

**U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
CENTERS FOR DISEASE CONTROL AND PREVENTION
National Center for Environmental Health/
Agency for Toxic Substances and Disease Registry**



**Board of Scientific Counselors Meeting
June 27-28, 2013
Atlanta, Georgia**

Record of the Proceedings

TABLE OF CONTENTS

	<u>Page</u>
Executive Summary	1
Meeting Minutes.....	5
June 27, 2013	
Opening Session: June 27, 2013.....	5
NCEH/ATSDR Office of the Director's Report	6
Update by the NCEH/ATSDR Office of Environmental Health Emergencies	13
Update by the CDC Healthy Homes/Lead Poisoning Prevention Program	17
Update on the NCEH/ATSDR Strategic Planning Process	24
Public Comment Session	28
June 28, 2013	
Opening Session: June 28, 2013.....	28
Overview of the Role of Epi-Aids at NCEH/ATSDR	28
Public Comment Session	32
Updates by the BSC Federal Expert Members	32
BSC Open Discussion.....	37
Closing Session	39
Participants' Directory	40
Glossary of Acronyms.....	42



Executive Summary

The U.S. Department of Health and Human Services and the Centers for Disease Control and Prevention (CDC) National Center for Environmental Health/Agency for Toxic Substances and Disease Registry (NCEH/ATSDR) convened a meeting of the Board of Scientific Counselors (BSC) on June 27-28, 2013 in Atlanta, Georgia.

In accordance with Federal Advisory Committee Act rules and regulations, the Designated Federal Official verified that the voting members and Federal Expert members constituted a quorum for the BSC to conduct its business on both days of the meeting.

The BSC voting members were reminded of their individual responsibility to identify real or perceived conflicts of interest with any of the agenda items and recuse themselves from participating in these matters. None of the BSC voting members disclosed any conflicts of interest for the public record. The Acting Chair called for public comment at all times noted on the published agenda for the June 27-28, 2013 BSC meeting.

The Chief Medical Officer and Associate Director for Science covered a comprehensive set of topics in the NCEH/ATSDR Office of the Director's (OD) report to the BSC.

NCEH/ATSDR OD Highlights

- Priorities of the NCEH/ATSDR Acting Director
- NCEH/ATSDR OD briefings, hearings and meetings
- Prestigious scientific honors awarded to NCEH/ATSDR staff
- NCEH/ATSDR publications
- The new "Clear Writing Initiative" to improve the quality of writing across NCEH/ATSDR programs
- Establishment of the Partnership Council to publicize and promote NCEH/ATSDR's achievements and ongoing activities in environmental public health (EPH)
- NCEH/ATSDR's funding and support of the "Frameworks Institute" project to improve environmental health (EH) messaging
- NCEH/ATSDR's increased use of social media
- The NCEH and ATSDR FY2012 enacted budgets, FY2013 continuing resolutions with sequestration, and FY2014 President's budgets

ATSDR Highlights

- Site-specific activities at Camp Lejeune, North Carolina and Vieques, Puerto Rico
- Updated uranium ToxProfile™

- The new Research Notification System for the National Amyotrophic Lateral Sclerosis Registry
- Investigation of a major chlorine gas release at a poultry production facility in Arkansas
- Navajo Birth Cohort Study to determine a potential association between reproductive birth outcomes and environmental contaminants from mining of uranium and other heavy metals
- Training course to effectively engage and collaborate with tribal governments on critical EH and public health topics

NCEH Highlights

- Strategies to improve the linkage between EH and clinical care (e.g., the NCEH partnership with the American Congress of Obstetricians and Gynecologists to develop a joint statement on EH in reproductive care)
- Development of the National Voluntary Environmental Assessment Information System to track environmental antecedents and contributing factors to foodborne illness outbreaks
- Continued funding and support of integrated pest management training and EPH training in emergency response
- Collaboration with the U.S. Department of Transportation to develop a voluntary, web-based resource to assess the potential relationship between transportation issues and health
- Investigations of gastrointestinal elevations or outbreaks on cruise ships and the provision of courses and certifications to cruise ship supervisors and sanitation inspectors
- Development of guidance for schools on modifying outdoor physical activity according to air quality index levels
- Epi-Aids in Arkansas, Indiana and Oklahoma to explore the public health impacts of drought on private well owners and better understand the barriers and needs for maintaining a safe and adequate drinking water supply in these conditions
- Leadership of a meeting with the Global Health Security Initiative Radiological and Nuclear Threats Workgroup to discuss policies, procedures and practices for the use of potassium iodide
- Development of timeline maps by the Environmental Health Tracking Program to illustrate changes in environment and health data over time
- Updated tables in the *Fourth National Report on Human Exposure to Environmental Chemicals* to illustrate nationally representative biomonitoring data that are now available: phytoestrogens data, phthalate metabolites data, and thiocyanate and nitrate surplus sample results
- Publications that evaluated sociodemographic, lifestyle and physiologic variables to determine an association with nutrition biomarkers

The NCEH/ATSDR Office of Environmental Health Emergencies (OEHE) presented an update on its public health preparedness and response activities that are underway to expand both internal and external collaboration and coordination. OEHE also provided a comprehensive overview of its three new areas of focus and future directions: drought, chemical terrorism preparedness, and disaster risk reduction.

The CDC Healthy Homes/Lead Poisoning Prevention Program (HHLPPP) presented an update on its ongoing activities and future directions:

- internal and external impacts of the elimination of CDC's lead poisoning prevention (LPP) funding of ~\$19.8 million to 35 state and local health departments on September 1, 2012;
- continuation of HHLPPP's expertise, technical assistance, analysis and epidemiological capacity with its annual \$2 million budget;
- CDC's Epi-Aid that was conducted in response to the detection of elevated blood lead levels among children whose parents were employed at a local battery recycling plant in Puerto Rico; and
- HHLPPP's potential funding opportunities and future directions after the Affordable Care Act (ACA) is implemented.

NCEH/ATSDR presented an update on the vision, mission statement, 3 goals, 15 objectives, and 7 proposed priorities for its draft strategic plan: asthma, emergency preparedness and response, environmental exposures, food, laboratory, tracking, and water. NCEH/ATSDR also described its specific set of criteria and questions to guide the process of narrowing the 7 topics to 3-5 strategic plan priorities that will include an overarching objective statement and 3-4 key action steps to accomplish over the next 1-3 years.

NCEH presented an overview of the background and history of the CDC Epidemic Intelligence Service (EIS) Training Program and the role of Epi-Aids in EPH. The EIS Program is a two-year post-graduate, capacity building and workforce development initiative that provides on-the-job training for health professionals with a focus on applied epidemiology, research and emergency response. An Epi-Aid is an emergency response led by an EIS Officer. NCEH/ATSDR also described CDC's recent domestic and international Epi-Aids that have focused on EPH issues:

- Morbidity surveillance in temporary shelters following Hurricane Sandy
- International travelers who were returning to the United States and triggered an alert of the U.S. Customs and Border Protection's radioactive screening system due to their high levels of radioactive strontium
- Artisanal gold mining in Peru and Nigeria that has resulted in high levels of methyl mercury in fish consumed by residents in nearby communities
- Neurological impacts and renal failure related to cough syrup that was contaminated with diethylene glycol and resulted in multiple deaths in Panama and Nigeria
- Deaths from illicit opioid use in Rhode Island and other communities in the United States

The BSC Federal Expert members provided updates on recently completed or ongoing EPH activities of their respective agencies.

- The National Institute for Occupational Safety and Health (NIOSH) update covered the NIOSH budget; NIOSH publications on new or revised recommended exposure limits for carbon nanotubes and nanofibers, hexavalent chromium and the chemical carcinogen classification policy; and other NIOSH initiatives that are underway.
- The U.S. Department of Energy update covered the Comprehensive Epidemiologic Data Resource (CEDR). CEDR is an electronic database that is designed to collect and maintain data from mortality studies of DOE contract workers, data from environmental studies of areas surrounding DOE sites, and data from the Former Worker Medical Screening Program.
- The National Institute of Environmental Health Sciences update covered the National Toxicology Program's (NTP) ongoing efforts to refine its systematic review process by

reviewing existing clinical and epidemiologic guidance for healthcare interventions and assessing the extent to which these recommendations can be tailored for EPH. NTP has published its systematic review framework and applied the methodology to external initiatives, such as the creation of American Academy of Pediatrics policy statements for air pollution and emerging children's health issues.

- The U.S. Environmental Protection Agency (EPA) update covered EPA's ongoing efforts to meet and consult with its federal partners to respond to multiple sets of guidelines that are directly targeted to EPA.
 - Recommendations to EPA in two recent National Academy of Sciences reports (*Sustainability and the U.S. Environmental Protection Agency* and *Exposure Science in the 21st Century: A Vision and a Strategy*)
 - Recommendations to EPA in the U.S. Government Accountability Office document on pharmaceuticals in the environment
 - Recommendations in the ACA language on 13 EPH areas requiring EPA leadership

The BSC provided NCEH/ATSDR with extensive comments, suggestions and recommendations over the course of the meeting on the following issues:

- Priorities established by the Acting NCEH/ATSDR Director
- NCEH/ATSDR's EPH preparedness and response activities
- Strategies to strengthen the linkage between EPH and clinical care
- NCEH/ATSDR's site-specific activities to assure a strong focus on environmental justice, community engagement and empowerment, fairness, social responsibility and equity
- Approaches to restore or increase CDC's lead poisoning prevention funding to state and local health departments
- Refinement of the goals, objectives and proposed priorities of the draft NCEH/ATSDR Strategic Plan
- Improvement of the BSC organizational structure, including the format of future meetings and the BSC's advisory role to NCEH/ATSDR

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**BOARD OF SCIENTIFIC COUNSELORS
June 27-28, 2013
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Minutes of the Meeting

The U.S. Department of Health and Human Services (HHS) and the Centers for Disease Control and Prevention (CDC) National Center for Environmental Health/Agency for Toxic Substances and Disease Registry (NCEH/ATSDR) convened a meeting of the Board of Scientific Counselors (BSC). The proceedings were held on June 27-28, 2013 in Building 106 of the CDC Chamblee Campus in Atlanta, Georgia.

The BSC is chartered to provide advice and guidance to the Secretary of HHS, Director of CDC, and Director of NCEH/ATSDR regarding program goals, objectives, strategies and priorities in fulfillment of the agencies' mission to protect and promote persons' health. The BSC shall provide advice and guidance to assist NCEH/ATSDR in ensuring scientific quality, timeliness, utility and dissemination of results. The BSC also shall provide guidance to help NCEH/ATSDR work more efficiently and effectively with its various constituents to fulfill its mission to protect America's health.

Opening Session: June 27, 2013

Vikas ("Vik") Kapil, DO, MPH, FACPOEM

Chief Medical Officer and Associate Director for Science, NCEH/ATSDR
Centers for Disease Control and Prevention
Acting BSC Chair and Designated Federal Official

Dr. Kapil conducted a roll call to determine the BSC voting members and Federal Expert members who were in attendance. He announced that the members constituted a quorum for the BSC to conduct its business on June 27, 2013 and called the meeting to order at 8:35 a.m. Dr. Kapil welcomed the participants to the meeting and particularly thanked the BSC members for continuing to contribute their valuable time and expertise to provide outstanding guidance and input on the NCEH/ATSDR environmental public health (EPH) portfolio.

Dr. Kapil reminded the BSC voting members of their individual responsibility to identify real or perceived conflicts of interest with any of the published agenda items for June 27, 2013 and recuse themselves from participating in these matters. None of the BSC voting members

disclosed any conflicts of interest for the public record. He opened the floor for all of the participants to introduce themselves and their affiliations.

Dr. Kapil announced that he would serve as both the BSC Chair and Designated Federal Official for the meeting because the nomination package for the permanent BSC Chair has not been officially approved and cleared at this time.

Robin Ikeda, MD, MPH, USPHS RADM

Acting Director, NCEH/ATSDR

Deputy Director, Office of Noncommunicable Diseases, Injury and Environmental Health
Centers for Disease Control and Prevention

Dr. Ikeda joined Dr. Kapil in welcoming the participants to the BSC meeting. She thanked the BSC members for their continued service to NCEH/ATSDR and the broader environmental health (EH) community.

NCEH/ATSDR Office of the Director's Report

Vikas ("Vik") Kapil, DO, MPH, FACPOEM

Chief Medical Officer and Associate Director for Science, NCEH/ATSDR

Centers for Disease Control and Prevention

Acting BSC Chair and Designated Federal Official

Dr. Kapil covered the following topics in the NCEH/ATSDR Office of the Director's (OD) report to the BSC.

Priorities of the NCEH/ATSDR Acting Director. Dr. Christopher Portier served as the NCEH/ATSDR Director until his retirement in April 2013. Dr. Robin Ikeda is serving as the Acting Director until the position is permanently filled. She has established five key priorities for NCEH/ATSDR.

