Environmental Health Research and the Community: Dissemination of Findings in the CCAUE

Elizabeth Matsui, MD MHS
Associate Professor of Pediatrics, Epidemiology, and Environmental Health Sciences
Johns Hopkins University

Center for Childhood Asthma in the Urban Environment
What is the CCAUE?

• Multi-disciplinary research center focused on studying asthma and the urban environment
  – Environmental Health Scientists
  – Pulmonologists
  – Allergist/Immunologists
  – Pediatricians
  – Internists
  – Behavioral Scientists
  – Community Outreach Core
Scientific Contributions of the CCAUE

• Findings to date
  – Coarse PM
  – NO2
  – Mouse allergen
  – Intervention study – air filters and PM reduction

• Current studies:
  – Genetics study
  – Panel study examining allergen-pollutant interactions
  – Nasal challenge study of allergen-pollutant interactions
  – PREACH – ETS intervention
    • Behavioral intervention
    • Air filters
CCAUE CAB

• Established 10 years ago
• Composition
  – Community leaders
    • Religious community
  – Community activists
    • Serve on EJB
  – Community members
    • Business owners
    • Residents
Rationale for a Community Advisory Board

- Benchmark set by published ethical standards for housing research in children
- Engage in a dialogue with community – focus group for a needs assessment
- Communication strategies
- Recruitment strategies
- Dissemination strategies
- Sustainability of benefits of participating in studies
Dissemination of Findings/Results

- Results to study participants and families
  - Clinical test results
    - Skin testing, blood test results
  - Environmental test results
    - Pollutant levels
    - Allergen levels
- Findings from study back to:
  - Study participants and families
  - Community
Participant results

Role of CAB

• advocacy for provision of as many of the test results as possible

• guidance in how to communicate test results to participants/families

• guidance in development of tool to communicate results
CCAUE Approach

• Pollutant results
• Settled dust allergen results
• Allergy skin test results
• RAST results
• Other clinical results
  – eNO
  – Lung function testing
## Cockroach Allergen Results Form

| German and American Cockroach | German and American roaches are the most common type of roaches in Baltimore.  
Roaches live in small cracks and near sources of food and water.  
Allergens are found in both dead and living roaches. Allergens make allergies and asthma worse.  
It is hard to get rid of roaches because each female roach can have another 300 babies.  
The allergen is found in their feces, stomach juices and dead body parts. | **Cockroach allergen levels above 8 units/g may be unhealthy.**  
The cockroach allergen level in your home is:  
_________ units/g  
This level is:  
☐ High  
☐ OK | **Exterminate.** A professional can use much stronger, yet safe chemicals. Baits and traps are helpful. Never use roach sprays.  
Take trash out daily.  
Keep floor, counter tops and appliances clean by sweeping and mopping often.  
Put exposed food in tightly sealed containers such as sugar, snacks, pasta boxes, breads and cereals.  
Clean grease from the stove and walls after cooking. |
## Mouse Allergen Results Form

<table>
<thead>
<tr>
<th>Mice</th>
<th>Mouse spread their allergens through urine and dander of skin scales. They enter homes through holes in walls and doors and live in nests in dark places. They come inside when it gets cold outside. Mice travel inside the home through holes in the walls or up and down gas and water pipes. Mice live near food and water sources. They can live inside the oven, behind walls and in the ceiling.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Mouse allergen levels above 500 ng/gm may be unhealthy. The mouse allergen level in your home is:</strong> ______ng/gm</td>
</tr>
</tbody>
</table>
| | This level is:  
  - [ ] **High**  
  - [x] **OK** |
| | **Exterminate mice by using mousetraps and poisons.**  
  - Clean up floors, countertops and stoves after meals.  
  - Keep exposed food in tightly sealed containers and take trash out everyday.  
  - Fill holes and around pipes with steel wool to keep mice out.  
  - Remove clutter and keep clothes and papers picked up to keep mice from nesting in these soft areas. |
Nitrogen Dioxide Results Form

