

## Afternoon Agenda

- 1pm: Rodents
- 1:45pm: Bed bugs
- 2:45pm: A tour of Charleston, SC
- 3:30pm: Group discussion / Q&A
- 4pm: Adjourn

## Rodents

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## Outline

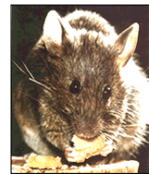
- What rodents are
- What they eat
- Where they live
- How to think like a rodent
- Prevention and control

Also known as...  
ratones y ratas



## Rodents are health hazards

- Carry infectious diseases
- May cause asthma attacks
- Bite
- Damage food and property
- Can attract other pests
- Are repulsive



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### What is a rodent?


A few types of rodents

- ☛ Rats
- ☛ Mice
- ☛ Squirrels
- ☛ Chipmunks
- ☛ Woodchucks

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### What is a rodent?

- ☛ Gnaw to wear down their teeth and get where they want to go (can cut anything softer than steel)
- ☛ Are most active at night
- ☛ Make lots of babies fast
- ☛ Travel the same paths nightly, staying close to walls




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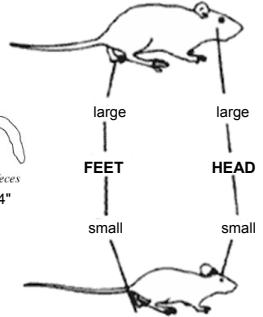
### Rodent identification



Mouse feces  
1/4"



Rat feces  
3/4"



large      large  
FEET      HEAD  
small      small


**Young Rat**

**House Mouse**

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### Rats

- ☛ Will travel 450 feet from their burrow, but prefer to live close to food and water sources
- ☛ Usually live outside and come inside for food and water



Norway rat burrow

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## Rodent identification

- ☛ Roof rats nest up high  
Occur in southern states and along the west coast
- ☛ Norway rats burrow in the ground  
Occur throughout the U.S

ROOF RAT *Rattus rattus*

NORWAY RAT *Rattus norvegicus*

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## Rats

- ☛ Need a hole the size of a quarter to enter
- ☛ Are very smart, cautious, and afraid of new things
- ☛ Need water every day

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## Mice

- ☛ Breed rapidly
  - A single pair can become an infestation quickly!
  - Take action when evidence of ONE mouse is seen or heard
- ☛ Don't travel far—just 30 feet from their nest

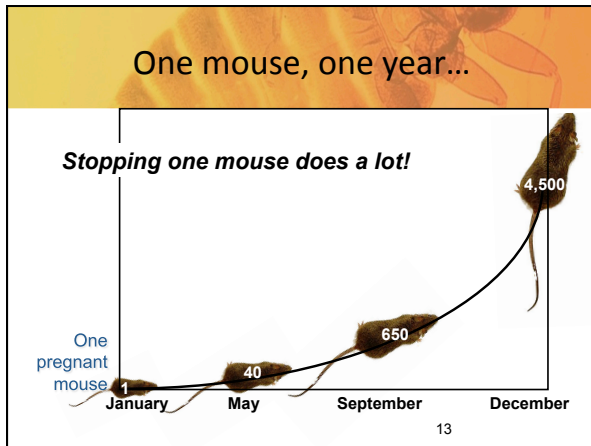
One day old mouse pups

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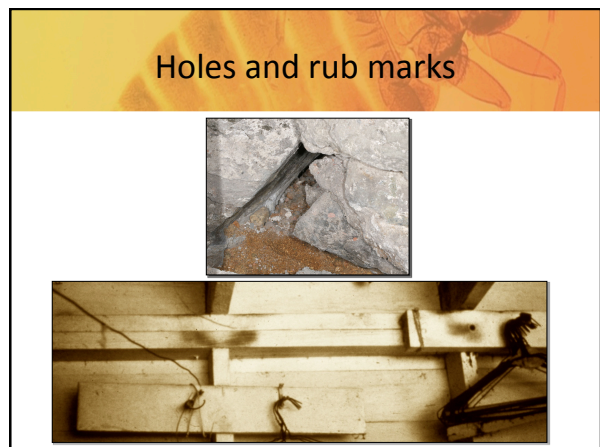
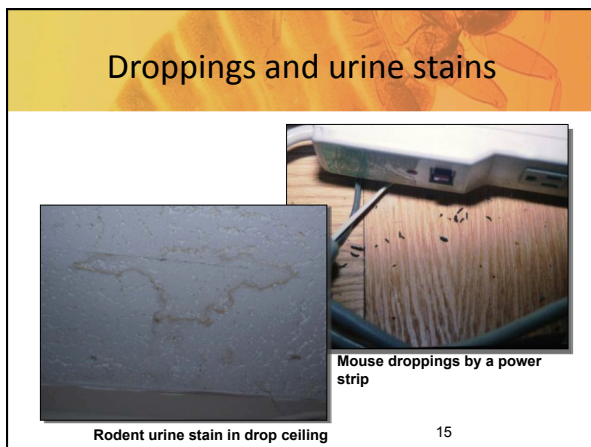
## Mice