Ongoing efforts will be continued to increase the efficiency, effectiveness and measurable impact of NCEH/ATSDR and its activities due to the current environment of severe budget constraints. The draft NCEH/ATSDR Strategic Plan and priorities will be finalized. Support will be provided for NCEH/ATSDR to publicize its "story" to multiple partners and diverse audiences. Strategies will be identified for NCEH and ATSDR to seamlessly collaborate across programs both within and outside of NCEH/ATSDR. Talented, permanent leadership will be identified to guide NCEH/ATSDR's new directions in EPH.

Drs. Kapil, Ikeda and Thomas Sinks, Deputy Director of NCEH/ATSDR, are continuing to discuss the BSC's role in helping OD to achieve these five priorities. Over the course of the meeting, the BSC will be asked to propose suggestions and identify opportunities in this regard.

NCEH/ATSDR OD Briefings, Hearings and Meetings. OD provided an overview of ATSDR's operations and budget during an in-person briefing to the House Appropriations Subcommittee on Interior, Environment and Related Agencies in March 2013. After the briefing, OD responded to a series of follow-up questions posed by Congressional staffers. OD provided an

overview of NCEH's FY2014 priorities and accomplishments to Ms. Adrienne Hallett during her visit to CDC in April 2013. Ms. Hallett is a senior Congressional staffer and also was given a tour of the CDC Environmental Health Laboratory.

OD gave its annual briefing to EH partners in April 2013 to discuss the FY2014 President's budget request for both NCEH and ATSDR. OD provided an overview of ATSDR's activities and areas of focus for the upcoming year to the House Committee on Transportation and Infrastructure in April 2013.

OD attended a hearing by the House Committee on Science Space and Technology to share information on HHS's hydraulic fracturing research activities. The U.S. Environmental Protection Agency (EPA), U.S. Department of Interior and U.S. Department of Energy (DOE) also testified during the hearing.

NCEH/ATSDR OD Highlights. OD is proud of the prestigious honors that were awarded to NCEH/ATSDR staff. Dr. Richard Gelting was awarded the 2013 Federal Engineer of the Year, the 2013 U.S. Public Health Service (PHS) Engineer of the Year, the 2013 CDC Engineer of the Year, and the 2013 Robert C. Williams PHS Engineering Literary Award in the peer-reviewed category. Dr. Moiz Mumtaz was awarded the 2013 Society of Toxicology Arnold J. Lehman Award in recognition of his 25 years of work on risk assessment and chemical mixtures.

OD is proud of the numerous papers and articles that NCEH/ATSDR staff has published in peer-reviewed journals and the CDC *Morbidity and Mortality Weekly Reports (MMWR)* over the past year. These publications covered a broad range of important EPH topics.

- Tornado-related fatalities in 5 states in Southeastern United States (July 2012)
- Lead poisoning in pregnant women who used ayurvedic medications from India (August 2012)
- Take-home lead exposures among children with relatives employed at a battery recycling facility in Puerto Rico (November 2012)
- Carbon monoxide exposures reported to Poison Control Centers in Northeastern United States related to Hurricane Sandy (November 2012)
- An updated Asthma Surveillance Report (November 2012)
- Health hazards associated with laundry detergent pods in the United States (October 2012)
- Acute kidney injury related to synthetic cannabinoid use in multiple states (February 2013)
- Exposures to discarded sulfur mustard munitions in Mid-Atlantic and New England states (April 2013)
- Blood lead levels (BLLs) in children 1-5 years of age in the United States (April 2013)
- Deaths associated with Hurricane Sandy (May 2013)
- Heat-related deaths after an extreme heat event in the United States (June 2013)
- Homemade chemical bomb incidents in 15 states (June 2013)

OD launched a new "Clear Writing Initiative" to improve the quality of writing across NCEH/ATSDR programs, educate authors on clear writing principles, and strengthen the writing of select classes of documents. OD is offering a number of resources to help staff acquire or enhance their skills: "Writing Tip Wednesday," "Writing Webinar Wednesday," the Clear Writing Summit, Clear Communication Index, and "Writers and Editors!" course.

OD formed a Partnership Council that is charged with publicizing and promoting NCEH/ATSDR's achievements and ongoing activities in EH. The Partnership Council developed a "Blueprint for Environmental Health: Healthy Environments for Healthy Communities," participated in the NCEH/ATSDR strategic planning process, and consulted on the FrameWorks Institute messaging project. The Partnership Council's assessment of available research on the value of EH will include cost-benefit and return-on-investment analyses for EH interventions.

OD is supporting the American Public Health Association (APHA) to conduct the Frameworks Institute project to improve EH messaging. Under this project, APHA will frame the core tenets of EH for the American public, clearly define the field, describe potential accomplishments and outline the role of government. Over the multi-year project, APHA will map a gap conceptual analysis (phase 1), map an experiment to facilitate public discourse and bridge gaps (phase 2), and refine the maps as needed.

OD's increased use of social media has resulted in an increase in visitors to NCEH/ATSDR websites. Most notably, the CDC Twitter account reached ~8.4 million persons following Hurricane Sandy and the asthma Twitter chat during "Asthma Month" in May 2013 trended higher than a major motion picture.

OD announced the NCEH and ATSDR budgets. For NCEH, the FY2012 enacted budget was \$158,233,000, the FY2013 continuing resolution with sequestration is \$142,638,000, and the FY2014 President's budget is proposed at \$155,126,000. Decreases between NCEH's FY2012 enacted budget and the proposed FY2014 President's budget are ~\$3 million for EH programs and \$6 million for the Tracking Program through the Prevention and Public Health Fund.

For ATSDR, the FY2012 enacted budget was \$76,215,000, the FY2013 continuing resolution with sequestration is \$73,065,000, and the FY2014 President's budget is proposed at \$76,215,000. If the FY2014 President's budget is approved, ATSDR funding will be level to the FY2012 budget and will include \$2 million for uranium exposure studies in the Navajo Nation.

ATSDR Highlights. ATSDR sponsored a Community Assistance Panel (CAP) meeting in Camp Lejeune, North Carolina in May 2013 to obtain further input from the community on its activities to address drinking water contamination at the site. ATSDR's efforts to address male breast cancer as a health outcome at the Camp Lejeune site are ongoing.

ATSDR published the final water modeling report of the Camp Lejeune site with several summaries, including analyses and results of reconstructed volatile organic compound-contaminant concentrations in water supply wells and drinking water in Hadnot Point and Holcomb Boulevard water treatment plant service areas. Links to transcripts and videos of CAP meetings and the final water modeling report of the Camp Lejeune site are available on the ATSDR website.

ATSDR released an updated public health assessment (PHA) for the Vieques, Puerto Rico site in March 2013. The PHA found no evidence that past military activities caused current exposure to high levels of contamination. However, potential exposure to high levels of mercury from consumption of local fish was noted. ATSDR recommended monitoring and evaluation of chronic diseases among Vieques community residents, administration of a fish consumption survey, and mercury biomonitoring by public health officials in Vieques.

ATSDR released the updated uranium ToxProfile™ in March 2013 to provide a more complete scientific picture of health effects from all types of uranium. The updated ToxProfile™ found no difference between toxicity of natural and depleted uranium. Evaluations of service members with embedded depleted uranium fragments have not shown adverse health effects. No strong evidence was found in human studies of an association between birth defects and uranium exposure.

ATSDR launched a Research Notification System for its National Amyotrophic Lateral Sclerosis (ALS) Registry to increase enrollment and connect ALS researchers and enrollees. The purpose of the registry is to identify ALS risk factors and determine the national incidence and prevalence of the disease. To date, ~5,000 ALS patients have been notified about new research opportunities. A biorepository pilot study is underway to collect and maintain blood, urine, hair and other biological specimens from living ALS patients and brain, spinal cord, muscle and other tissue samples from deceased ALS patients.

ATSDR and the National Institute for Occupational Safety and Health (NIOSH) investigated a major chlorine gas release at a poultry production facility in Arkansas that led to illnesses and hospitalizations of several hundred workers. The joint ATSDR/NIOSH response prompted the Arkansas Acute Chemical Event (ACE) Program to change its notification procedures to the state health department and establish new guidelines to respond to emergencies.

ACE typically did not inform the state health department about these types of releases. As a result, the health department's translators and other resources were not brought to bear to assist Spanish-speaking workers at the plant who were unable to read warning signs or follow instructions in English. ACE successfully implemented the new notification procedures for two additional events that occurred within two weeks following the chlorine gas release.

ATSDR initiated the Navajo Birth Cohort Study in collaboration with the University of New Mexico and the Navajo Nation to determine a potential association between reproductive birth outcomes and environmental contaminants from mining of uranium and other heavy metals. The study design includes recruitment of Navajo Nation mothers, an exposure assessment at key milestones, and follow-up of children post-birth to evaluate a specific association with birth defects or developmental delays.

ATSDR obtained three-year approval for the study from the Office of Management and Budget (OMB) in February 2013. The major components of the study will include community outreach, training, recruitment of participants, and collection of samples with culturally-appropriate and culturally-sensitive approaches. The study also will be designed to determine access to prenatal and other types of care in the cohort and identify strategies to improve care in the community.

The ATSDR Office of Tribal Affairs hosted a training course in April 2013 on strategies to effectively engage and collaborate with tribal governments on important EH and public health topics. The training course was open to all CDC and ATSDR staff. ATSDR will hold a follow-up course in August 2013.

NCEH Highlights. CDC is continuing to focus on its strong agency-wide efforts to develop strategies for meaningful engagement and improvement of the linkage between public health at

the population level and clinical care at the individual level. CDC hopes that these initiatives will help to incorporate key public health principles into actual clinical practice in the field.

NCEH/ATSDR launched a new project in this regard specifically for EPH issues. NCEH/ATSDR is partnering with the American Congress of Obstetricians and Gynecologists (ACOG) to develop and issue a joint statement on EH in reproductive care. The statement will assist primary care providers (PCPs) in simplifying and communicating complex EH issues to pregnant women and parents of newborns. NCEH/ATSDR and ACOG recognize that obstetricians, clinicians and nurse midwives most likely will demand more tools and approaches in the future to better understand and assess environmental exposures in reproductive health care for their patients.

NCEH developed the National Voluntary Environmental Assessment Information System to track environmental antecedents and contributing factors to foodborne illness outbreaks. In April 2013, NCEH published a *Federal Register* notice on the system with a 30-day public comment period. The system is expected to facilitate reporting from all U.S. EH programs in the future.

NCEH is continuing to fund and support integrated pest management training. In April 2013, the South Carolina Bureau of Environmental Health made NCEH's training course a top priority for the entire state for FY2013. In May 2013, Boston University allocated funds to offer NCEH's training course to >90 EH professionals throughout New England.

NCEH is continuing to fund and support EH training in emergency response. Over the past year, ~400 front-line EH professionals have completed the training course that is delivered by CDC and the Federal Emergency Management Agency. Additional EH professionals have completed the online version of the training course that is available on the National Environmental Health Association e-learning website.

NCEH is closely collaborating with the U.S. Department of Transportation to develop a voluntary, web-based resource to assess the potential relationship between transportation issues and health. Baseline data will be collected from states and large metropolitan regions using a broad range of indicators: active living, safety, air quality and health equity. APHA held a workshop in April 2013 for an expert panel to review and discuss the draft indicators.

The NCEH Vessel Sanitation Program (VSP) has responded to 30 gastrointestinal elevations or outbreaks to date in 2013 that included monitoring and/or field responses. VSP also completed 10 shipyard construction inspections; offered its 2.5-day enhanced training course for cruise ship supervisors; and provided its training course and certification for sanitation inspectors of ships sailing through South American seaports.

The NCEH Air Pollution and Respiratory Health Branch partnered with EPA to develop guidance for schools on modifying outdoor physical activity according to air quality index levels. The guidance was released in March 2013 and is available on the NCEH Air Quality website. NCEH published the *Climate Change and Extreme Heat Events Guidebook* that includes projections on impacts from increased extreme health events and describes strategies for public health to protect the nation from these impacts. The guidebook has received 270 page views since its release and publication on the CDC Climate Change and Health website in March 2013.

NCEH conducted Epi-Aids in Arkansas, Indiana and Oklahoma to explore the public health impacts of drought on private well owners and better understand the barriers and needs for maintaining a safe and adequate drinking water supply in these conditions. Information from the Epi-Aids will help public health officials to assist private well owners in managing their water supplies during droughts. Analyses of these data are underway.

The NCEH Radiation Studies Branch hosted a meeting in April 2013 with the Global Health Security Initiative Radiological and Nuclear Threats Workgroup to discuss policies, procedures and practices for the use of potassium iodide. The workgroup agreed to conduct an inter-comparison exercise between international bioassay laboratories using radiological emergency scenarios.

The NCEH Environmental Health Tracking Program developed timeline maps to illustrate changes in environment and health data over time. The maps are designed for users to select locations and easily identify and evaluate trends in data. The Tracking Program also developed 36 new measures for community water supplies and 6 new contaminant profiles. The Tracking Program posted new success stories and videos on YouTube, including mercury in fish and approaches to increase public access to cooling centers during heat waves.