<table>
<thead>
<tr>
<th>Nitrogen Dioxide</th>
<th>The level in your home was:</th>
<th>Use electric sources of cooking and heating.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen dioxide is a chemical found in smog and can be found both inside and outside the home.</td>
<td>✓ High&lt;br&gt;☐ OK</td>
<td>If you use a gas stove, it is helpful to open the windows or use the exhaust fan when cooking.</td>
</tr>
<tr>
<td>It comes from burning fuel such as oil, kerosene, coal, natural gas, tobacco smoke, and gasoline. Indoor sources are cooking with gas, using a gas stove for heat or using a kerosene heater.</td>
<td>The average level for the 3 days of monitoring was:</td>
<td>Never use a gas stove as a source of heating your home.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If you need additional heat, consider electric space heaters instead of kerosene. Kerosene gives off pollution that can trigger an asthma attack.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Don’t allow smoking inside your home.</td>
</tr>
</tbody>
</table>

*A level above 53 ppb is not healthy.*
Large particles are formed from soot and road dust being stirred up, especially on unpaved roads. Large particles come from dust and allergens inside the home. Burning fuels are also a source of large particles.

<table>
<thead>
<tr>
<th>Large Particles</th>
<th>The level in your home was:</th>
<th>Keep windows and doors closed especially on windy days if you live near the road or have a lot of loose dirt in your yard.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- High</td>
<td>- Keep windows and doors closed especially on windy days if you live near the road or have a lot of loose dirt in your yard.</td>
</tr>
<tr>
<td></td>
<td>- OK</td>
<td>- Wet mop the floors often to pick up particles.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Vacuum at least weekly, use a HEPA filter and open windows while vacuuming</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Change furnace filters every 3 months</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Use an air cleaner to help remove large particles from the air.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Use air conditioning instead of opening windows if possible.</td>
</tr>
</tbody>
</table>

The average level for the 3 days of monitoring was: 

* A level above 150 μg/m³ is not healthy

PM10 Results Form
Dissemination of Study Findings to Participants

• Different approaches
  – Social/educational activity with materials communicating findings
  – Mailed materials
    • Letters
    • Pamphlets
  – Health fairs
  – School outreach
    • A+ asthma clubs
    • HS Science Project
Dissemination of Findings to Community

• Have to define the community
  – More challenging than it might seem
  – Obviously should be done during the planning stages of the study
  – A recurring theme with the CCAUE CAB is the importance of framing all community outreach activities in terms of the community
East Baltimore
Dissemination to the Community

• Have to identify key findings that are relevant to the community
  – Relationship between relative humidity measures and wall moisture readings is more of a research methodology question, has little immediate, relevant impact on people
  – On the other hand, finding that a particular exposure makes asthma worse has important relevance.
Framing the Key Messages in Language Appropriate to the Community

- Stop and think to avoid medical/scientific terminology
- Provide a glossary if needed
- Balance between absolute scientific truth and complex language needed
  - scientific accuracy vs. practical message
  - simpler language can be used to communicate these practical message
How to Deliver the Key Messages

• scientific culture of communicating results vs. community activism culture of communicating results
  – Formal talks, scientific poster, slide presentation, tables and graphs
  – Entertainment and social venues, public health messages
Community arriving and being seated
Game Rules -explained to all!
The Friendly Feud Game in Action

Question:

- High levels of harmful indoor air particles make children's
  worse in East Baltimore.
Judges [in front row] point and confirm winners of this round
Other Dissemination Activities
Community Health Fairs: Dissemination and Study Recruitment Opportunities
HS Science Project

- HS Approached Community Outreach Coordinator
- Asthma Science Project
- Interaction with physicians and scientists in the CCAUE

About our Asthma Attacks! Exhibition

For the last 8 weeks, ninth-grade environmental science students have studied asthma — a disease with strong links to the environment. As part of our investigation, we did the following:

- Take trigger samples in our homes and test them at Johns Hopkins
- Research background information using school and library resources
- Host guest speakers from Johns Hopkins and take notes
- Research plan and build 2D and 3D models of the respiratory and immune systems

Create and conduct an asthma survey of our school.
Researching the Respiratory System
Learning to Collect and Summarize Data

School Survey - Doris M. Johnson #426

1. How many days of school do students miss because of asthma?
   - 1-3: 45%
   - 4-8: 5%
   - 9-12: 5%
   - more than 12: 45%

2. Students miss more than 10 million school days a year around the country.

3. Are there different kinds of asthma?
   - Yes: 42%
   - No: 17%
   - Don't know: 41%
   - No answer: 0%

4. How many asthma attacks can one person have in a year?
   - 1-3: 16%
   - 4-10: 8%
   - 11-20: 8%
   - more than 20: 17%

5. We don't know for sure, but our survey data indicates our students have asthma at a higher rate than nationally.
Learning About Laboratory Analysis of Dust

What happens to our samples at the Johns Hopkins Lab...

