Learning Laboratory Poster Session Abstracts

National Environmental Health Association (NEHA)
72nd Annual Educational Conference & Exhibition

Poster Session

Monday, June 23
8:00 – 11:00am

Children's Environmental Health

Compliance with Iowa's Statewide Plan for Childhood Blood Lead Testing
Deborah L. Dufficy, DVM, MPH, Epidemic Intelligence Service Officer, CDC, IA

Lead damages children's developing brains, but children exposed to lead usually do not have noticeable symptoms, necessitating blood lead tests for detection. Iowa's Statewide Plan for Childhood Blood Lead Testing recommends children ages 1–6 years be tested according to a predetermined plan, which considers age at testing, risk for lead exposure, blood lead level, and specimen type to determine test frequency. We developed a computerized tool to assess the degree to which patients adhered to plan recommendations.
Methods

By law, Iowans' blood lead levels are reportable to the Iowa Department of Public Health. Data regarding children born in 1999 from STELLAR, Iowa's blood lead database, were used to calculate compliance. Compliance is defined as having obtained the recommended number of tests within the recommended time, given the observed lead level, age at test, and sample type. One compliance measure is the ratio between observed and expected number of tests. Another measure is a binary variable that evaluates whether tests were performed within recommended intervals.

Despite a sensitive reporting system, compliance with Iowa's childhood blood lead testing plan is inadequate; only 62% of children born in 1999 received any recommended blood lead testing, and only 27% of those tested complied with testing recommendations. Using this tool to monitor compliance will provide a baseline for measuring program improvement, especially after passage of a 2007 Iowa law requiring blood lead testing of all children before kindergarten entry. We recommend determining risk factors and markers for noncompliance to target lead prevention resources toward identified risk groups and geographic areas, thus enhancing program efficiency and effectiveness.

Influencing the Home Environment of Children with Asthma
James Yannarelly, Program Supervisor, St. Paul/Ramsey County Dept. of Public Health, MN

The clinical management of asthma is the focus of most asthma initiatives even though environmental factors contribute to both pathogenesis and acute exacerbations of asthma. Coordinated improvements in the social and built environments, in conjunction with medical management, should lead to the greatest health benefits with reductions in health service utilization due to acute asthma exacerbations and school absenteeism, and improvement in

health related quality of life. Objectives: The primary objective for the Minneapolis/St Paul Healthy Homes program is to assist children with uncontrolled asthma and their families to reduce exposure to asthma triggers in the home environment. Methods: Children with uncontrolled persistent asthma or noticeable absences from school due to asthma are referred by physicians, school nurses, or home health providers. A collaborative team provides a comprehensive review of the home environment and its impact on asthma management. An Environmental Asthma Action Plan is written; allergen reducing products are provided; pest mitigation and other minor repairs are completed if needed; care management is coordinated with providers; referrals to other government programs are made for qualified families. Number of hospitalizations, emergency room admissions, unscheduled office visits, oral corticosteroid use and school absences due to asthma are collected and a health related quality of life instrument completed for each child at baseline and follow-up contacts.

We reported on 421 children who received services from 2005-2006. Hospitalizations, emergency department visits, school absences and symptom burden showed statistically significant reductions from baseline ($p < 0.05$). Additional referrals were made to lead abatement, weatherization, heating programs and other social service agencies; relocation assistance was provided to 6 families. Program costs were offset by savings from reductions in hospitalizations and emergency admissions. Lessons Learned: Maintaining a referral stream requires vigilance; reliance on physician referrals alone will not insure program services. Concentrating on the child's bedroom environment provides the most practical focus. Financial burdens to obtaining additional supplies exist for some families. Conclusions: A program focused on environmental concerns contributing to asthma enhances efforts to manage asthma effectively, fills an unmet service need and has the benefits of improved school attendance and decreases in symptom burden.

Lead Awareness and Education Project—A Community Partnership

Teresa Kelly, Special Projects Coordinator, Health Council of West Florida, Inc., FL

The goal of the Lead Education and Awareness Project (LEAP) is to increase the community's understanding of the importance of early detection of childhood lead poisoning, its causes and prevention. Using grant funding from the U.S. Environmental Protection Agency, our non profit agency designed and implemented the pilot project for three rural Florida counties. The key to LEAP's success is the involvement of the local community including: college faculty, government health departments, private healthcare providers, non governmental organizations, business leaders, health care advocates, and community/civic groups.

Components include: 1) Community Partnership to develop a long term strategic plan and provide guidance on educational activities; 2) Assessment of Local Resources related to lead poisoning testing and remediation, and solicitation of new remediation resources including volunteer programs; 3) Educational Outreach including four "train the trainer" sessions for agency staff, parents and community members, training for physicians, and two workshops for construction/maintenance workers on lead safe techniques. A videotape made of the community training will allow other groups to benefit from the information shared.

Pre and post tests for the training sessions illustrate the impact of educational outreach on the trainees' awareness. Using community partnerships to implement an educational outreach project insures that limited resources are maximized. Building trust and engaging the community partners present challenges. Lessons learned will be shared.

