

## Integrated Pest Management in Boston Public Housing: Partnerships, Programs, and Policy Advances

*Public housing residents have some of the highest rates of allergic asthma in the country. Traditional pest control in low-income multifamily housing, with initial flush out and periodic spray, has failed to eliminate pests long-term. As a consequence, residents take pest control into their own hands, using over-the-counter, restricted and illegal pesticides. A series of IPM-based initiatives at Boston Housing Authority serve as a model for other public housing authorities. The model uses peer educators and increasingly standardized approaches to IPM training, IPM contracts, data collection, and IPM teams. It can be adapted and undertaken in multi-family housing developments throughout the United States. The campaign to educate residents about the toxicity of pesticides and the pesticide buyback program is easily replicable. The policy initiative to have health insurance cover residential IPM as part of asthma management is one of national import.*



### Why Cockroaches?

Live cockroaches, as well as their remains and feces, cause asthma attacks in people sensitive to cockroach allergens according to a 2000 Institute of Medicine Report. The Inner City Asthma Study found that more than 60% of inner city children were sensitive to cockroach allergens. Asthma is a costly disease that disrupts a family and undermines a child's ability to learn. There is growing evidence that mice may have a similar effect.

This case study is part of a series addressing integrated pest management in low income housing. To access additional fact sheets in the series, please visit: [www.healthyhomestraining.org/ipm/studies.htm](http://www.healthyhomestraining.org/ipm/studies.htm).

### **T**he Healthy Public Housing Initiative: Research for Action and Community Empowerment (2000-2004)

The Healthy Public Housing Initiative (HPHI) is a community-university-city agency collaborative formed to improve resident respiratory health and building conditions in Boston public housing using an IPM intervention in 44 apartments of 57 asthmatic children enrolled in the project.<sup>1</sup>

The package of IPM interventions included:

- Educating and assisting residents with sanitation, clutter control, and preparation for IPM application;
- Deep cleaning with a HEPA vacuum;
- Monitoring for roaches with sticky traps;
- Flushing out cockroach harborages;
- Exclusion by sealing holes and cracks; and
- Application of gel baits and boric acid.

Pre- and post-interviews with residents over the course of a year and monthly standardized interviews with residents captured data on the change in asthma symptoms, caretaker quality of life, doctors' visits and hospitalizations for asthma. We also collected dust samples in apartments for cockroach allergens and pesticide residues as part of our study.

### Key Findings

1. **Traditional approaches to pest control are ineffective, especially for cockroaches.** Nearly 50% of the homes tested in HPHI showed cockroach allergen levels in excess of asthma sensitivity exposures; nearly 60% of the tested children showed allergic sensitivity to the most prevalent cockroach antigen. The

factors found to correlate with pest-related allergen levels were lack of housing renovation, holes in walls, poor housekeeping practices, and season of the year.<sup>2</sup>

*Every home tested showed evidence of between 3 and 8 pesticides used, at least one of which is either banned or restricted to non-residential use.* Boston public housing residents in our study have a higher rate of pesticide use than the national average.<sup>3</sup>

**2. A package of IPM interventions designed to reduce allergen burden and re-infestation was effective and improved both environmental and health indicators.** Intense cleaning and reduction in cockroaches reduced allergen loads in all homes. The reduced allergen levels were sustained over 4 months and then began to rise, showing the need to implement the intervention on a regular basis to maintain results.<sup>4</sup> During the period of IPM intervention, asthmatic children involved in the study reported a significant reduction in asthma symptoms, including coughing and wheezing, activity limitations and poor sleep quality.<sup>5</sup>

**3. Residents are central to successful IPM in their housing developments.** HPHI trained more than 20 public housing residents to conduct housing surveys and inspections as both health advocates and IPM educators.

### **Second Generation IPM in Boston Public Housing**

The research results spurred a set of pilot projects which refined the IPM model developed in the research project. The initial research and subsequent pilot projects also stimulated larger initiatives, including an IPM Demonstration Project and a Pesticide Buyback Program in Boston public housing.

