From Bulk Refillable Dispensers in Public Facilities

Marisa Chattman, MS
Sheri L. Maxwell
Charles P. Gerba, PhD

Abstract
The goal of the study discussed in this article was to determine the occurrence of heterotrophic and coliform bacteria in liquid soap from bulk refillable dispensers, obtained from restrooms in a variety of public facilities. A total of 541 samples was collected from five U.S. cities. Liquid soap from dispensers in public areas was found to contain heterotrophic and coliform bacterial numbers averaging more than 10^6 CFU/mL in 24.8% of the dispensers.

April 2011

Bed Bugs, Public Health, and Social Justice: Part 1, A Call to Action

Christopher Eddy, MPH, REHS, RS
Susan C. Jones, PhD

Abstract
The resurgence of bed bugs poses an urgent situation since infestations are rampant globally, nationally, and locally. In Ohio, bed bugs have become a virtual epidemic in many towns and cities, especially in central and southwestern regions of the state. These blood-feeding insects cause an array of adverse health effects in humans. Furthermore, bed bugs disproportionately occur in urban areas, and housing and the built environment are now recognized as dominant influences on health. Bed bugs’ potential role in disease transmission remains unqualified to date, and research on this issue is urgently needed. The escalating global bed bug resurgence leaves the divided public health community in a precarious social justice position if the lack of response to bed bug infestations disproportionately impacts underserved populations. Bed bugs are an urgent public health and environmental justice concern, and the authors recommend that public health agencies respond with authority of agency.


Christopher Eddy, MPH, REHS, RS  
Susan C. Jones, PhD

Abstract

Bed bug infestations have resurged globally, nationally, and locally, yet the public health community in the U.S. has yet to mount a coordinated response to the escalating bed bug problem. Surveys of attendees at the 2009 National Environmental Health Association Annual Educational Conference & Exhibition, 2009 Ohio Association of Health Commissioners Fall Conference, 2009 Central Ohio Bed Bug Summit, and 2010 Hamilton County Council on Aging Annual Conference were conducted to gauge opinions about bed bugs. Survey results revealed that 90% of all respondents considered bed bugs to be a public health concern, and 73% indicated that bed bugs pose an environmental justice concern. These findings, which indicate that bed bugs are an inescapable public health mandate with environmental justice undertones, should rally public health agencies at federal, state, and local levels to respond with authority of agency to the escalating bed bug problem.

**Health Effects of Dust Storms: Subjective Eye and Respiratory System Symptoms in Inhabitants in Mongolia**

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Takehiko Y. Ito, PhD  
Shinji Otani, MD, PhD  
Kazunari Onishi, MD  
Youichi Kurozawa, MD, PhD

Abstract

The cross-sectional study described here aimed to investigate potential health effects associated with dust storms in Mongolia. The authors surveyed the subjective symptoms of the eyes (e.g., bloodshot eyes) and respiratory system (e.g., coughing).
among inhabitants in different living environments (urban and desert) immediately after a dust storm. The subjects studied lived either in an urban area ($n = 36$ residents), or a desert area ($n = 87$ nomads). Information concerning eye and respiratory system symptoms was obtained by face-to-face household interviews. Multiple logistic regression analysis was performed on the relationships between the subjective symptoms and the different living environments adjusting for age, gender, and smoking status. The occurrence of lacrimation, an eye symptom, was higher among the desert area participants compared to those residing in the urban area. Results suggest that the occurrence of eye lacrimation is related to dust storms.

May 2011

**Association Between Presence of Visible In-House Mold and Health-Related Quality of Life in Adults Residing in Four U.S. States**

Xiao Jun Wen, MD  
Lina Balluz, MPH, ScD

Abstract

Despite the broad use of health-related quality of life (HRQOL) as one of the measurements to assess health status and effectiveness of health care and interventions, the impact of in-house mold exposure on HRQOL is unknown. The study described in this article examined the relationship between presence of visible in-house mold (PVIM) and HRQOL among adults. Data were analyzed from the 2005 and 2006 Behavioral Risk Factor Surveillance System (BRFSS) surveys that consisted of a random cross-sectional sample of 18,356 adults in four states. The authors examined the relationship between PVIM and three important indicators of the HRQOL by logistic regression analyses. Their results suggest that PVIM is independently associated with the indicators of HRQOL including mentally unhealthy, physically unhealthy, and totally unhealthy days. Therefore, implementation of appropriate measures at the household level to eliminate or reduce in-house mold may improve individuals’ HRQOL.