- ☛ Mice need a hole the size of a dime to enter
- ☛ Mice are curious
- ☛ Don't need to drink water daily

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- ### Signs of rodents
- Sightings
  - Noise
  - Gnaw marks
  - Nests
  - Rat burrows
  - Droppings
  - Holes and rub marks
  - Indicator pests
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### Indicator Pests

Found near dead animals or trash




Blow Fly




Hide Beetle

Found near grain or bait stored in walls



Indian Meal Moth



Grain Beetle

### What rodents eat and drink

Rodents eat

- ✦ Human and animal food available in the area


Rodents drink

- ✦ Rats drink water
- ✦ Mice can get the water they need from their food


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### Where rodents live

- ✦ Rats: Outside, but will come in if the place is hospitable
- ✦ Mice: Nest in walls, stored fabric, cars, boxes, or the ceiling



Rat burrow by a wall



Mouse nest in a hat

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### Got rodents? Now what?

- ✦ There is not a single answer
- ✦ First find out:
  - Rat or mouse?
  - How many?
  - Where?
- ✦ Then use solutions that provide:
  - Most effective prevention and control
  - Compatibility with people, pets, and other control measures

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### Write in the IPM log

- Find out:
  - Rat or mouse?
  - How many?
  - Where?
- Record:
  - Date
  - Detailed observations
  - Action taken



### Prevention and control: Dumpsters

- Dumpsters should be
  - free of holes
  - covered
  - placed on cement
- Screen drain holes
- Empty dumpsters regularly; they should never overflow



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### Prevention and control: Sanitation

Eliminate harborage, food, and water


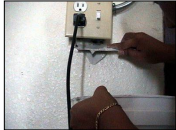



Clutter in a corner

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### Prevention and control: Exclusion

For a hole, crack, or gap...



Stuff it

Seal it

Check it often

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## Prevention and control: Traps

- ✦ Effective and reusable
- ✦ More ARE better
- ✦ Check often
- ✦ **Placement is key**



Trap jumped from the wall when it snapped

## Trap placement is key

Place the trap against the wall where rodents travel.  
(The edge of the trap must touch the wall.)



Trap set correctly so it snaps towards the wall

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## How to trap rodents

Bait with what they're eating or using to nest

### Mice

1. Bait & set many traps
  - 6 traps for each mouse
  - At least 3' apart
  - Set immediately

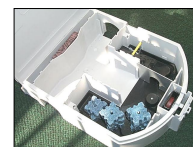
### Rats

1. Place many traps
2. Bait and leave **UNSET** until rats are readily feeding
3. Bait and set all traps

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## Prevention and control: Targeted chemical use

- ✦ The label is the law
- ✦ All rodenticide labels require tamper-resistant stations
- ✦ Read the label on both the station and the bait
- ✦ The bait station should be secured, locked, and labeled
- ✦ If the rodents are inside, consider using traps



An opened bait station


## A review of effective IPM tools

- Sanitation
- Exclusion
- Traps
- Rodenticides

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## How to eliminate a burrow

- Do not use loose rodenticide bait indoors. Rodents may carry the bait and put it where kids can get at it.
- If using loose bait outdoors, prevent rats from kicking out the bait:
  1. Use treated loose seed bait
  2. Open the packets
  3. Use a funnel to pour seeds into the burrow beyond the opening
  4. A week after baiting, burrows that show no sign of fresh activity can be filled in
- DO NOT:
  - Stuff packets into holes
  - Fill in burrows until rats are gone




## Questions?

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## What is a bed bug?

