

**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
May 17-18, 2012
Atlanta, Georgia**

Record of the Proceedings

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ATTACHMENT 1**List of Participants****BSC Members**

Dr. Timothy Ryan, Chair
 Dr. Thomas Arcury
 Dr. Darryl Barnett
 Dr. Arthur Frank
 Mr. Daniel Kass
 Dr. Michelle Kegler
 Dr. Michael Kleinman
 Dr. Shannon Marquez
 Dr. Marie Swanson
 Dr. Sacoby Wilson

BSC Federal Expert Members

Dr. Wayne Cascio (Alternate)
 U.S. Environmental Protection Agency

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

Designated Federal Official

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

CDC/NCEH/ATSDR Representatives

Dr. Christopher Portier
 (NCEH/ATSDR Director)
 Dr. Thomas Sinks
 (NCEH/ATSDR Deputy Director)
 Henry Abadin
 Barry Brooks
 Mary Jean Brown
 Sharunda Buchanan
 Ekta Choudhary
 Scott Damin
 Jay Dempsey

Ann Marie de Pasquale
 Betsy Dunaway
 Chris Earl
 Barbara Ellis
 Henry Falk
 Julie Fishman
 Tina Forrester
 David Fowler
 Paul Garbe
 Demetria Gardner
 Benjamin Gerhardstein
 Olivia Harris
 Lisa Hines
 Sarah Hines
 James Holler
 John Kastenbauer
 Shirley Little
 Sandra Malcom
 Josephine Malilay
 Susan Metcalf
 Susan Moore
 Moiz Mumtaz
 Ed Murray
 Jay Nielson
 Gary Noonan
 Jond Ogden
 Kenneth Orloff
 James Pirkle
 Judith Qualters
 Kenneth Rose
 Patricia Ruiz
 Michael Sage
 Franco Scinicariello
 Steve Skowronski
 Cassandra Smith
 Anne Sowell
 Heather Strosnider
 Marissa Scalia Sucusky
 [via teleconference]
 Monica Toles
 Marlena Wald
 Patrick Wall
 John Wheeler
 Laura Wiese
 Lynn Wilder

Sharon Williams-Fleetwood
Alan Yarbrough
Ying Zhou

Members of the Public

John Bucher
National Toxicology Program,
National Institute of Environmental Health
Sciences

Joel de Jesus
Magellan Diagnostics

Caroline Gross
Magellan Diagnostics

Robert Hill, Jr.
Battelle

Kenneth Olden
City University of New York, Hunter College

Denise Pat Rizutto
Chemicals Reporter, BNA, Inc.

Lara Zwonitzer
Battelle

ATTACHMENT 2

Glossary of Acronyms

ACCLPP	Advisory Committee on Childhood Lead Poisoning Prevention
ACE	Air, Climate and Energy
ASDs	Autism Spectrum Disorders
BLLs	Blood Lead Levels
BPA	Bisphenol A
BRFSS	Behavioral Risk Factor Surveillance System
BSC	Board of Scientific Counselors
CBPR	Community-Based Participatory Research
CDC	Centers for Disease Control and Prevention
CoAg	Cooperative Agreement
DCHI	Division of Community Health Investigations
DLS	Division of Laboratory Sciences
DoD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
DTHHS	Division of Toxicology and Human Health Sciences
EBLLs	Elevated Blood Lead Levels
ED	Emergency Department
EH	Environmental Health
EIs	Exposure Investigations
EJ	Environmental Justice
EPA	U.S. Environmental Protection Agency
EPH	Environmental Public Health
FDA	Food and Drug Administration
FEMA	Federal Emergency Management Agency
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
IRB	Institutional Review Board
NACP	National Asthma Control Program
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
NHBs	Non-Hispanic Blacks
NHWs	Non-Hispanic Whites
NIOSH	National Institute for Occupational Safety and Health
NPL	National Priorities List
NPOs	Non-Profit Organizations
NTP	National Toxicology Program
OD	Office of the Director
OMB	Office of Management and Budget
ORD	Office of Research and Development
ORNL	Oak Ridge National Laboratory

PCBs	Polychlorinated Biphenyls
PHA	Public Health Assessment
PM _{2.5}	Particulate Matter 2.5
PUFAs	Polyunsaturated Fatty Acids
REL	Recommended Exposure Limit
SFAs	Saturated Fatty Acids
TFAs	Trans Fatty Acids
VOCs	Volatile Organic Chemicals
WTC	World Trade Center

EXECUTIVE SUMMARY

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) on May 17-18, 2012 in Atlanta, Georgia.

In accordance with Federal Advisory Committee Act regulations, the Chair and 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. The Chair called for public comment at all times noted on the agenda published for the May 17-18, 2012 BSC meeting.

The NCEH/ATSDR Director presented certificates of appreciation to 4 BSC members whose terms would expire in June 2012: Drs. Darryl Barnett, Arthur Frank, Michelle Kegler and Timothy Ryan (Chair). The outgoing members were applauded for their outstanding service to the BSC and NCEH/ATSDR as well as for their ongoing commitment to advance environmental health (EH) in the field.

The comprehensive NCEH/ATSDR Director's report covered the following topics:

- the NCEH/ATSDR strategic planning process;
- ATSDR's site-specific activities at the Oak Ridge National Laboratory and Cabo Rojo, Puerto Rico sites;
- key outcomes of ATSDR's Science Symposium in April 2012;
- ATSDR's ongoing hydraulic fracturing activities;
- ATSDR's proposed reorganization;
- NCEH's crossover-design study to measure the levels of bisphenol A (BPA) in individuals who consumed canned soup versus fresh soup;
- NCEH's "Environmental Health and Emergency Response" Training Course and 15-part online environmental public health (EPH) course;
- NCEH's destruction of chemical weapons in the United States for the Department of Defense
- NCEH's inaugural "Health Impact Assessment Meeting" as part of its Healthy Community Design Initiative;
- NCEH's biannual inspections of all cruise ships that enter U.S. ports and provision of training to cruise ship employees on EPH issues;
- NCEH's release of the first *Asthma's Impact on the Nation Report* and the *Second National Report on Biochemical Indicators of Diet and Nutrition in the U.S. Population*;
- NCEH's 2012 ClearMark Award by the Center for Plain Language;
- recommendations by the Advisory Committee on Childhood Lead Poisoning Prevention on CDC's current level of concern for childhood blood lead levels of 10 µg/dL; and
- NCEH's global EH activities in Haiti, Kenya, Kosovo and Nigeria.

The NCEH Division of Laboratory Sciences (DLS) presented an update on two major activities. Key findings in the *Second National Report on Biochemical Indicators of Diet and Nutrition in the U.S. Population* were summarized for the prevalence of nutritional deficiencies in iron,

folate, and vitamins A, B6, B12, C, D and E in the general population and specific demographic groups. DLS's application of the first-time measurement of plasma trans fatty acids (TFAs) in the U.S. population showed that the Food and Drug Administration's final rule on product labeling of TFAs played a strong role in the food industry adopting different practices.

Following the release of DLS's compelling data, Campbell's Soups announced that BPA would be removed from all of its soup containers. CDC leadership was extremely pleased with this outcome because a major U.S. manufacturer voluntarily agreed to remove BPA from soup containers without the need for a regulatory process.

The NCEH/ATSDR Office of the Director presented an update on the "Future of Science at ATSDR Symposium." Participants in the track 1 subgroup, "The Science Behind ATSDR's Public Health Assessment Process," advised ATSDR to take the following actions: incorporate biomonitoring when appropriate; enhance support for the collection of exposure and health outcome data; and evaluate and formalize community engagement in the early stages of site-specific activities.

Participants in the track 2 subgroup, "Toxicology and Risk Assessment of ATSDR," advised ATSDR to take the following actions: evaluate risks from combined exposures and enhance ToxProfiles™ by conducting a systematic review, developing a web-based interface, prioritizing chemicals and identifying emerging contaminants.

NCEH presented a comprehensive update on the goals, current status and future direction of the National Environmental Health Tracking Program. The BSC provided extensive guidance on the Tracking Program in response to 2 questions posed by NCEH: (1) Given limited and decreasing resources, what strategies can CDC implement to identify and prioritize the content and features of the Tracking Program? (2) What are the key priorities for the Tracking Program?

The Chair moderated an open discussion with the BSC: The comments and suggestions focused on NCEH/ATSDR's leadership and partnerships, the HHS Environmental Justice Strategic Plan, hydraulic fracturing activities, vulnerable communities/populations, domestic versus global EH activities in severe resource-constrained environments in the United States, and improved use of the BSC's expertise.

The NCEH/ATSDR Deputy Director presented an update on CDC's Healthy Homes/Lead Poisoning Prevention Program (HHLPPP) and National Asthma Control Program (NACP). The \$27 million cut to the HHLPPP budget will require CDC to entirely eliminate extramural program funding for lead poisoning prevention efforts by September 30, 2012.

The \$2 million cut to the NACP budget also will require CDC to make drastic program adjustments in FY2012 in asthma control surveillance, staff and funding to local education agencies. The BSC provided extensive guidance on the severe HHLPPP and NACP budget cuts in response to the following question posed by CDC: What strategies can CDC implement to maximize its ability to prevent childhood lead exposures and control asthma given reduced resources?

The ATSDR Division of Community Health Investigations (proposed) presented an extensive update on its EH exposure investigation (EI) process to obtain the BSC's guidance on 2 questions: (1) Is the EI process appropriate? (2) Are emerging technologies available that ATSDR should pursue for both biological monitoring and environmental sampling?

The BSC Federal Expert members provided updates on recently completed or ongoing EH activities of their respective agencies: National Institute for Occupational Safety and Health, National Toxicology Program, U.S. Department of Energy, and U.S. Environmental Protection Agency.

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**BOARD OF SCIENTIFIC COUNSELORS
May 17-18, 2012
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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 May 17-18, 2012 in Building 106 of the CDC Chamblee Campus in Atlanta, Georgia.

Opening Session: May 17, 2012

Timothy Ryan, PhD, BSC Chair

Associate Professor, School of Public Health Sciences and Professions
Ohio University, College of Health and Human Services

Vikas (“Vik”) Kapil, DO, MPH, FACPOEM

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

Drs. Ryan and Kapil opened the floor for introductions to determine the BSC voting members and Federal Expert members who were in attendance. They verified that the members constituted a quorum for the BSC to conduct its business on May 17, 2012 and called the meeting to order at 8:38 a.m. The list of participants is appended to the minutes as [Attachment 1](#).

Dr. Kapil reminded the BSC voting members of their individual responsibility to identify real or perceived conflicts of interest with any of the agenda items for May 17, 2012 and recuse themselves from participating in these matters.

Dr. Ryan welcomed the participants to the first BSC meeting of 2012. He announced that the meeting format was revised to allow the BSC to have longer discussion periods following each presentation and provide more outcomes-based guidance to NCEH/ATSDR.

Christopher Portier, PhD
Director, NCEH/ATSDR
Centers for Disease Control and Prevention

Dr. Portier presented certificates of appreciation to 4 BSC members whose terms would expire in June 2012: Drs. Darryl Barnett, Arthur Frank, Michelle Kegler and Timothy Ryan. Dr. Ryan also was given a plaque in recognition of his excellent leadership as the BSC Chair. The participants joined Dr. Portier in applauding the outgoing BSC members for their outstanding service to NCEH/ATSDR and their continued commitment to improve environmental health (EH) in the field.

NCEH/ATSDR Director's Report

Christopher Portier, PhD
Director, NCEH/ATSDR
Centers for Disease Control and Prevention

Dr. Portier covered the following topics in his Director's report to the BSC.

Office of the Director (OD) Highlights. OD held its first Twitter chat on April 20, 2012, "Your Health and the Environment." Based on the number of re-tweets and tracking of other information, the Twitter chat reached ~320,000 persons. OD held its second Twitter chat on asthma on May 15, 2012 in recognition of World Asthma Month.

Over the past 6 months, NCEH/ATSDR has published 77 papers, reports and manuscripts covering a diverse range of topics (e.g., aquatic health and emergency preparedness and response).