**Impact of an Urban Healthy Homes Intervention**

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Rosemary V. Chaudry, MPH, PhD, RN  
John Crawford, MS, PhD, RN  
Phillip Bouton, HHS  
Laura Sweet, RN

Abstract

In the study described in this article, the authors evaluated the impact of an urban Healthy Homes intervention that included educational home visits. Their one-group, pre-
post design used a structured interview at baseline and postintervention. The sample (N = 84) was comprised of low-income children younger than 18 years of age with an asthma diagnosis or with an asthmatic mother. Children were primarily male (62%), ≤10 years old (74%), and lived in a single family home (69%) with moisture (61%). Interventions included a personalized action plan, education, demonstrations, and home remediation as needed. Significant post-intervention decreases occurred in reported asthma symptoms for the child, school days missed, caregiver work days missed, and emergency department/urgent care center visits. Caregiver self-efficacy and quality of life increased significantly. The comprehensive home visitation intervention program effectively impacted asthma symptoms, lost school and work days, emergency use of the health care system, and improved caregiver quality of life and self-efficacy.

Sources, Distribution, and Toxicity of Polycyclic Aromatic Hydrocarbons

Yongyong Guo, MS
Kusheng Wu, PhD
Xia Huo, PhD
Xijin Xu, PhD

Abstract
Polycyclic aromatic hydrocarbons (PAHs) are ubiquitous pollutants released from the incomplete combustion of fossil fuels and are always found as a mixture of individual compounds. Due to economic growth and a sharp increase in energy consumption in recent years, large quantities of PAHs have been released into the environment worldwide. Because many PAHs and their derivatives are strongly potent carcinogens or mutagens, PAHs have been extensively studied recently. The authors reviewed the origin and distribution of PAHs in atmosphere, soil, and sediment in natural environments. PAHs represent a class of toxicological compounds that can create a variety of hazardous effects in vivo/in vitro, including genotoxicity, immunotoxicity, developmental toxicity, and carcinogenesis, which the authors also describe.

June 2011

Heavy Metals in Bottled Natural Spring Water

Michael J. Sullivan, PhD, CIH, REA
Shannon Leavey

Abstract
New regulations regarding the presence of contaminants in bottled water went into effect in California in January 2009. These requirements include testing, reporting, and notification to regulate the presence of heavy metals in bottled natural spring water sold in California. In the study described in this article, six sources of bottled natural
spring water were purchased and analyzed for silver, arsenic, barium, beryllium, cadmium, cobalt, chromium, copper, mercury, molybdenum, nickel, lead, antimony, selenium, thallium, vanadium, and zinc. All of these metals except beryllium, mercury, and thallium were detected in at least one of the bottled natural spring water sources. No concentrations were above either federal or California maximum contaminant levels but arsenic concentrations exceeded California public health goals in all six sources. Improving the California notification requirements for bottled water contaminants would result in a process more similar to the notification process for tap water and would result in better-informed consumers.

**Evaluation of Surface Lead Migration in Pre-1950 Homes: An On-Site Hand-Held X-Ray Florecence Spectroscopy Study**

V. Balasubramanian, MS  
T.M. Spear, PhD  
J.F. Hart, MS, CIH  
J.D. Larson, MS

**Abstract**  
Lead-paint concentration on specific surfaces (walls, floors, windowsills, etc.) in pre-1950 homes was measured using a hand-held X-ray fluorescence (XRF) spectroscope. Surface lead was examined concomitantly using wipe sampling and XRF. Lead was detected in all 147 samples via XRF; and of these, 29 (~20%) revealed surface lead contamination via wipe sampling. Seventeen of the positive wipe samples were collected from surfaces with clear visible defects, while 12 samples were collected from surfaces with no visible defects. Curve fitting of surface to lead-paint concentrations generated empirical relationships that described the migration of lead from inner layers at locations with and without visible defects. Curve fitting indicated that lead migration was power-law dependent when surface defects were present and linear when no defects were visible. These correlations may assist surveyors in predicting lead migration to the surface from lead-paint concentration measured with a hand-held XRF instrument.