We give the lab person the samples so that our samples can be analyzed.

She looks at the samples in the lab book.

The ELISA plate

The darker the green, the more trigger is present.

This is some of the things that kids in our school can learn from their homes.

Sandwich ELISA
Acknowledgments

- CCAUE Investigators
- CCAUE Community Outreach
  - Pat Tracey & Barbara Bates-Hopkins
- CCAUE CAB
- CCAUE Study Participants
- Sponsors
  - EPA & NIEHS
Addressing Environmental Threats, Health Disparities Through Translation of Community-Based Participatory Research Into Policy Initiatives

September 15, 2008

Presentation at the 2008 Healthy Homes National Conference

Ogonnaya Dotson-Newman
WE ACT For Environmental Justice
WE ACT Based In Northern MANHATTAN

- 7.4 sq. miles, over 600,000 people
- 86% African-American and Latino
- $16,000 median household income
- Excess mortality: asthma, cancer heart disease, learning disabilities
- Multiple environmental exposures
- Non-attainment area for clean air
- Ranked #1 in Cancer Risk from Air Toxics by EPA
- Highest asthma rates in nation
WE ACT FOR ENVIRONMENTAL JUSTICE

- WE ACT builds community power that improves environmental health, policy and protection in communities of color and low-income communities.

- Emerged in 1988 out of community struggles re: North River sewage treatment plant and diesel pollution.

- Programs: Environmental Health and CBPR, Government Accountability, Youth Leadership Development, Community Organizing and Education, Sustainable Development.

- Part of national, global EJ Movement
Environmental Racism & Justice

- Millions of people of color live and work in polluted environments and bear the brunt of the nation’s pollution problems.
- Exposures, health risks are greater.
- Numerous studies indicate that race is the prime predictor of where toxic waste sites are located; income secondarily.
- Right of all to be protected from environmental degradation.
Environmental Injustice

- All do not have access to clean water, clean air, healthy schools free of lead, asbestos, pesticides and toxins, clean workplaces, and open space;

- Discrimination in the enforcement of laws, deliberate targeting of communities of color for waste disposal, exclusion of people of color from decision making bodies, boards and commissions.
Key Determinants of Health Status

- Affluent residents enjoy better health than do people of color and low income leading to shorter life expectancy.
- Higher rates of cancer, birth defects, infant mortality, asthma, diabetes, developmental delays, and cardiovascular disease.
- Access is a factor but differences in environmental and occupational exposures are important contributors.
Excess Mortality

- Lowest probability of survival is for Harlem residents: 1/3rd of Harlem boys and 2/3rds of Harlem girls live to age 65.
- Study concluded that contributors to excess mortality: excessive exposures to environmental pollutants, dilapidated housing and over-crowding. (Geronimus et al. 1966)
- In NYC, disparity in asthma mortality rates is 3 to 5.5 times that of Caucasians.
Environmental Justice Framework

- Challenges current environmental protection model in addressing environmental inequities, disparate impact, and unequal protection.
- Seeks to prevent environmental threats before they occur and shift burden to polluters.
- Incorporates other social movements seeking to stop harmful practices: housing, land use, zoning, economic disinvestment, infrastructure decline, deteriorating housing, lead poisoning, pollution, health care, sanitation, and industrial planning.
IF YOU LIVE UPTOWN, BREATHE AT YOUR OWN RISK.
Diesel bus fumes can kill.

West Harlem Environmental ACTion
WE ACT for Environmental Justice.
Realized that evidence-based campaigns moved policymakers, empowered residents.

Important tool and dynamic-- science and technology.

Has great impact on our ability to develop safe, sustainable communities.

Lack of scientific literacy, information, data, and context was serious void contributing to systemic exclusion of communities of color from decision-making.