#### **Pilot Projects (2005)**

##### **1) The IPM Educator Pilot in Charlestown Housing Development**

The IPM Educator Pilot study in the Charlestown Housing Development was designed to measure the effectiveness of training and employing an IPM peer educator on residents' preparation for IPM and on cockroach control.

Cyfluthrin, a nerve poison and the active ingredient in the roach powder Tempo, is used in its non-diluted, powder form by some residents, and is typically sold in Latino neighborhood bodegas with no health and safety information.

Thirty-four moderate- and high-infested units in the Charlestown family development received baseline assessment and three applications of gel baits, with 2-4 weeks between applications, by a pest management professional. Before the first pest control application, residents received written notice to prepare their units for treatment, a routine industry method of alerting residents to prepare for pest control treatment. Before the second and third gel bait treatments, an IPM peer educator:

- Instructed residents in how to prepare for IPM treatment;
- Educated them on pest biology and habits;
- Explained the role of sanitation and clutter in infestation; and
- Used a HEPA vacuum to remove dead insects and allergens in dust.

The IPM treatment with peer education resulted in a significant decrease in cockroach activity in the infested apartments, whereas IPM treatment with a written notice but without peer education did not. All of the units that were both clean and prepared for IPM treatment had “light” or “no” pest activity by the end of the study, while 100% of units that were both not prepared and not clean had no improvement in pest infestation at the end of the study.<sup>6</sup>

## 2) The IPM Pilot in Holgate Apartments Senior Housing

A second IPM pilot project, modeled on the Charlestown Development pilot program, was conducted by the Asthma Regional Council in an 85-unit housing development for elderly and disabled people, Holgate Apartments. Two residents were trained and employed as IPM Educators. An IPM team was formed including BHA management and maintenance personnel who were given a short training in IPM, the IPM Educators, and the pest control operator. Over a period of five to six months, every apartment was visited by the peer educators for the purposes of:

- Monitoring baseline infestation;
- Educating resident;
- Scheduling treatment visits for infested apartments;
- Assisting with HEPA vacuuming and preparation for IPM treatment;
- Calling in work orders for repairs; and
- Eliciting resident feedback on program satisfaction.



Results showed that by the end of the pilot program, units with “light” or “no” pest activity increased from 77% to 100% and the common areas with “light or no” pest activity improved from 0% pre- IPM to 100% post- IPM. In six of the units visited, IPM educators arranged for needed social services for the residents, another benefit of this model program.

### **IPM Demonstration Project: The Healthy Pest Free Housing Initiative (2006-2009)**

With five years of promising results, the partners received funding to scale up IPM in the Boston Housing Authority, with an ambitious schedule to implement IPM in 15 family developments over the course of three years. The Healthy Pest Free Housing Initiative (HPFHI), as the demonstration is called, established a set of goals to:

- Improve asthma and overall health;
- Eliminate infestation;
- Reduce pesticide use and exposure;
- Maximize resident peer education; and
- Promote IPM in public policy on housing and health.

The HPFHI activities include:

- Hire and train 10 Boston Housing Authority (BHA) residents to be employed as health advocates and IPM educators within Boston public housing. Advocates will provide multi-lingual health education on asthma and information about IPM; assist residents with reducing clutter and placing work orders; and will serve as a bridge for residents to other needed health and social services.
- Develop a multilingual, multimedia public health information campaign for public housing residents. The Safe Pest Control Campaign will reach all the BHA developments and will include posters, flyers and other materials including videos in several languages to educate about IPM and the toxicity of pesticides, with emphasis on illegal and restricted pesticides.
- Train BHA managers, staff and resident leaders in the model IPM program as they prepare to implement it in their developments. Work with BHA to set up a database to track baseline

housing conditions and IPM results, to develop a model IPM contract, and to prepare an IPM orientation for new residents.