**Keep Calm and Carry On: The 2009 NEHA Sabbatical Exchange Ambassador Report**

Marcy Barnett, MS, REHS

**Abstract**  
As an environmental health specialist working with the California Department of Public Health as an emergency planner, the author was interested in the NEHA sabbatical exchange program for the opportunity it affords its awardees to see how Canada and the United Kingdom utilize their environmental health workforce. Specifically, she wanted to examine the role environmental health has in the preparations being made for the 2012 Olympic Games to be held in London. The author had a special interest in the emergency preparedness efforts related to the games as her work involves promoting the integration of environmental health into the emergency response structure.
Use of Community-Owned and -Managed Research to Assess the Vulnerability of Water and Sewer Services in Marginalized and Underserved Environmental Justice Communities

Christopher Heaney, PhD
Sacoby Wilson, PhD
Omega Wilson, MA
John Cooper, PhD
Natasha Bumpass
Marilyn Snipes

Abstract

In the study described in this article, the authors’ objective was to use community-owned and -managed research (COMR) to assess the safety and adequacy of water and sewer services in three low-income African-American communities in Mebane, North Carolina. Community monitor (CM) training workshops, household surveys, and drinking water and surface water tests of fecal pollution were completed at private (target) and regulated public (referent) service households. CMs collected survey data showing a mixture of failing private wells and septic systems and regulated public drinking water and sewer infrastructure. Drinking water and surface water fecal pollution levels exceeded limits protecting health at target and referent households. COMR methods built community capacity to investigate private and regulated public drinking water and sewer service failures. Drinking and surface water fecal contamination levels suggest a need for provision of improved water and sewer services to protect health in these underserved and marginalized communities.

MRSA as a Health Concern in Athletic Facilities

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Mary Lux, PhD, MT, ASCP
Kyna Shelley, PhD
Jan L. Drummond, EdD
Patti Laguna, PhD

Abstract

Methicillin-resistant *Staphylococcus aureus* (MRSA) is a group of bacteria resistant to antibiotic treatment. Open abrasions, therapeutic whirlpools, treatment tables, locker rooms (LR), and athletic equipment are identified as potential areas of transmission in athletic training rooms (ATR) and LR facilities. To determine the
prevalence of MRSA and to identify control measures in ATR and LR, the authors collected samples from nine surfaces at seven high schools over a four-month period. Initial analyses considered both suspected colonies and confirmed MRSA colonies with analyses of variance revealing significant differences of suspected colonies based on regular cleaning product and facility surface. Further results, however, focused on MRSA colonies as the primary variable, rather than suspected colonies. Results indicate a need for more effective cleaning products and schedules in LRs.

**Promoting Environmental Public Health in Rapidly Urbanizing Areas of Less Developed Countries in Africa: A Collaborative Interdisciplinary Training in Ibadan, Nigeria**

Derek G. Shendell, MPH, DEnv
Godson R.E.E. Ana, MPH, PhD

Abstract

Globally, urbanization has been occurring more rapidly in small-to-medium-sized cities in less-developed countries of Africa and Asia. Studies have suggested associations between traffic and industry-related air pollutants and adverse health outcomes. These chemical and physical exposure agents have also received increased attention for environmental quality concerns like global climate change. Most research to date, however, was conducted in larger industrialized country urban centers. Ibadan, Nigeria, is a historic city characterized by urban sprawl and increasing modernization as an academic and medical training center but is lacking in the implementation of environmental laws. The authors conducted their first training in Ibadan, Nigeria, May 19–23, 2008, based on initial collaborative work during 2006–2008 as well as a trip in mid-March 2007. They describe the rationale for and components of the training, likely one of the first of its kind in Africa. The title of the training was “Advances in Community Outdoor and Indoor Air and Environmental Quality Monitoring and Exposure Assessment.” Content was multimedia and interdisciplinary. The authors included lectures, group discussions, field experiences at community and industrial sites with cross-sectional environmental monitoring, and planned pilot studies including master’s thesis projects based on real-time, grant-funded monitoring equipment provided to the University of Ibadan, including protocol development demonstrations.