Demanded health studies to assess environmental exposures or residents living in polluted areas.
Response by the Academic Community to Health Disparities

- Need to respond to the disproportionate burden of pollution across communities, impacts of multiple and cumulative exposures, special concerns of susceptible populations, i.e. children, immuno-compromised, elderly.

- Scientists, community leaders agreed: work in partnership to prioritize research needs, get data, assess environmental exposures, test interventions to influence public policy and involve community in informing the research agenda.
COMMUNITY-BASED PARTICIPATORY RESEARCH

- Research findings communicated to a broader community—so they can effect needed changes in environmental and health policy to improve existing conditions.

- CBPR seeks to build capacity and resources in communities, and to ensure that government agencies and academic institutions better understand and incorporate community concerns into their research agendas.

- Collaborative, co-learning process that stresses systems development, community capacity building, and balancing research and action (Israel et al, 1998) CBPR has achieved particular prominence in the U.S. in the field of environmental health
The partnership between WE ACT and the NIEHS Center at Columbia and the Columbia Children’s Center for Environmental Health began in the mid 90s with two goals:

1. studying the relationship between community-level environmental exposures and environmental health outcomes and

2. translating those findings into policy changes that create equity in environmental decision making and environmental protection.
Intentional Collaboration

- Developing the capacity to perform and sustain CBPR work, activities and partnerships involves an intentional collaborative and co-learning process that stresses:
  - Systems development,
  - Community capacity building, and
  - Balancing research and action.
CCEH Working To Identify Env. Exposures of Mothers and Children

- WE ACT member of administrative core of investigators
- Monitors ethical issues, concerns arising from study findings, design
- Coordinating NYC community conference to report findings
- Developing PSAs for radio, media and policymakers briefings
CCEH Findings

- High prenatal exposure to certain PAHs increases the likelihood of children’s allergic response to cockroach, mouse and dust mite allergens as measured by a known asthma predictor (IgE) at two years of age.

- ~40% of babies in the study were born with DNA damage from PAHs. Such damage can increase cancer risk.

- Prenatal exposure to PAHs alters the structure of babies’ chromosomes. This is the first study to show that environmental exposure during pregnancy to such pollutants can cause an increase in abnormalities of fetal tissues.
CCEH Findings

- Prenatal exposure to two household pesticides transferred readily to the fetus, and reduced birth weight by ~6.6 oz.

- Prenatal combined exposure to air toxics from vehicle exhaust and secondhand smoke is more detrimental to the fetus than either exposure alone. This exposure resulted in reduced birth weight and reduced head circumference both of which are linked to health and learning problems in childhood.

- Governmental regulation has immediate positive effects on children’s health. The CCEH Mothers and Children study is the first to show benefits from the 2000-2001 EPA bans on the home use of certain pesticides.
Early Achievements: Building Community Capacity

- Trained 200 residents in Environmental Health Leadership trainings
- Community-driven research on air pollution: *Diesel Exhaust Exposure Among Adolescents In West Harlem* (PI: Dr. Northridge)
- *Airborne Concentrations of PM2.5 and Diesel Exhaust Particles On Harlem Sidewalks* (PI: Dr. Kinney)
- WE ACT youth trained as field technicians
Earth Crew members with traffic counting equipment

Earth Crew members (from left to right: Carl Willis, David Betancourt, Latanya Stevens and Felicia Reynolds) keep a close watch as they count the number of diesel buses and trucks rolling down the streets of Northern Manhattan.
Along with Meredith Minkler and others, I co-authored a paper that was published last January in the Journal of Urban Health, a bulletin of the NY Academy of Medicine.

One of the findings: “carefully designed CBPR that is committed to strong science, high level community involvement, engagement in policy steps and activities, and the strategic use of study findings to help impact policy can be an important part of the broader struggle for urban health and environmental justice.”
The Truth about AIR POLLUTION... Don’t just breathe it all in!

Air pollution includes tiny particles as well as gases, such as soot. These pollutants are produced by burning fossil fuels, including coal, oil, and gasoline, and wood. People breathe these harmful particles as pollutants, which lodge into the lungs and cause illness. The largest pollutants are cars, trucks, and buses, coal-fired power plants, and industrial boilers.

What is air pollution?