- Distribute up to 800 Healthy Home Kits which include important information and supplies for safer pest management and for reducing asthma triggers in the home.
- Develop a pesticide "buy back" program, to eliminate potentially toxic substances from the home environment in all developments. Residents participating in the buyback will receive free pest control equipment and supplies.

*"This demonstration project builds on an earlier initiative, which proved that including residents as full partners to educate their neighbors is the most successful method of addressing health related issues in public housing,"*  
*Sandra B. Henríquez,*  
*BHA Administrator.*

### **Preliminary Results: Year 1**

The IPM team in each development includes the housing manager and maintenance staff, the IPM contractor, the peer educator, and the residents. Data collected include the baseline data on infestation, sanitation, clutter, repairs needed, and any unique social needs. A list of "focus units" is developed by the IPM contractor and the development manager, these being units in need of continued IPM treatment, peer education, social services, and repair.

The peer educators are assigned to work with the residents of these focus units to educate them in IPM, to advocate for other needed services, and to assure that work order repairs are made. A comparative study of work orders for pest problems in the 12 months before and after the IPM program in developments is being conducted to help evaluate the effectiveness of the IPM program. Other components of evaluation include a comparison of pest control contract and services costs and a comparison of unit inspection findings pre-and post-IPM.

### **Other On-Going Initiatives**

#### **Health Policy**

The Asthma Regional Council (ARC) has identified a need to create policies that would support sustainable financing mechanisms to address environmental controls in the home. ARC has spearheaded discussions with the health care payer and health purchaser communities about supporting policies for delivering and/or paying for home-centered environmental interventions. These interventions include IPM services and supplies.

Health payers have indicated receptiveness to addressing environmental triggers, but want guidance on what are considered to be best practices and how implementing the practices will affect their bottom line. To that end, ARC has produced a *Business Case*, which documents the health and cost benefits associated with offering asthma education programs and home-based interventions to reduce environmental triggers. The document, entitled "Investing in Best Practices for Asthma: A Business Case for Education and Environmental Interventions" concludes that health payer organizations and policy makers would be well-served to invest in these effective asthma management strategies.

ARC is also developing an *Issues Brief* with the Alliance for Healthy Homes on recommended federal, state and local policies to pursue for promoting IPM in residential settings. The policy brief will focus on the residential environment where virtually no regulations exist to govern the use of IPM. To complement the *Issues Brief*, ARC is also developing a manual on "How to Implement IPM in Residential Housing." The manual is geared toward housing development Facilities Managers, incorporating

effective strategies implemented at the Boston Housing Authority. For contact information on ARC, see below.

**Training Center for Healthy Housing and IPM**

The Center for Healthy Homes and Neighborhoods in Boston University School of Public Health offers trainings in New England as a member of the National Healthy Homes Training Center & Network and specifically has tailored and offered the IPM curriculum developed in the Healthy Public Housing Initiative for low-income, multifamily housing managers, including public housing authorities, community development corporations, and Section 8 programs. To date the center has provided one- and two-day trainings in IPM to:

- Large and medium public housing authorities in six New England cities, with the goal of launching IPM programs in those housing developments;
- Two community-based organizations; and
- Local health officers in Massachusetts.

For contact information on the IPM curriculum, see below.