- ✿ A blood-sucking insect
- ✿ Flat
- ✿ Range in size from a sesame seed to a apple seed
- ✿ Light brown to mahogany red depending when they last fed



Adult bed bug feeding on a human



### Why they're back

- ✦ Change in pesticide availability
- ✦ Change in pesticide use patterns
- ✦ More travel/ mobility of people
- ✦ More infested locations
- ✦ Pesticide resistance
- ✦ Lack of preparedness of society in general


### Bed bugs are health hazards

Bed bugs do not transmit disease, but they are a pest of significant public health importance


- ✦ Cause secondary infections after people scratch their bed bug bites
- ✦ Result in stress, loss of work, loss of productivity, loss of sleep, and financial burden
- ✦ Are unwelcome in our homes and workplaces

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### Bed bug life cycle



Fed



Unfed

### Bed bug behavior



- ✦ Most active at night
- ✦ Hide in cracks and crevices, often in groups
- ✦ Cannot fly, jump, or burrow into skin... they crawl
- ✦ Hitchhike on coats, bags, furniture, wheelchairs...



Bed bug crawling into a screw hole to hide


### What bed bugs eat and drink

Blood




### Can be confused with...


- Ticks
- Cockroach nymphs
- Other kinds of bug bites
- Allergic reactions to chemicals




Tick




Mosquito Bites



Cockroach Nymph



Bat Bug



Spider Beetle

### Signs of bed bugs

- Bites
- Fecal spots
- Shed skins
- Dead bed bugs
- Live bed bugs




### Bites

- Bed bugs cannot be confirmed by bites alone—bites do not show up on everyone
- Live bed bugs must be found



### Fecal spots

- ✦ Fecal spots are bed bug droppings
- ✦ Different from frass—frass is gritty, fecal spots are smooth.
- ✦ A current bed bug infestation cannot be confirmed by fecal spots alone
- ✦ Live bed bugs must be found




A bad infestation

### Shed skins

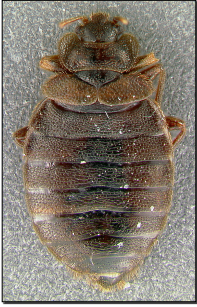


Bed bug signs on a mattress seam

### Dead bed bugs



Bottom



Top

### Where bed bugs live

- ✦ In the building
- ✦ In any crack or crevice where a credit card edge could fit
- ✦ In anything near where people rest



Mattress piping

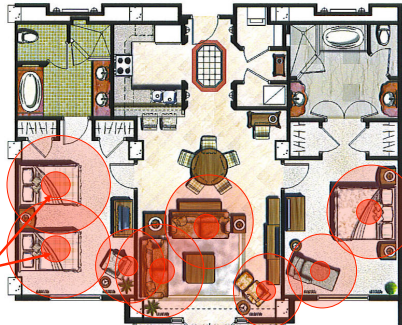


Switch plates

### Where bed bugs live

Beds, sofas, bedside tables, recliners, picture frames...

● = Hot Spot



### How does an infestation begin?



### Areas at-risk for introduction and infestation

- Introduction is likely where people
  - frequently travel
  - set down personal belongings
  - sit or lay down for long periods of time
- Infestation is likely where bed bugs can
  - Crawl (upholstered furniture or bedding)
  - Feed on a person for 5 minutes without being detected
  - Hide in cracks or folds

### Encourage a community response

- Educate everyone
- Destroy discarded items
- PHA should take the financial burden off of residents by providing
  - mattress encasements
  - monitors
  - large bags for furniture removal

### Prevent introduction and spread: residents

- Keep coats, backpacks, purses, and bags off beds, recliners, and sofas at home and while out
- Inspect used furniture carefully before bringing it home—avoid it if possible
- Look for signs when sleeping away from home

### Advice for staff, health aides, and contractors

- In units:
  - Avoid sitting or placing items on potentially infested surfaces
  - Wear a protective layer when moving infested items
- In the main office/community areas:
  - Replace fabric-covered furniture that has many crevices with plastic or metal items
  - Have residents set their belongings in plastic totes during meetings