Air pollution includes tiny particles as well as gases, such as soot. These pollutants are produced by burning fossil fuels, including coal, oil, and gasoline, and wood. People breathe these harmful particles as pollutants, which lodge into the lungs and cause illness. The largest pollutants are cars, trucks, and buses, coal-fired power plants, and industrial boilers.

What types of health problems are caused by air pollution?

Air pollution can cause cancer and trigger asthma. Air pollution has been linked to reduced lung function, increased hospital and emergency room admissions, and premature death. A recent study by the National Resources Defense Council linked air pollution to 44,000 deaths per year.

Tips for Fighting Air Pollution

- Use mass transportation as an alternative to driving whenever possible.
- Write to the New York City Metropolitan Transportation Authority and demand that they convert all diesel buses and depots to natural gas.
- Join a clean air campaign in your community to combat air pollution. For information contact West Harlem Environmental Action (212) 961-1000.

Developed by:
The Columbia Center for Children’s Environmental Health (CCCEH)

Community Partner:
West Harlem Environmental Action (WE ACT)

For Further Information Contact
WE ACT at (212) 961-1000
COEP Collaboration
Press conference launching “Breathe At Your Own Risk”
ALL CHOKED UP:
Diesel Exhaust Exposure Among Adolescents in Harlem

Who conducted this study?
The selected study group was seventh grade students at Thurgood Marshall Academy located at 135th Avenue and 135th Street. Appropriate approvals were obtained from the students’ parents/guardians, the school’s principal, Dr. Sanjoy O. Johnson, and the Institutional Review Board of Columbia University.

The study was conducted jointly by WE ACT staff -- Executive Director Peggy Shepard, Program Director Cecil Cotton-Mark, Youth Coordinator Luis Arce -- and researchers at the Harlem Center for Health Promotion and Disease Prevention led by Dr. Mary Norwood and the Center of Environmental Health at New York University, especially Dr. Patrick Kinyoro and Joseph Cardona.

The students’ parents/guardians were informed of the study design and purpose at a pre-study meeting held at the school. The study was designed to help address any questions or concerns among the parents/guardians regarding their child’s participation in the study. Informed consent was obtained for each child, parent or guardian before participation.

Why was it important to examine the extent to which youth are exposed to diesel exhaust? What is diesel exhaust composed of?
Diesel exhaust has harmful effects on human health. Motor vehicles produce most of the diesel exhaust that pollutes the earth’s environment. A total of 445 components have been identified in the particulate and gases components of diesel exhaust emissions. Some of these components -- sulfur dioxide, nitrogen oxides, particulate matter, and gaseous hydrocarbons -- are emitted in amounts that have a known biological impact on human and environmental health. During combustion, unburnt carbon atoms from the carbon-rich diesel fuel form soot, a highly toxic substance that contains polycyclic aromatic hydrocarbons that include known carcinogens.

How can diesel exhaust affect you? Who does it affect the most?
Long-term exposure to diesel exhaust in occupational studies suggests a 1.5 to 2.5-fold increased risk of death. Exposure to diesel exhaust is greatest on streets and intersections heavily traveled by diesel buses and trucks.

On Tuesday, April 15th, 1997, twenty-four students from Thurgood Marshall Academy traveled to Columbia University’s Health Science Campus in order to participate in the study.

- Twenty-four students participated in the study by responding to a questionnaire.
- All of the students were from the same background.
- The average student age was 12.8 years (range 12-14).
- Twenty-three students considered themselves to be African American.
- One student considered himself

Exposure to diesel exhaust is greatest on streets and intersections heavily traveled by diesel buses and tracks.

1) Questionnaire
A questionnaire was administered to each study member of WE ACT’s Early Crew Youth Leadership Program, a community-based outreach initiative for youth leadership development through environmental education and community service. The questionnaire requested demographic data (i.e., age, sex, race/ethnicity, address), information regarding exposure to tobacco smoke, and asthma history.

Key information reported on the questionnaire:
- Nine students — 38% — reported having mothers who currently smoke cigarettes.
- Nine students — 38% — reported having fathers who currently smoke cigarettes.
- Two students identified themselves as current tobacco smokers, neither of whom reported a current history of asthma.

The number of students who reported...
Translate and disseminate the research of the Center to the larger community.