Lead Harms: A Mural Arts Project Collaboration with the Philadelphia Department of Public Health's Childhood Lead Poisoning Prevention Program

Jill Ann Coleman, Health Education and Training Specialist Supervisor, Philadelphia Dept. of Public Health, PA

Using the Geographic Information System (GIS) to create a color-shaded map, the Philadelphia Department of Public Health's (PDPH) Childhood Lead Poisoning Prevention Program (CLPPP) was able to identify specific areas in the city with disproportionately high concentrations of poorly maintained housing. Concurrently, these same households revealed a disproportionately higher number of lead poisoning cases among children than any other area in the city. Also known as the "Lead J", North Philadelphia became the main area of interest for PDPH.

As a result of such findings community-based organizations, sub-contractors, the Philadelphia Housing Authority (PHA), and the Temple University Department of Nursing - all with strong ties to the neighborhood - were asked to participate in an innovative collaborative to address this serious community environmental health hazard. Through funding from the Environmental Protection Agency (EPA) the collaborative chose a "permanent education tool" in the form of a wall mural on a local recreation center. Commissioned by the Philadelphia Mural Arts Program (MAP) - established in 1984 as a citywide anti-graffiti initiative (The Anti-graffiti Network) - MAP has produced the largest collection of public murals in the country. With "by-in" from local youth groups and after school programs, it creatively engaged at-risk communities in a neighborhood beautification project.

In conjunction with National Lead Poisoning Awareness Month (October), more than 250 students, community members, tenants, EPA and Health Department staff attended a mural dedication ceremony. Information tables disseminated environmental and health-related education materials and giveaways.

The long-term effects of the mural are immeasurable: community "by-in" will add to the success of maintaining the mural, and students retained more information about lead hazards because of hands-on involvement**.** The result is a *tangible,* final product with the potential for replication - to address other community health risks. The next phase involves securing additional funding to provide a mounted plaque explaining the message of the mural, entitled "***Lead Harms***", by artist Cliff Ward and Wade Williams, for passers-by and future recreation center participants!

Radio Disney Gets the Lead Out: A Creative "Infotainment" Campaign About the Hazards of Lead Poisoning for Philadelphia's At-Risk Communities

Jill Ann Coleman, Health Education and Training Specialist Supervisor, Philadelphia Dept. of Public Health, PA

Through funding from a grant from the Environmental Protection Agency (EPA), the Philadelphia Department of Public Health's (PDPH) Childhood Lead Poisoning Prevention Program (CLPPP) contracted with *Radio Disney* AM640 to provide an innovative Lead Poisoning health education campaign. Radio Disney worked in conjunction with annual community health fairs scheduled by various District Health Care Centers throughout the city. Each Disney on-site public appearance featured local "EJs" *Awesome A and the All-Star Cast*, along with ninety minutes of music & interactive "infotainment". Games and prizes were disseminated to participants with winning answers about the hazards of lead poisoning (based on various State and Federal environmental health hazard mandates). Disney provided several CDs with recaps of the entire campaign - including national newsletter articles, website inclusions, studio interviews, radio commercials and event photos. A culmination of the campaign took place when Radio Disney and PDPH co-hosted both the *Sunoco Welcome America Kids Day 2006, Annual July Fourth Celebration* at the Great Plaza at Penn's Landing, and National Lead Poisoning Awareness Week (Oct 23-27).

Why Is There Lead in My Candy?: A Profile of Lead in Mexican and Traditional American Candies in King County, Washington

Leocadio Melédez-Figueroa, PhD, MS, REHS, Industrial Hygiene Compliance 3, Department of Labor and Industries, WA
Kazuhiro Okumura, Student, University of Washington, WA

Lead in Mexican candy is a well-known issue among public health authorities and children's advocates across the country. Health advocate Leticia Ayala, since 2002 in the state of California, has brought the issue of leaded candy to the forefront. The state of Washington has been dealing with the issue of lead in children for years and it is just touching the tip of the iceberg when dealing with lead in candy. In 2005, the population of children under age five in the state of Washington was 6.3 percent and in King County, it was 6.0 percent.

The Federal Food and Drug Administration (FDA) issued a guidance document entitled "Lead in Candy Likely to Be Consumed Frequently by Small Children: Recommended Maximum Level and Enforcement Policy." This guidance document announces a recommended maximum level for lead in candy of 0.1 ppm.

This study employed correlation and simple parametric statistics of 300 samples of candy (150 Mexican and 150 traditional American candies) collected and bought at these Latino grocery stores. The survey entailed the collection of three Mexican made candies and three traditional American candies as control samples from each store. The objective was to compare the two groups (Mexican-made and the traditional American candies for lead content in parts per million (PPM). The comparison between the data set was examined for significance differences of lead content at the 0.05 alpha level. Mexican candy had significantly higher lead content than traditional American candies. There were significant differences in lead content in Mexican Candies when compared with traditional American candies.