NCEH/ATSDR recently announced its strategic planning process to staff. During the 9-month exercise, existing procedures and approaches will be rigorously examined to develop new strategic plans for both NCEH and ATSDR.

ATSDR Program Highlights. ATSDR will soon release the final report of a mercury public health assessment (PHA) based on its 20-year investigation at the Oak Ridge National Laboratory (ORNL). The PHA found that current exposures from mercury at the ORNL Y-12 Plant were not a public health hazard, but conclusions could not be reached on past exposures due to the lack of data.

Over the course of its 20-year investigation at ORNL, ATSDR addressed >500 community concerns; held 150 community meetings; and completed 4 health consultations, 9 PHAs, 9

health education sessions for physicians and community members, and 1 exposure investigation. ATSDR's 20-year investigation in and around ORNL showed that levels of exposure to most toxic releases from the Oak Ridge Reservation were much lower than expected.

In partnership with the U.S. Environmental Protection Agency (EPA), ATSDR is continuing its investigation in Cabo Rojo, Puerto Rico of groundwater contamination as a result of volatile organic compounds (VOCs). The site is listed on the National Priorities List (NPL). ATSDR released a PHA for public comment in August 2011, but EPA asked ATSDR to conduct an additional evaluation of data on soil gas beneath buildings at the Cabo Rojo site.

In response to ATSDR's finding of vapor intrusion at a Head Start facility that potentially would be harmful to children, EPA immediately conducted indoor air sampling. ATSDR currently is preparing a health consultation and developing bilingual health education materials to be distributed to the Cabo Rojo community in Puerto Rico.

ATSDR convened a Science Symposium in April 2012 to evaluate its scientific approach to assessing health risks at sites and generate action-oriented strategies for improvement. A number of topics were addressed during the symposium: multiple exposures and cumulative risks at sites; approaches to engage communities in site-specific scientific work; strategies to evaluate and address health disparities in community settings; efforts to streamline chemical hazard reviews; prioritization of chemicals for ToxProfilesTM; and a process to determine the most appropriate time to expand site assessment work and change exposure assessments.

ATSDR and its partners convened 2 meetings to review new methods for drilling natural gas (e.g., hydraulic fracturing). Meeting 1 included representatives from a diverse range of sectors (e.g., government, industry, academia and non-governmental organizations (NGOs)). The meeting provided numerous opportunities for ATSDR to collaborate and conduct additional research on hydraulic fracturing in the future. Materials from the meeting will be available on the Institute of Medicine website in the near future.

Meeting 2 was held to achieve 3 major goals: (1) identify priorities and determine a sequence of appropriate next steps for NCEH/ATSDR and its partners to ensure the health and safety of communities and workers; (2) examine the potential for environmental exposures from hydraulic fracturing to determine the impact of natural gas development activities on health; and (3) identify data gaps and data sources. ATSDR is compiling information from both meetings (e.g., scientific data, experiences in the field, and anecdotal reports across the country) to better respond to concerns raised by communities of their health effects from hydraulic fracturing.

ATSDR is awaiting formal approval of its proposed reorganization. Over the 1-year period of a rigorous and thorough analysis of ATSDR's existing organizational structure, mission and goals, NCEH/ATSDR leadership solicited extensive input from partners and external stakeholders. ATSDR's overarching function to protect the public from harmful chemical exposures and its primary focus on communities will remain the same in the reorganization. As a result, ATSDR will be decentralized with the relocation of 11 Headquarters staff to Regional Offices. Stronger support will be given to cooperative agreement (CoAg) states as well.

ATSDR's 4 divisions will be restructured into 2 divisions in the proposed reorganization. The "Division of Community Health Investigations" (DCHI) will have responsibility and oversight of all field work in communities. DCHI will combine the former Division of Health Assessment and Consultation, the former Division of Regional Operations, and 3 Atlanta-based geographic branches: Eastern Branch, Central Branch and Western Branch. Branch Chiefs will have oversight of operations in Regional Offices and CoAg states for their respective geographical areas.

DCHI's other components will include (1) the "Science Support Branch" to support exposure investigations, dose reconstructions, and statistical/mathematical analyses of data and (2) a "Petition Coordinator" to process requests to ATSDR for site-specific activities.

The "Division of Toxicology and Human Health Sciences" (DTHHS) will focus on research and the translation of research into tools that can be used in communities to better understand risk. DTHHS will combine the former Division of Health Studies and the former Division of Toxicology and Environmental Medicine to improve coordination of ATSDR's science and scientific reviews by merging toxicology, epidemiology and environmental medicine.

DTHHS will house the "Science Innovation Group" in which staff will be detailed as Science Innovation Fellows for a fixed period of time to develop, test and implement ideas to improve ATSDR's science. A review panel of NCEH/ATSDR leadership will evaluate the proposed ideas and select staff that will be awarded resources and support to serve as Science Innovation Fellows.

A "Quality Assurance/Quality Control Group" will be added to the NCEH/ATSDR Office of Science to oversee the quality of reports and investigations. Policy and communications staff will be moved into both DCHI and DTHHS to improve linkages to and communications with NCEH/ATSDR OD.

In terms of ATSDR's successes, the ToxProfiles™ are internationally recognized for their utility and completeness. ATSDR has had an active presence in >10,000 communities in the United States over its history and >600 communities in 2011 alone. ATSDR's recommendations are widely accepted and implemented in communities.

In terms of ATSDR's challenges, the budget has remained flat for 10 years, but expectations for site-specific activities have increased. Most notably, PHAs must be conducted to identify chemical exposures at lower levels. Gaps exist in current scientific tools and knowledge. Moreover, ATSDR has limited authority to collect data in communities.

Overall, the proposed reorganization is expected to improve the focus on regional and community issues, enhance partnerships, increase ATSDR's presence in communities to strengthen communication and oversight of activities, encourage integration and coordination of scientific disciplines, and promote scientific innovation. The proposed reorganization also should result in clearer lines of responsibility, stronger capacity to coordinate activities,

increased efficiency in completing activities, and targeting of more resources to communities in the future.

NCEH Program Highlights. NCEH conducted a crossover-design study to measure the levels of bisphenol A (BPA) in individuals who consumed canned soup versus fresh soup. The study showed that BPA levels were 10-fold higher in persons who consumed canned soup versus those who consumed fresh soup based on a single exposure.

NCEH collaborated with the Federal Emergency Management Agency (FEMA) to develop and offer the “Environmental Health and Emergency Response” Training Course. The 10 modules provide training in diverse areas (e.g., food safety, potable water, wastewater, radiation, disaster management and building assessments).

The face-to-face training course was featured as a case study in the *2012 State of FEMA Report* and also was showcased on the FEMA Facebook page. Graduates discussed the value and important role of the training course in addressing EH emergencies at the community level. Efforts are underway in NCEH to convert the face-to-face training course to an online training course.

NCEH launched a 15-part online environmental public health (EPH) course that covers topics from general EPH to specialty areas (e.g., zoonosis, vectors, pest control, radiation protection, and EH protection of swimming pools and recreational facilities).

NCEH has had oversight of the destruction of chemical weapons in the United States for the Department of Defense (DoD) for nearly 30 years. NCEH and DoD met the deadline in the treaty that called for the destruction of 90% of chemical weapons by 2012. However, the destruction of the remaining 10% of the stockpile will pose the greatest challenge because ~100 locations across the nation are suspected to house non-stockpile chemical weapons.

NCEH recently held the inaugural “Health Impact Assessment Meeting” with 430 participants as part of its Healthy Community Design Initiative. NCEH awarded CoAgs to 6 organizations to train professionals; conduct health impact assessments on built environment issues; and develop and disseminate a plain-language checklist to communities that have little or no knowledge of public health and built environment issues.

NCEH is responsible for conducting biannual inspections of all cruise ships that enter U.S. ports and training cruise ship employees on EPH issues. NCEH provides cruise ship training in 3 key areas: combined operations (e.g., housekeeping, infection control and pest management); hotel operations (e.g., food-borne hazards, food safety and potable water); and technical operations (e.g., water-borne illnesses, water chemistry and recreational water facilities).

NCEH recently released the first *Asthma’s Impact on the Nation Report* that is now available on the CDC.gov website. The report concluded that asthma continues to be a major public health concern and has a large financial impact on families, the healthcare system and nation. NCEH recently met with Congressional staffers to highlight key data from the report:

- In 2010, an estimated 29 million adults (or ~13% of all adults in the United States) had been diagnosed with asthma in their lifetime. Of these Americans, nearly 19 million continue to have asthma.
- At this time, 10 million children (or ~14% of all children in the United States) have been diagnosed with asthma in their lifetime. Of these children, ~10% continue to have asthma.
- In the first decade of the 21st century, the proportion of persons with asthma in the United States increased by 15%.
- In 2008, children from elementary school to high school missed 10.5 million school days. Parents also missed workdays to care for their children.
- In 2008, adults with asthma missed 14.2 million workdays.
- In 2009, asthma accounted for 3,300 deaths in the United States, 2 million emergency department (ED) visits, 500,000 hospitalizations, and ~9 million visits to physicians.
- As of the most recent and complete data set in 2007, asthma accounted for a total societal cost of \$56 billion (e.g., \$50 billion in medical expenses, \$4 billion in lost productivity, and \$2 billion in premature deaths).

NCEH recently released the *Second National Report on Biochemical Indicators of Diet and Nutrition in the U.S. Population*. NCEH added a biomonitoring module to the National Environmental Health Tracking Program with several new features (e.g., data from the *National Report on Human Exposure to Environmental Chemicals*; updated data on cancer, carbon monoxide poisoning and birth defects; and new mapping functionalities). For example, the new mapping functionalities of the biomonitoring module show that childhood blood lead levels (BLLs) have decreased by nearly 50% from 1999 to 2008.

NCEH was honored with the 2012 ClearMark Award by the Center for Plain Language for the best use of clear communications and plain language documents and websites for the Tracking Program's outdoor air quality materials. NCEH currently is developing a model aquatic health code for the United States that can be utilized and/or tailored by local governments to address specific needs at the local level. The model code will cover several issues, but the first topic will address the management of municipal swimming pools.

NCEH issued a 3-part charge to its Advisory Committee on Childhood Lead Poisoning Prevention (ACCLPP): (1) examine CDC's current level of concern for childhood BLLs of 10 µg/dL; (2) consider the ability of laboratories to measure lead in blood; and (3) provide guidance for CDC to effectively communicate this complex information to the public. To fulfill its charge, ACCLPP extensively reviewed data compiled by CDC, the National Toxicology Program (NTP) and other sources.

ACCLPP adopted the recommendations during its November 2011 meeting and CDC formally accepted the recommendations on May 16, 2012. The recommendations are outlined below.

1. CDC should discontinue using of the term "level of concern" by removing this language from all of its guidelines and other documents. ACCLPP's position was that "level of concern" calls for actions in a clinical setting rather than for public health. ACCLPP

further emphasized that the best approach to end childhood lead poisoning is to prevent, control and entirely eliminate exposures. CDC concurred with the recommendation and will take action.

2. CDC should replace “level of concern with “reference value.” Because no threshold exists for a safe level of lead in children’s blood, the term “reference value” will drive preventive public health practice and will eliminate the need for a “safety level.” ACCLPP recommended the reference value as the top 97.5 percentile of the National Health and Nutrition Examination Survey (NHANES) distribution of BLLs for children in the United States. The reference value should be used to target lead elimination efforts to communities and environments in the United States with the top 2.5% of children with BLLs >5 µg/dL. ACCLPP further advised CDC to review and change the reference value every 4 years to match the most recent NHANES data. CDC concurred with the recommendation and will take action.
3. CDC should implement a nationwide primary prevention policy to assure that no children are significantly exposed to lead. CDC concurred with the recommendation in principle because resources are not available at this time to take action. However, CDC will collaborate with partners to develop strategies and guidelines to take action in the future.
4. CDC should fully engage clinicians as public health partners to serve as a reliable source of information on lead hazards and play a primary role in educating families on preventing lead exposures. Pediatricians and obstetricians should take environmental assessments prior to examining the BLLs of children and make appropriate referrals for lead testing, particularly for children and women of childbearing age who live in homes built before 1978. CDC concurred with the recommendation in principle and will support clinicians in this effort by providing educational materials that can be distributed to their patients.
5. CDC should help clinicians to monitor the health status of all children with confirmed BLLs >5 µg/dL. Clinicians should follow children until the remediation is complete or the child is >6 years of age. ACCLPP noted that unless the environment is remediated, children’s BLLs would continue to rise through their early developmental years. CDC concurred with the recommendation in principle and will support clinicians in this effort.
6. CDC should help clinicians to ensure that BLLs at or higher than the reference value are reported to state and local health or housing departments if reporting is not mandated. CDC should continue to collect and use these data to identify trends or clusters in communities that have a large proportion of children with high BLLs. Primary prevention should be targeted to these areas. CDC concurred with the recommendation in principle and will strongly encourage clinicians to report BLLs to maintain national surveillance capacity. CDC will continue to collaborate with laboratories to make blood lead testing easier and more accurate with new technologies.

