

# IPM- Study and Practices from the Field

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## **Goal of Integrated Pest Management (IPM)**

- Manage pest damage by the most economical means, and with the least possible hazard to people, property, and the environment.
  - Environmental Protection Agency

# The Integrated Pest Management Intensity Impact Study (IPMIIS)

## The purpose of IPMIIS:

- Develop a method for classifying BHA managed public housing developments by the intensity of their pest control activities.
- Describe the health, environmental, and economic impact of IPM methods for preventing, reducing and/or eliminating cockroach and/or rodent populations in multifamily housing.
- Assess, the sustained health, environmental and economic benefits across IPM intensity levels for a nested group of asthmatic public housing residents.

# Background on IPM in Boston Public Housing

- Our panel today includes IPMIIS partners who have played key roles in the transition to IPM policy alternatives in Boston's public housing community since 2006. These partner organizations include:
  - The Boston Housing Authority
  - The Boston Public Health Commission
  - The Committee for Boston Public Housing

## **IPMIIS & CBPR**

- IPMIIS partners make study decisions together.
- IPMIIS provides employment opportunities to public housing residents, advocates, and graduate public health students.
- IPMIIS builds on strengths, resources, and relationships already available in Boston.

# IPM at Boston Housing Authority

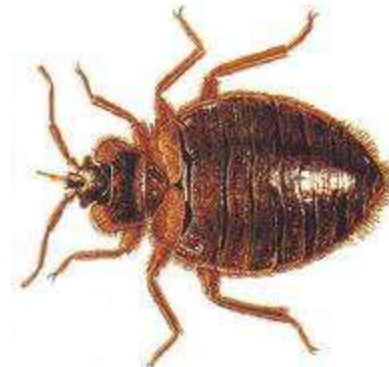


- **Largest housing authority in New England**
- **Largest property owner in Boston**
- **10% of Boston residents in BHA housing**

# IPM at Boston Housing Authority

## Three main pests:

- Cockroaches
  - Rodents
  - Bedbugs
- (not to scale)



# IPM at Boston Housing Authority


## Evolution of Pest Control at BHA:

- 1982 – bug crew
- 1995 – outside contractors “flushouts”
- 2001 – listeni



# IPM at Boston Housing Authority

## Healthy Public Housing Initiative:

- Indoor Air Quality  Resident Health
- Various methods researched
- Recommendation: Integrated Pest Management (IPM)



# IPM at Boston Housing Authority

## Healthy Pest Free Housing Initiative:

- Implement IPM at 15 developments over 3 years
- Community Health Advocates
- Institutionalize
- Evaluate continually



# IPM at Boston Housing Authority

## Cost Benefit Analysis:



- \$4.63 to \$7.09 = +\$2.46
- Decrease pest infestations, pest work orders, pesticide use, stress, losses from REAC scores, HID complaints, court cases
- Increase or Improve quality of life, sense of health, job satisfaction, staff time, and achieve high performer status

# IPM at Boston Housing Authority

## IPM Controls Pests = other impacts?

- Reduce Pesticide Exposure?
  1. Environmental Exposure Grant
- Improve Health Outcomes?
  2. IPM Intensity Impact



## IPMIIS: 3 Phases

1. We created intensity level classification criteria using available quantitative and qualitative data (7Cs of IPM); and then classified eligible developments into 3 levels of IPM intensity.
2. We are performing a cross-sectional study (n=480) of self-reported health status of residents living in public housing across 3 levels of IPM intensity.
3. We will perform a 1-year follow-up visit to 96 households to assess sustained health, environmental and economic benefits across 3 levels of IPM intensity.

## **Phase 1 Field Work Lessons Learned**

- IPMIIS Phase 1 field work was completed April 2011.
- Today we are here to share lessons we learned through the creation of our classification criteria for assigning developments to our 3 levels of IPM intensity.