Drinking Water Quality/Water Pollution

A Day in the Life of Three Streams: Diurnal Variation in Concentrations and the Use of Ribotyping to Determine the Sources of *E. coli*

Cindy Meays, PhD, Water Quality Science Specialist, Ministry of Environment, Canada

Microbial contamination is a major concern for drinking water worldwide. Many monitoring protocols using one or very few samples are inadequate and introduce a very large margin of error. Developing meaningful monitoring programs for managing water quality requires scientific data on the number of samples needed and the sources of bacterial contaminants. In this study, 3 streams from drinking water watersheds were sampled every 15 minutes over a 24-hour period on 3 different days to determine concentrations of *E. coli* and to identify their sources using ribotyping (ribosomal RNA finger printing). Concentrations of *E. coli* varied throughout the day in each of the 3 streams. Ribotyping identified many different animal sources of *E. coli* in the samples. The sources of *E. coli* varied significantly with site ($P < 0.001$, $df=16$). The development of monitoring programs for watersheds need to consider individually the watershed, and care needs to be taken in determining appropriate sample sites, sampling regime and number of samples taken during each sampling period. It was demonstrated that there are significant variability in concentrations and sources of *E. coli* during a day; however, the mechanisms and processes associated with these variations need further research.

Impact of Beneficial Management Practices on Water Quality for Three Beef Cattle Farms in the Salmon River Watershed in British Columbia, Canada

Cindy Meays, PhD, Water Quality Science Specialist, Ministry of Environment, Canada

The evaluation of BMPs on the Salmon River is part of a four-year national Watershed Evaluation of Beneficial Management Practices (WEBs) project. The Salmon River WEBs project is located approximately 12 km south of Salmon Arm, BC, and is one of seven small watershed studies underway across Canada. The Salmon River is an important water system that provides water for many users groups and flows into Shuswap Lake, BC. Environmental concerns in the watershed include: poor riparian vegetation, unstable eroding riverbanks, high sediment load, poor water quality, low summer flows, high irrigation demands, high water temperatures and declining salmon stocks. The Salmon River Watershed Roundtable (SRWR) is an active group working toward Salmon River watershed sustainability since 1993. Activities of the group have included watershed planning, stream and bank restoration and substantial water quality and water quantity monitoring, involving local, provincial, federal and non-government agencies. Significant stream restoration progress has been made by SRWR over the past 11 years; however, a need has been recognized for more emphasis on land-based BMPs. The objective of this study is to determine if riparian exclusion fencing and supplying off-stream water for beef cattle on three farm winter feeding and calving pastures within the Salmon River watershed are effective BMPs. Water quality (chemistry, *E. coli*, and nutrients) and water quantity were measured and compared upstream of the ranch (just before the stream enters the farm), midpoint (just below fenced riparian area), and downstream (unfenced riparian area). Project design and preliminary results will be discussed.

Emerging Pathogens

Occurrence of Methicillin Resistant *Staphylococcus aureus* (MRSA) on Fomites in the Public Setting

Jonathan D. Sexton, Research Assistant, University of Arizona, AZ

Staphylococcus aureus is commonly found on the epidermis and in the nose passage of healthy individuals. *S. aureus* may cause infections with symptoms ranging from pimples, boils and other skin conditions to life-threatening pneumonias and blood stream infections. Some strains have developed resistance to many commonly administered antibiotics, including methicillin. These strains are known as methicillin resistant *Staphylococcus aureus* (MRSA). MRSA is one of the leading causes of infections in patients in hospitals and long-term care facilities and, until recently, was limited to these environments. Since the late 1990's, there has been a large increase in MRSA infections in people outside of these environments, termed community acquired MRSA (CA-MRSA).

The current study was undertaken to determine the community occurrence and frequency of MRSA. A total of 2,595 samples were collected using sterile transport swabs. Samples were then spread plated onto Tryptic Soy Agar amended with 5% defibrinated sheep blood, for b-hemolysis analysis, and 0.015 g/L of Nalidixic Acid and 0.01 g/L of Colistin. Typical colonies then underwent a short set of biochemical tests to identify S. aureus isolates from public restrooms, offices, public transportation and automobiles. The isolates were further identified as MRSA by growth on media containing methicillin-derived antibiotics. Results were confirmed utilizing PCR, detecting the presence of the PVL and Mec A genes. *S. aureus* was detected in 32.4% of automobiles and 9.1% of the isolates were methicillin resistant. The isolates were from the steering wheels and seatbelt buckles. MRSA was isolated from 100% of buses and planes that were sampled. *S. aureus* was detected in 16% of all offices sampled with 33% of the isolates being MRSA. Desktops and phones were the most common site that contained MRSA in the offices. Only 6.3% of public restrooms were positive for *S. aureus* and MRSA. MRSA was isolated from 11.1% of sites tested in the subway and 9.1% of sites in the train. These results demonstrate that MRSA is

commonly present on fomites in public facilities. These fomites could be a potential route of transmission.

Survival of Respiratory Viruses on Produce
Maria S. Yepiz-Gomez, Graduate Student, University of Arizona, AZ

Produce consumption has increased as a result of studies clearly showing that diets low in fat, and high in fiber, with at least five servings a day of fruits and vegetables are protective against many types of cancer and lessen the risk of heart disease. Even though not all consumers reach the goal of five servings per day, per capita consumption of fresh produce is steadily increasing. Global trade provides food from over 130 countries around the world to U.S. consumers year-round. Coinciding with the increase of produce consumption, there has been a significant increase in the number of foodborne disease outbreaks associated with fresh produce. No previous research has been conducted on the survival of respiratory viruses on produce. During the SARS outbreak of 2002, there was concern that the SARS Coronavirus could be spread from one country to another via food. In the current study the survival on produce of the respiratory viruses Coronavirus 229E and Adenovirus 2, along with the enteric Poliovirus was determined. Virus-inoculated produce was stored at 4°C (typical of post-harvest temperature) for a period of two weeks, at which time virus survival was determined using cell culture techniques.