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**September 2011**

**A Statewide Multiagency Intervention Model for Empowering Schools to Improve Indoor Environmental Quality**

Kenneth Foscue, MPH
Margaret Harvey, MPH
Abstract
A large population of children and adults is potentially exposed to indoor environmental quality (IEQ) hazards in schools. Those with asthma are particularly at risk because IEQ-related hazards in school buildings can trigger asthma episodes. A multiagency consortium created and led by the Connecticut Department of Public Health has successfully implemented and continues to sustain the U.S. Environmental Protection Agency’s (U.S. EPA’s) Tools for Schools (TfS) program in the majority of Connecticut public schools. TfS is an action kit promoting a low-cost, problem-solving team approach to preventing or improving IEQ. One key to the consortium’s success is the array of services they provide to schools, including aggressive outreach and specialized training and consultation. The consortium is also a platform for launching other school IEQ initiatives. The authors present and analyze the consortium model and their efforts at evaluating the impact of TfS in Connecticut.

Low-Level Groundwater Arsenic Exposure Impacts Cognition: A Project FRONTIER study

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Julian Spallholz, PhD
Mallory Boylan, PhD
David Lefforge, MS, MBA
Sid E. O’Bryant, PhD

Abstract
Arsenic is a ubiquitous environmental toxin with known neurological consequences. Few studies, however, have investigated groundwater arsenic concentrations and cognition among adults and elders. In the study described in this article, the authors examined the potential link between cognitive functioning and low concentrations of arsenic in drinking water. Arsenic concentrations were estimated by the Geographic Information System approach (GIS-arsenic) for 299 rural-dwelling adults and elders. Cognition was assessed with Folstein Mini-Mental State Examination (MMSE). Those in the relatively high GIS-arsenic exposure (>10.0 μg/L) group had significantly lower MMSE scores than those in the low GIS-arsenic exposure (≤10.0 μg/L) group (p < .03). The number of years of education was significantly lower in those in the high GIS-arsenic group(s) than in those in the low GIS-arsenic group (p < .05). These results suggest that poorer cognitive functioning and lower education levels were associated with higher (though still low-level) GIS-arsenic levels in this rural adult cohort.

Solid Waste Management Problems in Secondary Schools in Ibadan, Nigeria

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D. Shendell, DEnv, MPH
O.O. Elemile
O.R. Benjamin
M.K.C. Sridhar, PhD

Abstract

Inappropriate solid waste management practices in schools in less-developed countries, particularly in major urban communities, constitute one of the major factors leading to declining environmental health conditions. The objective of the authors’ descriptive, cross-sectional study was to assess solid waste management problems in selected urban schools in Ibadan, Nigeria. Eight secondary schools with average pupil populations not less than 500 per school were selected randomly. Four hundred questionnaires (50 per school) were administered. In addition, an observational checklist was used to assess the physical environment. Paper and plastics were the most frequently generated wastes. Common methods of solid waste disposal reported were use of dustbins for collection and open burning. Major problems perceived with current refuse disposal methods by the study students were odors, pest infestation, and spillages. Littering and spillages of solid waste were also common features reported. Data suggested inadequate waste management facilities and practices in study schools. The lack of refuse bins may have contributed to waste spillages and the burning practices. Odors may have arisen from both the decay of overstored organic waste rich in moisture and emissions from refuse burning. This scenario poses a community environmental health nuisance and may compromise school environmental quality.

October 2011

Particulate Matter (PM$_{2.5}$) and Carbon Monoxide From Secondhand Smoke Outside Bars and Restaurants in Downtown Athens, Georgia

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Louis H. Kudon, PhD
John Pearce
Shaneece Baptiste
Sylvia Ferguson
Tiffany Green
Luke P. Naehler, PhD

Abstract

In the study described in this article, the authors’ objective was to measure particles $\leq 2.5$ $\mu m$ in aerodynamic diameter (PM$_{2.5}$) and carbon monoxide (CO) in outdoor waiting areas and patios of restaurants and bars in downtown Athens, Georgia,
where indoor smoking is banned. The authors also wanted to investigate whether the measured concentrations are directly associated with the number of cigarettes lit in these settings. Real-time PM$_{2.5}$ and CO were monitored on four summer weekend afternoons/evenings in outdoor waiting areas or patios at five locations in Athens. In addition, smokers and pedestrians present or passing and motorized vehicles passing each sampling location were counted. PM$_{2.5}$ levels were significantly higher than levels at the control location (all $p$-values $> .001$). Carbon monoxide levels outside the restaurant and bar sites did not differ significantly from the control. The results of the authors’ study indicate that (1) secondhand smoke (SHS) leads to significant increases in PM$_{2.5}$ outside of restaurants and bars; and (2) although CO can be used as a proxy for SHS in these outdoor environments, its levels remain relatively low.