### What are you doing to prevent introductions?



### Prepare before you have to

- Once bed bugs are present, you don't want to disturb the area
- Ideally, residents routinely
  - inspect with a flashlight
  - launder bedding
  - vacuum
  - maintain their unit according to housekeeping standards

## IPM in action: bed bugs

- Someone reports bed bugs and the response (IPM) plan is initiated
  - Inspect
  - Identify
  - Plan treatment scaled to level of infestation
  - Take action
  - Evaluate effectiveness

## IPM in action: bed bugs

1. Inspect and interview
  - Find out where people sleep
  - Find out where people put the things that come in/out of the unit
  - Note financial, physical, or cognitive limitations that could influence treatment
  - Use a flashlight and look around sleeping areas and areas where introduction is likely

## Inspection

- Always use a flashlight
- If bed bugs are found, inspect all adjacent units
- Two types
  - Visual
  - Scent detecting canine

## Monitoring

- Trap and kill bed bugs
- Determine how bad the infestation is
- Two types
  - Passive
  - Active



Passive, moat-style interceptor

## IPM in action: bed bugs

### 2. Empower the resident

- Encourage patience and cooperation
- Ask them to NOT: fog/bomb, use their own pesticides, throw away items, change too much until a professional arrives to inspect and treat
- Give them control options: vacuum with a pantyhose, clothes dryer for 30 minutes on high heat, encasement and interceptors, isolate belongings in plastic totes/bags
- Give them an idea of the treatment timeline

## IPM in action: bed bugs

### 3. Rally the troops

- Pest management professional (PMP): inspects, vacuums, installs encasements, installs monitors, steams, treats if necessary, schedules a follow-up 10-14 days later
- Resident: prepares for the PMP according to provided instructions **\*\*minimize burden and disruption of bugs and residents' lives\*\***
- Staff member: "knock & talk": meet with the resident and makes sure preparation instructions are understood, get resident support/supplies if needed, check in on progress before the PMP comes to treat.

## Treatment options

- |              |                             |
|--------------|-----------------------------|
| • Pesticides | • Freezing                  |
| • Spray      | • Liquid CO <sub>2</sub>    |
| • Dust       | • Chest freezer             |
| • Fumigation | • Vacuuming                 |
| • Heat       | • Isolation                 |
| • Dryer      | • Encasements               |
| • Steam      | • Clear bags                |
| • Container  | • Closed plastic containers |
| • Whole unit | • Make the bed an island    |

## IPM in action: bed bugs

### 4. Focus until "no bugs, no bites"

- PMP: follow-up visit 10-14 days after treatment, and routinely until infestation is gone
- Resident: continues to cooperate and prevents reintroduction
- Staff: supports resident and checks in on progress

## IPM in action: bed bugs

5. Return back to routine inspection and monitoring—find introductions before they become infestations

## Questions?

In-house options (minimum training)	Leave it to the experts
• Encasement	• Canine inspection
• Monitoring	• Whole-unit heat treatment
• Quick (15 min) visual inspection	• Pesticide application
• Steam	• Thorough inspection
• Clothes Dryer	• Active Monitoring
• Vacuum	
• Heat chamber (FL model)	
• Diatomaceous Earth (APPLICATOR'S LICENSE)	
• Resident training/support	

**STOP Pests in housing**

Request Training Pest Solutions Search

HOME - PEST SOLUTIONS - Bed Bugs

### Bed Bugs

**HOW DO YOU GET RID OF BED BUGS?**  
Bed bugs hitchhike on people's belongings and hide in crevices near where they rest. To prevent an infestation of bed bugs, you need to keep them from coming into your home and detect new infestations early. Basically, no silver bullet exists. Pest control has changed and we are still working on the best solutions for bed bug management. Rely on the pest management professional (PMP) for all pesticide use. Focus on preventing introduction and detecting them early. Educate residents and staff about how to prevent bed bugs from hitchhiking on their belongings. Make sure procedures are in place for prompt and proper furniture removal from the property. Install mattress- and box-spring encasements and bed bug interceptors. Offer products and services for free to incentivize cooperation. Teach residents and staff to inspect often. If a unit is being treated for bed bugs, have a staff person check on the preparation progress before the pest management professional arrives.