Environmental Health Research

Acute Effects on Cardiovascular Physiology Upon Intratracheal Instillation of Zinc, a Component of Ambient Particulate Matter
Adriana J. LaGier, PhD, R-Authority Post-Doctoral Fellow, EPA, NC

Exposure to ambient particulate matter (PM) correlates epidemiologically with deleterious health outcomes. The goal of this study was to ascertain the effects of zinc, a major component of particulate air pollution, on respiratory and cardiovascular physiology. New Zealand White rabbits (3.6-4.5 kg) were exposed by intratracheal instillation to 2ml saline or 16ug/kg of zinc, containing 8ug/kg of soluble zinc sulfate and 8ug/kg of insoluble zinc oxide. Prior to, during and up to 1hr after instillation, the following physiological parameters were monitored: temperature, peripheral oxygen saturation, heart rate, respiratory rate and end-tidal carbon dioxide. Peripheral oxygen saturation was decreased in zinc-instilled rabbits compared to saline instilled animals immediately after exposure. In addition, zinc instillation stimulated a steady rise in heart rate, from instillation to five minutes after instillation, which did not occur with saline instillation. These differences between zinc and saline instilled animals were not present 1hr post-instillation. No significant disparities in the other measured physiological parameters were noted between zinc and saline instilled animals. This study provides evidence that exposure to zinc has transient effects on cardiovascular physiology. These immediate cardiovascular changes may result from zinc-induced altered vascular tone or other effects, which may trigger late-onset adverse responses. (abstract does not reflect USEPA policy)

Levels and Distribution of Aflatoxin B_1 in Aerosolized Grain Dust
Mustafa I. Selim, MS, PhD, Professor, East Carolina University, NC

The levels and distribution of aflatoxin B_1 in aerosolized grain dust were measured during the cleanout of 14 corn feed storage bins on 11 Iowa farms, a low frequency but potentially highly hazardous operation. An Andersen 1 ACFM cascade impactor was used to collect and separate dust samples into particle size fractions. The proportion of each size fraction was determined gravimetrically and by chemical analysis using solvent extraction and high pressure liquid chromatography to determine aflatoxin B_1. Among all bins, the geometric mean of the concentration

of dust in the air was 42.9 mg/m³ and its average mass median aerodynamic diameter (MMAD) was 9.7 μm. Aflatoxin B_1 was detected in 13 out of the 14 samples collected. The geometric mean of the concentration of Aflatoxin B_1 was 794 ng/m³ in the air and 17.6 ppm in the dust. An inverse correlation ($p = .0024$) was found between the concentration of aflatoxin B_1 and the diameter of the airborne dust particles. Small particles with diameters <4 μm contained on average roughly 7x the concentration of aflatoxin B_1 as particles ≥4 μm, but only comprised one quarter of the total measured airborne aflatoxin B_1.

Research Needs for Community-Based Risk Assessment: Findings from a Multi-Disciplinary Workshop

Yolanda Anita Sanchez, MS, MPA, EH Fellow, Association of Schools of Public Health, Washington, DC

Problem Explored. Communities face myriad exposures and stressors; yet, most risk assessments consider impacts of single chemical agents or additive impacts of similar chemical agents. Community-based risk assessment (CBRA) is a model that addresses the multiple chemical and non-chemical stressors faced by a community, while incorporating a community-based participatory research framework and a transparent process to instill confidence and trust among community members. Research scientists and health practitioners are currently developing methods and tools for this emerging field.

Methodology Used. Recently, a workshop entitled “Research Needs for Community Based Risk Assessment” was sponsored by the Environmental Protection Agency’s (EPA’s) National Center for Environmental Research (NCER) and National Center for Computational Toxicology (NCCT).

This successful workshop brought together environmental and public health scientists and practitioners to foster an innovative discussion about tools, methods, models, and approaches for community-based risk assessment. Three specific areas were addressed:

1) Data needs and measurement methods for CBRA,
2) The biological impact of non-chemical stressors and interaction with chemical stressors, and
3) Statistical and mathematical modeling for CBRA.

Results. The workshop highlighted a number of research needs. Major research needs identified include:

- Develop mechanistic understanding about the impact of biological stress on physiologic response to chemical exposures
- Develop biomarkers or biosensors to quantify and monitor exposure to multiple stressors
- Incorporate existing social indices into chemical risk assessment methods
- Create approaches for linking exposure models with effect information in order to facilitate interpretation of risk

Solutions. EPA’s Office of Research and Development (ORD) has identified community-based risk assessment as an important research area. NCER aims to begin a research program in this area, building largely on the needs that were identified through the workshop.

Conclusions. CBRA is an emerging field that can help assess the role of multiple environmental stressors within a targeted community. Identifying key research needs is an important step in effectively applying CBRA. This poster will summarize the workshop findings, present the identified research needs, and discuss future research opportunities in this emerging field.