7. CDC should educate families, service providers, advocates and the public in primary prevention of lead exposure. CDC concurred with the recommendation in principle and will collaborate with partners to provide educational materials on websites.
8. CDC should encourage state, local and other agencies to share data, develop and enforce preventive lead-safe housing rules, and identify financing for lead hazard remediation. CDC concurred with the recommendation in principle and will encourage federal, state and local partners to develop substantive policies on this issue. CDC will continue to widely distribute its existing materials and will explore the development of new educational materials in the future.
9. CDC should educate elected officials and leaders in public health, housing and code enforcement agencies to assure further protection of children from lead in their jurisdictions. CDC concurred with the recommendation in principle and will provide materials, educational courses and other resources at the local level.
10. CDC should emphasize the importance of environmental assessments to identify and mitigate lead hazards before children demonstrate BLLs at or higher than the reference value. CDC concurred with the recommendation in principle and will collaborate with EPA, the U.S. Department of Housing and Urban Development (HUD) and other federal partners to provide education on the critical role of environmental assessments in alleviating lead exposures.
11. CDC should support lead remediation of an entire dwelling if a lead hazard that requires a response is found in any unit in a multi-family housing property. CDC concurred with the recommendation in principle and will explore options to increase housing inspections.
12. CDC should encourage additional research to develop interventions that are capable of maintaining children's BLLs at lower levels than the reference value. CDC concurred with the recommendation in principle and will collaborate with the National Institute of Environmental Health Sciences and academic partners to encourage research in this area.
13. CDC should expand its research priorities to improve the use of data from screening programs. CDC concurred with the recommendation in principle and will collaborate with its partners in this effort.

NCEH is continuing its involvement in global EH activities. The earthquake in Haiti destroyed most of the country's sanitation infrastructure and led to a cholera outbreak of 470,000 cases and ~7,000 deaths. NCEH is collaborating with the Haitian government and other partners to address the cholera outbreak and water sanitation issues by formulating budgets, developing strategic plans, and providing training to 250 new water utility technicians.

NCEH, the Kenyan government and key stakeholders are investigating a recent aflatoxin outbreak in Kenya to determine its spread and public health impact. NCEH tested aflatoxin

levels at large distribution centers, conducted a house-to-house search to identify infected persons, and measured serum adduct levels in individuals. The investigation found widespread aflatoxin at the public health level and some degree of exposure to aflatoxin at the individual level. Based on these results, the Kenyan government shifted the focus of the aflatoxin investigation from a local community to a national problem with additional resources.

NCEH provided training to clinicians and laboratory personnel to identify and treat lead poisoning in Kosovo and also offered services for children to return to lead-free communities. NCEH is collaborating with a diverse group of partners to address the pervasive lead poisoning problem in Nigeria. Most notably, NCEH and the World Health Organization are continuing their investigation of a lead poisoning outbreak in Zamfara State, Nigeria that resulted in the deaths of several hundred children and heavy exposure to several thousand children.

The environments of these children were remediated, but soil in the villages most likely will become lead poisoned again due to continued processing of gold. NCEH and its partners are continuing to provide education and interventions to the villages to ensure that another childhood lead poisoning outbreak does not occur in the future.

Dr. Ryan moderated the BSC's discussion with Dr. Portier on his NCEH/ATSDR Director's report. The discussion topics included:

- research, funding and activities by federal agencies and NGOs to better engage the public and address community concerns regarding hydraulic fracturing;
- the potential of unintended consequences or adverse public health outcomes as a result of hydraulic fracturing;
- local entities that most likely would be responsible for problems related to hydraulic fracturing (e.g., EH agencies or the engineering community);
- the absence of baseline data to compare health impacts in hydraulic fracturing versus non-hydraulic fracturing communities with similar demographics;
- plans to collect data below the county level to determine the potential for long-term diseases or subtle health effects from hydraulic fracturing (e.g., cancer or immunological illness);
- systematic efforts to analyze contaminants that are added to the hydraulic fracturing process to identify potential health outcomes and target appropriate interventions to the public;
- ongoing efforts to better coordinate studies, tracking and other activities between NCEH and ATSDR;
- the status of ATSDR's public health prioritization scheme; and
- the public's recognition and use of ATSDR versus state/local health departments, EH agencies or EPA to address EH concerns in communities.

A number of BSC members were extremely troubled and distressed by CDC's "concurrence in principle" with ACCLPP's major recommendations. The BSC members noted that CDC's response is not based on realities in the field because agencies at state and local levels have

no resources to take action on ACCLPP's recommendations on childhood lead poisoning prevention.

The BSC members also pointed out that due to severe budget cuts at federal, state and local levels, an increase in childhood BLLs when CDC reviews the reference value in 4 years is a strong possibility. The BSC members further emphasized that without federal dollars and support to eliminate childhood lead poisoning in the United States, the lead infrastructure at state and local levels will be dismantled. The Congressional decision to end the lead poisoning prevention budget does not appear to be supportive of children's health.

Additional comments and suggestions by the BSC in response to Dr. Portier's Director's report are outlined below.

- The lack of public involvement and participation in the 2 hydraulic fracturing meetings is of great concern. Federal agencies, industry and academia have appeared to develop, rollout and deploy hydraulic fracturing technologies without adequate input from and appropriate education to the American public on risks and benefits. The omission of highly impacted rural communities from these discussions is particularly troubling. ATSDR should conduct an honest and credible assessment of hydraulic fracturing in full partnership with communities. ATSDR also should replicate its existing public outreach tools and other resources to strengthen community engagement in hydraulic fracturing activities at the outset.
- ATSDR should describe specific action steps that will be taken in response to the BSC's suggestions during the November 2011 meeting on the public health approach to hydraulic fracturing and other natural gas activities.
- NCEH should provide guidance to state and local health departments on developing reference values for childhood BLLs and establishing goals based on local surveillance data.
- NCEH should convene focus groups or conduct formative research to test messages and develop strategies to appropriately frame and convey information to parents on the complex topic of the childhood BLL reference value. Because CDC guidance states that no threshold exists for a safe level of lead in children's blood, parents will be concerned if their children have BLLs 0-5 µg/dL.

Update by the Division of Laboratory Sciences (DLS)

James Pirkle, MD, PhD

Director, NCEH Division of Laboratory Sciences
Centers for Disease Control and Prevention

Dr. Pirkle covered two major topics in his update to the BSC on DLS's recent activities.

Second National Report on Biochemical Indicators of Diet and Nutrition in the U.S. Population. NCEH released the Second National Report in March 2012. The report is the most comprehensive biochemical assessment of the nutritional status of the U.S. population and measures 58 indicators of nutritional status. The overarching functions of the report are to:

- serve as a “one-stop shop” for nutrition information on a population basis;
- describe the prevalence of nutritional deficiencies in the United States;
- track the effectiveness of interventions;
- provide reference ranges for populations;
- stratify data by certain demographic groups (e.g., age, gender, race/ethnicity and special populations); and
- offer high-quality methods to measure the nutritional status of folate, vitamin D and other nutrients.

The report contains an extensive amount of data. For example, the table on serum folate includes 16,411 data points to estimate the 97.5 percentile with a small confidence interval. The report also includes a large number of graphs to illustrate trends in the nutritional status by the general U.S. population and certain demographic groups.

The major findings in the report are highlighted as follows. The prevalence of nutritional deficiencies in iron, folate, and vitamins A, B6, B12, C, D and E was <10% overall, but variations were observed in certain demographic groups. Folate is needed for fetal development and growth and has been recommended for women of childbearing age to lower the risk for neural tube defects in newborns. The level of folate deficiency previously was 12% in the United States, but has decreased to <1% as a result of folate-fortified cereal grain products and recommendations for folate supplementation for women of childbearing age.

Vitamin D is essential for strong bone health and can be obtained from milk, milk products or supplements. By race/ethnicity, the report showed that the prevalence of vitamin D deficiency was 3.2% in non-Hispanic whites (NHWs), 12% in Mexican Americans, and 31% in non-Hispanic blacks (NHBs). Although patterns of dietary consumption and metabolic differences might be strong contributors to this outcome, follow-up research is needed to definitively determine the cause of the high prevalence of vitamin D deficiency in NHBs.

Iodine is essential to produce adequate amounts of thyroid hormones. Iodine deficiency is the most preventable cause of mental retardation in the world. Urine measurement is the best marker to assess recent dietary intake of iodine. North American women are advised to take a prenatal vitamin with 150 µg of iodine each day during pregnancy and lactation. The report showed that the nutritional deficiency of iodine in young women is at the low end of “adequate” intake (or fairly close to “insufficient” intake). NCEH is aware of the need to increase iodine uptake in the target population of women 20-39 years of age to prevent adverse effects to the fetus.

Women of childbearing age and children are at increased risk for iron deficiency. Iron deficiency can lead to negative effects on cognitive development and reduced work capacity.

Current guidelines recommend increased iron intake for women who are capable of having children as well as pregnant and breastfeeding women. However, the traditional clinical approach of using serum ferritin to diagnose iron deficiency was problematic due to its inability to track the full progression from iron deficiency to anemia. Moreover, inflammation of disease can adversely impact the capacity of ferritin to measure iron deficiency.

Serum transferrin receptor is a new and sensitive marker of iron deficiency that is not affected by inflammation of disease and has the ability to track the full progression from iron deficiency to anemia. The report includes sound data on iron deficiency based on application of the serum transferrin receptor in a large NHANES population in the United States. The report showed iron deficiency in ~11% of Mexican American children 1-5 years of age, ~14% of Mexican American females 12-49 years of age, and ~16% of NHB females 12-49 years of age.

First-time Measurement of Plasma Trans-Fatty Acids (TFAs) in the U.S. Population.

According to dietary guidelines, saturated fatty acids (SFAs) should account for <10% of an individual's caloric intake. Moreover, pregnant women should consume 8-12 ounces of seafood per week from a variety of sources. The consumption of TFAs and SFAs should be minimal, but are unavoidable in ordinary diets due to partially hydrogenated vegetable oils added to foods for preservation, milk products or other foods from ruminant animals with 2 stomachs, and trace amounts of refined vegetable oils.

The report highlights measurements of 24 fatty acids in Americans for the first time. The consumption of heart healthy polyunsaturated fatty acids (PUFAs) in the general U.S. population was good overall, but differences were observed in certain demographic groups. Most notably, NHBs and NHWs had slightly higher levels of PUFAs.

TFAs increase "bad" cholesterol, decrease "good" cholesterol, and are much more harmful than SFAs. TFAs can increase the risk for heart attack and stroke by ~26%. Current guidelines recommend that transfat consumption be as low as possible while consuming a nutritionally adequate diet.

After the Food and Drug Administration's (FDA) final rule on product labeling of TFAs went into effect in 2003, states and local jurisdictions passed rules to ban TFAs in restaurants. Food composition information was reported and food questionnaires were administered to determine the impact of the FDA final rule in reducing TFA exposures. However, these traditional approaches were not effective because the trans-fat content of many foods was not known due to a variety of food reformulations and mixtures. Moreover, existing analytical methods to measure plasma TFA levels were not adequately specific.