Form a Housing and Health Leadership Council comprised of motivated residents and organizations from communities in Northern Manhattan and the South Bronx, that will identify and pursue a needed change in housing policy and practice.

Develop a citywide network of housing and health organizations to share information and resources related to housing and children’s health, and to serve as a platform to discuss and address the policy issues identified by the Leadership Council on a citywide scale.
Expanding the capacity of low-income communities of color to improve children’s environmental health by educating area residents and organizations about the Center’s work and other supporting research.

Training community stakeholders to apply this information in ways that will help modify current policies to improve community-wide environmental conditions.

Coordinating their efforts to translate Center findings into policy results.
Goals for the Healthy Home, Healthy Child Campaign

- To **Win** healthier homes for tenants across the city
- To **Illustrate** the connection between poor quality housing & poor health
- To **Reduce** the use of dangerous household products (ex: Tempo & Tres Pasitos)
- To **Empower** residents to respond to the health risks associated with poor quality housing.
- To **Organize & Mobilize** residents to win safe and affordable housing
Organized the “Mold is Taking Hold: Creating Healthier Indoor Environments” held on March 28th, 2006

Recruited 15 community based organizations to the Our Housing is Health Network – held 2 network meetings.

Made formal presentations Brooklyn Borough President Cabinet meeting, Project Remain/Slumlord Accountability, “Black Equity Alliance Roundtable.”

Delivered bi-lingual “Mold is Taking Hold” and Safer Ways to Eliminate Pests” workshops to 75 residents.

Presentations to key NYC and NYS legislators.

Organized a “Know Your Rights” workshop for residents living in substandard housing. 6/27/06
Local Laws Passed on Pesticides in 2005

- Local Law 36 on Pesticide Notification

- Local Law 37: Pesticide Use Reduction Act requires that city agencies use the least toxic alternatives in city-owned housing.

- WE ACT introduced scientific findings from the center to the Health and Environment committees which was crucial in securing 3 No. Manhattan council members support. Center researchers testified.
1) The Diesel Emission Reduction Act of 2006. A.11340 (Grannis et al) / S.8185 (Marcellino et al)—This law will reduce the public’s exposure to diesel, by requiring all NYS owned heavy duty vehicles working on state contracts to use the best retrofit technology.

- Local Law 77 requires use of ultra low sulphur diesel and best available technology for non-road vehicles in city construction.

- Also there is a new state mandate for NYC to adopt best available technology for pollution control on school buses.
2) Assemblyman Peter Rivera’s “Children’s Clean Air Act” (A. 9874), a proposal to strengthen the state’s anti-idling regulations for school buses.

- Requires school officials to enforce, report violations of the state’s anti-idling laws.

- Calls for school districts to create Clean-fuel Program Advisory Councils that will recommend ways and timelines for the replacement of aging school buses with clean-fuel burning technologies.
The 10-year partnership between WE ACT/ Columbia’s NIEHS Center / Children’s Center produced credibly scientific research and helped bring about environmental health policy change.

From a research perspective, the 1996 Earth Crew study, and the WE ACT partnership’s careful look at the relationship between bus diesel emissions and asthma are still widely cited by the EPA and academic researchers.

Policy makers commented on the strength of having research partners with recognized and respected staff scientists. These scientists, well-received by regulatory agencies, do the research that the community partner has access to and ownership of to present convincing health and public risk arguments.

One of 10 CBPR Projects Selected in Kellogg Effort to Document Impacts of CBPR on Health Policy
Decreasing Health Disparities

- The partners’ roles in creating awareness of, and leading the fight for environmental justice and the reduction in health disparities around asthma has been widely recognized and cited (Brown et al, 2003; Lee, 2004; Corburn, in press; Blackwell et al, 2005). As Brown et al (2003) have noted:

- “Asthma has become perhaps the primary disease in which poor and minority people have pointed to social inequality and have engaged in widespread political action. The case of asthma demonstrates how environmental justice approaches place ethics and rights issues in the center of health policy” [40].
“Conversion of NYC’s bus fleet to clean diesel and installation by the EPA of permanent air monitors in Harlem and other hot spots were among outcomes for which the partnership’s research and policy work was given substantial credit.”
Reducing allergen and mold exposures in homes: Collaborations among government, community organizations, and academia

Ginger L. Chew, Sc.D.
National Center for Environmental Health
### Collaboration efforts

#### 1. Little Sisters of the Assumption: Mold Intervention

**Description:** The LSA asked me to determine if their interventions were effective in decreasing mold levels. We sought to collect some baseline data.