The Utility of Next-of-Kin Interviews for Exposure Identification: Preliminary Results from Mesothelioma Surveillance

Natalia Melnikova, MD, PhD, Medical Epidemiologist, CDC/ATSDR, GA

Mesothelioma is an aggressive tumor of mesothelial tissue primarily caused by past occupational exposure to asbestos. Assessment and identification of exposure in patients with diseases/conditions related to potential occupational or environmental factors such as mesothelioma is critical for the development of preventive public health strategies. Because of the very short median survival period following diagnosis, it is difficult to interview mesothelioma cases. Interviewing next-of-kin is another commonly used method for obtaining information, although the validity of next-of-kin interviews for case exposure identification has not been adequately addressed in the literature.

Objective: To evaluate the validity of next-of-kin interviews for exposure identification.

Design: Cases were 33 residents of NJ, NY and WI with newly diagnosed and histologically confirmed malignant mesothelioma. Both cases and their next-of-kin were interviewed using identical questionnaire, designed to collect information on potential occupational or environmental exposure to asbestos. The Kappa Statistic was used to determine the extent of agreement between next-of-kin responses and case responses.

Results: Thirty-three mesothelioma cases and 33 next-of-kin responded independently to a set of questions on the case's participation in jobs/activities with potential asbestos exposure. Responses received from cases
and next-of-kin were consistent 87.9% of the time. The overall Kappa for inter-rater agreement in case and next of-kin responses was 0.65 with the 95% confidence interval of (0.56, 0.74). The proportion of agreement was 0.90 with standard error 0.05, indicating a substantial degree of agreement in case and next-of-kin responses. The agreement between cases and spouses (Kappa=0.64, 95% CI: 0.52-0.76) was lower than agreement between cases and blood relatives, such as siblings (Kappa=0.80, 95% CI: 0.61-0.99). The detailed exposure information obtained from cases and very few next-of-kin was in a poor agreement.

Conclusions: Next-of-kin interviewing is a valid method for obtaining general exposure information on cases when direct case interviews are not possible. In addition to spouses, other next-of-kin may be a good source for general exposure information. However, detailed job/activity specific information obtained from next-of-kin interviews should be interpreted with caution.

Food Safety and Protection

Benefits and Barriers for Use of the Hygienalyzer Test for Monitoring Hand Hygiene Compliance

Eugene P. Pittz, PhD, President, CanBeFit HealthCare Consultants, LLC, NV

The objective of the presentation is to describe the benefits and barriers for use of the Hygienalyzer® Test for hand hygiene assessment. Hands contaminated with pathogens are a major cause of food poisoning, hospital associated infections and the spread of respiratory and norovirus infections in the community. The FDA, WHO, etc. guidelines for proper hand hygiene practices are available and have been adapted to the needs of the food service industry, hospitals, etc. Guidelines include methods for hand washing, the use of gloves and for sanitizing hands with 'waterless' sanitizers. The Hygienalyzer® Test has been used to monitor hand hygiene compliance under various protocols: 1) A clinical trial, involving 40 subjects, demonstrated that the Hygienalyzer® Test can be used to distinguish between proper and improper hand washing practices ($p < 0.0001$). At a skin surface pH 'cut off' of 6.0, above which proper hand washing takes place, there is a 97.5 % predictive accuracy. The Hygienalyzer® Test can be used for

monitoring frequent hand washing practices - since the skin surface pH remains above 5.5 when hands are washed at 30 min. intervals; 2) Studies show that the Hygienalyzer Test can be used to determine if workers have washed their hands between glove changes; 3) Studies have determined that the Hygienalyzer® can determine the frequency of hand sanitizing with use of a proprietary 'waterless' hand sanitizer. The major barrier to use of the Hygienalyzer® Test is the need to take a single 10 second, non-invasive measurement of skin surface pH on a worker's hand. When both managers and workers realize that enforcing proper hand hygiene will make the establishment safer for everyone, this barrier is reduced.

Certified Kitchen Managers: Do They Improve Restaurant Inspection Outcomes?
Michael Anthony Penne, MPH, Research Statistician, RTI International, NC

Restaurants are a significant source of foodborne illness in the United States. Certification of kitchen managers through an accredited training and testing program may help improve food safety practices and thus prevent foodborne illness. This study examined the relationship between routine restaurant inspection results for the State of Iowa and presence of a certified kitchen manager (CKM). We analyzed data for 4,461 restaurants inspected during 2005 to 2006 (8,338 inspections). Using logistic regression analysis, we modeled the outcome variable (0=no critical violations [CVs] and 1=one or more CVs) as a function of the presence/absence of a CKM and other explanatory variables such as sales revenue category and service type (fast food vs. full service). We estimated separate models for the seven inspection categories. Restaurants with a CKM present during inspection were less likely to have a CV for Personnel ($p<.05$), Food Source/Handling ($p<.05$), Facility/Equipment Requirements ($p<.05$), Warewashing ($p<.10$), and Other Operations ($p<.10$). However, restaurants with a CKM present during inspection were equally likely to have a CV for Temperature/Time Control and Plumbing/Water/Sewage as restaurants without a CKM present. Analyses by type of violation within the Temperature/Time Control category revealed that restaurants with a CKM present during inspection were less likely to have a CV for not maintaining potentially hazardous foods at 140°F or above ($p<.05$), but presence of a CKM did not have an effect on other types of Temperature/Time Control violations such as cold holding and adequate cooking. Other results indicate full service restaurants were more likely than fast food restaurants to have a CV for Temperature/Time Control, Personnel, Food Source/Handling, Warewashing, and Facility/Equipment Requirements ($p<.05$). Our analyses suggest that presence of a CKM is protective for most types of CVs, and identified areas where improvements in training are needed.