## Phase 1 Field Work Data Sources

- These Data Sources Included:
  - IPM Logbooks
  - IPM Unique Pest Work Orders
  - IPM Contracts
  - IPM Tenant Coordinator Survey
  - Kellogg Demonstration Program Data

# Classifying IPM Intensity

	IPMIIS Core Classification Criteria	Traditional PM	Low IPM	High IPM
<b>C1</b>	<b>INSPECTED UNITS</b>	* IF C1 ≤ 84%	IF C1 ≥ 85%	IF C1 ≥ 85%
<b>C2</b>	<b>IPMIIS FOCUS UNITS</b>	*IF C2 ≥ 51%	IF C2 ≥ 51%	IF C2 ≤ 50%
<b>C3</b>	<b>IPMIIS FOCUS UNITS NOT FOLLOWED UP</b>	*IF C3 ≥ 51%	IF C3 ≥ 51%	IF C3 ≤ 50%
<b>C4</b>	<b>3-YEAR AVERAGE PEST WORK ORDER PREVALENCE</b>	*IF C4 ≥ 26%	IF C4 ≥ 26%	IF C4 ≤ 25%
<b>C5</b>	<b>+/- CONTRACT LAPSES</b>	*IF C5=Yes	IF C5=Yes	IF C5 =No
<b>C6</b>	<b>+/- KELLOGG SITE</b>	*IF C7=No	IF C7=No	IF C7 =Yes
<b>C7</b>	<b>+/- TENANT COORDINATOR</b>	*IF C6=No	IF C6=No	IF C6 =Yes

# Classifying IPM Intensity

S08	Total housing units in the development (2009)	Count
S09	The development's funding source	Fed F, S
S10	% of residents under the age 22	%
S11	% of residents over the age of 62	%
S12	% of residents reporting Black as their race.	%
S13	% of residents reporting Hispanic as their ethnicity.	%
S14	% of residents reporting Asian as their race.	%
S15	% of residents reporting to BHA that they primarily speak a language other than English.	%
S16	# of HC in NH	#
S17	Relative distance between BMC and development	Miles
S18	Is there any capital improvement work at the development	Yes or No
S19	What type of management does the development have	BHA Only

# Classifying IPM Intensity

S20	Will the development's task force likely play a supportive role	Yes or No
S21	Will the development's management likely play a supportive role	Yes or No
S22	Has the development participated in previous studies	Yes or No
S23	Is the development currently participating in other studies	Yes or No
S24	The number of other studies the development is participating in	Yes or No
S25	Is the development reasonably accessible to the study teams	Yes or No
S26	The Boston neighborhood where the development is located	HP, SB, M, BB, EB, RX, JP, RS, NE,D, SE, CH
S27	Date the development was constructed	Date
S28	The development structure(s)	GS, 2SF, 3SW, <7HR, >8HR, TH
S29	Residents	F, E/D

## Phase 2 Field Work (Underway)

- Phase 2 field work was started June 2011 (n=480). This data will be used to determine a baseline estimate of:
  - Observable IPM and pest activity.
  - Perceived pest and IPM activity.
  - Quality of asthma control, cost-effectiveness of asthma care, and quality of life experienced by asthmatic adults, adolescents, children, and their caretakers.
  - Prevalence of adult respondents with stress, anxiety, and depression symptoms.
  - Pest-specific asthma allergen and pesticide analyte exposure levels.

## Phase 3 Field Work (Still-to-Come)

- Phase 3 field work will start June 2012 (n=96). This data will be used for a follow-up assessment of:
  - Observable IPM and pest activity.
  - Perceived pest and IPM activity.
  - Quality of asthma control, cost-effectiveness of asthma care, and quality of life experienced by asthmatic adults, adolescents, children, and their caretakers.
  - Prevalence of asthmatic respondents with stress, anxiety, and depression symptoms.
  - Pest-specific asthma allergen and pesticide analyte exposure levels in asthmatic households.

# Lessons Learned from Phase 1 Field Work

1. Multiple data sources are important.
2. Classifying in the real world is never easy.
3. Whenever estimating the actual time and resources needed to collect, standardize, and assess primary field data, multiply your estimated value by 3.
4. Consistently communicate with partners throughout.
5. Carefully define all the values, variables, you h
6. Sit down with each of your study partners and define what it is you want to measure, what data they have to measure it, and then write out how it will be done. Once you make a protocol stick to it.