To address this data gap, DLS developed the first method to separate regular fatty acids from TFAs and identified the top 4 TFAs of concern that account for 40%-60% of total levels in humans. DLS applied its new method to measure TFAs in plasma samples from 2000-2009 NHANES populations and a randomly selected subset of fasting NHWs ≥ 20 years of age. The total cohort included ~250 persons in each sample. The data showed a remarkable decrease in TFA levels of 58% in NHW adults from 2000-2009. Consistent reductions also were observed

in each of the 4 individual TFAs of concern. DLS will use these data to track disease risks and consumption sources.

All of these findings indicate that the FDA final rule on product labeling of TFAs played a strong role in the food industry adopting different practices. CDC leadership is using DLS's data to encourage FDA to take additional actions to further decrease the TFA levels in the 2009 populations and eliminate TFAs from the diet as much as possible.

DLS is undertaking efforts at this time to measure and conduct detailed analyses of TFA levels in full NHANES cohorts (e.g., 1999-2000 and 2009-2010) and special populations (e.g., children, adolescents, NHBs and Mexican Americans). DLS will review NHANES questionnaire data to better ascertain true levels of TFAs in humans by examining the association between TFA levels and LDL-cholesterol and the relationship between TFA levels and the dietary intake of various foods.

Dr. Ryan moderated the BSC's discussion with Dr. Pirkle on DLS's recent activities. The discussion topics included:

- DLS's plans to integrate or conduct simultaneous tracking in communities with multiple EH problems related to the built environment and infrastructure, biomonitoring, exposure to metals, and lack of access healthy foods; and
- inclusion of NHANES data in the Tracking Program to improve accessibility to data.

The BSC made several comments and suggestions on DLS's recent activities.

- In addition to its national study, DLS also should conduct a study in states and local jurisdictions to determine the impact of the FDA final rule on product labeling of TFAs and the prohibition of TFAs in restaurants. New York City will begin conducting its second community HANES in 2013 and would serve as an ideal pilot site for the study.
- DLS should collect data to better understand the distribution of nutrients and metabolites by neighborhoods. For example, survey data identified extremely diverse disease patterns in 42 distinct neighborhoods in New York City. Data at the neighborhood level would be much more useful than data on NHBs, Mexican Americans and other large subpopulations that are not homogenous.
- DLS should align its messages on the nutritional status of the U.S. population with the public/private "Weight of the Nation Campaign." In this campaign, CDC and its public/private partners are exploring the role of poverty, low socioeconomic status, food deserts and other factors in obesity, particularly in low-income urban communities.

Update on the “Future of Science at ATSDR Symposium”

Vikas (“Vik”) Kapil, DO, MPH, FACPOEM

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

Dr. Kapil presented an update on the “Future of Science at ATSDR Symposium.” ATSDR’s major successes include its international recognition as a toxicological and EH authority; active presence in >600 communities in 2011; and the 85% rate by which federal partners, states and communities adopt and implement its recommendations. ATSDR’s key challenges include the inability of the flat budget to maintain pace with increased expectations; limited staff, financial resources and authority to collect environmental and health outcome data; and gaps in existing scientific tools and knowledge.

ATSDR has taken steps over time to adapt to the evolving EH science landscape. When ATSDR was officially established in 1985, emphasis was placed on addressing concerns regarding health impacts of exposures to hazardous wastes; conducting traditional risk assessments and developing epidemiological methods; and assuming that science would provide helpful answers to communities.

Over the past 27 years, ATSDR has gained a broader understanding of social and environmental determinants of health; developed new tools and innovative methods to better understand cumulative risk and improve biomonitoring; and recognized the important role of community involvement in advancing science and building local capacity.

ATSDR’s decision to convene the Science Symposium in April 2012 was based on 3 major developments. First, the National Conversation on Public Health and Chemical Exposures is an ongoing collaborative effort to widely engage the government, communities, industry, academia, NGOs and health professionals through web-based dialogue, “community conversations,” face-to-face meetings and other opportunities for public comment.

Stakeholders were extensively involved in developing the National Conversation Action Agenda that included specific guidance to ATSDR on public health approaches to address chemical exposures. Key recommendations in the Action Agenda were for ATSDR to (1) engage independent experts to review its scientific methods that are used to investigate public health effects of community exposures to toxic substances and (2) apply these results to improve PHAs and related activities.

Second, 2 independent reviews were conducted on ATSDR. The BSC’s 2007 review found that ATSDR’s site-specific activities (1) offered a positive contribution to the health of communities and the public health infrastructure and (2) served as a unique opportunity to add to the knowledge base regarding health effects from exposures to environmental agents. The BSC encouraged ATSDR to strengthen its existing relationship with EPA and other stakeholders and seek additional resources for research.

Dr. Susan Klitzman is a Professor of Environmental Health and Director of the Urban Public Health Program at Hunter College. Her review found that ATSDR's challenges were not caused by a lack of scientific integrity or expertise. She noted a significant gap between the public's expectations and limited tools that are available to scientists to assess public health effects from hazardous waste sites. Dr. Klitzman further concluded that ATSDR's scientific methods were mainstream, but were not sufficiently robust to detect site-specific health effects.

Third, ATSDR senior leadership, key partners and staff identified a clear need to reorganize ATSDR's structure based on findings from an outside contractor. The reorganization fully complements and responds to recommendations by stakeholders to increase ATSDR's focus on site-specific activities, improve its engagement with communities, and strengthen the science. The reorganization will decentralize the oversight of ATSDR Headquarters to 3 geographical regions.

The overarching purpose of the Science Symposium was to evaluate ATSDR's scientific approach to assessing health risks at sites and generate action-oriented ideas for improvement. The participants included state CoAg partners from California, Michigan, New Jersey and Texas.

The participants were divided into 2 subgroups of ~15-18 persons to provide recommendations on 2 tracks. The track 1 subgroup, "The Science Behind ATSDR's Public Health Assessment Process," was charged with addressing the following questions:

- What critical changes should ATSDR make to its PHA process (e.g., dose calculations, statistical methods and cumulative risk)?
- What actions can ATSDR take to better evaluate interactions between chemical and non-chemical stressors (e.g., poverty and other social determinants of health) in its PHA process?
- Under what circumstances and in what ways should ATSDR use health outcome data to assess site-specific health risks?
- When and how should ATSDR use biomonitoring methods in non-occupational community settings?

The track 1 subgroup advised ATSDR to incorporate biomonitoring when appropriate; enhance support for the collection of exposure and health outcome data; and evaluate and formalize community engagement in the early stages of site-specific activities.

The track 2 subgroup, "Toxicology and Risk Assessment of ATSDR," was charged with addressing the following questions.

- What actions can ATSDR take to better assess health risks from multiple exposures at sites?
- Can ATSDR improve the quality of ToxProfiles™ by adopting a more quantitative and systematic literature review process?

The track 2 subgroup advised ATSDR to evaluate risks from combined exposures and enhance ToxProfiles™ by conducting a systematic review, developing a web-based interface, prioritizing chemicals and identifying emerging contaminants. ATSDR will develop and widely distribute a report on the Science Symposium to the BSC and other stakeholders for review and comment.

Dr. Ryan moderated the BSC's discussion with Dr. Kapil on the ATSDR Science Symposium. The discussion topics included:

- potential endpoints and outcomes of interest ATSDR will use to “evaluate and formalize” community engagement (e.g., retention of community engagement, the diversity of stakeholders, effectiveness of communication methods, or capacity to match community concerns to risk);
- ATSDR's adaptation of EPA's existing models to engage stakeholders (e.g., the Cumulative and Aggregate Risk Evaluation System and the Environmental Justice (EJ) Collaborative Problem-Solving Model);
- cumulative risk from multiple chemicals, pathways and media;
- the intersection between chemical and non-chemical stressors (e.g., biological, physical and psychosocial stressors); and
- ATSDR's improved use of geospatial technologies and epidemiologic tools to better evaluate cumulative, social, environmental and other types of risk.

The BSC members who attended the ATSDR Science Symposium were impressed by the quality of the scientific presentations. The BSC made several comments and suggestions for ATSDR to consider in its ongoing efforts to implement the recommendations from the symposium.

- In addition to engaging communities early in the PHA process, ATSDR also should extensively involve partners at the outset to address broader social determinants of EH issues that are relevant to the community's concerns. Health and human service agencies, academic research centers and other local partners should be engaged to meet community expectations that are outside the purview of ATSDR's mission and sustain activities in the community over time.
- ATSDR and its state health department partners should use recommendations from the symposium to conduct a comprehensive study and proactively address the national problem of hydraulic fracturing in communities.
- ATSDR should conduct the systematic review of ToxProfiles™ in parallel with its ongoing activities to continue to produce outputs over time.
- ATSDR should place more emphasis on the “disease registry” component of its mission to longitudinally analyze different exposures in communities.
- ATSDR should explore the development of biomonitoring tools and biomarkers of disease that have the ability to assess and measure gene-environment interactions in communities through multiple mechanisms (e.g., combined social, behavioral, chemical and physical exposures).

- ATSDR should extensively engage social scientists in its efforts to implement the symposium recommendations, particularly to provide expertise on long-term, cumulative social determinants of EH.

Update on the National Environmental Health Tracking Program

Heather Strosnider

Acting Science Development Team Lead
Environmental Health Tracking Branch, NCEH
Centers for Disease Control and Prevention

Ms. Strosnider presented an update on the Tracking Program that was established as a result of the Pew Commission Report. The report found a disconnect between health and environmental data and recommended the development of a network to integrate these data. The network would be designed to better understand the impact of the environment on health and fill data gaps in this area. CDC established 5 major goals for the Tracking Program:

1. build a sustainable National Environmental Public Health Tracking Network of integrated health and environmental data;
2. advance EPH science and research;
3. disseminate information to guide policy, practice and other actions to improve the nation's health;
4. enhance the EPH tracking workforce and infrastructure; and
5. foster collaboration between health and environmental programs.

The Tracking Program is designed to transform data into information and knowledge to drive public health action (e.g., conduct surveillance activities to detect and monitor trends, generate hypotheses, guide actions, inform policymaking and interventions, provide information, and track progress). The other features of the Tracking Program are designed to utilize data, engage partners and build capacity.

The Tracking Program covers 55% of the U.S. population and a high proportion of racial/ethnic groups: 70% of Asians, 61% of Hispanics, 57% of other groups, 55% of NHWs, 48% of NHBs, and 48% of Native Americans. However, 60% of measures cover more than those in Tracking Program states and cities. The Tracking Network of the program includes public portals, secure portals, standardized data, and 23 state and city public portals.

In 2008, CDC launched the National Public Portal of the program with 15 data sets, 2.2 gigabytes of data, 18.7 million rows of data and 257 measures. Content and data in the Public Portal measure asthma, annual particulate matter 2.5 (PM_{2.5}) levels, birth defects, cancer, carbon monoxide poisoning, childhood lead, developmental disabilities, heart attacks, reproductive birth outcomes, biomonitoring, climate change, community design, homes, outdoor

air, urinary arsenic levels, water, and population characteristics (e.g., the percent of persons living in poverty).

Childhood lead poisoning data in the Public Portal include 4 measures (e.g., the number of children tested and the number of children tested with confirmed elevated BLLs (EBLLs) by birth cohort). These data represent 87% of U.S. counties over the past 8 years. The measures can be stratified by BLL category. Efforts are underway to include additional childhood lead poisoning indicators in the Public Portal (e.g., the number and percent of children tested and those with EBLLs by year).

Birth defects data in the Public Portal include 26 measures covering 12 birth defects that can be stratified by age, race/ethnicity and gender. Birth defects data from 17 states are reported as 5-year average annual prevalence rates and counts. Several Tracking Program grantees have used their funds to supplement or develop birth defects registries in their individual states.

Developmental disabilities data recently were added to the Public Portal. Data were collected from CDC on the estimated prevalence rates and confidence intervals of autism spectrum disorders (ASDs). Data also were gathered from the U.S. Department of Education on the number and percent of children 3-17 years of age who received early interventions, special education or related services for developmental disabilities in accordance with the Individuals for Disability Education Act. Disabilities covered under this law include ASDs, developmental delay, emotional disturbance, hearing impairment, intellectual disability, specific learning disabilities, and speech or language impairment.