What the FDA Market Basket Survey Means for Perchlorate in the U.S. Diet
Keith Hoddinott, MS, Environmental Scientist, USCHPPM, MD

In recent years food safety has become a more visible concern in the eyes of the general public. Concerns about tainted meat and contaminated vegetables have made headlines and changed the way people think of food. Since the mid-eighties, the US Department of Agriculture and the Food and Drug Administration (FDA) have been annually collecting food items in various parts of the country for analysis of residual chemicals. Mainly for evaluating the general public's exposure to residuals of chemicals used for agricultural pest control, the data can be used to model the public's chemical exposure health risk from their diet. In the early eighties, the US Environmental Protection Agency published a method of evaluating health risk from chemical exposure data for use at Comprehensive Environmental Response, Compensation, and Liability Act (commonly known as Superfund) sites. Used to make decisions about environmental remediation, media data and toxicological studies are used to estimate the probability an exposed population could develop health consequences from the chemical exposure. The Perchlorate data from the FDA's 2005 Total Diet Study was used to determine an exposure point concentrations in an average US

diet. Using the Superfund methodology, health consequences were estimated and target organs identified for the adults, adolescence, and children in the general US population.

General Environmental Health

Columbus Public Health SIGNS

Joseph Stacey, Sanitarian-In-Training, Columbus Public Health, OH

Columbus Public Health introduced a new Environmental Health Public Information Initiative that was passed by the Columbus Board of Health on January 23, 2007. The system gives the public expanded access to public information that is easy to read and understand on the current inspection or enforcement status of more than 8,000 restaurants, markets, public pools and spas, body art studios, manufactured home parks, solid waste facilities, campgrounds, and other licensees. Information on restaurants and markets licensed by Columbus Public Health is also available to the public on the department's web site.

The new "color-coded" signage system informs consumers what stage of the inspection or enforcement process the licensed facility is currently in. Thus, it is a unique signage system that uses colors instead of letter grades and it's based on process, not a snapshot of an inspection score. Additionally, the system honors licensees that have an exemplary record with Columbus Public Health, with the Healthier, Safer People Honor Award – practicing excellent health and safety procedures.

"The health and safety of our residents is the City's most important job, and this new system helps make it clear when restaurants and others are doing a good job and when they are on our watch list," said Mayor Michael B. Coleman. "We're always watching out for public health hazards, and that will continue, but this system will also recognize and reward great local businesses who meet our standards."

Licensees are provided color coded signage to post at their businesses; green illustrates Columbus Public Health standards were met during inspection, yellow – those in the enforcement process, red identifies businesses closed to protect the public from health risks, and white for those businesses placed on probation and increased inspection frequency by the Board of Health.

Finding the Key: Healthier Homes & Communities—A Year-Long Environmental Health Education Campaign

Eleanor Dixon-Terry, MPH, CHES, Assistant Executive Director, Society for Public Health Education, Washington, DC

Finding the Key: Healthier Homes & Communities" is a year-long environmental health education campaign that is supported by a cooperative agreement between the Society for Public Health Education (SOPHE) and the Agency for Toxic Substances and Disease Registry (ATSDR). The overall goal of the "Finding the Key: Healthier Homes & Communities" campaign is to increase environmental health literacy among health educators and the general public. Environmental health literacy integrates concepts from both environmental literacy and health literacy to develop the wide range of skills and competencies that are needed to seek out, comprehend, evaluate, and use environmental health information. This information can then be used to make informed choices, reduce health risks, improve quality of life, and protect the environment. "Finding the Key: Healthier Homes & Communities" was launched by SOPHE during National Health Education Week (NHEW) '07, which ran October 15-20, 2007. SOPHE is expanding the theme for NHEW '07 from a traditional one week celebration into a full, year-long health education campaign featuring quarterly sub-themes that will highlight specific areas of environmental health. Sub-themes will

include: an overview and introduction to environmental health (Oct. – Dec., 2007); a focus on children and the elderly as sub-populations that may be more susceptible to environmental health risks (Jan. – March, 2008); a look at how our built environment impacts public health outcomes (April – June, 2008); and an overview of how the environment influences infectious diseases, including a variety of water-borne, food-borne, and vector-borne diseases (July – Sept., 2008). SOPHE will provide health educators, environmental health specialists, and other health promotion professionals with several resources to complement the campaign and assist in increasing environmental health literacy at the local level.

Improving Communications Between Community Activists and State Agencies in Addressing Environmental Health Concerns

Danielle M. Laroche, Student Researcher, University of New Hampshire, NH

Background/Significance: Communities facing potential environmental exposures often feel that government environmental health agencies are not adequately addressing their concerns regarding risk. If communities feel their concerns are not taken seriously and do not believe the messages from these agencies, a lack of understanding and distrust occurs. Perceptions about environmental health factor into a community's sense of well-being.

Objective/Purpose: The primary objective of this study was to assess the current methods of risk communication and the perceptions of risk held by two communities hosting municipal solid waste incinerators and state agencies during environmental exposure investigations. The purpose of this assessment was to create a set of recommendations to promote better working relationships and the acceptance of investigation findings.