The NCEH Division of Laboratory Sciences (DLS) released the *Fourth National Report on Human Exposure to Environmental Chemicals* with updated tables in March 2013 to illustrate nationally representative biomonitoring data that have become available. Since the release of the Fourth Report in 2009, 119 chemicals have updated tables and 34 new chemicals have been added. The most recent updated tables in the Fourth Report feature phytoestrogens data, phthalate metabolites data, and thiocyanate and nitrate surplus sample results.

DLS published 8 papers as a supplement to the June 2013 issue of the *Journal of Nutrition*. The papers evaluated sociodemographic, lifestyle and physiologic variables to determine an association with nutrition biomarkers. The papers reported overall differences in nutrition biomarker levels that continued to be dependent on age, gender and race/ethnicity.

The BSC made several comments and suggestions for NCEH/ATSDR to consider in enhancing its EPH portfolio.

NCEH/ATSDR OD Priorities

- The BSC members should utilize their memberships in various professional societies to promote and advocate for the five EPH priorities that the Acting NCEH/ATSDR Director has established.
- OD should identify creative opportunities to engage partners and programs that have more funding in order to leverage resources from other grant mechanisms (e.g., the CDC-funded Prevention Research Centers (PRCs) and academic institutions) to better address EH issues.

EPH Preparedness and Response

- NCEH/ATSDR should collaborate with its federal partners to issue guidance that strongly emphasizes the need for states to be more proactive and less reactive to chemical releases and other types of EPH emergencies; enhance communications at the local level; and rapidly inform the community about potential adverse health effects. As a case study, the guidance should first cite the lack of communication between ACE

and the Arkansas Department of Public Health about the chlorine gas release and its outcomes. The guidance should then describe the benefits and impact of improvements in Arkansas's emergency notification procedures on two new events that occurred within two weeks of the chlorine gas release.

- NCEH/ATSDR should require state grantees to develop their public health preparedness and response plans with EPH safety data, communication strategies, and educational materials that are appropriate for persons in the general population and workers in occupational settings who cannot speak English or read in any language.

EPH/Clinical Care Linkage

- NCEH/ATSDR should engage its professional society partners to launch a national effort to include more EPH topics in medical school and nursing school curricula. Practicing and newly-licensed clinicians, nurses and other providers typically have minimal knowledge of the role of the environment on reproductive health, nutrition and other important healthcare issues.
- NCEH/ATSDR should consult with Dr. Kristina Thayer, the BSC Federal Expert member for the National Institute of Environmental Health Sciences (NIEHS), to obtain additional expertise on improving the linkage between EPH and clinical care. The NIEHS National Toxicology Program (NTP) initiated a new effort that will include the validation of questionnaires and the collection of biomonitoring data and biological specimens over time. The new NTP tool could serve as a useful resource in the ACOG/NCEH project to help clinicians in assessing environmental exposures in reproductive health care.
- NCEH/ATSDR, EPA, NIEHS and other federal EPH partners should take concrete steps to ensure that an EH-related assessment or a series of questions are included in electronic health records (EHRs). Most notably, NCEH/ATSDR and its EPH partners should be extensively involved in the ongoing initiative to establish a core set of EHR standards. From a clinical perspective, EHRs should be expanded with a short "EH-focused" script for PCPs to cover with pregnant women or women of reproductive age during their routine visits. The short script could be designed with specific EH screening and biomonitoring questions. From a public health perspective, the inclusion of EH-focused questions in EHRs could facilitate future research and assess the major needs of communities.
- NCEH/ATSDR will be extremely challenged in attempting to change the traditional mindsets and different cultures between the public health and clinical communities. Instead of implementing a broad strategy for the entire clinical community, a more realistic, practical and productive solution to this problem would be for NCEH/ATSDR to target its efforts to specific practitioners who already have a strong interest in public health. A successful model of this targeted approach is the Minnesota Department of Health's (MDH) "mini-internship" for practitioners with an interest in EPH. In this program, practitioners visit MDH for 2-4 weeks and obtain first-hand knowledge, education and experience from a state public health department. Occupational health physicians and emergency department doctors are the most frequent participants of the MDH internship program.
- NCEH/ATSDR's key EPH messages to the clinical community should be designed to be relevant and meaningful to "actual" clinical practice rather than "theoretical" medical school curricula. Practicing pulmonologists with training in EPH and experience in the use of EHRs should be engaged to assist NCEH/ATSDR in this effort.
- The BSC should launch a national effort with federal agencies, professional societies and external stakeholders to formulate effective strategies to preserve the critically

important resource of NIOSH-funded Education and Research Centers (ERCs). ERCs across the country have generated a great deal of interest in public health and occupational medicine among medical residents over the past few decades, but the FY2014 President's budget request calls for elimination of the ERCs. For example, the University of California-Irvine School of Medicine already has de-emphasized preventive medicine as a discipline and nearly eliminated its entire EH and occupational health curricula.

- The BSC should engage the Association of American Medical Colleges, schools of public health and other professional societies to identify creative strategies to ensure that EPH is prominently featured in the national dialogue on approaches to improve the linkage between public health and clinical care.

Site-Specific Activities

- NCEH/ATSDR should ensure that its site-specific activities address environmental justice (EJ) concerns and ethical issues through extensive community engagement and outreach at the beginning of each project to empower individuals. For example, NCEH/ATSDR should report biomonitoring data and other findings of the Navajo Birth Cohort Study and other cohort studies in a manner that is appropriate for the community from cultural, linguistic and literacy perspectives.

NCEH/ATSDR made several remarks in follow-up to some of the comments and suggestions the BSC made during the discussion. Dr. Edward Murray, Acting Director of the ATSDR Division of Toxicology and Human Health Sciences, reported that NCEH/ATSDR leadership is continuing to discuss and propose potential strategies to better engage medical schools. These approaches include a "Blue Panel" forum and collaboration with a school of public health to target outreach to physicians through a pilot program at a local medical school.

Dr. Kapil announced that NCEH/ATSDR recently attended the first meeting of a newly-formed Institute of Medicine (IOM) committee to propose approaches to improve the linkage and communications between the public health and clinical communities. The potential use of EHRs for asthma, lead, tobacco smoke, healthy homes and other EPH issues is one of the ongoing discussion topics in the IOM committee.

Dr. James Pirkle, Director of DLS, announced that CDC has made great strides over the past few years in reporting National Health and Nutrition Examination Survey (NHANES) biomonitoring data to individual study participants. However, he agreed that improvements are still needed because the timeliness of reporting NHANES results to persons continues to be based on their individual level of exposure and CDC's access to data.

For example, reporting of results to persons with exposure levels above a health threshold is generally rapid. Reporting of results to persons with exposure levels in the normal range is completed at a later time. Reporting of results to persons included in studies with states, academic institutions or other CDC partners typically is delayed.

Update by the NCEH/ATSDR Office of Environmental Health Emergencies

RADM Scott Deitchman, MD, MPH

Associate Director for Environmental Health Emergencies
Office of Environmental Health Emergencies, NCEH/ATSDR

Dr. Deitchman covered the following topics in his update to the BSC on activities by the NCEH/ATSDR Office of Environmental Health Emergencies (OEHE). The 2003 IOM report defined “public health preparedness and response” (PHPR) as the capability of the public health system, communities and individuals to prevent, protect against, quickly respond to, and recover from health emergencies, particularly those in which scale, timing or unpredictability threatens to overwhelm routine capabilities.

CDC’s role in executing PHPR activities is part of the broader National Response Framework. The U.S. Department of Homeland Security has overall authority for emergency preparedness and response, while HHS has responsibility for public health and medical services. President Obama released Presidential Policy Directive 8 that outlines national preparedness goals in 5 emergency management categories:

- prevention (primarily terrorism);
- protection (actions to safeguard the nation from the effects of terrorism and disaster);
- response (immediate steps to save lives, protect property and the environment, and meet basic human needs);
- mitigation (strategies to minimize the impact of a disaster); and
- recovery (assistance to affected communities).

The Congressional appropriation for CDC’s PHPR activities is >\$1 billion, but the majority of this funding is for extramural line-items to support state and local PHPR activities and maintain medical supplies in the Strategic National Stockpile. The remainder of the appropriation is divided among several CDC programs for intramural line-items:

- Office of Public Health Preparedness and Response to maintain and activate the CDC Emergency Operations Center (EOC) for a full-scale public health response;
- OEHE to provide both senior leadership and technical expertise when CDC activates the EOC to respond to chemical, radiological and natural disasters;
- Office of Infectious Diseases to address bioterrorism events; and
- NIOSH to protect first responders and other front-line workers of emergencies.

The NCEH/ATSDR “Office of Terrorism Preparedness and Emergency Response” was renamed to “OEHE” to more clearly define its broader role as CDC’s focal point for science-based emergency management of public health consequences of natural and technological disasters, including nuclear reactor accidents, chemical releases and radiological phenomena. OEHE leads EOC’s emergency management response for chemical, radiological and natural disasters during emergencies and fosters collaboration across NCEH/ATSDR and with external partners and non-federal stakeholders in between emergencies.

OEHE uses findings from the *2004 9/11 Commission Report* to clearly distinguish between coordination and collaboration and improve its PHPR activities. “Coordination” is when an individual first defines and then makes others aware of a problem or response. “Collaboration” (*i.e.*, “joint actions”) is when individuals from various backgrounds differently define problems and options at the outset, but then collectively analyze and develop plans to manage the case.

OEHE's highly-trained staff of 15 full-time equivalents and 2 contractors has a broad range of academic degrees and expertise in various disciplines: emergency medicine, disaster medicine, medical toxicology, occupational medicine, preventive medicine, veterinary preventive medicine, business and contracting, industrial engineering and public health.

OEHE recently activated staff and provided technical expertise for several major emergency responses, including the Deepwater Horizon Oil Spill, radioactive release at the Fukushima-Daiichi Nuclear Power Plant in Japan, Hurricane Sandy, and potential ricin threats from castor beans hidden in letters.

OEHE has a strong presence in several groups to expand both its internal and external collaboration and coordination, including White House subcommittees and workgroups to develop new national guidance on chemical decontamination and disaster risk reduction. OEHE also serves on the federal interagency National Response Team that plans for and responds to oil spills and other hazardous material releases.

OEHE actively participates in CDC's Noncommunicable Diseases, Injury and Environmental Health emergency management activities; development and revision of the CDC Emergency Operations Plan; the CDC pandemic influenza response; crisis leadership training; and Coast Guard incident management planning.

OEHE currently is focusing on three new major activities that extend far beyond its traditional PPHR role. New activity 1 is drought. This weather condition is viewed as a "slow-moving emergency." As of June 18, 2013, 47% of U.S. counties had no drought, 53% had some level of drought, and 30% had severe to extreme drought. However, the proportion of U.S. counties that are experiencing drought at this time could dramatically increase by the end of the summer in August 2013.

The health consequences of drought include decreased availability of water for drinking and hygiene, respiratory hazards from dust and wildfire smoke, infectious fungal, vector-borne or zoonoses diseases, increased food prices due to crop failures, and a rise in suicides or other adverse behavioral health effects among farmers and other persons who are most affected by drought. The June 20-September 30, 2013 forecast for the United States predicts persistent or intensified drought, particularly in the Western part of the country.

CDC produced several public health outreach resources for its federal partners and non-governmental organizations (NGOs) in response to the 2012 drought. The educational resources included a drought website, a series of four drought webinars targeted to health departments, and publication of the *When Every Drop Counts: Protecting Public Health During Drought Conditions* booklet. The health surveillance resources included technical assistance to states to improve their existing systems or develop new systems to better detect drought-related conditions.

New activity 2 is chemical terrorism preparedness. In March 2013, the Director of National Intelligence announced that Syria has a highly active chemical warfare program and maintains a stockpile of sulfur mustard, sarin and VX nerve gas. OEHE, its internal NCEH/ATSDR partners and external federal partners are conducting a number of activities to support this new focus area.

Extensive information on chemical terrorism was reviewed and updated on the CDC website. The American Association of Poison Control Centers' National Poison Data System is being used to enhance surveillance of unrecognized exposures to chemical weapons. The extensive set of laboratory assays are continuing to be improved to strengthen detection and confirmation of individual exposure through analyses of blood and urine specimens.

The longstanding relationship with the Department of Defense to provide health and safety oversight in the destruction of military chemical weapons is ongoing. Plans are underway to rapidly deploy a registry team if a chemical terrorism event occurs. New guidance on decontamination is currently undergoing an interagency review process. New guidelines are being developed on environmental decontamination and cleanup efforts.

Outreach is being provided to the Federal Bureau of Investigations to facilitate a joint public health/law enforcement response to a chemical terrorism event. The "Agents of Opportunity" course is offered to healthcare providers and students across the country to strengthen capacity in addressing both chemical and radiological threats associated with terrorism. OEHE has requested funding to develop an online version of the course to broaden the reach and access to this important information.