Biomonitoring data recently were added to the Public Portal based on NHANES data. These data cover 11 analytes that can be stratified by age, race/ethnicity and gender. Data were recently added to the Public Portal on the estimated percent change in the death rate from baseline based on a 10%-25% reduction in air pollution. These data can be used to rank counties that would receive the largest benefit from a percent reduction in air pollution.

Other improvements in the Public Portal include integrated messaging and data, new base layers with maps to review streets and terrains, and enhanced data export functionalities with footnotes, citations and background information. The Public Portal currently has 425 Facebook "likes" and 1,832 Twitter followers. The Public Portal received 741,160 page views as of July 2009.

The Tracking Program includes >200 skilled EPH practitioners in 23 states and New York City. Since 2008, CDC has hosted 18 Association of State and Territorial Health Officials Fellowships to provide opportunities for non-Tracking Program grantees to engage in Tracking projects and develop EPH tracking programs in their jurisdictions. Since 2002, CDC, its partners and external researchers have developed 133 Tracking-related publications and health reports. Since 2005, 132 public health actions have been taken in response to Tracking data.

Examples of Tracking Program success stories include efforts to reduce the effects of extreme heat in San Jose, California. Because life-saving cooling centers are costly, city leaders required proof of the health impact of heat before approving this expenditure. The California

Tracking Program provided city leaders with data that documented an increase in health-related ED visits during heat events. Based on these data, the city leaders approved the expenditure of the cooling centers.

New York City focused on reducing childhood asthma hospital stays and ED visits due to an increase in these events at the beginning of the school year. Advisories were distributed to remind physicians to review and update asthma management plans of their patients at the beginning of the school year. Because a decrease was observed in the rates of childhood asthma hospital stays, the advisories are now standard practice in New York City. Success stories of all of the Tracking Program grantees can be reviewed at: (www.cdc.gov/nceh/tracking/successstories.htm).

CDC conducts a 3-phase process of evaluation, development and implementation to add new content to the Public Portal. Internal CDC staff, external partners, Tracking Program grantees and the Content Workgroup provide input in all 3 phases. During the evaluation phase, all aspects of the proposed content are assessed (e.g., its utility for the Tracking Program; contributions to the EH field; capacity to drive action; availability, quality and limitations of data; and spatial and geographic coverage). During the development phase, data are collected to determine measures and calculations for the Public Portal.

The following topics currently are in the evaluation phase: air toxics, ischemic heart disease mortality benefits associated with reducing PM_{2.5} levels, mortality associated with extreme heat events, additional cardio and respiratory hospitalizations, ED visits and mortality, temporal and spatial patterns in pollen, radon levels in homes, private water wells, occupational health issues, ATSDR data on amyotrophic lateral sclerosis, chemical incident data from the ATSDR National Toxic Substances Incident Program, and vulnerability measures.

The following topics currently are in the development phase: new analytes in drinking water, extreme heat events, and U.S. Geological Survey data on well water. The following topics currently are in the implementation phase: children's EH issues, annual BLLs in children, and Behavioral Risk Factor Surveillance System (BRFSS) data on smoking prevalence.

In addition to data and content, efforts also are underway to improve the functionality of the Public Portal with enhanced metadata, expanded charting options, additional benchmarks, and capacity to compare populations. CDC is exploring the addition of more features as well (e.g., an animated map for time series and comparison of related measures).

Several activities are underway to address gaps in data, methods and information in the Tracking Program. National, state and local data systems are being evaluated by conducting an inventory of the availability and quality of data and making recommendations on reaching national consistency. Methods are being evaluated and developed related to environmental epidemiology, linkages between health and environmental data, and exposure assessments. EH issues are being tracked through surveillance summaries, exposure impact, and evaluation of policies and programs.

To improve data linkage and utilization of the Tracking Program, CDC is evaluating methods for defining “extreme heat events,” linking PM_{2.5} exposure to cleft birth defects, estimating the association between ischemic heart disease and reductions in PM_{2.5} levels, and evaluating and developing models for estimating air pollution.

In addition to its 23 state and local Tracking Program grantees, CDC also funds 6 academic partners to conduct Tracking projects. For example, the University of Utah is linking drinking water contaminants and adverse birth outcomes. Methods are being developed and evaluated to estimate exposure to constituents in drinking water. In this study, populations and individuals are being assigned to community water systems to estimate residential tap water concentrations and consumption, assess overall uncertainties, and provide recommendations to CDC. Biases and uncertainties associated with these studies will be evaluated by conducting parallel ecologic and individual-level analyses.

The University of California at Berkeley is generating estimates of smoking and body mass index based on data from the American Cancer Society Cohort Study. The data will be used to derive estimates of smoking and obesity at a small area level. Census data on the characteristics of the cohort (e.g., education, gender, marital status and age) will be included in the study. Spatial auto-correlation will be used to calibrate the prediction model that will be applied to census data to derive estimates of smoking and obesity.

CDC developed prioritization criteria to reach the goals of the Tracking Program. The criteria include the burden, magnitude and severity of the topic; alignment of the topic with the Tracking Program paradigm; feasibility of the topic from a technological perspective; information system factors; ability of the topic to resonate with partners; scientific plausibility of the topic; capacity to take action on the topic; and Congressional directives.

The FY2012 Senate appropriations report directed CDC to explore the ability of the Tracking Program to map autoimmune diseases, neurodegenerative diseases and autism to help researchers evaluate potential environmental risk factors. The report further directed CDC to provide communities with information to monitor the impact of current and future drilling sites on the health of nearby residents.

Ms. Strosnider concluded her update by requesting the BSC’s guidance on 2 questions. First, given limited and decreasing resources, what strategies can CDC implement to identify and prioritize the content and features of the Tracking Program? Second, what are the key priorities for the Tracking Program?

Dr. Judith Qualters is the Director of the NCEH Division of Environmental Hazards and Health Effects. She responded to the BSC’s questions on the Tracking Program budget. The entire Tracking Program was relocated to the Prevention and Public Health Fund in 2011 and received an appropriation of \$35 million in both FY2011 and FY2012. The vast majority of the budget is allocated to states, academic partners and NGOs. If Congress approves the President’s proposed budget in FY2013, the Tracking Program will be cut by \$6 million from \$35 million to \$29 million.

Dr. Ryan moderated the BSC's discussion with Ms. Strosnider on the Tracking Program. The discussion topics included:

- CDC's efforts to help states overcome barriers to collecting data at the sub-county level (e.g., confidentiality issues and instability of small population sizes);
- CDC's efforts to engage communities in gathering data;
- CDC's ongoing efforts to link environmental and other determinants of risk and conduct a county-by-county analysis of their role in life expectancy, mortality, cancer rates and other health outcomes; and
- CDC's memoranda of understanding with federal partners (e.g., EPA and NASA) to increase access to additional data and leverage more resources.

The BSC made several comments and suggestions on the Tracking Program in response to the 2 questions posed by Ms. Strosnider.

Question 1:

- CDC's prioritization criteria for the Tracking Program should include the use of the same types of data sources and methods for all grantees to uniformly define asthma, autism and other diseases to ensure comparability of data. Assurance of accurate measures would help CDC to identify and prioritize content in light of limited resources.
- CDC should make stronger efforts to collect data at the sub-county level because an individual's neighborhood is by far the best predictor of health outcomes. Tracking Program data at national, state and city levels might demonstrate successes in environmental and health outcomes, but rates of certain endpoints might be much higher in specific neighborhoods. Solid data at the sub-county level would be an extremely efficient and effective use of limited resources by decreasing the complacency of policymakers and prompting increased funding for the Tracking Program.

Question 2:

- NCEH should use the Tracking Program as a marketing tool to collect new data from and develop measures for other CDC National Centers on various content areas (e.g., the built environment, chronic disease outcomes and community needs assessment profiles). NCEH should create Public Portals for these data and charge other National Centers for their use.
- CDC should collect data beyond the 23 Tracking Program grantees to geographically and visually map the occurrence of birth defects and make a compelling argument on the strong and unequivocal association between birth defects and the environment.
- CDC should collect additional data from ATSDR in an effort to answer complex questions regarding mixtures.
- CDC should establish partnerships with agencies that do not have an explicit EH mission (e.g., HUD, Department of Homeland Security and Department of Interior) to increase access to other types of data and leverage more funding for the Tracking Program.

General Suggestions:

- CDC should explore the replication and adaptation of existing models to improve the functionality and content of the Tracking Program:
 - The University of Southern California is mapping Medicaid data with a circular map to present 10 different variables at the same time.
 - A cumulative risk mapping model has been developed that includes indicators on land use, social vulnerability, exposure and health as well as data at the sub-county level.
 - Meharry Medical College is building a geospatial database to analyze EH disparities and map factors in 11 Southern states with high throughput technology.

BSC Open Discussion

Timothy Ryan, PhD, BSC Chair

Associate Professor, School of Public Health Sciences and Professions
Ohio University, College of Health and Human Services

Dr. Ryan moderated the BSC's discussion on the presentations or other issues that were raised during previous meetings. Comments and suggestions from the BSC's open discussion are outlined below.

- NCEH should use the tremendous interest in its Healthy Community Design Initiative as an opportunity to provide leadership on this emerging trend and answer serious EH questions prospectively during the growth of the healthy community design field. For example, NCEH could develop and distribute a guide or primer with advice on addressing EH issues in healthy community designs.
- CDC should become a federal partner in the EPA/HUD/Department of Transportation (DOT) Sustainable Communities Program. The program is allocating an extensive amount of resources to regional governments and community groups to conduct sustainable planning and development.
- NCEH/ATSDR should consult with HHS to explore strategies to make its lengthy EJ Strategic Plan more user-friendly. The document should be streamlined and posted on the CDC website to place NCEH/ATSDR in a better position to actually implement the recommendations.
- ATSDR should ensure that its hydraulic fracturing activities address the potential impact of this technique on depleting the supply of fresh water and drinkable, potable water in the United States.
- NCEH/ATSDR should collaborate with partners to increase the focus on incorporating the food desert concept into site-specific work, particularly in underserved communities with limited food access and riverfront communities with contaminated waterways. This approach would provide NCEH/ATSDR with a major biomonitoring opportunity to better address the needs of vulnerable communities that rely on ecological resources.

- NCEH/ATSDR should make better use of the BSC's expertise by soliciting advice on priorities in a resource-constrained environment, such as the allocation of limited funding to address domestic versus international EH issues. Concerns have been raised in the field that CDC may no longer be viewed as a worldwide public health leader if severe budget cuts continue in the United States.

NCEH/ATSDR leadership and senior management made several clarifying remarks in response to some of the BSC's comments and suggestions.

HHS EJ Strategic Plan. Dr. Sharunda Buchanan is the Director of the NCEH Division of Emergency and Environmental Health Services. She confirmed that NCEH/ATSDR and other HHS agencies identified their individual action steps in the HHS EJ Strategic Plan and would develop and provide communities with clearly defined, agency-specific implementation guides.

Vulnerable communities/populations. Dr. Pirkle informed the BSC that a major development occurred following the release of DLS's compelling data on BPA in canned soup. Campbell's Soups announced that BPA would be removed from all of its soup containers. CDC leadership was extremely pleased with this outcome because a major U.S. manufacturer voluntarily agreed to remove BPA from soup containers without the need for a regulatory process.

NCEH/ATSDR is aware of the need to strengthen collaborations with state and local partners to conduct studies on the most vulnerable communities to achieve the greatest incremental impact. During a future meeting, Dr. Pirkle asked the BSC to provide guidance to NCEH/ATSDR to better engage states and improve networks in high-risk local areas.

Domestic versus global EH activities. Dr. Kapil was aware of the BSC's concerns regarding the allocation of limited domestic resources to global EH activities. He raised the possibility of placing a presentation on global health biomonitoring applications on a future BSC agenda. Vulnerable populations outside the United States have tremendous exposures that are orders of magnitude higher. Lessons learned from global populations could be applied in the United States.

Use of the BSC's expertise. Dr. Portier confirmed that the BSC would be an integral part of the NCEH/ATSDR strategic planning process. During a series of meetings, the BSC would be asked to provide critical and thoughtful guidance on NCEH/ATSDR's priorities, future directions, and programs that need to be eliminated in the current environment of severe budget cuts.