<table>
<thead>
<tr>
<th>Good Points</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Help for most severe asthmatic children</td>
<td></td>
</tr>
<tr>
<td>• Multi-factorial intervention</td>
<td>• Did not want to collect outdoor samples</td>
</tr>
<tr>
<td></td>
<td>• Disappointed that results did not match what they saw in the homes</td>
</tr>
</tbody>
</table>
Fungal Spores
Little Sisters of the Assumption

Fungi Levels (Colony Forming Units) in NYC homes.

<table>
<thead>
<tr>
<th>Home ID</th>
<th>Total Fungi (cfu/cubic meter)</th>
<th>Bedroom</th>
<th>Bathroom</th>
<th>Outside</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td></td>
<td>250</td>
<td>300</td>
<td>2000</td>
</tr>
<tr>
<td>102</td>
<td></td>
<td>800</td>
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<td>1000</td>
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<td>2000</td>
<td>1350</td>
<td>1900</td>
</tr>
<tr>
<td>98</td>
<td></td>
<td>2300</td>
<td>1800</td>
<td>1000</td>
</tr>
</tbody>
</table>

Average 591 538 847
Disadvantages of Traditional Fungal Exposure Measurements

- Culture sampling
- Nonviable sampling
- Biologically relevant time period
- Location

Collaboration efforts

1. Little Sisters of the Assumption: Mold Intervention

Overcoming the barriers

- Co-wrote a grant application (listing LSA as the prime institution instead of Columbia University)
Development of Collaborations in NYC

Little Sisters of the Assumption

Suzanne Gaynor
(Past affil: Mt. Sinai)
(Current affil: HUD)
Development of Collaborations in NYC

Little Sisters of the Assumption

Terry Brennan

Chris D’Andrea (NYC DOH)

Suzanne Gaynor (Past affil: Mt. Sinai) (Current affil: HUD)
Development of Collaborations in NYC

Little Sisters of the Assumption

Tom Matte
(CDC & NYC DOH)

Terry Brennan

Chris D’Andrea
(NYC DOH)

Suzanne Gaynor
(Past affil: Mt. Sinai)
(Current affil: HUD)

Dan Kass
NYC DOH

Bill Sothern
(IH)

Housing departments (HPD & NYCHA)

New York City Asthma Partnership (NYCAP)
Collaboration efforts

2. Briefing Senator Marcellino on proposed Mold legislation(2001)

Description: CBO’s, academicians, architects, mycologists, Industrial Hygienists, and building scientists voiced concern over proposed bill.

**Good Points**
- Made several changes to bill
- Received invitation to State Assembly hearing

**Limitations**
- Great turnout
- Lack of health effects data bogged down passage of the bill

Note: Bill finally passed and 1st Mold Task Force meeting occurred in Fall 2007
Collaboration efforts

3. Training Housing Inspectors on mold

Description: A group comprised of academicians, NYC DOH Env. Scientists and epidemiologists, CBO’s, an IH, and an architect proposed training Housing Preservation & Development (HPD) Inspectors to understand mold exposure respiratory effects, prevention and remediation.

**Good Points**
- Established a dialogue with HPD
- Developed a training module

**Limitations**
- No regulations for mold = No mandate to do anything
- Wanted us to train the trainers.
Collaboration efforts

3. Training Housing Inspectors on mold

Overcoming the barriers

- Little Sisters of the Assumption persuaded the Housing Agency to use their mold consultant to train the HPD inspectors directly
Collaboration efforts

4. Integrated Pest Management (IPM) in New York City Public Housing

David Evans\textsuperscript{1}, Ginger Chew\textsuperscript{1, 4}, Elizabeth Carlton\textsuperscript{1}, Sean Nagle\textsuperscript{1} Dan Kass\textsuperscript{2}, Wendy McKelvey\textsuperscript{2}, Ingrid Peterson\textsuperscript{2}, Marta Hernandez\textsuperscript{2}, Julius Tiven\textsuperscript{3}, Brian Clarke\textsuperscript{3}

\textsuperscript{1}Columbia Center for Children’s Environmental Health
\textsuperscript{2}New York City Department of Health and Mental Hygiene
\textsuperscript{3}New York City Housing Authority
\textsuperscript{4}currently at CDC
IPM and our research partnership

NYCHA conducted IPM at 2 sites after positive results from a pilot study.