New activity 3 is disaster risk reduction (DRR). This concept involves systematic efforts to analyze, reduce and prevent causal factors and adverse health impacts of disasters. "Disaster risk" is equivalent to the probability of an event times exposure times vulnerability. DRR can be achieved by decreasing exposure to hazards, improving preparedness and reducing vulnerability. An example of a DRR model would be public health epidemiologic approaches to prevent injuries and deaths during a tornado (e.g., availability of shelters, effective messages to motivate individuals to relocate to shelters, and helmets to protect persons from head injuries).

OEHE is undertaking this effort due to the need for EH to play a prominent role in reducing the public health consequences of disasters and the similarity in terminology between DRR and EH: "environmental," "hazards," "disaster," "risk," "emergencies," "reduction," "exposures," and "impacts." OEHE is involved in several activities to increase its role and presence in DRR initiatives.

For policy initiatives, input was provided to the World Health Organization on the development of a new "Global Disaster Risk Reduction Strategy." The creation of a regional DRR strategy was facilitated across all Pacific Island nations. CDC is represented on the White House Subcommittee for Disaster Risk Reduction.

For educational initiatives, DRR training is being offered to the Medical Reserve Corps. Efforts are underway to develop an undergraduate college curriculum on DRR. For coordination initiatives, subject-matter expert (SME) reviews of CDC's risk communication materials are being conducted to identify opportunities to widely promote DRR in CDC's EPH portfolio.

In addition to focusing on these three new directions, OEHE also will continue to address its existing challenges, such as strengthening interagency collaboration, identifying strategies to intervene sooner rather than wait for an invitation by states, and evaluating the impact of PHPR activities in reducing morbidity and mortality. OEHE is aware of the need for CDC to help states anticipate disasters and determine their preparedness and response needs well in advance of an event.

The BSC's discussion with Dr. Deitchman on NCEH/ATSDR's PPHR activities covered the following topics.

- Effective approaches to help states prioritize their planning, preparedness, prevention and response efforts for rare or non-existent events, particularly in the current setting of constrained budgets.
- The need for a stronger DRR focus in EJ communities (e.g., those with underlying social, geographic, economic and structural vulnerabilities).
- The critical need to include mental health professionals in NCEH/ATSDR's PPHR activities to address mental health and behavioral health outcomes, psychological factors, and community resilience after an emergency, disaster or exposure for both the public and responders.
- The need for NCEH/ATSDR to engage and collaborate with the U.S. Chemical Safety Board, particularly on its emergency response activities.

Update by the CDC Healthy Homes/Lead Poisoning Prevention Program

Mary Jean Brown, ScD, RN

Lead Scientist, Healthy Homes/Lead Poisoning Prevention Program
Centers for Disease Control and Prevention

Dr. Brown covered the following topics in her update to the BSC on activities by the CDC Healthy Homes/Lead Poisoning Prevention Program (HHLPPP). The overarching mission of HHLPPP is to reduce or eliminate dangerous lead sources prior to exposure to ensure that children and other persons are not affected by environmental hazards in their homes. HHLPPP also maintains a strong commitment and dedication to eliminating high BLLs in children in the United States.

HHLPPP's major functions are three-fold. Technical assistance and expertise are provided to states to collect data related to lead and other health hazards in homes to populate and maintain the CDC Healthy Homes/Lead Poisoning Surveillance System. Staff is maintained to provide expertise and epidemiological support in response to lead poisoning outbreaks. Support is provided to maintain the Advisory Committee on Childhood Lead Poisoning Prevention (ACCLPP).

ACCLPP advised CDC to abandon its use of the term "blood level of concern" and the "threshold of ≥ 10 $\mu\text{g}/\text{dL}$ " and replace this terminology with a "reference value" based on the 97.5 percentile of the NHANES distribution for children 1-5 years of age (*i.e.*, ≥ 5 $\mu\text{g}/\text{dL}$). In response to the ACCLPP recommendation, CDC published an *MMWR* article in April 2013, *Blood Lead Levels in Children 1-5 Years Old: United States, 1999-2010*.

The data showed that the confidence intervals overlapped and were not statistically significant in terms of the ability of race/ethnicity, poverty-to-income ratio, age of housing and Medicaid enrollment status to predict the percentage of children 1-5 years of age with BLLs ≥ 5 $\mu\text{g}/\text{dL}$. Based on the geometric mean BLL, however, these same four factors that historically have placed children 1-5 years of age at risk for BLLs ≥ 5 $\mu\text{g}/\text{dL}$ remained statistically significant.

The data further showed that African American children and poor children have a much higher geometric mean BLL than children in all other racial/ethnic and income groups. Although traditional strategies of targeting interventions to children, geographic areas and housing at highest risk have been effective, disparities in childhood BLLs are persistent.

HHLPPP has faced several major challenges over the past year. CDC's lead poisoning prevention (LPP) funding of ~\$19.8 million to 35 state and local health departments ended on September 1, 2012. The funding cut included the elimination of ~\$308,000 to each program on average to build local LPP capacity in high-risk areas.

CDC funding supported ~170 HHLPP jobs at state and local levels, including epidemiology, surveillance, clerical, health education, program management, case management, data entry, and information technology functions. Based on 2010 surveillance data, 291,000 children met the criteria for and were enrolled in case management services for high BLLs ranging from ≥ 5 -15 $\mu\text{g}/\text{dL}$.

Based on HHLPPP's review of the 35 formerly funded programs, 24 received no-cost extensions that ended in June 2013. The programs are implementing multiple strategies to help offset the funding shortfalls (e.g., combining LPP activities with other internal programs to provide limited services; seeking reimbursement from Medicaid and other funding sources for health education, inspections, risk assessments and other services; concentrating on very limited LPP activities; and relying on outside partners for various LPP components).

HHLPPP's review also showed that 13 programs reported a loss of jobs to 126 staff. Most of the programs achieved reductions by contract cancellations or attrition. The loss of staff was reported in all programmatic areas, but epidemiology and data entry functions were most severely impacted. If possible, 5 programs will continue to report data to CDC beyond the period of their no-cost extensions.

The external impact due to the elimination of CDC funding is highlighted as follows. The concept of statewide comprehensive programs will be lost. The merger of LPP management functions with other programs will result in a dilution of effort. Education and outreach programs will be drastically reduced. Healthcare provider education and consultation will be discontinued.

Surveillance capacity will be reduced due to the loss of epidemiology staff. Case management capacity will be reduced due to longer wait times for environmental inspections and less ability to make follow-up contact with families. Program effectiveness will be reduced due to the elimination of LPP evaluations. State funding to local programs for inspections, home visits and health education will be eliminated. State programs that fully depended on CDC funding will be eliminated.

A recent survey by the National Center for Healthy Housing showed that 78% of programs have cut funding for health education campaigns with LPP information for the public; 67% of programs have cut funding for medical and health professional education through grand rounds or individual consultations with physicians; 56% of programs have cut funding for primary prevention efforts; and 11% of programs have cut funding for surveillance.

The internal impact due to the elimination of CDC funding is highlighted as follows. The HHLPPP workforce was reduced from 28 staff to 4 scientists and 2 public health advisors. The following internal activities have been entirely eliminated from the HHLPPP portfolio:

- support for public health professionals to participate in LPP training through the Healthy Homes Training Center and Network;
- participation in conferences, meetings or expert consultation to state and local decision-makers;
- leadership of health education campaigns;
- analyses and presentations of national and state data;
- program evaluations; and
- management of LPP cooperative agreements.

The 6 HHLPPP staff will continue to provide LPP expertise, technical assistance, analysis and epidemiological capacity at the national level as required by the Congressional mandate. HHLPPP's annual budget of \$2 million will support the following activities. The new web-based Healthy Homes/Lead Poisoning Surveillance System will be deployed in ~17 states in order for HHLPPP to continue to collect LPP data to some degree. However, the system will not be nationally representative because some states will no longer report any childhood blood lead surveillance data to CDC, while other states will provide CDC with incomplete data only.

Support will be provided for ACCLPP to continue to advise the HHS Secretary and CDC Secretary on HHLPP activities. Scientific and logistic capacity will be maintained for HHLPPP to respond to outbreaks, identify new sources of lead, and implement interventions to reduce exposure. Training will be provided to states that continue to conduct their surveillance and case management programs, but training will be expanded to include a wider variety of housing professionals. Collaborative opportunities with partners will be identified to continue to participate in "Lead Week" and a select number of health education campaigns.

HHLPPP is aware of the critical need to maintain CDC's outbreak investigation capacity for childhood BLLs despite the elimination of funding. Based on 1991-1994 NHANES data, 60% of children with BLLs ≥ 10 $\mu\text{g}/\text{dL}$ and 83% of children with BLLs ≥ 20 $\mu\text{g}/\text{dL}$ were estimated to be Medicaid-eligible. Older data showed that even if 5 $\mu\text{g}/\text{dL}$ was used as the blood lead screening value, Medicaid-enrolled children were not at higher risk. In 1997, CDC recommended blood lead testing of children at 1 and 2 years of age or at 36-72 months if not previously tested for all children who received Medicaid or other public assistance programs for the poor.

The Centers for Medicare and Medicaid Services (CMS) adopted CDC's guidance and prohibited states from using a statewide screening plan for elevated BLLs (EBLLs) that did not require lead screening of all Medicaid-eligible children. Data collected in 1999 estimated that only 19% of Medicaid-enrolled children received a BLL test by 2 years of age, but this estimate increased to 24% of children based on 2003 data. Other data estimated that 83% of Medicaid enrollees received at least one Early and Periodic Screening, Diagnostic and Treatment visit by 1 year of age.

Current NHANES estimates have found no statistically significant difference between the percent of EBLLs based on Medicaid enrollment status or income level. State-based surveillance data showed that the decrease in the risk of EBLLs was consistent between Medicaid-enrolled children and children in the general population. In 2007, CDC adopted the

Healthcare Effectiveness Data and Information Set (HEDIS) measure for blood lead testing of Medicaid-enrolled children.

Based on 1999-2004 NHANES data, 42% of Medicaid-enrolled children were tested. The National Committee for Quality Assurance estimated that the proportion of Medicaid-eligible children who were tested by 2 years of age tremendously increased from 20% in 1996 to 61% in 2007. CDC took steps to ensure that its funded programs collaborated with their state health departments and Medicaid agencies to adopt the HEDIS measure. Data from the next NHANES survey are expected to be available in 2015.

These events led to CDC's publication of an *MMWR* article in August 2009, *Recommendations for Blood Lead Screening of Medicaid-Eligible Children Aged 1-5 Years: An Updated Approach to Targeting a Group at High Risk*. CDC's key recommendations to its funded programs were to (1) update blood lead screening policies for Medicaid-eligible children; (2) improve blood lead screening rates for Medicaid-enrolled children who were determined to be at increased risk for lead exposure; and (3) design and implement updated surveillance and evaluation strategies. CDC outlined the following criteria to assist its funded programs in complying with the guidance:

- the child is suspected by the parent or healthcare provider to be at risk for lead exposure;
- the child has a sibling or frequent playmate with an EBLL;
- the child is a recent immigrant, refugee or foreign adoptee;
- the child's parent or principal caregiver works professionally or recreationally with lead;
- the child has a household member who uses traditional, folk or ethnic remedies or cosmetics or who routinely consumes informally imported food from abroad; or
- the child's family has been designated at increased risk of lead exposure by a health department because the family meets local risk factors for lead exposure.

For states that requested a waiver from CMS's mandatory policy of universal blood lead screening of all Medicaid-eligible children 1-5 years of age, CDC designed a data-driven protocol to assist these states in identifying specific children to test. States were required to provide data in response to the following evaluation framework in order to be granted a waiver:

- the number or percent of children who were targeted for screening and received screening;
- the number or percent of children who were tested and identified with an EBLL;
- the number or percent of children with an identified EBLL who received complete environmental investigations, had identified lead hazards, and had their lead hazards remediated; and
- information on the provision of follow-up services, including the number of children with EBLLs who received case management services.

To further increase blood lead screening among children at highest risk, CDC also explored blood lead testing by age of housing and enrollment in Women, Infants and Children (WIC) Clinics. Based on the outcomes of a pilot study in Atlanta, Georgia, CDC is pursuing opportunities to place point-of-care blood lead testing instruments in WIC Clinics in Richmond, Virginia. The purpose of this effort will be to determine whether the intervention will increase screening rates among high-risk children and enhance capacity to identify children who need case management services.

As a case study of the waiver policy, the Puerto Rico Department of Health (PRDOH) informed CDC of its annual \$1 million allocation to adhere to the mandatory blood lead screening policy for all Medicaid-eligible children 1-5 years of age. However, CDC was asked to perform an Epi-Aid because PRDOH's capacity and resources were insufficient to conduct a full investigation to determine its eligibility for a waiver.