Public Comment Session

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

Update on CDC's Healthy Homes/Lead Poisoning Prevention Program and National Asthma Control Program

Thomas Sinks, PhD

Deputy Director, NCEH/ATSDR
Centers for Disease Control and Prevention

Dr. Sinks presented an update on CDC's Healthy Homes/Lead Poisoning Prevention Program (HHLPPP) and National Asthma Control Program (NACP). NACP data show that the current asthma prevalence is 1 in 12 children <18 years of age in FY2012. NACP's resources for intramural activities include 47 staff and an annual budget of ~\$5 million. These activities include national asthma surveillance, evaluation technical assistance and guidance, asthma partnerships and technical assistance to state health departments, and asthma epidemiology and research.

NACP's resources for extramural activities include 216 state staff and an annual budget of ~\$22.5 million. These activities include comprehensive asthma control (e.g., education, medical assessments, environmental control and medications), population-based surveillance with BRFSS data, and implementation of effective school policies. The January 12, 2011 edition of the National Health Statistics Reports documented that on an annual basis, asthma accounts for 10.5 million missed school days, 640,000 ED visits, 157,000 hospital admissions, and 185 deaths among children <18 years of age.

HHLPPP data showed that the prevalence of BLLs ≥ 5 $\mu\text{g}/\text{dL}$ was 1 in 40 children in FY2011. HHLPPP's resources for intramural activities include 24 staff and an annual budget of ~\$5.7 million. These activities include national surveillance, applied research, support of ACCLPP, laboratory proficiency, and retention of important federal and NGO partnerships.

HHLPPP's resources for extramural activities include 217 health department staff and an annual budget of ~\$20 million. These activities include case-based surveillance, primary prevention, case management and education. NHANES 2007-2008 data showed that the largest proportion of children had BLLs <1.22 $\mu\text{g}/\text{dL}$ and the smallest proportion of children had BLLs ≥ 5 $\mu\text{g}/\text{dL}$.

Opportunities in HHLPPP include a strong focus on 3 major areas: at-risk housing, particularly pre-1978 properties with lead-based paint and plumbing; take-home exposures to lead from the worksite to the home; and lead from contaminated soil. The HHLPPP model in 2011 focused on surveillance, laboratory-based reporting, blood lead screening and case management, and targeting of high-density, at risk housing.

Opportunities in NACP include a strong focus on asthma control through medical assessments, patient education, management of asthma triggers and appropriate medications. The NACP model in 2011 focused on population-based surveillance, partnership development, school programs, and implementation of state plans and effective interventions.

An analysis of homes of all children 1-5 years of age most likely would identify an intersection between homes of children with asthma and homes of children with BLLs ≥ 5 $\mu\text{g}/\text{dL}$. However, this comparison is difficult to make because national asthma prevalence data are based on children <18 years of age, while national BLL prevalence data are based on children 1-5 years of age. Childhood lead poisoning prevalence declines above 6 years of age. Data show that ~24 million homes have lead hazards. The effectiveness of interventions is a function of the attributable fraction due to housing and the efficacy of home-based prevention efforts.

The FY2011 enacted budget was ~\$29 million for HHLPPP and ~\$27 million for NACP. The FY2012 President's budget included a proposal to combine HHLPPP and NACP with a total budget of \$32.6 million. The FY2012 enacted budget was ~\$25.4 million for NACP and \$2 million for HHLPPP. In the appropriations language, Congress directed CDC to continue its support of NACP as currently structured and use HHLPPP funds to maintain expertise and analysis at the national level and serve as a resource to states and localities.

CDC was required to make drastic program adjustments in FY2012 due to the \$27 million cut to the HHLPPP budget and the \$2 million cut to the NACP budget. In HHLPPP, extramural program funding will be eliminated by September 30, 2012 and staffing will be reduced. However, ACCLPP will be retained, subject-matter expertise will be provided to partners, and national surveillance capacity will be maintained by collecting NHANES biomonitoring data on BLLs in children. CDC will continue to analyze and utilize surveillance data that are reported by non-funded states.

In NACP, reductions will be made in surveillance, staff and funding to local education agencies. The FY2013 President's budget includes a proposal to integrate NACP and HHLPPP into the new "Healthy Home and Community Environments" Program with a budget of \$27.3 million.

Dr. Sinks concluded his update by requesting the BSC's guidance on the following question: What strategies can CDC implement to maximize its ability to prevent childhood lead exposures and control asthma given reduced resources? To assist the BSC in providing input on this issue, Dr. Sinks outlined the tools that are currently used in extramural and intramural activities for both programs:

Extramural Programs

- Survey-based surveillance (asthma)
- Laboratory-based reporting (lead)
- Case management (lead)
- Focus on high-risk housing (lead)
- School interventions (asthma)
- Education (asthma and lead)
- Intervention implementation and evaluation (asthma)
- Partnership development (asthma)

Intramural Programs

- National surveillance (asthma and lead)

- Federal and NGO partnerships (asthma and lead)
- Applied research (asthma and lead)

Dr. Ryan moderated the BSC's discussion with Dr. Sinks on the HHLPPP and NACP budget cuts. The discussion topics included:

- the Congressional rationale for eliminating the state/local lead poisoning prevention infrastructure, particularly given the disproportionate impact of lead poisoning in minority communities;
- concerns and outrage expressed by the EJ and advocacy communities regarding the \$27 million cut to the HHLPPP budget;
- the decrease in BLL rates and the increase in asthma rates nationally;
- data that show the lack of efficacy or sensitivity for housing interventions to reduce BLLs at the individual case level or population level due to the low prevalence of childhood BLLs nationally;
- the possibility of CDC conducting early intervention studies to reduce the body burden of lead in children; and
- payment sources for blood lead testing of children (e.g., Medicaid, private health insurance, and CDC as the payer of last resort).

The BSC made several comments and suggestions in response to Dr. Sinks' request for guidance.

- CDC should continue to educate pediatricians and family physicians on the importance of screening children for blood lead and reporting EBLLs to state surveillance systems. Most notably, continuing education to physicians, parents and students as well as surveillance will be the 2 most common and significant factors in lead poisoning prevention and asthma control efforts. In terms of the prevention of childhood lead exposures, CDC does not have sufficient resources to take any actions other than education and surveillance.
- CDC should target its limited asthma control dollars to interventions with a track record of success in significantly reducing asthma episodes and hospitalizations. Children with asthma should be identified and enrolled in programs along with their parents to obtain education and medication.
- CDC should establish new partnerships and strengthen existing relationships to leverage new resources for asthma control and lead poisoning prevention in children:
 - EH advocacy groups (e.g., Children's Environmental Health Network)
 - EPA/HUD/DOT Sustainable Communities Program
 - HUD Healthy Homes Program
 - U.S. Department of Agriculture Rural Assistance Program
 - Healthy Homes Programs in Extension Programs of Land Grant Schools
 - Community Health Clinics
 - Medicaid
 - Healthy Schools/Green Schools Program
 - U.S. Department of Energy (DOE) Green Retrofit Program

- Professional societies (e.g., American Public Health Association) along with their state affiliates
- CDC should not be entitled to or expect lead poisoning surveillance data from state health departments if extramural funding will be eliminated. If CDC intends to maintain national surveillance capacity for lead poisoning, extramural funding must be restored for states to collect and report data to CDC.
- CDC should conduct a rigorous assessment at the end of FY2013 to present a strong and evidence-based case on the negative national impact of the HHLPPP and NACP budget cuts (e.g., an increase in the childhood BLL prevalence or a less robust lead poisoning surveillance system).
- CDC should package the remainder of its lead poisoning prevention and asthma control efforts into larger, more comprehensive and high-profile home environment initiatives to continue to protect children. For example, the chronic disease community recently completed several intervention studies focusing on the role of the home food environment in childhood obesity and the contribution of secondhand smoke in the home environment to children's health. Moreover, healthy homes initiatives should place more emphasis on delivering simple educational messages to the public on both issues (e.g., mitigating lead dust in homes and controlling asthma by reducing moisture, decreasing indoor chemical use, and implementing mold mitigation and safe pest control strategies).
- CDC should widely publicize the potential for childhood BLLs to rise in the United States due to the persistence of lead in the environment from multiple sources (e.g., the manufacture of lead-acid batteries for electric and hybrid vehicles, lead in roadways and soil, and the substantial amount of lead in weights that are used to balance tires).
- CDC should increase its use of e-learning technology, Twitter and other social media platforms to develop and disseminate educational modules to the asthma control and lead poisoning prevention communities as well as the general public in a cost-effective manner.
- CDC should identify common areas between children with EBLLs 1-5 years of age and children with asthma 1-18 years of age. For the proportion of children who would overlap in both age groups, CDC could fund state Asthma Control Programs to undertake some lead poisoning prevention activities (e.g., education and surveillance).
- CDC should consult with lead testing programs and non-profit organizations (NPOs) to determine their interest in airing public service announcements and disseminating outreach materials. The campaign should be designed to raise awareness of the dismantling of the domestic lead poisoning prevention infrastructure and appeal to the public for funds and support. This effort could be modeled after the successful March of Dimes fundraising campaign.
- CDC should strengthen its partnerships with schools and EDs for asthma control in its new Healthy Home and Community Environments Program.
- CDC should explore opportunities to fund asthma control innovation projects in states to place stronger emphasis on EH issues.
- CDC should partner with the Community Transformation Grants Program that is housed in the National Center for Chronic Disease Prevention and Health Promotion. In this initiative, several policy, environmental and systems changes were identified. States and communities were funded to establish a foundation, develop partnerships, and

provide education and advocacy in these areas. CDC should determine whether asthma control could be incorporated into the systems changes, particularly with respect to the delivery of primary care, the structure of schools and housing policies.

- CDC should focus on preventing childhood lead exposures and controlling asthma with its proposed \$27 million budget and without the expectation of partnerships. The BSC's suggestions to partner with federal, state and local agencies, collaborate with NPOs, and link to existing resources in other parts of CDC are not realistic at this time because these groups also are operating in severe resource-constrained environments.

In follow-up to Dr. Ryan's opening remarks, Dr. Portier reiterated that the revised structure of the meeting provided the BSC with much more time to discuss issues and provide guidance to NCEH/ATSDR. For future meetings, he announced that outside experts would be invited to stimulate the BSC's discussion on each agenda item. He asked the BSC to provide feedback on the revised meeting format to inform the development of future agendas.

In general, the BSC was pleased with the extended discussion periods. The revised meeting format allowed the BSC to provide NCEH/ATSDR with more thoughtful, insightful and constructive guidance. In particular, the BSC advised NCEH/ATSDR to distribute well-defined and targeted questions in advance of meetings. This approach would allow the BSC members to consult with their colleagues who have expertise in other EH areas prior to meetings and provide NCEH/ATSDR with more comprehensive advice during meetings.

With no further discussion or business brought before the BSC, Dr. Ryan recessed the meeting at 4:05 p.m. on May 17, 2012.

Opening Session: May 18, 2012

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

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

Dr. Kapil confirmed that the BSC voting members and Federal Expert members in attendance constituted a quorum for the BSC to conduct its business on May 18, 2012. He reconvened the meeting at 8:31 a.m. and welcomed the participants to day 2 of the meeting.

Dr. Kapil reminded the BSC voting members of their individual responsibility to identify real or perceived conflicts of interest with any of the agenda items for May 18, 2012 and recuse themselves from participating in these matters.

Update on ATSDR's Environmental Health Exposure Investigations

Tina Forrester, PhD

Acting Director, Division of Community Health Investigations (Proposed)
Agency for Toxic Substances and Disease Registry

Dr. Forrester presented an update on ATSDR's EH exposure investigations (EIs). ATSDR does not have the necessary data to assess exposure. ATSDR's conclusion categories for its documents include "urgent hazard," "public health hazard," and "indeterminate." At this time, ~25% of documents fall in the indeterminate category due to the lack of data to answer exposure questions.