<b>HUD IPM Program Elements</b> <i>(Results of Study in Bold Italics)</i>	<b>HPHI</b> <b>IPM and Asthma Research</b> <b>Project</b> <b>2000-2004</b>	<b>HPFHI</b> <b>IPM Demonstration</b> <b>Project</b> <b>2006-2009</b>
<b>1. Communicate Policies</b> Communicate Housing Authority’s IPM policies and procedures to: <ul style="list-style-type: none"> <li>• All building occupants</li> <li>• Administrative staff</li> <li>• Maintenance personnel</li> <li>• Contractors.</li> </ul>	Communication by researchers to managers and residents about IPM intervention program	Communication by BHA administration to managers and maintenance. Community meeting for residents with manager and IPM contractor
<b>2. Identify Problems</b> Identify: <ul style="list-style-type: none"> <li>• Pests</li> <li>• Environmental conditions that limit the spread of pests.</li> </ul>	Comprehensive initial visual assessment of 44 units in three developments and use of sticky traps to monitor cockroach activity	Comprehensive visual assessment of every unit, common areas, basements, perimeter of bldg., in five developments per year for three year demonstration program and use of sticky traps
<b>3. Monitor and Track</b>	Monitor traps every 2 weeks and intervene as necessary  Research Results: Allergen results reduced in all homes and sustained for 4 months, after which they began to rise Statistically significant reduction in asthma symptoms	Develop short list of units with persistent pest problems and monitor. Inspect every 2 to 3 weeks and treat with gel baits until no infestation. Provide data on sanitation, infestation, repairs, and social services needed to building manager after every visit.
<b>4. Set Thresholds for Action</b>		

<b>HUD IPM Program Elements</b> <i>(Results of Study in Bold Italics)</i>	<b>HPHI</b> <b>IPM and Asthma Research</b> <b>Project</b> <b>2000-2004</b>	<b>HPFHI</b> <b>IPM Demonstration</b> <b>Project</b> <b>2006-2009</b>
Determine, with involvement of residents: <ul style="list-style-type: none"> <li>• Pest population levels – by species – that will be tolerated</li> <li>• Thresholds at which pest populations warrant action.</li> </ul>	Zero pests is the goal  Evidence/presence of pest warrants action	Zero pests is the goal  Evidence/presence of pest warrants action
<b>5. Improve Non-Pesticide Methods</b> Improve: <ul style="list-style-type: none"> <li>• Mechanical pest management methods</li> <li>• Sanitation</li> <li>• Waste management</li> <li>• Natural control agents</li> </ul> that have been carefully selected as appropriate in light of allergies or cultural preferences of staff or residents.	HEPA vac all units  Educate residents to improve sanitation and to prepare for IPM treatment  Provide residents with plastic containers for food and garbage.	HEPA vac all units  Educate residents to improve sanitation and to prepare for IPM treatment. Resident peer educators continue to work with residents needing more education, repairs, social services.
<b>6. Prevent Pest Entry and Movement</b> <ul style="list-style-type: none"> <li>• Monitor and maintain structures and grounds including</li> <li>• Sealing cracks</li> <li>• Eliminating moisture intrusion and accumulation</li> <li>• Add physical barriers to pest entry and movement.</li> </ul>	Seal cracks and small holes with copper mesh, expanding foam.  Report water leaks to BHA for repair	Seal cracks and small holes with expanding foam.  Report water leaks to BHA for repair
<b>7. Educate Residents and Update Leases</b> <ul style="list-style-type: none"> <li>• Develop an outreach/educational program</li> <li>• Ensure that leases reflect residents' responsibilities for:               <ul style="list-style-type: none"> <li>• Proper housekeeping</li> <li>• Reporting presence of pests, leaks, and mold.</li> </ul> </li> </ul>	Residents are educated by peer educators and research staff regarding sanitation preparation, and hazards of pesticides and assisted with work orders.  Lease spells out responsibilities	Residents are educated by peer educators and research staff regarding sanitation preparation, and hazards of pesticides And assisted with work orders where needed.  Lease spells out responsibilities
<b>8. Enforce Lease</b> Enforce lease provisions regarding resident responsibilities such as: <ul style="list-style-type: none"> <li>• Housekeeping</li> <li>• Sanitation</li> <li>• Trash removal and storage.</li> </ul>	BHA enforces lease where necessary.	Emphasis is on peer educators' assisting residents with housekeeping problems.  BHA enforces lease where necessary.