CDC conducted a population-based prevalence study in Puerto Rico with a cluster sampling design. The key results of the study are highlighted as follows. Of 363 households, 38% were owner-occupied and 64% were single-family homes. By age, the distribution of 440 children was similar in 5 age groups: 12-23 months (21%), 24-35 months (19%), 36-47 months (18%), 48-59 months (19%), and 60-72 months (18%). By gender, the distribution of 440 children was higher among males (53%) than females (44%). BLLs of the 440 children were <5 µg/dL (425 children), 5-9 µg/dL (12 children), 10-14 µg/dL (2 children), and >14 µg/dL (1 child).

Of 259 homes with environmental samples to date, none had soil lead levels or window dust lead levels (DLLs) that exceeded EPA action levels. However, 3 homes exceeded the EPA action level of ≥ 15 µg/L for water lead levels (WLLs) and 1 home exceeded the EPA action level of ≥ 40 µg/ft² for floor DLLs. Of 3 households with elevated WLLs, the WLLs were 16 µg/L in both the homes built in 1994 and 1995, while the WLL was 22 µg/L in the home built in 1967. In addition to having an elevated floor DLL of 180 µg/ft², the house that was built in 1967 also was in poor condition with peeling and cracking paint.

CDC concluded that the 1% prevalence of BLLs ≥ 10 µg/dL among children in Puerto Rico <6 years of age was low and was comparable to the most recent U.S. national estimate. Moreover, few environmental lead hazards were identified in the surveyed homes. Results of the study indicated that the mandatory blood lead testing policy for all Medicaid-eligible children in Puerto Rico should be revised and a waiver should be granted. However, CDC advised PRDOH to develop and clearly define a process to screen children at highest risk in specific communities, particularly in San Juan.

In addition to conducting the prevalence study in Puerto Rico, CDC also reviewed blood lead testing data of children in the Head Start Program and identified three children with BLLs ≥ 10 µg/dL who had a common link of their parents being employed at a local battery recycling plant. Because PRDOH does not have a Childhood Lead Poisoning Prevention Program, CDC leveraged funding from EPA to initiate a voluntary blood lead screening clinic in November 2010 for all children ≤ 7 years of age whose parents worked in the battery recycling plant.

CDC's first round of blood lead screening with 14 children identified 5 (or 36%) with BLLs ≥ 10 µg/dL. After CDC notified EPA of the potential for take-home exposures, EPA launched an investigation in December 2010 to address issues related to the transportation, recycling, treatment, storage and disposal of lead batteries at the plant. EPA found numerous problems that were not in compliance with the Comprehensive Environmental Response, Compensation and Liability Act or the Resource Conservation and Recovery Act.

Dr. Brown presented a photograph of a plant worker in Jamaica to illustrate the extremely hazardous and unsafe battery recycling operations that typically are performed in residential communities of countries outside of the United States. The plant in Puerto Rico recycles all car batteries on the island and some from the U.S. Virgin Islands for a volume of ~600 tons per

month of spent lead-acid batteries. The plant's operations produces ~500 tons of lead per month.

CDC's second round of blood lead screening showed that of 67 children <6 years of age whose parents worked at the battery recycling plant, >50% had high BLLs. CDC also performed blood lead testing on 48 employees of the plant. Most of these workers were male smelter workers with an average age of 30 years, an average length of employment of 28 months, and a mean BLL of ~31 µg/dL. Initial testing showed that 69% of the workers had BLLs ≥ 25 µg/dL. Drivers, ingot makers and shredders accounted for the job descriptions with the highest mean BLLs.

EPA performed environmental sampling of the homes and vehicles of both current and former workers to determine a linkage between their children's EBLLs and take-home lead exposures from the plant. As of November 11, 2011, EPA completed 139 home inspections, decontaminated 43 homes, and cleared 56 homes. The highest lead level from environmental sampling of the workers' homes was ~15,701 µg/ft², but the range of lead levels in children's cribs or playpens also was extraordinarily high at 7-91 µg/ft².

As of November 11, 2011, EPA completed 200 vehicle inspections, decontaminated 137 vehicles, and cleared 94 vehicles. The highest lead level from environmental sampling of the workers' vehicles was ~780,386 µg/ft², but the range of lead levels in children's car seats also was extraordinarily high at 12.5-924.4 µg/ft². EPA's other environmental sampling included 149 soil samples around the battery recycling plant as well as blood and milk samples from dairy cows near the plant. None of the 15 home tap water samples were above the EPA action level of concern of 15 ppb.

The outbreak investigation of EBLLs among children in Puerto Rico is ongoing because a linkage was established between take-home lead exposures from workers and their children's EBLLs. All workers involved in battery reclamation activities at the plant had BLLs ≥ 10 µg/dL, while 69% of workers had BLLs ≥ 25 µg/dL. EPA funding is being used to ensure ongoing remediation, address legal issues, and assure continued provision of case management services to children by a pediatrician in Puerto Rico.

The BSC was astounded by and did not understand the Congressional rationale to terminate LPP funding to CDC's 35 state and local programs. Several members noted that the dramatic decrease in childhood BLLs over time has been one of the greatest EPH successes and EJ victories in U.S. history. The BSC members proposed a number of suggestions to restore or increase CDC's LPP funding to state and local health departments.

- CDC's estimates of the number of local health departments that have been severely impacted by the elimination of external LPP funding are extremely low and conservative. For example, Michigan requires blood lead testing of all WIC-enrolled children of a certain age. This state law has numerous consequences at the local level because not all WIC-enrolled children are eligible for Medicaid.
- The need for states to provide leadership and take ownership of funding and supporting LPP activities in their jurisdictions should be broadly publicized and widely promoted. For example, Michigan recently set aside \$1.4 million of its state budget for LPP activities, while Minnesota recently approved a limited amount of funding to restore a portion of its LPP budget.

- A “personal” approach at the local level rather than an “NHANES-statistical” approach at the national level should be implemented to strengthen advocacy for an increase or restoration of CDC’s LPP budget. For example, CDC’s LPP funding to state and local programs has resulted in targeted interventions, research and other activities to address important adverse impacts of lead in children: neurodevelopmental effects, poor school performance, developmental delays, violence, and loss of IQ points on future earning potential. Congressional Black Caucus members, elected officials and other local decision-makers should be informed of actual case studies of individual children in their jurisdictions who have benefited from CDC’s lead prevention efforts to educate Congress on these success stories.

Dr. Brown made several remarks in follow-up to the BSC’s specific questions, comments and suggestions on HHLPPP’s budget, ongoing activities and future directions.

One, the community benefit component of the Affordable Care Act (ACA) will provide solid opportunities to improve primary prevention for lead and other healthy housing issues. Most notably, ACA will require non-profit hospitals to spend their “Free Care Pool” dollars on community-based initiatives in order to maintain their status.

Non-profit hospitals will conduct community needs assessments over the next year, but all of the preliminary white papers have identified housing and education as primary areas to spend community benefits. As an additional resource for state and local health departments, CDC is thoroughly reviewing the ACA language to determine areas in which community benefits could be integrated into the HHLPP Training Program.

Two, CDC is building its knowledge base on the use of “social impact bonds” (SIBs) that have been piloted in Massachusetts and New York City to address housing and other public health issues. An SIB allows the public and private sectors to enter into a contract and make a commitment to pay for improved social outcomes that result in tremendous cost-savings and a strong return on investment.

Private foundations account for all investors of SIBs at this time, but the U.S. Department of Housing and Urban Development (HUD) will allocate ~\$100 million under an SIB in the near future to support green initiatives in public housing. Moreover, the Annie E. Casey Foundation and the Pew Charitable Trusts have allocated funding to support the “Green and Healthy Housing Initiative” in ~30 cities across the country. CDC has leveraged funding from HUD to evaluate the activities of these foundations.

Three, CDC is proud of its strong and longstanding partnership with HUD. CDC currently receives ~\$2 million from the HUD Office of Healthy Homes and Lead Hazard Control to support various LPP activities, including outreach and training, the Green and Healthy Housing Study, and the Federal Strategic Action Plan for Healthy Homes.

Four, a cadre of state and local health department staff is continuing to educate Congress and strongly advocate for the restoration of CDC’s LPP budget. In the interim, however, CDC is attempting to maintain a portion of its leadership on LPP educational initiatives. For example, CDC currently is conducting a study to determine the relationship between BLLs and third-grade test scores.

Five, CDC is aware that the elimination of an “actual” nationally representative surveillance system of individual lead-poisoned children and their housing will have dire consequences for the country. Most notably, HUD will no longer be able to target and sustain resources to the most at-risk children and housing units across the country.

EPA, HUD and the U.S. Department of Justice will no longer be able to fully execute enforcement activities for the most egregious housing in the country. Federal, state and local agencies will no longer be able to develop data-driven primary prevention strategies and systematically perform lead paint abatements of hundreds of thousands of housing units across the country without CDC’s nationally representative lead surveillance system.

Update on the NCEH/ATSDR Strategic Planning Process

Julie Fishman, MPH

Associate Director for Program Development
NCEH/ATSDR Office of the Director

Ms. Fishman presented an update on the NCEH/ATSDR strategic planning process. The goals of the strategic planning process are four-fold: (1) clearly define a vision, mission and strategic areas of focus for NCEH and ATSDR; (2) establish organizational priorities; (3) better align the NCEH/ATSDR organization with the strategic plan; and (4) align the NCEH/ATSDR strategic plan with other goal-setting initiatives throughout CDC.

NCEH/ATSDR’s progress to date on its strategic planning process is outlined as follows. The overall concept of the strategic plan was presented to the BSC during the May 2012 meeting for NCEH/ATSDR to gather preliminary input and perspectives on next steps. Several meetings, interviews and discussions were held throughout the summer of 2012 in California, New York and Washington, DC. These events allowed NCEH/ATSDR to obtain additional external input on the strategic plan from influential thought leaders, organizations and experts in the fields of EPH and the overall environment.

Conference calls were convened with key external advisors (e.g., the BSC and Partnership Council) in the summer of 2012. A number of internal retreats were held in the fall of 2012 for NCEH/ATSDR leadership and staff to provide verbal and written feedback on the strategic plan. An update on the strategic plan was presented to the BSC during the October 2012 meeting for NCEH/ATSDR to describe its progress and obtain further advice. A thorough review of the input gathered over the past year has allowed NCEH/ATSDR to draft the strategic plan vision, mission statement, goals/objectives and priority areas.

Dr. Robin Ikeda, Acting Director of NCEH/ATSDR, informed all senior management and staff that one of her top priorities would be to finalize the draft strategic plan before the new, permanent NCEH/ATSDR Director is appointed. Ms. Fishman’s summary of the content of the draft NCEH/ATSDR Strategic Plan is outlined below.

- NCEH/ATSDR Vision: “Healthy people in a healthy environment.”

- NCEH/ATSDR Mission Statement: “NCEH/ATSDR protects people’s health from environmental hazards found in the air we breathe, the water we drink, and the world that surrounds us.” “NCEH/ATSDR does this by investigating the relationship between environmental factors and health, developing guidance, and building partnerships to support healthy decision-making.”
- Goal 1: Implement environmental health programs and interventions to protect and promote the public’s health.
 - Objective 1.1: Build the capacity of states, tribes, localities and territories to assess and respond to concerns about environmental exposures.
 - Objective 1.2: Strengthen collaboration between EPH and healthcare.
 - Objective 1.3: Reduce asthma morbidity and mortality through comprehensive asthma control activities.
 - Objective 1.4: Develop solutions to address known and emerging environmental challenges, including unsafe food and water, air pollution and climate change.
 - Objective 1.5: Investigate, reduce and prevent environmental threats in neighborhoods and communities.
 - Objective 1.6: Develop and strengthen comprehensive policies and practices to promote healthy land use and community design initiatives as well as safe home and indoor environments.
 - Objective 1.7: Ensure the public health workforce is adequately prepared to meet current and future EH challenges with the best available tools.
- Goal 2: Prepare for and response to public health emergencies, including chemical, nuclear and radiological incidents, natural disasters and extreme weather events.
 - Objective 2.1: Enhance the nation’s capacity to respond to EH emergencies through the use of epidemiology, laboratory science, and integrated preparedness and response planning with federal, state and local partners.
 - Objective 2.2: Provide support to people, communities and EPH systems to recover and rebuild following the acute impact of environmental incidents.
 - Objective 2.3: Guide DRR, resilience and other emerging protective practices to reduce future environmental threats and promote health community environments.
- Goal 3: Identify, characterize and monitor health outcomes and environmental exposures to guide public health actions that protect and promote health.
 - Objective 3.1: Develop and use new tools and technologies to better quantify exposure in populations.
 - Objective 3.2: Provide more complete, relevant, timely and accurate data through EH surveillance and tracking.
 - Objective 3.3: Advance the development and interpretation of human health risks from exposure to environmental hazards.
 - Objective 3.4: Improve the characterization of environmental threats found in air, water and food; implement and evaluate solutions to protect health.
 - Objective 3.5: Provide laboratory science that improves the diagnosis, detection, treatment and prevention of disease resulting from exposure to environmental chemicals.