**Evaluation of CS (o-Chlorobenzylidene Malononitrile) Concentrations During U.S. Army Mask Confidence Training**

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**Abstract**  
All soldiers in the U.S. Army are required to complete mask confidence training with o-chlorobenzylidene malononitrile (CS). To instill confidence in the protective capability of the military protective mask, CS is thermally dispersed in a room where soldiers wearing military protective masks are required to conduct various physical exercises, break the seal of their mask, speak, and remove their mask. Soldiers immediately feel the irritating effects of CS when the seal of the mask is broken, which reinforces the mask’s ability to shield the soldier from airborne chemical hazards. In the study described in this article, the authors examined the CS concentration inside a mask confidence chamber operated in accordance with U.S. Army training guidelines. The daily average CS concentrations ranged from 2.33–3.29 mg/m$^3$ and exceeded the threshold limit value (TLV) ceiling, the recommended exposure limit (REL) ceiling, and the concentration deemed immediately dangerous to life and health (IDLH). The minimum and maximum CS concentration used during mask confidence training should be evaluated.

**Public Health Response to Striking Solid Waste Management**

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Howard Shapiro, MSc, MD, FRCPC  
Ron de Burger, CPH, CPHI

**Abstract**
In 2009, the City of Toronto, Ontario, Canada, experienced a six-week labor disruption involving 24,000 city workers that included solid waste and public health employees. In an attempt to control illegal dumping and to manage garbage storage across the city during this period, 24 temporary garbage storage sites were established by the city (mostly in local parks) for residents to dispose of their household waste. No other municipality in North America has attempted to operate this many temporary sites for this long a period. Management and nonunion staff from Healthy Environments in Toronto Public Health (TPH) performed daily inspections, responded to community questions, issued public health orders, and worked closely with Solid Waste Management (SWM) and the Ministry of the Environment (MOE) to actively manage the public health concerns associated with these sites. This intensive oversight mitigated public health risks to the community and facilitated an effective, safe solution to the temporary garbage storage problem.

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New Questions and Insights Into Nitrate/Nitrite and Human Health Effects: A Retrospective Cohort Study of Private Well Users’ Immunological and Wellness Status

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Jean Maddux
Diane Depken, EdD
Jeff Orr, MA
Patricia Theran, MA

Abstract
The retrospective cohort study described in this article examined 150 Iowa private well users’ (aged 1–60 years) drinking water below the 10 parts per million (ppm) nitrate-nitrogen (nitrate-N) maximum contaminant level (MCL) and analyzed health history data and blood samples including hemoglobin fractions and immunological parameters.

Positive associations existed (bivariate fit) between higher nitrate exposure and body mass index, lower recreational activity, perceived poorer health, and perceptions of susceptibility to illness. A directly proportionate relationship was seen between methemoglobin level in the blood and nitrate ingestion. High tumor necrosis factor-beta (TNF-β) expression was also seen (bivariate fit, $f = 3.76, p = .05$). Complaints of stomach/intestinal difficulties (heartburn/reflux > 50%; $f = 5.274, p = .0231$) and bone, muscle, and nerve complaints (osteoarthritis [rheumatoid excluded] = 47%; $f = 6.0533, p = .0150$) were found with increasing nitrate exposure.
In vivo exposures of nitrate-N associated with complaints of bone/joint disorders or with altered ex vivo production of TNF-β or Th2/Treg cytokine interleukin-10 (IL-10) have not been previously illustrated with environmental exposures.