A recent inventory showed that since 2007, ATSDR has made 575 recommendations to collect additional data to characterize health hazards. State partners (e.g., health departments, Environmental Protection Agencies and Departments of Environmental Quality) have adopted 83% of these recommendations. ATSDR's recommendations for further characterization of health hazards have focused on source and media characterization, exposure point monitoring, biota data, and continued monitoring of ongoing exposures.

Communities are ATSDR's most important client and have expressed concerns over a long period of time about the lack of data for ATSDR to characterize exposures. For example, residents who lived adjacent to the fence line of the Brio oil refinery waste processor plant in Texas informed Congress of clusters of cancer and birth defects in infants delivered by young women in the community.

Congress allocated \$1 million for ATSDR to investigate the relationship between exposures from the plant and adverse health effects in the community. Because ATSDR's investigation found substantial subsurface contamination from vinyl chloride, styrene, solvents and petroleum residues, the Brio site was added to the NPL in 1989.

In August 1996, ATSDR established and charged an Expert Review Panel with reviewing the process and products of EIs in terms of collecting biological and environmental data to better characterize exposures. The panel's input was based on 4 questions posed by ATSDR:

- Is ATSDR on the right track in providing exposure information to improve public health decisions?
- Are ATSDR's EIs duplicating efforts by other groups?
- What other types of information should ATSDR obtain during EIs to better address community concerns?
- What other strategies can ATSDR implement to improve EI products and services?

The panel's key recommendations to ATSDR are highlighted as follows. Site criteria and a protocol should be developed to target EIs to specific sites. A systematic approach and guidelines should be created to involve communities in the design and development of EIs.

Time activity information should be assessed and incorporated into EIs. Data should be collected on health status and other exposure sources. Up-to-date knowledge on new biomarkers should be maintained. Reports should include information on uncertainties related to EIs. ATSDR has conducted >182 EIs since 1996.

The purpose of EIs is three-fold. Gaps are filled in environmental data (e.g., soil, residential air, indoor dust, fish, garden produce and free-range chicken eggs) and biological data (e.g., urine, blood and hair). A determination is made on whether communities are exposed, and if possible, whether exposures are at levels of health concern. Actions are initiated to reduce or eliminate exposure.

Data gaps in EIs are a result of 3 key factors. In terms of regulations, EPA's regulatory authority ends at the facility's fence line or site boundary. A tension exists between site characterization and community exposure. Contaminants related to health concerns are not well regulated. In terms of politics, major employers at sites, the potential impact on local economics and the tax base, and funding cuts are higher priorities than EIs. In terms of state resources, funding and technical expertise in EH and public health disciplines to assess exposures vary by state.

EIs and health studies have unique and different characteristics. On the one hand, EIs target the most likely exposed populations, use reference range values based on NHANES data to assess whether exposures are of concern, strengthen knowledge about exposures without being generalizable to all sites, and are completed in a relatively rapid period of time.

On the other hand, health studies represent and are generalizable to the broader population, include a comparison population, and are completed in a longer period of time. ATSDR's internal multidisciplinary EI Team of physicians, toxicologists, industrial hygienists and EH scientists is supported by EPA, state health departments and contractors.

The phases of the EI process are described as follows. In the "request" phase, ATSDR receives and documents requests for EIs from multiple sources: internal staff (e.g., health assessors, regional representatives and the Petition Program Coordinator), EPA, state partners, community members, elected officials and NPOs.

In the "evaluation" phase, ATSDR decides whether to accept or decline a request for an EI based on the following criteria: (1) Can the exposed population be identified? (2) Does a data gap exist that hinders evaluation of the health threat? (3) Can an EI address the data gap? (4) Are the EI results able to impact public health decision-making? The evaluation phase also is used to determine the feasibility of the EI in terms of scientifically defensible methods, logistics, expertise and ethics as well as the community's willingness to accept ATSDR's abilities and limitations.

In the "acceptance" phase, ATSDR designs the EI protocol and coordinates activities with the requesting entity/individual and other stakeholders. In the "design and implementation" phase, ATSDR creates the EI protocol in accordance with Office of Management and Budget and Institutional Review Board (OMB/IRB) requirements; coordinates and broadly communicates activities with stakeholders and the public; and initiates site-specific work.

The components of the multifaceted EI protocol are similar to a sound and well-designed scientific study. The EI components include an introduction, objectives, initial contacts, target areas, consent forms, survey questions, fact sheets, data analysis plans, collection, handling, storage and chemical analysis of samples, quality assurance/quality control, presentation of results, and follow-up activities.

In the “results interpretation” phase, ATSDR communicates interim findings to the community before the EI report is finalized. Strong efforts are made to ensure that the community fully understands complex data outlined in the EI report.

In the “action” phase, ATSDR’s EIs have helped to mitigate exposures of concern at sites, prompted other agencies to take action, identified future research needs related to contaminant exposures, and strengthened the economy at the community level. Although ATSDR has made small investments in EIs of <\$150,000 in many cases (excluding staff time), these actions have led to important policy and regulation changes in several states: Alabama, Illinois, Minnesota, Montana, Nebraska, Ohio and South Carolina.

ATSDR’s EI recommendations to sites in these states addressed hydrogen sulfide in residential air, polychlorinated biphenyls (PCBs) in soil and indoor dust, uranium in well water, the linkage between PCBs and fish consumption, and elevated perfluorochemical levels associated with drinking water. ATSDR is continuing to receive extensive media coverage on actions taken as a result of its EIs. These headlines include:

- the Monsanto Plant hiding decades of pollution from PCBs in Anniston, Alabama (reported in January 2002);
- a joint federal/state regulation for a meatpacking plant in Nebraska to reduce hydrogen sulfide emissions (reported in May 2000 with a \$14 million settlement in 2002);
- completion of the Warren Recycling Plant cleanup in Ohio (reported in May 2006); and
- characterization of a dairy farm in Thief River Falls, Minnesota as a health hazard due to hydrogen sulfide levels (reported in June 2009).

ATSDR’s major challenges to improve EIs include limited data for comparison of biomonitoring values, biomonitoring of compounds with short half-lives, misclassification of exposures, the lack of biological and environmental analytical methods, and limited resources and expertise. ATSDR is proposing to pursue several options to overcome these challenges: physiologically-based pharmacokinetic modeling, biological equivalents, regional comparison values, repeated measures, development of personal exposure technology, and establishment of new partners.

ATSDR also is exploring the feasibility of obtaining OMB/IRB approval and clearance of standardized and generalizable EI protocols in advance of receiving requests. This approach would decrease the response time between the request and implementation phases. However, ATSDR is aware of the tremendous bureaucratic, regulatory and scientific barriers to obtaining “advance” OMB/IRB approval.

Dr. Forrester concluded her update by requesting the BSC's guidance on 2 questions: (1) Is the EI process appropriate? (2) Are emerging technologies available that ATSDR should pursue for both biological monitoring and environmental sampling?

The BSC made several comments and suggestions in response to the 2 questions posed by Dr. Forrester.

- ATSDR should review existing environmental data and proactively conduct a science-based evaluation of a site prior to efforts to detect adverse health outcomes in the community. This approach would be much timelier than the current EI process and also would help to fill existing data gaps.
- ATSDR noted that its major challenges in the EI process are limited data, resources and technical expertise at the agency level. However, ATSDR also should attempt to answer the following questions to address challenges in the EI process at the community level.
 - What is ATSDR's approach to communicate with communities at the outset of an EI and share results at the end of an EI?
 - What is ATSDR's strategy to continue to conduct EIs in communities that have hired attorneys and are no longer willing to participate in the government's EI process?
 - What is ATSDR's approach to conduct EIs in communities with a recognized cluster of birth defects, childhood cancer or other health outcomes that cannot be verified with data?
 - What is ATSDR's protocol to address the community's perception of an "agency-to-agency" conflict of interest during the EI process? For example, ATSDR is a federal agency that would report toxic exposures from a facility owned by its "federal partner" (e.g., DoD or DOE).
- ATSDR should decrease its focus on individual-level and door-to-door testing during EIs. ATSDR's limited resources should be targeted to the community to ensure that public health actions are generalizable to the broader population.
- ATSDR should collect and include health insurance data in EIs because this information is the best source to learn about an individual's current health status. A precedent has been established in terms of overcoming confidentiality and security issues in this effort. For example, a health insurance company allowed public health agencies to use its data for community asthma studies.
- ATSDR should be more proactive and transparent in informing communities of its abilities and limitations and clarifying its role as a public health resource before an EI request is submitted. This approach would help to reduce distrust between communities and government agencies in general. For example, ATSDR could develop and post a guidance document on its website to educate communities on the absence of science and data in conclusively determining an association between "X" types of environmental impacts and "X" types of adverse health effects.
- ATSDR should increase its focus on community-based participatory research (CBPR) in EIs. Because many national databases are inaccurate or incomplete, CBPR would empower communities to serve as full partners during the EI process and convey their site-specific stories. ATSDR should collaborate with partners, experts, stakeholders and other groups that are using technology to collect exposure data in local communities.

For example, NASA and the Oak Ridge Institute for Science and Education are developing personal sensors in the area of ubiquitous monitoring. Other groups are using GPS and cell phones as part of sensor networks.

- ATSDR should explore the possibility of obtaining exceptions to or exemptions from the OMB clearance/approval process by framing EH issues as a public health emergency in states. For example, OMB allows clinical exemptions from the clearance/approval process for studies of clinical disorders related to examination or treatment. However, this process is extremely burdensome and difficult.
- ATSDR should adapt creative sampling approaches to improve EIs:
 - Comparison groups of similar communities with different exposures should be used in EIs to increase the sample size and statistical power.
 - Data should be compiled across communities to inform future EIs.
 - To overcome the OMB clearance/approval process, multiple studies should be conducted with the same design and with a 9-person cohort each.
 - The social sciences literature should be reviewed on hard-to-reach populations. EIs should be designed to include this cohort.
 - E-communication technology (e.g., smartphones) should be used for data collection, data dissemination and communication of community research results.
- ATSDR should redesign the EI process to focus more on prevention interventions rather than reactionary interventions at sites by widely publicizing and applying its findings in other communities.
- ATSDR should present modeling data to communities at the outset of EIs to show results that would be expected at the conclusion of the investigation. This approach would increase ATSDR's credibility at sites.
- Before conducting EIs in communities, ATSDR should analyze the workforce or another cohort that is closer to the source of exposure and has the greatest length, intensity and duration of exposure to obtain stronger measures in the population.

Public Comment Session

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

Updates by the BSC Federal Expert Members

Dr. Ryan 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, CIH, RPh

Senior Scientist, Office of the Director
NIOSH/Centers for Disease Control and Prevention

Dr. Decker reported that the National Institute for Occupational Safety and Health (NIOSH) has received flat funding since FY2008. Reductions to the NIOSH budget in FY2012 included an overall decrease of \$496,000, an additional decrease of \$346,000, and the requirement to share a portion of CDC's agency-wide \$20 million decrease. However, Congress restored funding to the 17 NIOSH-funded Education and Resource Centers of ~\$24 million annually and funding to the Agriculture, Forestry and Fishing Program at the FY2011 level.

NIOSH is continuing to award Training Project Grants totaling ~\$4-\$5 million to multiple grantees in the areas of industrial hygiene, occupational health nursing, occupational medicine, occupational safety, and occupational safety and health.

NIOSH is continuing its research and activities in the World Trade Center (WTC) Health and Compensation Act to evaluate the health effects of workers. A Scientific and Technical Advisory Committee and 7 Clinical Centers of Excellence have been established to support this effort. An interim final rule was passed on the enrollment and appeals processes, certification of health conditions, and reimbursement for WTC workers. A proposed rule is pending on procedures to add new conditions as WTC-related conditions.

The first WTC Health Program Cancer Report was released (www.cdc.gov/niosh/wtc), but the report is being reevaluated at this time due to controversies related to the exclusion of cancers from treatment of WTC workers. Several grants and contracts will be announced in 2012 to conduct further research on WTC workers.

NIOSH has released ~75 publications over the past year, including current intelligence bulletins on asbestos, titanium dioxide and coal mine dust; seminal research papers on total worker health; and other publications on beryllium, non-conforming rock dust, guidance on nail gun safety for construction contractors, and skin notation profiles.