In addition to drafting the goals and objectives, NCEH/ATSDR also proposed 7 priority areas for the strategic plan: asthma, emergency preparedness and response, environmental exposures,

food, laboratory, tracking, and water. The 7 topics eventually will be narrowed to 3-5 priorities that will include an overarching objective statement and 3-4 key action steps for NCEH/ATSDR to accomplish over the next 1-3 years.

NCEH/ATSDR established a set of criteria and questions to guide the process of specifying priority areas for the strategic plan.

- What is the burden of the health condition, risk or exposure (e.g., economic issues, disease prevalence, or morbidity or mortality of disease)?
- Does NCEH/ATSDR have a specific mandate to address this topic?
- What are the demands, needs or influential recommendations by state and local public health in the field or by stakeholders for NCEH/ATSDR to address this topic?
- Why is NCEH/ATSDR best positioned to address this topic? Can other groups perform this activity?
- Will the intervention be oriented toward results? Does evidence exist that the activity will lead to programmatic impact?

Ms. Fishman reiterated that all components of the NCEH/ATSDR Strategic Plan are draft at this time and will be revisited shortly after the new, permanent NCEH/ATSDR Director is appointed. The audiences of the strategic plan include internal NCEH/ATSDR staff, EPH partners and stakeholders, and the general public.

In response to the BSC's specific question, Ms. Fishman confirmed that her top 3 priorities would be asthma, environmental exposures and water. She asked the BSC to consider the following questions while providing input on the draft NCEH/ATSDR Strategic Plan.

- What steps can NCEH/ATSDR take to protect key programs while focusing on future directions in the current era of resource constraints?
- What opportunities are available for NCEH/ATSDR to leverage resources and activities internally and externally in the field?
- What process should NCEH/ATSDR create to engage the BSC to ensure optimal implementation and monitoring of the 3-5 strategic plan priorities over time?

The BSC provided extensive comments and suggestions for NCEH/ATSDR to consider in the next phase of finalizing the strategic plan.

Overarching Input on the Draft Strategic Plan

- The strategic plan goals/objectives do not explicitly address EJ issues (or "exposure disparities"). EJ issues should be embedded in all parts of the strategic plan. For example, President Obama's interagency memorandum of understanding (MOU) that renewed the focus on and commitment to EJ issues should be referenced. Moreover, NCEH/ATSDR should review the 2012 National Academy of Sciences (NAS) report, *Exposure Science in the 21st Century: A Vision and A Strategy*, to obtain guidance and language on exposure disparities, ethics in community engagement and empowerment, and other important EJ issues to include in the strategic plan. The report also includes a set of recommendations on improving the future direction of EPH that could be cited in the strategic plan.
- The objectives should be developed with measurable outcomes and specific timelines for action steps. This approach would allow the BSC, external partners and other

stakeholders to hold NCEH/ATSDR accountable for achieving the goals and objectives, monitor progress over time, and recommend changes in programs and priorities as needed.

- The strategic plan should highlight the roles, expertise and activities of NCEH/ATSDR that are unique to all other agencies in the world: the NCEH Tracking Program, ATSDR's disease registries, NCEH's premiere Environmental Health Laboratory, and the NCEH/ATSDR Emergency Preparedness and Response Program. NCEH/ATSDR's focus on its unique roles and expertise in the strategic plan would improve its ability to leverage funding and grow these programs over time.
- NCEH/ATSDR should establish an internal goal of leveraging resources, building capacity and strengthening partnerships at the local level. For example, CDC could allocate funding for its PRCs to specifically focus on EH issues. Regional academic centers could be created to proactively and more rapidly address EH concerns in vulnerable or hard-to-reach populations that have minimal access to health departments or other local resources. CDC could explore funding opportunities from the multi-agency EH disparities program announcement that is expected to be released in the near future.
- The strategic plan goals/objectives should have much stronger emphasis on policy issues.
- The strategic plan should be designed with a logic model construct.
- The 15 objectives are too overwhelming for actual implementation by NCEH/ATSDR staff. Consideration should be given to combining or deleting some of the objectives.
- The goals/objectives and priorities appear to have no clear relationship. The linkage between these two areas should be clarified.

Input on the Draft Strategic Plan Goals/Objectives

- Objective 1.1 includes "weak reactive" language for states (e.g. "address and respond" to concerns about environmental exposures), while Objective 1.5 includes "strong proactive" language for states (e.g., "investigate, reduce and prevent" environmental threats). The language should be revised to resolve the discrepancy between these two objectives.
- Objective 1.4 should be more clearly worded to ensure that NCEH/ATSDR's plan to address known and emerging environmental challenges related to "unsafe food" does not encroach on the mission of another federal agency.
- Objective 3.3 should be revised to emphasize NCEH/ATSDR's intent to translate data for reasonable and improved public health practice in the field.

Input on the Draft Strategic Plan Priorities

- The proposed priorities should be revised to reflect targeted action items under the objectives rather than broad standalone topics. This approach is more focused and would allow NCEH/ATSDR to make progress in objective-based priorities over the next 1-3 years.
- The decision to list asthma as the only disease in the proposed priorities is problematic. This priority should be expanded (e.g., children's EH or maternal/child EH) because the public may perceive that asthma is the only disease of concern and interest to NCEH/ATSDR for funding and support. For example, "obesity" is not formally defined as a disease, but this health condition has a strong linkage to the major causes of morbidity and mortality in the U.S. population. NCEH/ATSDR should consider obesity in its process to identify the final list of 3-5 strategic plan priorities.

- The built environment should be considered as an additional candidate for the strategic plan priorities.
- Rigorous and clearly defined performance indicators should be developed for NCEH/ATSDR to measure progress and achievements in the priorities from baseline to specific time points. The approach will help to assure continuous quality improvement of the priorities over time.

Public Comment Session

Dr. Kapil opened the floor for public comments; no participants responded.

With no further discussion or business brought before the BSC, Dr. Kapil recessed the meeting at 2:43 p.m. on June 27, 2013 for the members to tour the CDC Environmental Health Laboratory with Dr. James Pirkle, Director of DLS.

Opening Session: June 28, 2013

Vikas (“Vik”) Kapil, DO, MPH, FACPOEM

Chief Medical Officer and Associate Director for Science, NCEH/ATSDR
Centers for Disease Control and Prevention
Acting BSC Chair and Designated Federal Official

Dr. Kapil conducted a roll call to determine the BSC voting members and Federal Expert members who were in attendance. He announced that the members constituted a quorum for the BSC to conduct its business on June 28, 2013 and reconvened the meeting at 8:34 a.m. Dr. Kapil welcomed the participants to day 2 of the BSC meeting and opened the floor for all of the participants to introduce themselves and their affiliations.

Dr. Kapil reminded the BSC voting members of their individual responsibility to identify real or perceived conflicts of interest with any of the published agenda items for June 28, 2013 and recuse themselves from participating in these matters. None of the BSC voting members disclosed any conflicts of interest for the public record.

Overview of the Role of Epi-Aids at NCEH/ATSDR

Lauren Lewis, MD, MPH

Chief, Health Studies Branch
Division of Environmental Hazards and Health Effects, CDC

Dr. Lewis described the role of Epi-Aids at NCEH/ATSDR. An Epi-Aid is one of CDC's mechanisms to respond to public health emergencies and also is a key function of CDC's elite Epidemic Intelligence Service (EIS) Training Program. CDC was established in July 1946 with a mandate to assist states in controlling communicable diseases. CDC subsequently assigned

responsibility for epidemic aid to states in October 1947 and eventually established the EIS Program in July 1951. CDC's first Epi-Aid was a response to an EPH disaster.

The EIS Program is a two-year post-graduate, capacity building and workforce development initiative that provides on-the-job training for health professionals with a focus on applied epidemiology, research and emergency response. CDC recruits ~160 EIS Officers (EISOs) annually with a broad range of academic degrees: MDs, PhDs, DVMs, RNs, DDSs and MPHs. The training model is similar to residency training in which EISOs train and work at CDC, state and local health departments, NIOSH and the Indian Health Service.

CDC programs account for 118 of 161 EISO assignments in the 2012-2013 cycle: infectious diseases (64), global health (18), chronic diseases, maternal/child health and genomics (17), EH, occupational health and injury control and prevention (16), and health statistics (3). State and local health departments (42) and the Veterans Administration (1) account for the remaining EISO assignments in the 2012-2013 cycle.

In addition to its elite status, premiere training, workforce development and capacity building, the EIS Program also promotes leadership in public health. Alumni of the EIS Program include 4 former CDC Directors, 2 Surgeon Generals, ~50% of state epidemiologists, an ABC News Senior Health and Medical Editor, a *New York Times* writer, and directors or senior fellows of respected NGOs.

An "Epi-Aid" is defined as an emergency response led by an EISO. CDC EISOs respond to 80-100 requests per year, while state-based EISOs conduct an additional 600-800 investigations per year. All EISOs are required to lead or participate in at least one Epi-Aid during the two-year training program. CDC also conducts numerous Epi-Aids in countries outside of the United States.

Epi-Aids address a wide range of public health problems, emergencies and threats that require urgent action, including infectious and non-infectious events, large-/small-scale events, acute and long-term events, and recently recognized or emerging issues. These events include disease outbreaks, known or suspected hazardous exposures, natural or technological disasters, and potential terrorist targets or other intentional events.

CDC established a set of mandatory criteria or requirements to deploy EISOs to conduct an Epi-Aid. First, the Epi-Aid must be justified with a known, suspected or potential public health threat. Second, CDC's assistance to conduct an Epi-Aid must be formally requested by a federal, state or local public health agency, NGO, foreign government, or Ministry of Health (MOH). Third, a lead program in CDC, a group of CDC SMEs, or CDC and its external partners with expertise in the response must be responsible for conducting the Epi-Aid.

Fourth, a lead EISO must be designated and assigned to the Epi-Aid. Authority for the Epi-Aid can be given to the CDC EISO for an event with a national scope, the state EISO for an event based on a specific geographic area or jurisdiction, or an EISO with the necessary skills and experience to lead the Epi-Aid.

Fifth, both the CDC EIS Program and the government in the location of the event must approve the Epi-Aid. Requests for Epi-Aids are made through several channels, including the requesting

agency; EOC, EIS Program, Center for Global Health or other CDC programs; or SMEs in the responding program.

On the one hand, an Epi-Aid offers multiple advantages compared to a response by other CDC mechanisms. For example, an Epi-Aid is a recognized and established process that results in a high-priority, rapid response to draw attention to an important public health issue. An Epi-Aid promotes dissemination of information, leverages resources and increases response capacity.

Most notably, EISOs are required to publish their findings in peer-reviewed journals, present at the highly-publicized Annual EIS Conference and other scientific conferences, and respond to media requests. The EIS Program supports the travel of EISOs who conduct Epi-Aids. Several Epi-Aids are developed as case studies or teaching tools for the EIS Program that eventually are publicly available to various programs.

On the other hand, an Epi-Aid is associated with several disadvantages. The requirement for EISOs to serve as the lead of an Epi-Aid can be problematic during an emergency due to their “trainee” status. The mentorship, supervision and other resources given to EISOs can be a burden on the resources of the state and responding agency. A great deal of media attention generated by a high-priority Epi-Aid can detract from an important public health issue. An Epi-Aid potentially can increase the complexity and timeliness of a response due to the need to strictly adhere to EIS Program requirements and obtain approvals.

NCEH/ATSDR will house 6 EISOs in two divisions for the 2013-2014 cycle. Of 52 Epi-Aids that NCEH/ATSDR has led since 2007 (or an average of 8 Epi-Aids per year), the Health Studies Branch accounts for leadership of 62%. NCEH/ATSDR also devotes its EISOs and other resources to large-scale Epi-Aids conducted by other CDC National Centers.

NCEH/ATSDR is responsible for conducting Epi-Aids of non-infectious health threats, including intentional chemical and radiological events, air pollution and extreme weather events, natural and technological disasters, known or suspected environmental exposures with potential health impacts, “mystery” illnesses, and disease outbreaks with a known or suspected non-infectious etiology. NCEH/ATSDR also collaborates with its internal CDC partners to conduct Epi-Aids of infectious disease health threats. For example, NCEH/ATSDR leads cruise ship outbreak investigations and serves as the co-lead in investigations of infectious illnesses with an unknown etiology.

NCEH/ATSDR’s recent Epi-Aids are highlighted as follows. NCEH/ATSDR performed morbidity surveillance in temporary shelters following Hurricane Sandy in October 2012. NCEH/ATSDR developed a surveillance protocol that allowed American Red Cross volunteers to use their SmartPhones to rapidly report data to CDC and local public health agencies within 24 hours with no additional burden.

Real-time reporting of surveillance data allowed CDC to quickly identify a cluster of respiratory illness, rapidly locate persons who needed medication refills, and immediately determine other priority healthcare issues of displaced residents in 21 Hurricane Sandy shelters. The American Red Cross has now adopted CDC’s Hurricane Sandy surveillance protocol for use in other disasters.