# IPM- Boston Studies and Practices

John Kane, Boston Housing Authority



Margaret Reid, Boston Public Health Commission



Mae Fripp, Committee for Boston Public Housing



# Goal of Integrated Pest Management (IPM)

- Manage pest damage by the most economical means, and with the least possible hazard to people, property, and the environment.
  - Environmental Protection Agency



# Integrated Pest Management

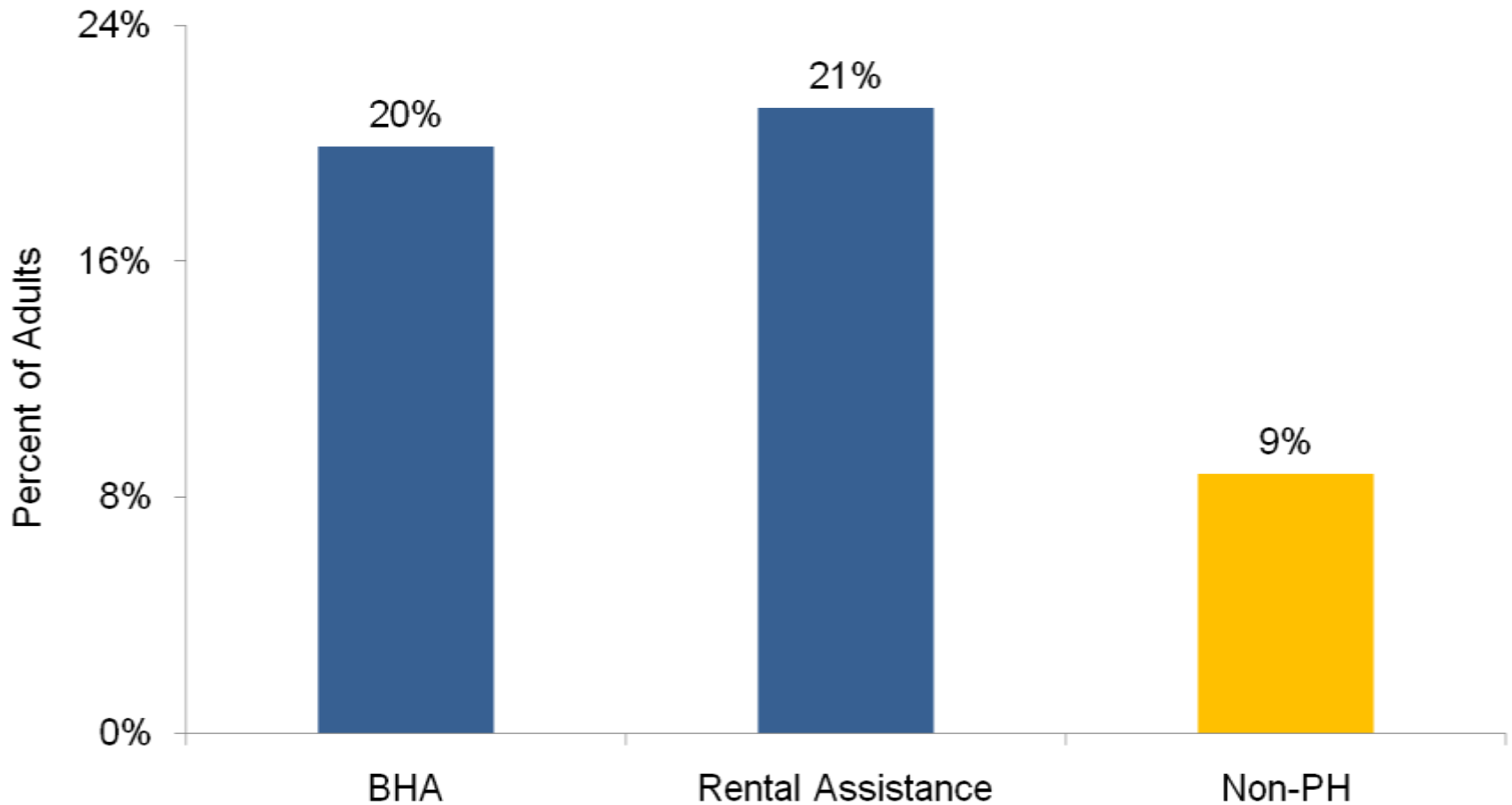
- Eliminate sources of food, water, shelter, block entry points.
- Safer, more effective alternative.  
Reduces need for pesticides.
- Requires involvement by residents, property managers, and pest control companies