NIOSH's pending publications include a current intelligence bulletin on the derivation of immediately dangerous to life or health values. The diacetyl criteria document is currently undergoing an expanded peer review. Diacetyl is butter flavoring that causes severe respiratory disease. The 1-bromopropane criteria document is being prepared for external review based on new data from NTP. The 1972 hot environments and heat stress criteria document is being updated at this time.

NIOSH released landmark publications on nanotechnology, including *Approaches to Safe Nanotechnology* in March 2009 and *Progress Toward Safe Nanotechnology in the Workplace* in November 2009. Criteria for a recommended standard on carbon nanotubes and nanofibers were drafted as well.

The Ryan White Act of 2009 was reenacted in November 2011 with criteria for informing emergency response employees of exposure to potentially life threatening diseases. NIOSH and infectious disease experts at CDC collaborated on publishing a list of these infectious diseases based on their exposure by body fluids, aerosols or aerosols droplets. The infectious diseases included in the list are hepatitis B and C, HIV, rabies, vaccinia, measles, tuberculosis,

varicella, avian influenza A, diphtheria, meningococcal disease, mumps, plague, rubella, smallpox, severe acute respiratory syndrome coronavirus, and multiple hemorrhagic fevers.

In terms of recent respirator rulemaking, NIOSH issued a final rule on closed circuit escape respirators and has proposed rules for total inward leakage testing to improve the facial fit of respirators, respirator certification fees, and end-of-service life indicators. NIOSH's long-term pre-rules will cover supplied and powered air purifying respirators, closed-circuit self-contained breathing apparatus, and wildland firefighting protection performance requirements.

NIOSH is continuing to update its Carcinogen and Recommended Exposure Limit (REL) Policy in consultation with ATSDR. NIOSH launched this effort in December 2011 by opening the docket and holding a public meeting. NIOSH plans to release the draft carcinogen REL policy later in 2012 for public comment. NIOSH is answering the following scientific questions to inform this process:

- How should NIOSH classify "carcinogens?"
- What evidence should form the basis for determining that substances are carcinogens?
- Should a 1 in 1,000 working lifetime risk be the target level for the carcinogen REL?
- What uncertainties or assumptions are appropriate for use in the development of RELs?
- What is the utility of an "action level" and how should this level be set?
- How should NIOSH address complex mixtures?

Bonnie Richter, PhD, MPH

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

Dr. Richter reported that DOE's mission is targeted to 2 major areas: (1) national security and (2) research, development and technology. DOE has stewardship and responsibility of all U.S. nuclear weapon stockpiles. The 35 DOE sites in the United States include pre-World War II manufacturing sites and National Laboratories.

DOE maintains an extensive and comprehensive data set of mortality studies of its workers over the past 40 years. Exposures addressed in these worker mortality studies include radiation, chemicals and the manufacture of nuclear weapons. Stockpiling and disassembling of nuclear weapons have resulted in very low radiation exposures, but chemical exposures persist at DOE sites.

In terms of key partnerships, DOE funds NIOSH to conduct worker studies at DOE sites (e.g., the Fernald mortality study, pooled study of leukemia mortality, U.S. Nuclear Worker Study, and combined uranium workers study). These large cohort studies have been instrumental in adding to the scientific knowledge base. The current DOE workforce is ~120,000-170,000 workers across the United States.

DOE funds ATSDR to conduct PHAs to evaluate environmental exposure pathways and potential health effects to communities near DOE sites. ATSDR's DOE-funded PHAs have

covered a variety of environmental exposures at multiple sites, including uranium, mercury and other toxic exposures at the Y-12 and K-25 Plants (Oak Ridge); Toxic Substances Control Act incinerator (Oak Ridge); radionuclide releases (White Oak Creek); and PCBs, iodine-131, current chemical exposures and groundwater.

After its extensive review of DOE's environmental sampling records and other site data, ATSDR makes PHA recommendations. ATSDR's PHA at Savannah River Site focused on biota, air, and ground and surface drinking water. Data validation studies were a part of this PHA. ATSDR also completed a health study due to community concerns of cancer incidence near a DOE site.

DOE has funded NCEH in the past to conduct dose reconstruction studies of offsite exposures based on existing data, but the agencies have no joint projects at this time. NCEH has completed dose reconstruction studies at Los Alamos, Rocky Flats, Oak Ridge and Savannah River Site to model chemical and radiologic exposures at these DOE sites. The complex and comprehensive dose reconstruction process is now complete at all DOE sites.

Dr. Richter made follow-up remarks in response to the BSC's questions. DOE has not conducted any studies on Native American populations affected by exposures from the Nevada Test Site. The mission of the surveillance program in the DOE Office of Health, Safety and Security is to monitor the health of current workers, but funding for this program in the FY2013 proposed President's budget is \$0.

The BSC advised DOE to include family members in its worker studies to evaluate potential health effects from take-home exposures.

Kristina Thayer, PhD

Director, NTP Office of Health Assessment and Translation
National Institute of Environmental Health Sciences

Dr. Thayer reported that NTP released its draft "Monograph on Health Effects of Low-Level Lead" that summarizes the evidence in humans and presents conclusions on health effects in children and adults associated with low-level lead exposure as indicated by BLLs <10 µg/dL. In November 2011, NTP convened an external peer review panel with a diverse group of experts in the field to review and provide comments on the draft monograph.

The panel recommended acceptance of NTP's conclusions regarding health effects of low-level lead. In general, NTP concluded that evidence is sufficient regarding the association between BLLs <10 µg/dL and <5 µg/dL with adverse health effects in children and adults. In particular, NTP concluded that evidence is sufficient regarding the association between BLLs <10 µg/dL with adverse cardiovascular, reproductive and neurological (adults) effects. NTP further concluded that evidence is sufficient regarding the association between BLLs <5 µg/dL with adverse developmental, neurological (children) and renal effects. NTP expects to publish the final monograph in June 2012.

NTP held its BSC meeting in December 2011 and Technical Report Peer Review meetings in February 2012. NTP's upcoming events include the BSC meeting in June 2012, the Scientific Advisory Committee for Alternative Toxicological Methods meeting in September 2012, and the peer review meeting on the draft "NTP Monograph on Cancer Chemotherapeutics During Pregnancy" in the fall of 2012.

NTP solicited public comments on its draft process for the *Report on Carcinogens*. The proposed changes would improve the systematic review process, allow for more flexibility in NTP's process to obtain external scientific feedback, and strengthen the evaluation process. Comments were made by 19 speakers during the public listening session in November 2011 and 13 written comments were submitted before the November 30, 2011 deadline. NTP presented the revised process during its BSC meeting in December 2011 and finalized the review process in January 2012.

In April 2012, 2 Congressional subcommittees held a joint hearing to discuss the use of science in the *Report on Carcinogens* to meet statutory obligations and its impact on small business jobs. The sponsors included (1) the Subcommittee on Investigations and Oversight of the Committee of Science, Space and Technology and (2) the Subcommittee on Healthcare and Technology of the Committee on Small Business.

NTP hosted webinars to provide education on specific aspects of the systematic review process. The development of web-based tools to facilitate systematic reviews and evidence assessment is underway. NTP will host a meeting with its federal partners in June 2012 to share software-based information management tools for extraction, display and assessment of data and discuss plans for the use of these tools in evidence assessment.

A follow-up interagency meeting will be held in the fall of 2012 to obtain advice and feedback on reaching conclusions in evidence assessment. A public workshop will be convened in the winter of 2012 with case studies on the use of the systematic review approach to address EH questions.

In response to Dr. Portier's question, Dr. Thayer confirmed that NCEH/ATSDR BSC members are welcome to attend the NTP BSC meeting on June 21-22, 2012 to listen to the presentation on the systematic review process. She noted that the NTP BSC meeting also would be webcast for NCEH/ATSDR BSC members who would be unable to attend in person.

Wayne Cascio, MD, FACC, FAHA

Director, Environmental Public Health Division
U.S. Environmental Protection Agency

Dr. Cascio presented the EPA update on behalf of Dr. Hal Zenick who was unable to attend the meeting. The mission of EPA is to protect human health and safeguard the natural environment (air, water and land) upon which life depends. EPA's research programs in the Office of Research and Development (ORD) were reorganized to consolidate the existing 14-16 research areas into 6 streamlined programs: Air, Climate and Energy (ACE) Program; Chemical Safety for Sustainability Program; Sustainable and Healthy Communities Program; Safe and

Sustainable Water Resources Program; Human Health Risk Assessment Program; and Homeland Security Research Program.

The ORD reorganization was designed to achieve 3 major goals: (1) encourage greater partner and stakeholder involvement in problem identification and formulation; (2) produce greater certainty that research results and products would provide necessary resources for partners, stakeholders and communities to evaluate their regulatory options and decisions; and (3) emphasize sustainable solutions from green chemistry processes and products in problem-solving.

EPA held a series of workshops with partners and stakeholders to identify gaps in knowledge and inform the development of its Research Action Plan. The plan outlines several thematic research programs, projects and individual tasks. Leaders are assigned to oversee individual tasks. The plan is based on the matrix management model in which EPA National Program Directors and management closely collaborate in implementation of the plan.

The 3 ACE research focus areas in the plan are to assess impacts of air pollutants, reduce emissions and mitigate health effects, and respond to changes in climate and air quality. American communities face serious health and environmental challenges from air pollution and the growing effects of climate change that are inextricably linked to energy options. In collaboration with partners, EPA will address ACE scientific questions related to multi-pollutant mixtures in air, source-to-outcome issues, and ecological and public health vulnerabilities to climate change. Answers to the scientific questions will be applied to an integrated translational approach to address the needs of the ACE Program.

EPA is continuing its efforts to integrate human health and ecological sciences. Anthropogenic stressors impact human health, ecological health and EH at landscape, ecosystem, community, population and individual levels. A case study of this effort is EPA's recent completion of an investigation to address EH disparities using CDC data. After a wildfire at the Pocosin Lakes National Wildlife Refuge in 2008, the North Carolina Disease Event Tracking and Epidemiologic Collection Tool reported an increase in ED visits related to respiratory and cardiac outcomes in adults.

EPA collected hospital discharge data based on ICD-9 codes and demographic data of patients (e.g., county of residence, gender, age and date of admission). ICD-9 codes were grouped according to outcomes of interest. EPA determined the counties that were exposed based on aerosol obstacle density measures taken from satellite imaging. The investigation found a substantial difference in several respiratory complaints and conditions between the exposed and unexposed areas. ED visits for heart failure increased by 40% in the days immediately following the wildfire.

EPA used data from the investigation along with county health rankings of health outcome factors and health factors to conduct a more extensive review of community-based and social issues. In the congestive heart failure endpoint, for example, the majority of this effect was related to socioeconomic factors and the physical environment in the exposed counties. EPA will increase its efforts to better understand EH disparities by including environmental, economic

and social issues in a more holistic approach. EPA hopes to hire more social scientists and social/molecular epidemiologists in the future to build its expertise in this area.

The BSC advised EPA to conduct other analyses with data from the North Carolina wildfire study. For example, medical records of residents in the affected counties could be compared to sub-county factors using census data at a same point in time as the wildfire. This analysis would place EPA in a better position to more clearly distinguish between true socioeconomic factors and actual health impacts from the environment.

Closing Session

Dr. Ryan emphasized that he was privileged to have served on the BSC as both a member and the Chair. He thanked his colleagues for their continued participation in BSC meetings and their ongoing commitment and dedication to improve EH in the field. He wished NCEH/ATSDR well in its endeavor to advance EH for the nation.

Dr. Portier thanked Dr. Ryan for his excellent leadership as the BSC Chair. He also thanked the current and outgoing BSC members for their continued support and guidance to NCEH/ATSDR. During his Director's report at the next meeting, Dr. Portier confirmed that he would describe NCEH/ATSDR's specific action steps in response to the BSC's recommendations.

With no further discussion or business brought before the BSC, Dr. Ryan adjourned the meeting at 11:41 a.m. on May 18, 2012.

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

Date

Timothy J. Ryan, PhD
Chair, Board of Scientific Counselors