<b>HUD IPM Program Elements</b> <i>(Results of Study in Bold Italics)</i>	<b>HPHI IPM and Asthma Research Project 2000-2004</b>	<b>HPFHI IPM Demonstration Project 2006-2009</b>
<b>9. Use Pesticides Only When Necessary</b> Use pesticides only when necessary, with preference for products that, while producing the desired level of effectiveness, pose the least harm to human health and the environment, and, as appropriate, notifying PHA management before application.	Flushing and vacuuming where high infestation  Work with resident to improve sanitation. Do exclusion.  Where evidence of infestation, apply get baits and boric acid.	Flushing and vacuuming where high infestation  Work with resident to improve sanitation. Do exclusion.  Where evidence of infestation, apply gel baits.  Rodent treatment: exclusion, traps and tamper-resistant bait boxes
<b>10. Post Signs</b> Provide and post 'Pesticide Use Notification' signs or other warnings.	Notice given	Notice given
<i>Treatment Cost Per Unit at End of Study</i>	NA Asthma Research Study	Not yet available
<i>Total Cost Per Unit Over Length of Study</i>	NA Asthma Research Study	Not yet available

#### REFERENCES:

- <sup>1</sup>Hynes HP, Brugge D, Osgood N, Snell J, Vallarino J, Spengler JD. (2004). Where does the damp come from? Investigations into the indoor environment and respiratory health in Boston public housing. *Reviews on Environmental Health, Special Issue on Housing and Health*, 19(3-4),171-190.
- <sup>2</sup>Peters J, Levy J., Rogers C, Burge H, Spengler JD. (2007). *Journal of Urban Health*, 84(2), 185-197.
- <sup>3</sup>Julien R, Adamkiewicz G, Levy J, Bennett D, Wishioki M, Spengler JD. (2007). Pesticide loadings of select organophosphate and pyrethroid pesticides in urban public housing. *Journal of Exposure Science and Environmental Epidemiology*, 1-8.
- <sup>4</sup>Peters J, Levy J., Rogers C, Burge H, Spengler JD. (2007). *Journal of Urban Health*, 84(2), 185-197.
- <sup>5</sup>Clougherty JE., Levy J., Hynes HP, Spengler JD. (2006). A longitudinal analysis of the efficacy of environmental interventions on asthma-related quality of life and symptoms among children in urban public housing. *Journal of Asthma*, 43(5), 335-343.
- <sup>6</sup>Condon C, Hynes HP, Brooks D, Rivard D, McCarthy J. (2007). The integrated pest management educator program in Boston public housing: Results and recommendations. *Local Environment*, 12(3), 223-238.

## For More Information

### On Case Study

Tom Neltner  
National Center for Healthy Housing  
10320 Little Patuxent Parkway, Suite 500  
Columbia, MD 21044  
443.539.4160 / Fax: 443.539.4150  
[tneltner@nchh.org](mailto:tneltner@nchh.org)

H. Patricia Hynes, Professor of Environmental Health  
Center for Healthy Homes and Neighborhoods  
Boston University School of Public Health  
[hph@bu.edu](mailto:hph@bu.edu)

Healthy Public Housing Initiative  
<http://www.hsph.harvard.edu/hphi/>

Healthy Pest-Free Housing Initiative  
[Margaret\\_Reid@bphc.org](mailto:Margaret_Reid@bphc.org)

Asthma Regional Council  
[www.asthmaregionalcouncil.org](http://www.asthmaregionalcouncil.org)



**National Center for  
Healthy Housing**

### On Series

Kathy Seikel  
U.S. Environmental Protection Agency  
Mail Code 7511C, 1200 Penn. Ave., N.W.  
Washington, DC 20460  
703.308.8272 / Fax 703.305.5558  
[Seikel.Kathy@epamail.epa.gov](mailto:Seikel.Kathy@epamail.epa.gov)

This case study was prepared by the National Center for Healthy Housing through a contract with U.S. Environmental Protection Agency's Office of Pesticide Programs and Battelle.