NCEH/ATSDR conducted an Epi-Aid in 2011 in response to international travelers who were returning to the United States and triggered an alert of the U.S. Customs and Border Protection's radioactive screening system due to their high levels of radioactive strontium. Interviews with all of the travelers showed that a recent cardiac positron emission tomography scan with the same device was the common factor in alerts of radioactive strontium exposure.

The U.S. Food and Drug Administration (FDA) used data from NCEH/ATSDR's evaluation of >300 patients in four states and interviews with multiple cardiologists to determine that the problem stemmed from only a few sites and was not widespread. FDA lifted its recall of the device and required the problem sites to apply NCEH/ATSDR's findings to resolve these issues.

NCEH/ATSDR is continuing to conduct Epi-Aids to address artisanal gold mining in Peru and Nigeria. These practices have resulted in high levels of methyl mercury in fish that are consumed by residents in nearby communities. NCEH/ATSDR's investigation of inorganic and methyl mercury found ubiquitous and widespread exposure throughout the nearby communities, including toxic levels of mercury exposure in some residents.

The communities have used NCEH/ATSDR's findings to enforce a ban on the use of mercury, implement pilot programs to reduce mercury and lead emissions from the practice of artisanal gold mining, increase laboratory capacity, and launch a national "NHANES-like" survey. NCEH/ATSDR's results also are being used to replicate similar programs in other communities

NCEH/ATSDR conducted an Epi-Aid to investigate neurological impacts and renal failure related to diethylene glycol poisoning that resulted in the deaths of ~20 persons in Panama. NCEH/ATSDR's case-control investigation, hospital surveillance of patients, and laboratory analyses of specimens showed that cough syrup prescribed by the Panama MOH Hospital was contaminated with diethylene glycol.

NCEH/ATSDR issued an immediate recall of >30,000 vials of cough syrup that were in the community, while the Panama MOH launched a broad public health campaign, retrieved contaminated cough syrup from individual households in a door-to-door effort, and offered renal function tests to all persons regardless of whether their exposure to diethylene glycol was real or perceived. NCEH/ATSDR conducted a subsequent Epi-Aid of a diethylene glycol poisoning outbreak in cough syrup that resulted in the deaths of >100 infants in Nigeria.

NCEH/ATSDR's Epi-Aid of deaths from illicit opioid use is ongoing in several communities. Most notably, the Rhode Island Department of Health requested NCEH/ATSDR's assistance due to a statistically significant cluster of deaths from illicit use of a new synthetic opioid in March 2013. Laboratory testing confirmed that the deaths were related to acetyl fentanyl. This opioid is 5 times more potent than heroin.

NCEH/ATSDR and its federal partners developed and disseminated an official CDC health advisory on June 20, 2013 with recommendations for laboratory testing of acetyl fentanyl, patient evaluation and treatment for overdose with synthetic opioids. Other states are using the findings from NCEH/ATSDR's Epi-Aid in Rhode Island to investigate similar problems in their jurisdictions.

Overall, changes in public health are affecting NCEH/ATSDR's emergency response capacity. State and local capacity and resources to address and investigate non-infectious health threats

greatly vary. The complexities of investigating environmental exposures and their health impacts are unique, difficult to explain and differ across states.

Requests for Epi-Aids are decreasing throughout all CDC programs due to increased state capacity, the presence of more EISOs in states, and less attention to some issues due to constraints of state budgets. NCEH/ATSDR has developed and will soon pilot training modules of environmental exposure investigations to ensure that non-infectious health threats continue to be appropriately addressed domestically and internationally.

The BSC commended CDC on its elite EIS Program. The members noted that the program has been one of the major driving forces in advancing public health in general and the EPH field in particular. In response to the BSC's request, Dr. Kapil confirmed that NCEH/ATSDR would provide periodic updates on OMB's recommendations and approvals on the EIS Program. The BSC also would be given links to Epi-Aids that have been developed as case studies or teaching tools and are now publicly available.

Public Comment Session

Dr. Kapil opened the floor for public comments; no participants responded.

Updates by the BSC Federal Expert Members

Dr. Kapil opened the floor for the BSC Federal Expert members to provide updates on recently completed or ongoing EPH activities in their respective agencies. The updates are summarized below.

John Decker, RPh, CIH

Senior Scientist, Office of the Director
National Institute for Occupational Safety and Health

Dr. Decker reported that the President's FY2014 budget request recently was released with a proposal to eliminate the NIOSH ERCs and the Agriculture, Forestry and Fishing Program. The two programs also were proposed for elimination in the President's FY2012 and FY2013 budget requests, but were not approved.

Reductions to the NIOSH budget from sequestration depend on specific funding categories. For example, programs in the Division of Compensation Analysis and Support received a 7% cut; domestic mandatory programs (e.g., the World Trade Center Health Program Research Cooperative Agreements) received a 5.1% cut; and domestic discretionary programs received a 5% cut.

NIOSH recently issued a new intelligence bulletin on carbon nanotubes and nanofibers. This notable publication serves as NIOSH's first recommended exposure limit (REL) on occupational exposure to nanotechnology. The new REL is intended to minimize risk for adverse lung effects in workers over their lifespan.

NIOSH recently published a new criteria document and an REL for hexavalent chromium to better protect 558,000 U.S. workers who are exposed to this chemical compound in the workplace. NIOSH recently published a draft list of antineoplastic and other hazardous drugs to workers in healthcare settings. The document will be open for public comment until August 2, 2013.

NIOSH recently issued a request for information on toluene diisocyanate to inform its evaluation of scientific data, development of a new criteria document, and establishment of an updated REL. NIOSH expects to release a revised REL for its chemical carcinogen classification policy for peer review and public comment in the fall of 2013.

NIOSH established a Center for Workers' Compensation Studies to increase capacity to use workers' compensation data to improve occupational safety and health evaluations. NIOSH is continuing to conduct research and publish data to assess the effectiveness of engineering controls in reducing silica exposures in the hydraulic fracturing industry.

This research will include an animal study to explore the toxicology of combined inhaled diesel particulates and crystal in silica and also to compare the individual toxicity of each agent. NIOSH will launch a search in July 2013 to replace Dr. Albert Munson who will retire from his position as the Director of the Health Effects Laboratory Division.

The BSC members noted that NIOSH's hazard alert on crystal in silica exposures in hydraulic fracturing has been extremely helpful to state and local health departments. Most notably, the NIOSH document was instrumental in state and local public health presenting a strong evidence-based argument to the mining industry of actual occupational exposure and helping exposed workers to submit claims.

Bonnie Richter, PhD, MPH

Senior Epidemiologist, Office of Health, Safety and Security
U.S. Department of Energy

Dr. Richter reported that the DOE Comprehensive Epidemiologic Data Resource (CEDR) is an electronic database that is designed to collect and maintain data from mortality studies of DOE contract workers, data from environmental studies of areas surrounding DOE sites, and data from the Former Worker Medical Screening Program.

The mission of CEDR is three-fold. First, the DOE Epidemiologic Research Program is enhanced by facilitating independent access and use of data collected during studies. Second, the public's right to know is supported by making taxpayer-funded data available to researchers and the general public. Third, an excellent teaching tool is available for public health students.

The CEDR structure includes both "working" and "analytic" data: background and historical information on each DOE site, "cleaned" datasets, published papers, surveillance data from Former Worker Programs, Naval shipyard data, and a bibliographic section with epidemiologic studies, links to CDC documents, and Los Alamos Historical Document Retrieval and Assessment data. Analytic data are only available from recent studies, while access to Naval shipyard data requires separate account approval.

Because CEDR maintains data collected from medical histories and exposure histories of workers, DOE strictly adheres to Federal Information Security Management Act requirements for security certification, accreditation and privacy protection. CEDR is a password-protected database that releases data to approved users only in an aggregate format with no personal identifiers (e.g., name and date of birth).

All persons or groups that are approved as CEDR users must complete and submit a confidentiality waiver to DOE to use the data for research purposes only. For example, DOE does not grant access to attorneys to use CEDR data to litigate workers' compensation claims. Dr. Richter concluded her update by illustrating a screen shot of the CEDR web page, presenting a video on CEDR, and distributing a CEDR brochure.

Kristina Thayer, PhD

Director, NTP Center for the Evaluation of Risks to Human Reproduction
National Institute of Environmental Health Sciences

Dr. Thayer reported that NTP is continuing its work on systematic reviews. Existing clinical and epidemiologic recommendations for healthcare interventions are being reviewed to assess the extent to which this guidance can be tailored for EH. Some recommendations were easily adapted for EH, but NTP developed a specific framework to adapt other guidance. The framework allows NTP to consider the range of human and observational studies that are more commonly conducted in EH and also to integrate data across human, animal and mechanistic studies.

NTP published its systematic review framework with two protocols: the linkage between bisphenol-A and obesity and the association between perfluorooctanoic acid/perfluorooctane sulfonate exposure and immunotoxicity. NTP is testing its systematic review framework with these two case studies at this time to identify areas for revision. Over the next year, NTP will broadly solicit input from risk communicators and convene a series of focus groups with experts and stakeholders to determine whether its existing categories of "hazard identification" and "level of concern" conclusions need to be changed in light of the ongoing systematic review process.

NTP applied its scientific and technical expertise with the systematic review process to assist the American Academy of Pediatrics in developing policy statements for air pollution and emerging children's health issues. NTP currently is narrowing and categorizing ~19,000 studies identified in the preliminary literature scan to determine studies that meet the criteria to include in the systematic review of air pollution and emerging children's health issues. NTP assigned two independent screeners and also will solicit input from other experts to validate this effort, assure its quality, and ensure that this initiative is unique and does not encroach on the existing mission or domain of another agency.

NTP is conducting a "state-of-the-science" effort to evaluate safety issues, assess neural tube defects and prevent other harms related to high intake of folic acid. NTP is applying its systematic review process to the literature scan for this effort. The NTP BSC recently reviewed a nomination to evaluate various health outcomes of circadian disruptions in shift work. Cancer will be the health outcome of interest for carcinogens nominations, but NTP also will assess non-carcinogenic health outcomes among non-day shift workers (e.g., immune and metabolic disorders, reproductive development and cardiovascular effects).

NTP completed a literature-based analysis of trans-generational health effects with no direct *in utero* exposure, including environmental, chemical and disease-based impacts. NTP used two independent screeners to scan ~50,000 studies reported in the literature and determine their relevance for this analysis. The 50,000 studies have now been narrowed to ~800 clearly relevant studies, but a full-text review still needs to be performed and discrepancies between the two independent reviewers still need to be resolved.

NTP released draft reports on carcinogens (ROCs) in January 2013. NAS currently is reviewing the NTP ROC on styrene and formaldehyde that was initiated by an unidentified source in the continuing resolution passed by Congress in place of a 2012 budget. Congress has given NAS a two-year deadline to complete its review. Peer reviews of NTP's draft ROC monographs on 1-bromopropane and cumene confirmed NTP's findings that these solvents are human carcinogens. NTP intends to post the final ROC monographs on its website in the near future.

The *NTP Monograph on Developmental Effects and Pregnancy Outcomes Associated With Cancer Chemotherapy Use During Pregnancy* recently was peer reviewed. In the near future, NTP will launch a companion systematic review to the monograph focusing on occupational health outcomes among workers who handle these agents. NTP was one of the leaders of the "International Workshop on Alternatives to the Murine Histamine Sensitization Test for Acellular Pertussis Vaccines."

NTP's upcoming events include a meeting with its Scientific Advisory Committee on Alternative Toxicological Methods in September 2013 and peer reviews of several technical reports in the fall of 2013. NTP also is evaluating its current progress and accomplishments based on three overarching principles outlined in its 2004 roadmap: refining traditional toxicological assays, developing rapid mechanism-based screening for environmentally-induced diseases, and improving the overall utility of NTP products for public health decision-making. Preliminary results of the evaluation show that NTP has made great strides in all three areas since 2004.

The BSC members noted that NTP's systematic review process is extremely important, helpful and relevant to activities conducted by NCEH/ATSDR, NIOSH, other federal agencies and external stakeholder organizations. NTP's systematic review process of describing the literature and evaluating the strengths and weaknesses of recommendations most likely will serve as the "gold standard" in grading scientific evidence.

Dr. Rebecca Head and Mr. Daniel Kass are BSC members who volunteered to serve as reviewers of the NTP systematic review process to determine whether changes to the existing categories of "hazard identification" and "level of concern" conclusions are warranted. Dr. Kapil confirmed that he would solicit volunteers from NCEH/ATSDR staff with expertise in site-specific activities and risk communications to serve as additional reviewers in this effort.

Hal Zenick, PhD

Director, National Health and Environmental Effects Research Laboratory
U.S. Environmental Protection Agency

Dr. Zenick reported that EPA is continuing its efforts to respond to recommendations in the NAS report, *Sustainability and the U.S. Environmental Protection Agency*. The report describes a framework for EPA to apply sustainability analytics and take a more integrated approach to understanding societal, economic and environmental implications of decision-making.