# Boston Housing Authority



- Largest housing authority in New England
- Largest property owner in Boston
- 10% of Boston residents in BHA housing

# Asthma by Housing Status, Boston Adults, 2006 and 2008 Combined



DATA SOURCE: Boston Behavioral Risk Factor Survey 2006 and 2008, Boston Behavioral Risk Factor Surveillance System (BBRFSS), Boston Public Health Commission  
DATA ANALYSIS: Boston Public Health Commission Research and Evaluation Office

# Three Main Pests at BHA

- Cockroaches
- Rodents
- Bedbugs



## **Evolution of Pest Control at BHA:**

- 1982 – bug crew
- 1995 – outside contractors “flushouts”
- 2001 – listening tour  
Healthy Public Housing Initiative
- 2007 – Healthy Pest Free Housing Initiative
- 2010 – Integrated Pest Management Intensity Impact Study

# Healthy Public Housing Initiative

Partners: BHA, BPHC, CBPH, tenant task forces, Harvard, BU, and Tufts Schools of Public Health

- HUD, Kellogg, Boston Foundation, more
- Find ways to improve health and housing conditions

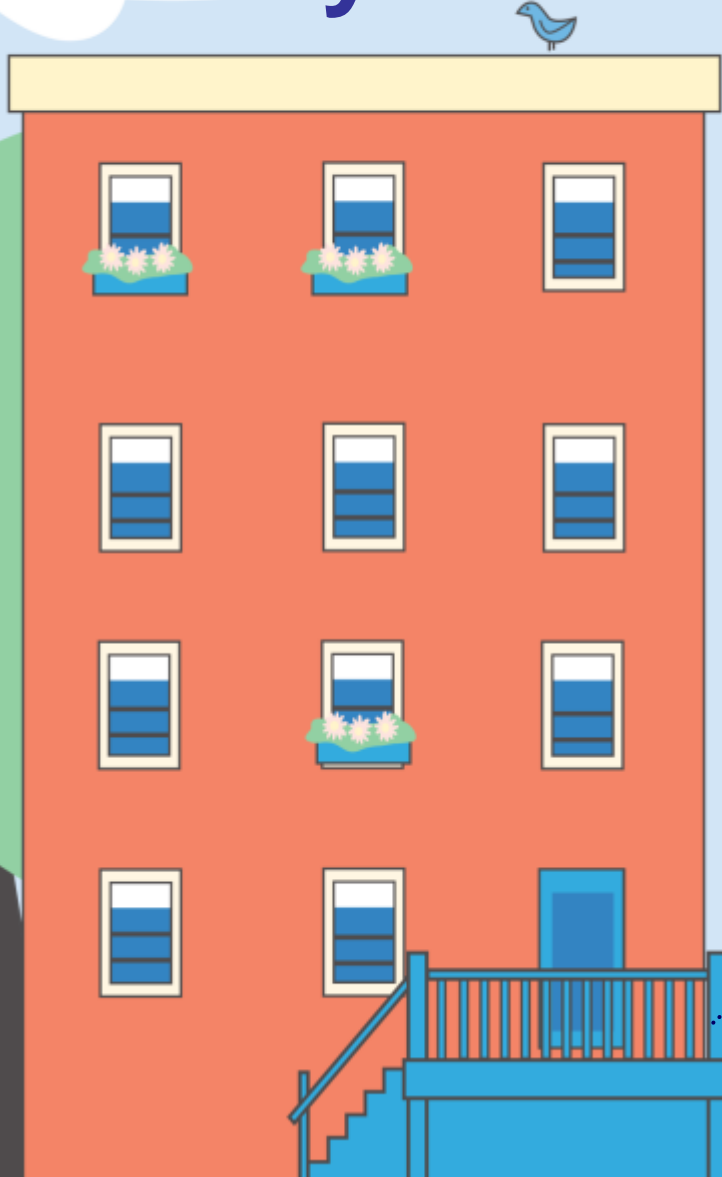


# Healthy Public Housing Initiative Findings

- Standard pest management practices at BHA are ineffective
- Affirmed importance of resident to resident IPM outreach and education
- Improved quality of life and health
- Found nearly 50% of units tested had cockroach allergen level in excess of asthma sensitivity exposure
- Unsafe resident pesticide use



