Researchers at Columbia University Mailman School of Public Health and their colleagues at New York University, the Columbia University/University of Chicago Arsenic Research Office in Bangladesh and the University of Chicago published the results of a prospective study of respiratory symptoms associated with chronic arsenic exposure in Bangladesh. Water arsenic contamination is widespread in Bangladesh and has been conclusively linked to an increased risk of lung, bladder and kidney cancers and other adverse health effects.

Prior studies have sought to establish a dose-response relationship between low-level arsenic exposure and non-malignant respiratory diseases, but most have methodological limitations (such as retrospective instead of prospective designs and small sample sizes). This study is a step toward filling this research gap. In addition, the study includes individuals exposed to a large range of water arsenic concentrations, and researchers were able to focus on those with low to moderate exposures over a period of at least three years.

The study, entitled the Health Effects of Arsenic Longitudinal Study (HEALS), was established between 2000 and 2002 and tracked a cohort of 11,746 adult participants over four years. Researchers also controlled for potential confounding factors such as age, gender, body mass index, smoking status, education and arsenic-related skin lesion status. Older participants, smokers and individuals with a lower body mass index were more likely to report respiratory symptoms and an inverse relationship between symptoms and education completed was also discovered. (Continued on page 3.)
On April 13, 2010, WE ACT for Environmental Justice, along with its academic partner, the Columbia NIEHS Center for Environmental Health in Northern Manhattan, co-hosted a Community Forum and Scientific Session to address issues concerning environmental impacts on human health with a special focus on exposures in the home. The event, entitled “Healthy Homes and You,” was co-sponsored by the National Institute of Environmental Health Sciences (NIEHS) and was held at the Harlem Stage Gatehouse. Over 75 people attended, including academics, students, representatives of local health agencies and residents and community leaders in Northern Manhattan, to learn about cutting edge research on key environmental problems affecting NYC and how best to solve them.

The scientific session featured presentations from four researchers working on indoor environmental health hazards at the NIEHS Center. Dr. Regina Santella, NIEHS Center Director, served as moderator. Dr. Matt Perzanowski presented research showing an association between exposure to cockroach and mouse allergens and asthma in children that live in Northern Manhattan and the Bronx. Dr. Pat Kinney discussed his work with the NIEHS Center’s new Climate and Health group and outlined unpublished data connecting climate change to a longer and “harsher” allergy season. Dr. Robin Whyatt presented key findings on metabolites in mothers and newborns after exposure to phthalates. The session concluded with a presentation by Peggy Shepard, Executive Director of WE ACT and Co-PI for the NIEHS Center’s Community Outreach and Education Core, which focused on the ways that WE ACT translates the Center’s Research into policy action.

The community forum provided an opportunity for Dr. Linda Birnbaum, Director of the NIEHS, to highlight priorities of the NIEHS and the Obama administration with respect to environmental health research. The community forum featured an enthusiastic panel, including Ray Lopez (Little Sisters of the Assumption Family Services), Dr. Joseph Graziano (NIEHS Center), Larraine Koehler (EPA), Daniel Kass (NYC Department of Health and Mental Hygiene), Dr. Linda Birnbaum (NIEHS), and Dr. Robin Whyatt (NIEHS Center). Peggy Shepard moderated the diverse group of researchers, community activists and advocates, and government representatives.

Offering pragmatic solutions to indoor environmental exposures was the highlight of the forum. The engaged audience asked a variety of questions related to indoor pollutants, covering topics from phthalates (found in any product containing fragrances) to how to get rid of bedbugs and mold.

The forum was a success with attendees remarking on the informative nature of the event. WE ACT looks to continue in the spirit of “Healthy Homes and You: A Community Forum and Scientific Session,” through the continuation of programs that focus on ways residents of Northern Manhattan can improve where they live, work, play and pray.

To learn more about these and other WE ACT initiatives, please visit: http://www.weact.org/
A total of 7.31% of the 11,746 participants reported a chronic cough; 9.95% reported breathing problems; and 2.03% reported blood in sputum. The study found significant positive associations between arsenic exposure and respiratory symptoms. A dose-response relationship between level of arsenic exposure and likelihood of respiratory symptoms was also observed. However, skin lesion status at baseline did not affect the risk of developing respiratory symptoms, even though the results of some prior studies suggested such a relationship.

The researchers suggest further research to evaluate “the relationship between arsenic exposure and respiratory end points based on more extensive diagnostic tests.” In addition, the respiratory symptoms discovered over the short term might eventually lead to more serious lung damage even though the mechanism of arsenic-induced non-malignant respiratory symptoms has not been established. Tissue inflammation from arsenic deposition on the epithelium is a possibility suggested by prior studies, and, if this is the case, arsenic exposure may lead to pulmonary fibrosis and impaired lung function.

Because of the widespread problem of water arsenic contamination in Bangladesh, it is likely that a large proportion (the researchers suggest approximately 80%) of the nation’s population may be at risk of developing serious respiratory diseases, even if their exposure level has been relatively low.

New Career Development Awardees

Dr. Darby Jack, an assistant professor in the Environmental Health Sciences Department, describes himself as a development economist who focuses on environmental health risks. He uses empirical tools from economics to understand the nature and extent of the environmental burden of disease, and to evaluate approaches to risk reduction.