Since the release of the NAS report in 2011, EPA has hosted ~270 listening sessions with diverse communities, included the NAS recommendations in 2015 budget strategies for EPA programs, and used the NAS guidance to inform the development of the 2015-2020 EPA Strategic Plan.

NAS released a broader report on sustainability for the entire nation that describes challenges and barriers to fostering an integrated approach across federal agencies. The NAS report is cited as follows: “Moving forward, it will important for agencies to build sustainability into their very fabric, their mission statements, their goals and objectives, and their organization and management structures. The agencies need not await structural overhauls to begin strengthening their capacity.”

The NAS report contains powerful language, but the recommendations are not mandated or funded for EPA to implement sustainable problem-solving activities. However, EPA has incorporated the NAS guidance into its existing organizational culture and mindset to improve sustainability and revamp the Office of Research and Development to reflect six key programs:

- Air, Climate and Energy Research Program
- Safe and Sustainable Water Resources Research Program
- Chemical Safety for Sustainability Research Program
- Human Health Risk Assessment Program
- Homeland Security Research Program
- Sustainable and Healthy Communities Research Program

The NAS report identified several EPA programmatic areas that could be linked to improve sustainability: energy, food and water; diverse and healthy ecosystems; human health and well-being; and stronger community resiliency to respond to extreme events. EPA has implemented several projects to respond to the NAS recommendations, including sustainability of natural resources in green chemistry and the provision of tools to empower community decision-making in sustainability. These tools include initial exposure assessments and atlases that depict the location of water resources, schools and areas with heavy traffic at the local level.

EPA and the interagency Committee on Environment, Natural Resources and Sustainability (CENRS) are continuing to conduct activities and broadly solicit input from stakeholders on potential opportunities to build partnerships in sustainability to address the NAS guidance. Following the Office of Science and Technology Policy directive on data sharing, EPA is exploring opportunities and identifying barriers to making all of its databases readily available for public use. To support this effort, the U.S. government will need to create an interoperability platform and invest resources for the public to access these data to advance from hypothesis generation to hypothesis testing to actual practice in the field.

A Congressional request to the U.S. Government Accountability Office resulted in the development of a document on pharmaceuticals in the environment that was targeted to EPA. In response to the document, EPA entered into an MOU with FDA, the U.S. Department of Agriculture and U.S. Department of Interior to form a workgroup with ~9 federal agencies that have an interest or regulatory responsibility in pharmaceuticals in the environment. The initial activity of the interagency workgroup in fulfilling its charge will be to conduct a needs assessment of its federal partners in enforcing drinking water and groundwater regulations,

identifying priorities for the chemical contaminant list, and addressing other issues in a collaborative effort.

EPA is attempting to determine its specific role and the broader role of EPH sciences in ACA. ACA describes 13 actions that will or could be an important role for EPH. EPA, along with CDC and GW, supported and participated in a workshop to begin discussing strategies to respond to the EPH activities described in ACA language. This issue also will be a featured topic at the IOM Environmental Health Round Table meeting on July 22-23, 2013.

The BSC advised EPA to engage local water systems and regulated entities in its ongoing efforts with federal partners. The BSC also asked EPA to consider developing a multi-pollutant index to replace the single air quality index.

BSC Open Discussion

Vikas (“Vik”) Kapil, DO, MPH, FACPOEM

Chief Medical Officer and Associate Director for Science, NCEH/ATSDR
Centers for Disease Control and Prevention
Acting BSC Chair and Designated Federal Official

Dr. Kapil summarized several key points and action items that he captured from the BSC's discussions over the course of the meeting.

- NCEH/ATSDR will attempt to convene the next BSC meeting in the Tom Harkin Global Communications Center located at CDC Headquarters. After the meeting site is confirmed, a tour of the EOC will be included on the BSC meeting agenda.
- NCEH/ATSDR will provide the BSC with additional information on Epi-Aids, including a publication on EPH-specific Epi-Aids and links to Epi-Aids that have been developed as case studies or teaching tools and are now in the public domain.
- NCEH/ATSDR will structure the agenda for the next meeting to allow for more focused and extensive discussions on two topics that are extremely relevant and important to the BSC: the linkage between EPH and clinical care and the draft NCEH/ATSDR Strategic Plan.
- NCEH/ATSDR will revise the format of all future meeting agendas to shorten the time of formal presentations and lengthen the time of BSC discussions and provision of advice.

The BSC made a number of comments and suggestions to expand Dr. Kapil's summary of key points and action items that were raised over the course of the meeting. The BSC's input and observations on its next steps and future directions fell into three major categories.

Format of BSC Meetings

- The agenda typically allows a 1-hour time slot of a 45-minute formal presentation and a 15-minute BSC discussion for each topic. The allocation of time should be switched to allow a 15-minute formal presentation and a 45-minute BSC discussion for each topic. However, the new format would require NCEH/ATSDR to provide the BSC with background information and targeted questions to address well in advance of meetings.

- Future agendas should be structured based on the importance of an individual topic. For example, the agenda for the current meeting gave equal weight to all items by allowing a 1-hour time slot for the presentation and discussion of each topic. However, a minimum of 2 hours should have been set aside for the draft strategic plan. This agenda item is directly aligned with the BSC's charter to provide advice and guidance on NCEH/ATSDR's "program goals, objectives, strategies and priorities." NCEH/ATSDR also should take action on the suggestion the BSC made during the October 2012 meeting to develop future agendas based on major themes or topics.

Advisory Role of the BSC

- A process should be developed for the BSC to provide ongoing input to NCEH/ATSDR on key issues in between meetings via teleconference or other platforms. For example, the draft strategic plan is an important topic that would warrant a teleconference before the next in-person BSC meeting is held in the fall of 2013.
- The BSC should provide formal recommendations for NCEH/ATSDR to take leadership and collaborate with other CDC programs in targeting resources to vulnerable and underserved communities with disparities in environmental exposures, chronic diseases and children's health issues. This approach would help to ensure that traditional EPH concepts of equity, fairness and social responsibility are emphasized in ACA and the National Prevention Strategy.
- NCEH/ATSDR should advise staff to end each presentation with a slide of no more than 3 bullet points on priority issues that require the BSC's advice and guidance for the specific topic.
- NCEH/ATSDR should provide ongoing feedback on specific actions that were taken to address the BSC's previous advice and the outcomes of these recommendations. For example, the minutes of the October 2012 meeting do not describe any outcome measures to demonstrate that NCEH/ATSDR took action or responded to the BSC's previous advice.
- NCEH/ATSDR should solicit the BSC's input on organizational changes or other major developments (e.g., the draft strategic plan and appointment of the new NCEH/ATSDR Director) at a much earlier time point in the process.

Future Agenda Items

- A full morning or afternoon session should be devoted to NCEH/ATSDR presentations and extensive BSC discussions on strategies to improve the linkage between EPH and clinical care. In preparation of this agenda item, NCEH/ATSDR should hold a teleconference before the next in-person meeting for the BSC to discuss the potential need to form a new workgroup to specifically address this issue.
- The BSC should be provided with periodic updates on ATSDR's ongoing or recently completed PHAs and public health consultations. These updates should include background information on the programs that conduct these investigations at sites.
- The translation of EPH studies and other data into actual practice in the field by state and local public health should be placed on a future agenda. For example, this agenda item could include the translation of CDC's sustainability and green chemistry activities in addressing the built environment, health impact assessments, social needs, equity issues, environmental protection and economic viability.
- A presentation on systematic reviews, grading of evidence, and determination of the strengths and weaknesses of recommendations should be placed on a future agenda. NIEHS-NTP has provided leadership in this area, but this presentation also will be

important for NCEH/ATSDR, NIOSH and other agencies that are beginning to adopt this approach.

Closing Session

Drs. Kapil and Ikeda thanked the BSC for their thoughtful insights, robust discussions and helpful input over the course of the meeting. The members also were thanked for continuing to contribute their valuable time to attend BSC meetings and provide NCEH/ATSDR with their expertise.

With no further discussion or business brought before the BSC, Dr. Kapil adjourned the meeting at 12:06 p.m. on June 28, 2013.

I hereby certify that to the best of my knowledge, the foregoing Minutes of the proceedings are accurate and complete.

Date

Vikas ("Vik") Kapil, DO, MPH, FACPOEM
Acting Chair, NCEH/ATSDR
Board of Scientific Counselors



Participants' Directory

BSC Members Present

Dr. Hillary Carpenter
Dr. Rebecca Head
Mr. Daniel Kass
Dr. Ewa King
Dr. Michael Kleinman
Dr. Shannon Marquez
Dr. Kenneth Ramos
Mr. Sanjay Ranchod
Dr. Sacoby Wilson

BSC Members Absent

Dr. Lisa Alvarez-Cohen
Dr. Thomas Arcury
Dr. Tina Bahadori
Dr. Julia Gohlke
Dr. Marie Swanson
Dr. Robert Wright

BSC Federal Expert Members

Dr. John Decker
National Institute for Occupational Safety
and Health

Dr. Bonnie Richter
U.S. Department of Energy

Dr. Kristina Thayer
National Toxicology Program, National
Institute of Environmental Health Sciences

Dr. Hal Zenick
U.S. Environmental Protection Agency

Designated Federal Official

Dr. Vikas ("Vik") Kapil
Chief Medical Officer &
Associate Director for Science,
NCEH/ATSDR

CDC/NCEH/ATSDR Representatives

Brian Anderson
Erik Auf der Heide
Brian Awsumb
Morgan Bartz
Barry Brooks
Mary Jean Brown
Sharunda Buchanan
Ginger Chew
Rick Collins
Kimball Credle
Rey de Castro
Scott Deitchman
Betsy Dunaway
Barbara Ellis
Federico Feldstein
Julie Fishman
Olivia Harris
Qaiyim Harris
Michael Hatcher
Leila Heidari
James Holler
Lindsey Horton
Robin Ikeda
Kristen Jarman
Maria Jolly
Celia Karp
Chinaro Kennedy
Lauren Lewis
Shirley Little

Josephine Malilay
Amy Mowbray
Moiz Mumtaz
Edward Murray
Zoe Petropoulos
James Pirkle
Jennifer Przybyler
Judith Qualters
Grace Raines
Franco Scinicariello

Samira Siddique
Thomas Sinks
Kandace Steele
Amy Sung
Germaine Vazquez
Padma Vempathy
Arthur Wendel
Lynn Wilder
Alan Yarbrough



Glossary of Acronyms

ACA	Affordable Care Act
ACCLPP	Advisory Committee on Childhood Lead Poisoning Prevention
ACE	Acute Chemical Event
ACOG	American Congress of Obstetricians and Gynecologists
ALS	Amyotrophic Lateral Sclerosis
APHA	American Public Health Association
BLLs	Blood Lead Levels
BSC	Board of Scientific Counselors
CAP	Community Assistance Panel
CDC	Centers for Disease Control and Prevention
CEDR	Comprehensive Epidemiologic Data Resource
CENRS	Committee on Environment, Natural Resources and Sustainability
CMS	Centers for Medicare and Medicaid Services
DLLs	Dust Lead Levels
DLS	Division of Laboratory Sciences
DOE	U.S. Department of Energy
DRR	Disaster Risk Reduction
EBLLs	Elevated Blood Lead Levels
EH; EPH	Environmental Health; Environmental Public Health
EHRs	Electronic Health Records
EIS	Epidemic Intelligence Service
EISOs	Epidemic Intelligence Service Officers
EJ	Environmental Justice
EOC	Emergency Operations Center
EPA	U.S. Environmental Protection Agency
ERCs	Education and Research Centers
FDA	U.S. Department of Food and Drug Administration
HEDIS	Healthcare Effectiveness Data and Information Set
HHLPPP	Healthy Homes/Lead Poisoning Prevention Program
HHS	U.S. Department of Health and Human Services
HUD	U.S. Department of Housing and Urban Development
IOM	Institute of Medicine

LPP	Lead Poisoning Prevention
MDH	Minnesota Department of Health
<i>MMWR</i>	<i>Morbidity and Mortality Weekly Report</i>
MOH	Ministry of Health
MOU	Memorandum of Understanding
NAS	National Academy of Sciences
NCEH/ATSDR	National Center for Environmental Health/ Agency for Toxic Substances and Disease Registry
NGOs	Non-Governmental Organizations
NHANES	National Health and Nutrition Examination Survey
NIEHS	National Institute of Environmental Health Sciences
NIOSH	National Institute for Occupational Safety and Health
NTP	National Toxicology Program
OD	Office of the Director
OEHE	Office of Environmental Health Emergencies
OMB	Office of Management and Budget
PCPs	Primary Care Providers
PHA	Public Health Assessment
PHPR	Public Health Preparedness and Response
PHS	U.S. Public Health Service
PRCs	Prevention Research Centers
PRDOH	Puerto Rico Department of Health
REL	Recommended Exposure Limit
ROCs	Reports on Carcinogens
SIBs	Social Impact Bonds
SME	Subject-Matter Expert
VSP	Vessel Sanitation Program
WIC	Women, Infants and Children
WLLs	Water Lead Levels