# Healthy Pest Free Housing Initiative



**A Partnership to Reduce Pest  
Infestation and Promote  
Safe Pest Control Practices  
in Public Housing**



# Healthy Pest Free Housing Initiative:

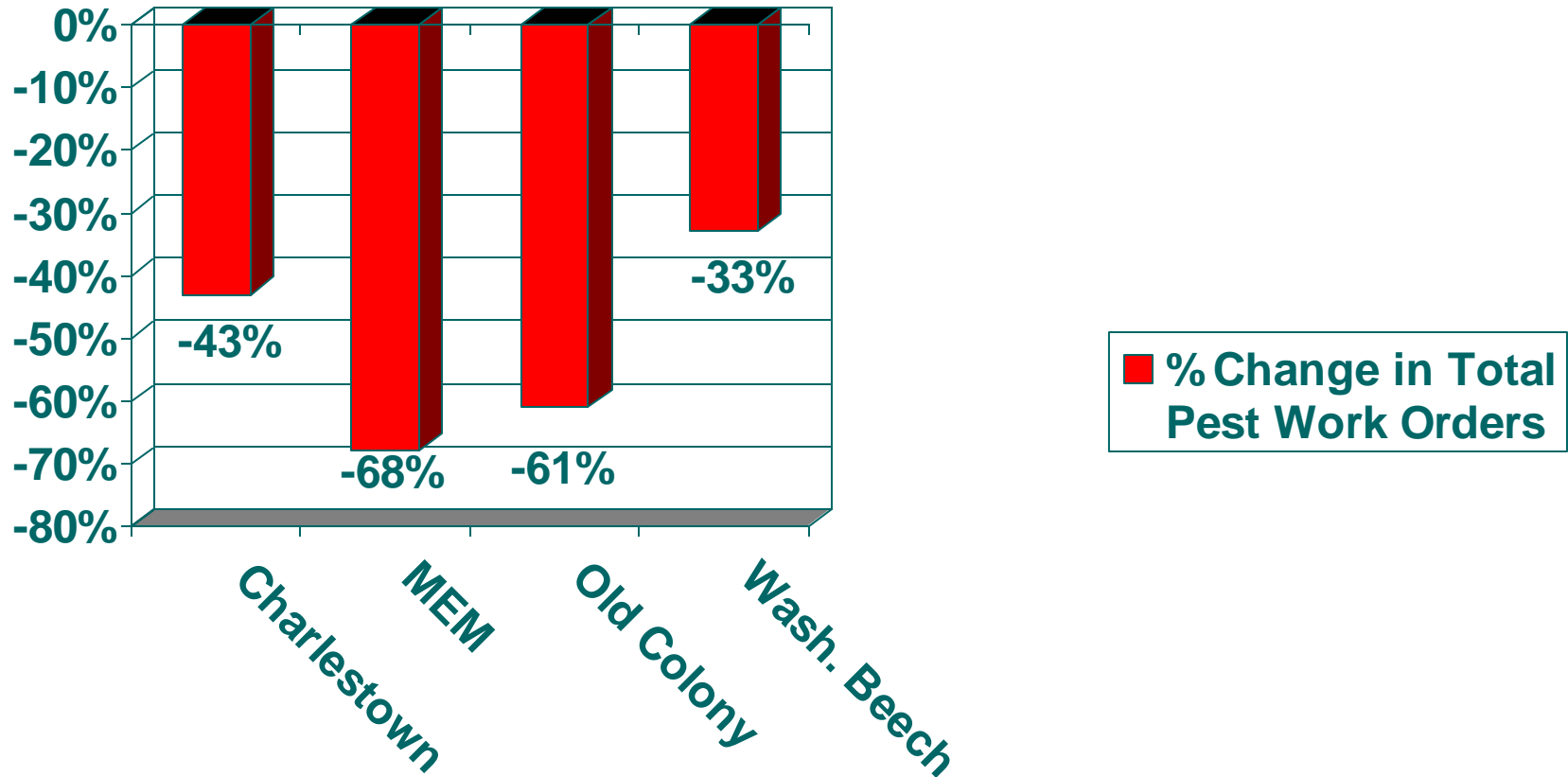
- Partners: BHA, BPHC, CBPH & more
- Funders: Kellogg Foundation and EPA
- Goal: Pilot implementation of IPM at 15 developments over 3 years
- Community Health Advocates
- Institutionalize
- Evaluate