Methods: Surveys of the host communities were conducted to examine the sources of knowledge and perceptions about environmental health information. Individual interviews with community activists and state employees were conducted to examine the experiences that shaped their perception of current risk communication methods.

Results: Results, though not finalized, indicate that determining communication barriers, clarifying misconceptions and engaging in cooperation between community activists and state agencies during environmental health investigations maximizes the knowledge, comprehension and acceptance of findings and results in better relationships. Concerns about the time commitments needed from both organizations were acknowledged.

Discussions/Conclusion: Potential conclusions include the creation of a staffed community health liaison position for communities. Their role would be to aid in the risk communication process and relieve the stress and commitment from both organizations. The creation of utilization techniques will be also be employed to communicate risk information via the determined effective media channels.

Potential Permanent Effects of Temporary Black Henna Tattoos

Edward J. Golding, MS, PhD, Environmental Specialist III, Florida Dept. of Health, FL

A favorite, supposedly temporary design drawn on the body with black henna paste has been a defining moment in the lives of too many people, including children. While reddish-brown, regular henna has been used for centuries to adorn the bodies of Asian and East-African people for ceremonial purposes without fear of allergic reactions, the organic, coal-tar derivative of petroleum used to make black henna causes a sensitizing, contact dermatitis allergic reaction in some people.

This chemical, para-phenylenediamine (PPD), is mixed with regular henna to produce a "temporary tattoo" that is darker, longer lasting, and of higher contrast to the skin than is a design made using the rust-colored, regular henna. PPD is being used, apparently in relatively small amounts, as a color additive in commercial, black hair dye. However, its use in elevated, indeterminate amounts by artists in street kiosks and t-shirt shops is turning newly acquired designs on the skin of those who are allergic to it into itching, blistering, oozing rashes in a matter of days. These rashes then scab over and produce a potentially permanent scar in the form of the original design.

An additional effect of PPD on those allergic to it is the body's sensitization to similar chemicals as well as to articles of clothing made using black dyes. Thus, a person who has had a reaction to a "temporary black henna tattoo" might also react to subsequently dying their hair, using sunscreen containing PABA (para-aminobenzoic acid) or applying topical anesthetics containing benzocaine, or wearing a black shirt. As sensitizing reactions tend to be cumulative, each subsequent reaction tends to be worse than the previous one.

A poster presentation will present designs using regular henna, allergic reactions to black henna containing PPD, and a subsequent allergic reaction to a chemically similar product caused by prior sensitization of the body with PPD-containing black henna.

Indoor Air Quality

Geologic and Structural Controls of Classroom Radon Levels in Southern California
Kathryn D. Fukumoto, Student, Palos Verdes High School, CA

Indoor radon is derived from the uranium content of underlying soils, since radon gas is the direct product of the uranium decay process. Recent studies of classroom radon and soil uranium concentrations in the Palos Verdes Peninsula Unified School District (PVPUSD), Palos Verdes Estates, California, have shown that although most of California is only rated a low to moderate radon risk, selected metropolitan areas can harbor high soil uranium concentrations that support significant indoor radon levels.

In the PVPUSD study, over six hundred short term classroom radon measurements were conducted over a two year period, followed by more than two hundred surface gamma ray spectrometry measurements yielding soil uranium concentrations at the seventeen school sites of the district. Soil samples were chemically analyzed at fifty locations for an independent assessment of uranium. The primary rock units supporting the school sites were identified by recent geologic maps, since it is generally recognized that certain units have characteristically high uranium content. Finally, an additional two hundred spectrometry measurements were performed in various areas of the peninsula, to substantiate the consistency of the uranium concentration in the labeled rock units, and to determine the accuracy of mapped geologic boundaries.

When taken together, the classroom radon levels, geologic data, and relevant structural features of the schools present a consistent picture of the parameters that dictate radon levels in many Southern California schools. These controls, and examples of their interaction, will be described in detail using specific school site data from the PVPUSD.

Injury Prevention/Occupational Health

Demolition of the X-770 Mechanical Testing Facility at the DOE Portsmouth Gaseous Diffusion Plant

Noah Lawson, Health & Safety Coordinator, CDM, OH

This poster describes the demolition of the X-770 Mechanical Testing Facility at the Department of Energy (DOE) Portsmouth Gaseous Diffusion Plant. The X-770 facility had been a uranium enrichment process building where DOE evaluated the performance and reliability of equipment and components used in the gaseous diffusion process. Multiple hazards and contaminants had to be addressed in the demolition process through various removal methods. The potential hazards associated with the demolition included trichloroethene (TCE) (and other degradation products), polychlorinated biphenyls, Resource Conservation Recovery Act metals (including beryllium), uranium, uranium isotopes, technetium-99, and corrugated asbestos siding. Each hazard was evaluated individually for potential health concerns and then all the hazards were addressed simultaneously as they often were found together in the same areas during the building demolition. These evaluations resulted in the selection of removal methods that had not been associated with any previously established demolition activities.

To protect workers' safety and health, industrial hygienists characterized the building to determine the levels of concern for each known hazard. After the levels of contamination had been determined, engineering, administrative, and personal protective controls were implemented for building demolition. Encapsulates were placed in areas where removable hazards existed, containment systems were built to collect and treat excess contaminated waters, fixed hazards were removed in bulk movements, and process piping from the gaseous diffusion process was treated to remove all hazardous byproducts before demolition could begin.