Dr. Jack’s research interests center on the health impacts of smoke from cooking fires in developing countries, which, according to the World Health Organization, is estimated to cause 1.6 million premature deaths per year, especially in children under five who are more susceptible to lower respiratory infections. Dr. Jack’s research seeks to determine “how clean is clean enough?” He seeks to establish a dose-response relationship in order to determine “how much exposures must decline before risks to health drop to acceptable levels.” His current work in Ghana and India utilizes randomized distribution of exposure-reducing cookstoves, detailed personal exposure monitoring and active case finding across a range of exposures.

His second research question asks, “which strategies will get us there? What changes in cooking practices and technologies will reduce exposures to safe levels, and how can these changes best be encouraged?” Dr. Jack’s research seeks to determine whether low-cost improved cookstoves truly deliver meaningful health benefits and addresses questions related to technology adoption, including government policy issues. Dr. Jack is also undertaking research that aims to illuminate health implications of climate change and of CO2 mitigation policies.

Dr. Diane Gourion-Arsiquaud (who publishes under her maiden name, Re), an associate research scientist in the Department of Neurology, conducts research work on the cellular and molecular basis of Amyotrophic lateral sclerosis (ALS), especially at the level of neuro-glial interactions. ALS is an adult-onset fatal paralytic disorder characterized by a loss of the upper and/or lower motor neurons. About 90% of cases are sporadic while 10% are inherited. Environmental factors such as cyanobacterial neurotoxins and organophosphate pesticides have been implicated in ALS development, and polymorphisms in the gene responsible for detoxifying organophosphates suggest that “genetic susceptibility combined with exposure to environmental agents may precipitate sporadic ALS.”

Dr. Re’s work includes research that implicates astrocytes, the most abundant central nervous system glial cell type, in degeneration of motor neurons characterizing ALS. Her research shows that “mutant SOD1-expressing astrocytes selectively kill spinal cord primary and stem cell-derived motor neurons by an unknown soluble toxic mechanism.” Dr. Re is now focused on identifying the toxic factor(s) and has begun work to characterize the biochemical nature of the factor(s).

In a parallel project, Dr. Re is looking at the effects of organophosphate pesticides on astrocytes, and has found that organophosphate-treated astrocyte medium is selectively toxic to motor neurons, suggesting that organophosphate pesticides cause astrocytes to produce some form of motor neuron toxin. She is working to ascertain whether this toxin is the same as the one discovered in her other study described above, as identification of the astrocyte toxin(s) could present both new diagnostic and treatment strategies for ALS.
More Community Forum Photos

Dr. Regina Santella, NIEHS Center Director, introduces the Scientific Panel

Drs. Robin Whyatt, Matt Perzanowski, Pat Kinney and Peggy Shepard, WE ACT Executive Director, answer questions

An engaged audience looks on
### Upcoming Events and Seminars

#### Fall Seminar Schedule

September 30: Qingyi Wei, MD, PhD, Professor of Epidemiology, UT MD Anderson Cancer Center, Houston, TX; “DNA Repair as a Susceptibility Marker for Head and Neck Cancer”; W. Duane Todd Amphitheater, P&S 16-405, 12-1:15 pm.

October 7: Frank Slack, PhD, Professor of Molecular, Cellular & Developmental Biology, Yale University, New Haven, CT; “MicroRNAs in Cancer”; W. Duane Todd Amphitheater, P&S 16-405, 12-1:15 pm.

November 4: Vincent Castranova, PhD, Chief of the Pathology and Physiology Research Branch, NIOSH Health Effects Laboratory Division, Morgantown, WV; “Pulmonary Responses to Multi-Walled Carbon Nanotubes: Comparison to Asbestos”; W. Duane Todd Amphitheater, P&S 16-405, 12-1:15 pm.

November 11: Scott Burchiel, PhD, Professor and Chair of Pharmacogenomics, University of New Mexico, Albuquerque, NM; "Genotoxic and Non-Genotoxic Mechanisms of Immunotoxicity"; W. Duane Todd Amphitheater, P&S 16-405, 12:00-3:15 pm.

December 2: Juan Celedón, MD, DrPH, Chair of Pediatric Pulmonology, Allergy and Immunology, University of Pittsburgh, Pittsburgh, PA; “Asthma in Hispanics”; W. Duane Todd Amphitheater, P&S 16-405, 12-1:15 pm.

#### Data Management Course

Offered by Diane Levy for Center members, students, postdocs or other staff members on Monday, November 8th from 9-1 (location to be announced).

RSVP to gcg1 by 9/30/10 to reserve a spot.

**Topics covered include:**

1. What is a spreadsheet (brief)?
2. What are the problems that investigators will face if they attempt to use a spreadsheet instead of a database to capture research data?
3. What is a database?
4. How does using a database solve the problems identified in #2?
5. How do you retrieve the information (data) from a well defined database? (general overview of the SQL: Sequel Query Language)
6. Importing and Exporting Data: How can data from spreadsheets and text files be imported into a database (e.g., lab results, old datasets, etc.); how do the data move from a database to a statistical package?
7. What should you keep in mind when hiring a data manager?

### Informational

For more information about the Center, please visit our website:

http://www.mailman.hs.columbia.edu/academic-departments/facilities/niehs-center-environmental-health

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**Reminders to Center Members**

**Publications:** Please remember to acknowledge the Center grant number P30 ES009089 on any publications that have relevance to the goals of the Center or that have utilized the services of the Center Facility Cores.

**Center Meeting:** Thursday, October 28, 12:30-2:30 pm, Pharmacology Library, 650 West 168th St., Black Bldg., Rm. 7-724. Speakers: Pilot Project Awardees Arianna Kim (Dermatology) and Norman Kleiman (EHS). Lunch will be served!