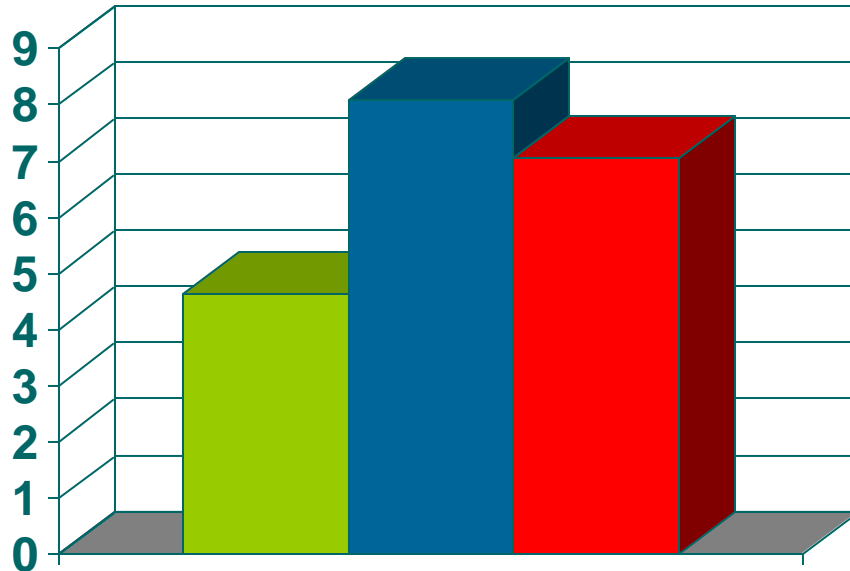
# Institutionalization of IPM at BHA

- IPM Toolkit:  
<http://www.asthmaregionalcouncil.org/about/IPM.html>
- Standard specification
- Staff training
- 100% inspection
- Focus units

# Percent Change in Total Pest Work Orders



# Unit Monthly Average Total Costs for Pest Management



Weighted Avg.

**Weighted Avg.**  
**Before: \$4.63**  
**First Year: \$8.09**  
**Second Year: \$7.04**

■ **Before**  
■ **First Year**  
■ **Second Year**

# Cost Benefit Analysis:



- \$4.63 to \$7.09 = +\$2.46
- Decrease pest infestations, pest work orders, pesticide use, stress, losses from REAC scores, HID complaints, court cases
- Improve quality of life, sense of health, job satisfaction, staff time, and achieve high performer status

# HPFHI Qualitative Results

At the start of HPFHI, 33% of residents reported heavy infestation; reduced to 14% (n=130)

At the start of HPFHI, 35% of residents used pesticides themselves; reduced to 5%.  
(n=130)

50% of respondents included improvements in health and stress (n=163)

# Environmental Exposure

- Partners: Harvard SPH, BHA, CBPH
- Funder: NIEHS
- Goal: Adopt IPM to reduce pesticide exposure



# Environmental Exposure

Less risk of  
exposure



More risk of  
exposure

Tamper-  
resistant  
station

Gel bait  
in a  
crevice

Total  
release  
fogger

# Environmental Exposure

- Phase I – recruit 30 families, samples
- Phase II - Implement IPM
- Phase III – collect samples
- Phase IV – analyze and disseminate

# Integrated Pest Management Intensity Impact Study (IPMIIS)

- Partners: BPHC, BHA, CBPH, HSoPH, BUSoPH, BMC
- Funding: HUD
- Question: Does intensity of IPM affect health outcomes?