Columbia and NYC Department of Health assess IPM program’s impact on pests, allergens, pesticides and asthma.
NYCHA’s IPM Intervention

The IPM intervention involved:

– Professional cleaning to remove food sources and cockroach frass in kitchen and bathrooms.
– Caulking and sealing kitchen cabinets and other points of entry.
– Use of MaxForce gels & bait stations, and boric acid powder.
– Residents receive a garbage can with a lid, food storage containers, and cleaning supplies.
Data collected during baseline, 3-month and 6-month home visits:

- Questionnaire about pests, pesticides, asthma symptoms and opinions of building conditions
- Cockroach and mouse populations monitored for 1 week
- Dust sample from kitchen floor and up to 3 beds
IPM Evaluation Research Sites

East Harlem

- 194 intervention units

Bushwick

- 129 control units
Variability in the percent of apartments with high allergen levels cockroaches and mice by building.

A. High (>8 U/g) bed Bla g 2

B. High (>1 μg/g) bed MUP

Chew et al, Annals of Allergy, Asthma, Immunology, Dec. 2006
Cockroach Allergen (Bla g 2) In Kitchens

In Kitchens

![Graph showing cockroach allergen levels over time and between different groups.](image)

- **Bla g 2 concentration (U/g)**

- **Baseline**
- **3 Months**
- **6 Months**

- **Control (n=85)**
- **IPM (n=126)**
Cockroach Allergen (Bla g 2) In Beds

<table>
<thead>
<tr>
<th>Bla g 2 concentration (U/g)</th>
<th>IPM (n=75)</th>
<th>Control (n=45)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 Months</td>
<td>93</td>
<td>212</td>
</tr>
<tr>
<td>3 Months Baseline</td>
<td>10,000</td>
<td>1,000</td>
</tr>
<tr>
<td></td>
<td>1000</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>0.1</td>
</tr>
</tbody>
</table>

Comparison of Bla g 2 concentration (U/g) in IPM and Control groups at 6 months and 3 months.
Cockroach allergen levels at follow-up: Ratio of IPM to control apartments

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Ratio</th>
<th>95% CI</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Kitchen</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 3 months later</td>
<td>0.4</td>
<td>0.2 - 0.8</td>
<td>0.02</td>
</tr>
<tr>
<td>- 6 months later</td>
<td>0.3</td>
<td>0.1 - 0.9</td>
<td>0.05</td>
</tr>
<tr>
<td><strong>Bedroom</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 3 months later</td>
<td>0.6</td>
<td>0.3 - 1.3</td>
<td>0.23</td>
</tr>
<tr>
<td>- 6 months later</td>
<td>0.5</td>
<td>0.2 - 0.8</td>
<td>0.03</td>
</tr>
</tbody>
</table>
Percent of Households Using Unsafe Pesticide by Intervention Status over Time

- **Baseline**
- **3 months**
- **6 months**

### Control
- Baseline: [Value]
- 3 months: [Value]
- 6 months: [Value]

### Intervention
- Baseline: [Value]
- 3 months: [Value]
- 6 months: [Value]
Summary

• IPM decreased cockroach allergen significantly
• Use of toxic pesticides decreased after our intervention
Collaboration efforts

4. Integrated Pest Management (IPM) in New York City Public Housing

Overcoming the barriers

- Housing Agency pesticide applicators found that IPM training could augment their job skills rather than put their jobs in danger
Lessons learned from collaborations

1. The researcher brings to the table some knowledge of how to measure mold and allergen exposure and some health outcomes.

2. The CBO’s give the researchers knowledge about the neighborhood and its residents, and they often serve as the glue to keep all of these collaborations together.

3. Local government (not only federal and state) support is necessary for change.
To quote Lynn Battle,

“Do not look for one CBO to fill all of your needs.”

can be generalized to:

“Do not look for one collaboration to fill all of your needs.”