Lung Function Study of Ohio Cash Grain Farmers

Jacqueline S. Ward, RS, REHS, MS, Program Manager, Delaware General Health District, OH

This paper describes the affects of cash grain farming on a random sampling of Central Ohio cash grain farmers. The data was collected as part of Phase 2 of the Ohio Farm Family Health and Hazard Surveillance Program. Phase 1 had only used self administered questionnaires, and Phase 2 utilized the same group of individuals. Phase 2 utilized spirometry tests to study if there was an effect on the farmer's lungs due to cash grain farming. For this paper only the male adults over the age of 20 were utilized. The results showed through the utilization of the T-test that a statistically significant difference at the 95% confidence level for all ages except for the age group of 30-39. There is a statistical difference at the 99% confidence level for those individuals over the age of 55. This clearly shows the adversarial effects of cash grain farming on the lung function of these farmers.

Using Evidence-Based Strategies to Reduce Motor Vehicle Injuries in a Southwestern Native American Community

Gordon D. Tsatoke, District Injury Prevention Coordinator, IHS, AZ
LCDR Stephen R. Piontkowski, MSEH, REHS, Service Unit Environmental Health Officer, USPHS, IHS, AZ

Motor vehicle injuries are a large public health burden for American Indians and Alaska Natives. In 2000, the overall motor vehicle injury death rate (age adjusted) was 27.5 per 100,000 for American Indians/Alaska Natives versus 15.5 for US All Races. Motor vehicle injuries are an even more severe problem for tribal communities in the southwest United States. In Arizona, the rate was 76.8 for American Indians and 19.9 for All Races.

Evidence-based strategies to reduce motor vehicle injuries were employed in a tribal community in the southwest United States in 2005 and 2006. These strategies focused to reduce alcohol-impaired driving through enhanced driving under the influence enforcement efforts such as sobriety checkpoints and saturation patrols. Work was also done toward implementation of a 0.08 blood alcohol concentration law and to adopt primary enforcement laws for occupant restraint use.

These efforts were associated with a 33% increase in DUI arrests, a 20% reduction in crashes involving injuries and/or fatalities, a 33% reduction in nighttime crashes, and a 27% reduction in overall police-reported crashes. Modest increases in occupant restraint use were observed as follows: driver seatbelt use - 8%, passenger seatbelt use - 6%, and child car seat use - 5%. We recommend these evidence-based strategies to local communities seeking to reduce motor vehicle-related injuries and fatalities.

Swimming Pools/Recreational Waters

Swimming Pool Associated Illness: A Training Opportunity

Farrah Machida, MSPH, District Epidemiologist, East Metro Health District, GA

Increasing incidence of recreational water illness has led the East Metro Health District to review and revise its swimming pool regulations. In addition, in response to a cluster of illnesses associated with a municipal pool, a new procedure was developed by district Environmental Health and Epidemiology to handle human illness associated with swimming pools. An educational program was developed in conjunction with the regulatory component to increase the knowledge of pool operators regarding sources of infection and prevention methods to reduce the incidence of human illness. Reducing potential sources of infection can lower the risk of contamination and ultimately reduce the associated human infections.

Lack of awareness among pool operators concerning the role of chlorine and pH in preventing disease spread is a common element in pool related illnesses and outbreaks. To increase awareness, district pool operators will be requested to participate in a training session highlighting recreational water associated illnesses, infection control, and proper facility maintenance. Upon completion, operators will be given an evaluation tool and data from the evaluation tool will help to guide revisions to future pool regulations and training requirements.

Program goals include educating pool operators of the risks associated with swimming pools, identifying and describing frequently acquired infections, and identifying control measures to reduce the risk of infection. Partnership and communication between Environmental Health and Epidemiology is essential in ensuring a successful educational and programmatic response.

Vector Control and Zoonotic Diseases

Fight the Bite: A Metro West Nile Surveillance Program

Tracy G. Kavanaugh, MS, CHES, Epidemiologist, East Metro Health District, GA

A West Nile Virus (WNV) surveillance program was initiated in the East Metro Health District (EMHD), serving Gwinnett, Newton, and Rockdale counties of Georgia, in 2000 to address the threat of the emerging virus. Initially, dead birds were collected and tested as an indicator for human risk. The program has evolved, with risk modeling and integrated pest management based on mosquito population monitoring and testing.

EMHD's WNV program is a surveillance based program in accordance with Healthy People 2010 objective 8-28 addressing increasing the number of local health departments or agencies that use

data from surveillance of environmental risk factors as part of their vector control programs. The main objective of the program is to reduce the risk of human WNV infection.

The core functions of the program are monitoring, trapping, and testing mosquitoes. Samples are submitted for testing on a weekly basis. Programmatic response and action are based on the WNV Action Grid and include notification of positives, larvaciding high risk areas as identified by monitoring, and source reduction in the community.

An outcome evaluation tool was developed to measure success and identify deficits in planning and response. Resulting actions have included amending the Action Grid, relocating mosquito traps, and reviewing program goals and objectives. Annual reviews of program data and evaluations result in program improvements and increased program success.

EMHD developed and operates a successful, surveillance based integrated pest management program focused on reducing human health risk due to WNV and protecting the livestock and recreational enjoyment of its population.