# Three levels of IPM

- High, Low, and Traditional
- Variables include: inspected units, focus units, follow-up, pest work orders, contract lapses, HPFHI site, and tenant coordinator



# IPMIIS Classification Criteria

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# The Integrated Pest Management Intensity Impact Study (IPMIIS)

- Phase I: Gather and analyze data -> assign developments to different levels
- Phase II: Conduct 480 resident surveys (criteria family member w/ asthma)
- Phase III: Follow-up 96 surveys
- Phase IV: Evaluate and Disseminate

# Community Based Participatory Research

- Efforts involve tenant organizations and tenants in planning, implementation, evaluation and publication
- Provide resident employment
- Residents conduct peer to peer education, data collection, outreach and advocacy
- Examples include...

# Educational Visit



Asthma triggers and behavioral factors that contribute to pest infestation



Going beyond the normal cleaning and sanitation process



Working with your manager-reporting repairs through the work order system



# Other educational initiatives



M  
Hot Dog

Asthma  
M House



Health VAN

Pesticide  
Exchange





# IPM Make Ready Procedure Winton Terrace

Cincinnati Metropolitan Housing Authority



# Unit Becomes Vacant

- Generated work orders for the vacant unit to have the locks change, extermination, and to be made ready.
- Management staff conducts move out inspection.
- All items and debris are removed from unit.

# Extermination Work Order (PMP responsibility)

- Inspection of unit, and determination of infestation level.
- If unit is infested, treat unit.
- Install dated monitors (6 minimum)
  - 1 near stove
  - 1 near refrigerator
  - 1 laundry area
  - 1 each bathroom
  - 1 master bedroom
  - 1 living room

# Make Ready Work Order

## Make Ready Crew

- Clean all surfaces of unit, to remove any possible food sources.
  - Removal of Grease, Smoke damage, Dirt, Frass (eggs, feces, droppings), old bait.
  - Cleaning of walls, ceilings, floors, appliances, cabinets, shelving, doors, windows, bathroom fixtures, ect.
  - Removal of old/deteriorated caulking (examples: tub, shower, sink, counter tops)

# Make Ready Crew

## ■ Maintenance

### ■ Make any necessary repairs to unit

- Electrical

- Carpentry

- Plumbing

- Repair any leaking faucet/waste lines.

- Repair holes in walls and ceiling, prep walls for painting. (no painting at this time, only prep work)

# Make Ready Crew

## ■ Sealing of unit

- Seal all openings, cracks, and voids where possible.
  - Clear silicone used: inside all cabinets, where cove base/baseboard meets floor.
  - Paintable caulking used: where cabinets meet wall, where cove base/baseboard meets wall.
  - All caulking color should match surrounding surface.

# Make Ready Crew

## ■ Sealing of unit

- Any voids larger than  $\frac{1}{4}$ " , cannot be caulked, additional support is needed, examples:
  - $\frac{1}{4}$  round wood trim
  - Luan board
  - Expandable foam
  - Various types of wood trim
  - Heat tape (range hoods)

# Pest Management Professional

## PMP Responsibility

- PMP checks unit
  - Checks monitors (records findings)
  - Retreat, if necessary
  - Replacing dated monitors
  - Checking unit for proper sealing, and cleaning
  - Contact supervisor that unit is ready to be painted



# Make Ready Paint WO generated Make Ready Crew

- A work order is generated for the unit to be painted by the make ready crew.
  - Make ready crew paints unit.
    - Make ready crew reports to manager's office that unit is completed.



# Make Ready Unit completed

- Housing Management office staff will check the unit.
  - Any deficiencies noted will be completed by make ready crew. (quality control)
  - If monitors are clear for 2 days, unit is declared pest free, and ready for occupancy.
  - If monitors show signs of pest, PMP is contacted and will treat unit if necessary and install new dated monitors, until unit is declared pest free.