Arsenic Levels in the Soil and Risk of Birth Defects: A Population-Based Case-Control Study Using GIS Technology

Jilei Wu
Gong Chen
Yilan Liao
Xinming Song
Lijun Pei
Jinfeng Wang
Xiaoying Zheng

Abstract
Arsenic is a highly dangerous metal that has been linked to a number of adverse health effects in both adults and children, including birth defects. Yet few epidemiologic studies have examined the relationship between arsenic levels in the soil and the risk of birth defects. The purpose of the authors’ study was to examine this association among people exposed to environmental pollution in a developed area of China. The authors used global positioning system to locate the coordinates of 80 villages in 40 towns for soil sampling. Soil samples were analyzed for arsenic content. Logistic regression was used to investigate the relationship between exposure to arsenic and birth defects, controlling for potentially confounding factors. The authors found that exposure to arsenic in any amount increased the risk of birth defects. The positive association found between arsenic exposure and birth defects warrants further study, and future large-scale population-based studies are needed with an emphasis on individual-level exposure and confounding variables.

Putting the Capital “E” Environment Into Ecological Models of Health

Christopher J. Coutts, MPH, PhD
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Abstract
The recent public health reawakening to the role of the built environment has largely excluded consideration of the natural environment. This exclusion is despite the fact that land conservation, or green infrastructure, supports the most fundamental human needs and healthy lifestyles. Although the contemporary public health paradigm acknowledges the environment as an important construct in an “ecological” approach to health, environmental protection is not commonly viewed as an upstream approach to preventing disease. This guest commentary suggests that environmental health research
and practice should consider green infrastructure as germane to a healthy human environment.

December 2011

Global Benefits From the Phaseout of Leaded Fuel

Peter L. Tsai, MBA
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Abstract
The study described in this article assessed the global benefits from the phaseout of leaded fuel. The authors extended previous estimates to the global level and incorporated the latest scientific and economic research on societal effects. Starting with detailed studies in the U.S., the authors argue that extrapolation based on the ratio of U.S. gross domestic product (GDP) to world GDP is the most accurate method at this time. Their overall best estimate is a global benefit of $2.45 trillion/year, within a range of $2.05–$2.83 trillion. Environmental health professionals increasingly face the task of justifying policies on the basis of economic benefits. Without more detailed morbidity and mortality data, the authors’ extrapolation here represents the best estimate of global benefits from leaded fuel phaseout. Their estimate adds to the justification of current programs and may help support future international efforts. The authors also comment on how these techniques may be extended to state and local levels.

Impacts of Biological Additives, Part 1: Solids Accumulation in Septic Tanks

S. Pradhan
Michael T. Hoover
G.H. Clark
M. Gumpertz
C. Cobb
J. Strock

Abstract
The efficacy of three septic tank additives and a control was assessed using a randomized complete-block design in a double-blind study described in this article. Sludge depth, scum thickness, and total solids were measured within 48 full-scale, functioning septic tanks. These tanks were distributed across three sites with low, intermediate, and high prior-maintenance levels. No significant, positive long-term additive treatment effects occurred across all maintenance levels at the $\alpha = .05$ level. Separate analyses of variance, however, indicated that at the high prior-maintenance site, significant treatment effects occurred on sludge depth, scum thickness, and total solids.
Sludge depths for the Liquid-Plumr and Rid-X additives were significantly reduced compared to the control at the high-maintenance site, but not at the low-maintenance site. Liquid-Plumr septic tank additive had significantly greater sludge depth at the intermediate-maintenance site, which is a negative impact. Sludge accumulation rates averaged 6.9 cm/yr. for 3,780-L (1,000 gallon) septic tanks.

**Impacts of Biological Additives, Part 2: Septic Tank Effluent Quality and Overall Additive Efficacy**

S. Pradhan  
Michael T. Hoover  
G.H. Clark  
M. Gumpertz  
C. Cobb  
J. Strock

Abstract:

The efficacy of 1,200+ septic tank additives on the market has always been a concern due to the previous lack of independent, replicated third-party, field-scale research studies. Twenty experimental units (well-maintained, full-size, functioning septic tanks) were pumped out 2–3 years before being assessed in the study presented here. These units were treated with one of three biological additives or a control in a double-blind study. Effluent data analyzed using a mixed linear model showed that the overall treatment effect was significant for effluent five-day biochemical oxygen demand (BOD$_5$) concentrations. One additive had significantly lower effluent BOD$_5$ concentrations in septic tank effluent than the control and the other two additives had the same BOD$_5$ as the control. No statistically significant effluent total suspended solids concentration effect occurred for any additive. These results were also considered in concert with two prior related studies regarding microbiological contents as well as sludge and scum accumulation rates across three prior maintenance levels in 48 septic tanks.