**Adult, nymphs and blood spots on wood.** (Photo by Gary Abbott, Env. Health & Safety, Harvard U.)

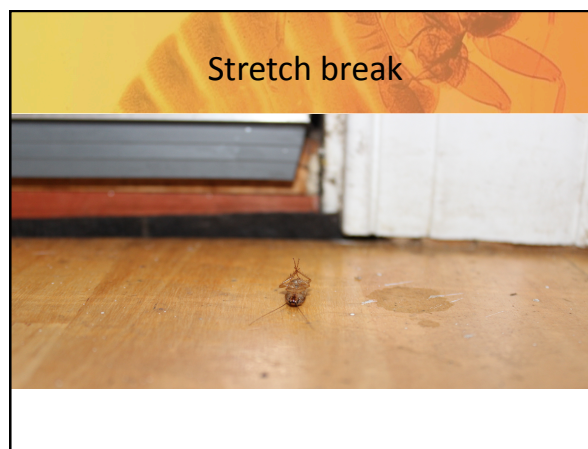
**Bed bug nymph feeding.** (Photo by Gary Abbott, Env. Health & Safety, Harvard U.)

**What they look like**  
Adults look like apple seeds with legs. Young bed bugs—nymphs—look like adults, only smaller. Newly hatched nymphs are poppy seed-sized. Eggs are tiny, white, and hard to spot.

**Where they live**  
In cracks and crevices of bed frames, floors, walls, furniture, electronics, mattresses—any spot they can wedge themselves near where people rest.

Want to use something you see? Go ahead. We're honored. So we can tell our funders how we shared these materials, please e-mail us what you want to use and how you will use it, then read and heed our guidelines.

Connect with StopPests!





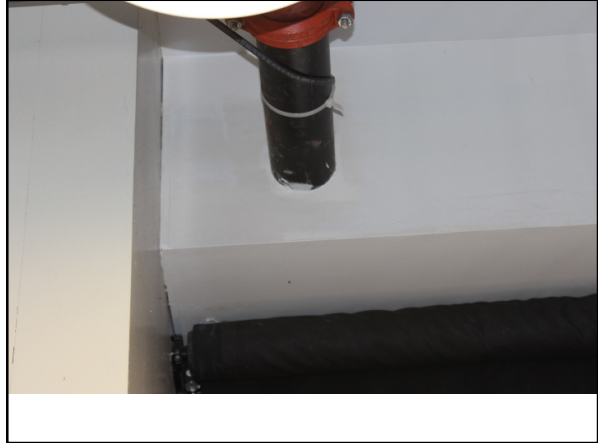


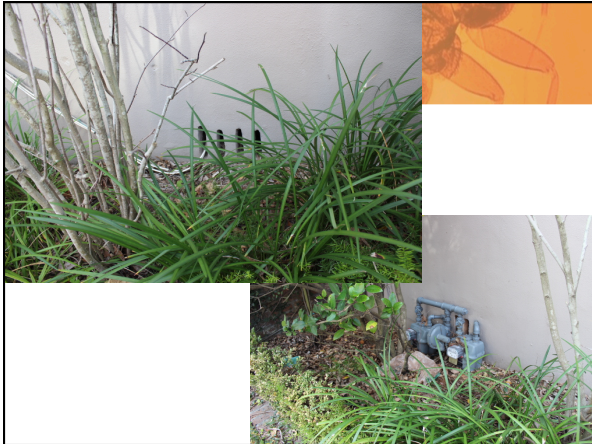
A Tour of Charleston, SC

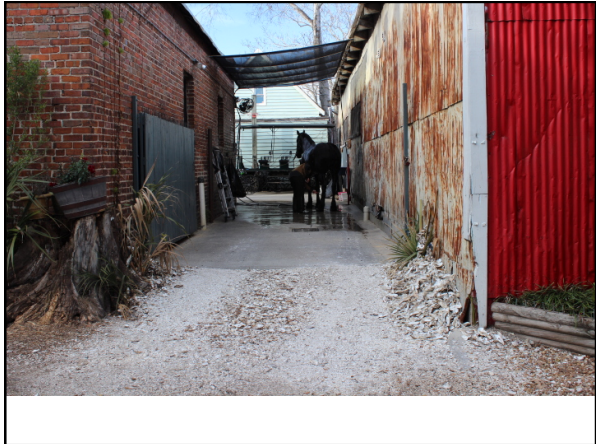
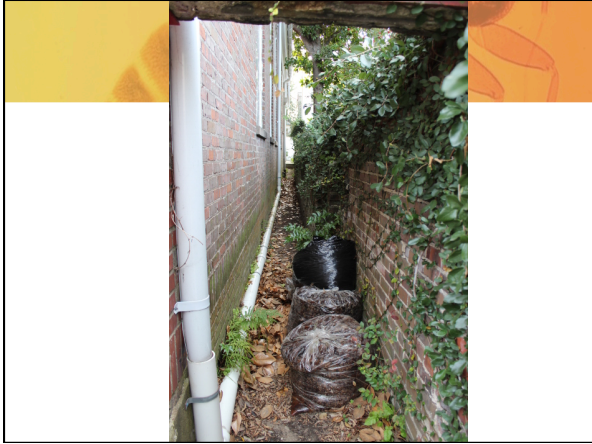
Allie Taisey, BCE  
IPM-Crazy Tourist



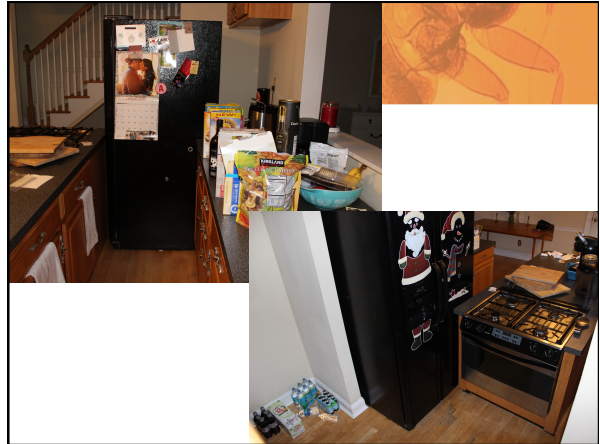












### Challenges you will face

- Raising standards for pest control
- Procuring IPM services
- Training staff
- Training residents
- Investing time and resources to preventative measures
- Documentation

## Your next steps

1. Convert the PHA to IPM—AMP by AMP, beginning with an IPM pilot site
2. Inspect and monitor every unit to identify focus areas
3. Train site IPM team members using resources from [www.stoppests.org](http://www.stoppests.org)

## Your next steps continued

4. Reduce pest infestation—Allocate pest control time and resources to solve pest problems in focus areas using the steps of IPM
5. Reduce the risk of pest infestation—turn units over so that they are pest-free and sealed up, continue to educate staff and residents
6. Aim for early detection and rapid response—continue to monitor and inspect

*"We do IPM because it is the right thing to do and because it works. Allowing our residents to live in a pest-free home is a basic service as well as a huge quality of life issue."*

—Gail Livingston

Director of Operations and Property Management  
Boston Housing Authority

## IPM resources

### Websites

- The Northeastern IPM Center's IPM in Multifamily Housing website and blog: [www.stoppests.org](http://www.stoppests.org)
- The National Center for Healthy Housing: [www.nchh.org](http://www.nchh.org)
- The National Pesticide Information Center: <http://npic.orst.edu/>
- Boston's Healthy Pest Free Housing Initiative: <http://www.bphc.org/hpghi/AboutUs/Pages/home.aspx>
- HUD's Office of Healthy Homes and Lead Hazard Control

### People

- Allison Taisey: [aat25@cornell.edu](mailto:aat25@cornell.edu) or 607-220-6417
- Local Cooperative Extension Office: <http://www.nifa.usda.gov/Extension/>





### HUD's IPM guidances

- PIH 2011-22: Promotion of Integrated Pest Management (IPM)
- Notice H 2011-20/PIH 2012-17: Guidelines on Bed Bug Control

### Get StopPests to your PHA:

1. E-mail [StopPests@cornell.edu](mailto:StopPests@cornell.edu)
2. Name a pilot site and IPM coordinator
3. Work with StopPests on realistic goals
4. Meet minimum requirements
5. Hold an on-site IPM in Multifamily Housing Training
6. Continue to work with StopPests

