


Bed Bugs and Beyond  
*Managing pests in public housing*

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You are a cockroach.

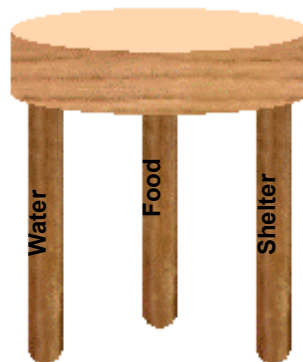


 University of Nebraska  
Department of Entomology



## What all pests need

- Food
- Water
- Shelter



Every infestation starts with an introduction



Pest management in multifamily housing must include managing introductions.



Find pests that get in before an infestation grows.





Get rid of pests using more than one control method

Methods must be economical and pose the least possible risk to people, property, and the environment





## Is your pest management working?

3/29/12

Apt 30: 3 roaches on one monitor in the living room. Baited living room & changed monitors. Asked resident to have kids eat in the kitchen, not on the couch. Will return in 2 weeks. Good housekeeping. No maintenance work needed.



## Integrated Pest Management (IPM)

1. Prevent pests from getting in.
2. Find introduced pests before they infest.
3. Scale the response to the level of infestation.  
Use multiple control methods that are economical and pose the least possible risk to people, property, and the environment.
4. Monitor control efforts until all signs of pests are gone.
5. Inspect routinely to catch new introductions.

## IPM is a team approach

### Job

1. Preventing pests
2. Finding introductions
3. Taking control
4. Monitoring success

### Responsibility



## IPM is not...

- Using only bait
- Applying more than one kind of pesticide
- A certain set of pesticides
- Using spices and herbs
- A service that can be contracted out



IPM is...



## How to know if you are getting IPM service

- Focus on prevention and monitoring
- Technicians focus on the source of the problem
- Methods such as exclusion, vacuuming & trapping are commonplace
- “Sprays” or “fogs” aren’t commonplace
- Time spent relative to the infestation
- Least risk products and application methods used

## Are you using IPM?

- Service reports are unit-specific and include recommendations for residents and maintenance staff—your PMP is a consultant
- Documentation shows evidence of monitoring in every area
- Documentation reports kind and level of infestation before any pesticide application
- "Treatment" includes non-chemical methods
- Infestation is focused on until solved
- Trends identified property-wide
- New introductions are prevented through education and behavior change
- New introductions are caught and responded to through inspection and monitoring
- Education for staff: orientation, staff meetings, trainings
- Education for residents: inspection within 90 days of move-in, lease re-sign, class for housekeeping inspection failure, one-on-one support from staff and outside agencies

## How to start

- Hire a qualified pest management firm or get staff licensed
- Pick a pilot site
  - ~100 units
  - Enthusiastic and willing property manager
  - Active tenant council
- Incorporate pest-specific codes into your work order system
- Train site IPM team members using resources from [www.stoppests.org](http://www.stoppests.org)



A property manager inspecting building exteriors for holes

## Identify focus areas

- Monitor and inspect
- Identify focus areas
- Look through service records and work orders for trends

## Solve problems

- Allocate time and resources to focus areas
- Use renovation as an opportunity
  - Eliminate pests
  - Reduce the risk of pest infestation
    - Seal up holes and crevices where pests hide
    - Educate the incoming tenant
- Track data from work orders and PMP service reports to identify trends and track efficacy



Monitor under a well-sealed sink

## Focus units & housekeeping

- Require housekeeping classes that focus on taking food, water, and shelter away from pests
- Case management
- Reach out
  - Family members
  - Faith-based organizations
  - Local support agencies
- Motivate with lease enforcement

## Focus units & the PMP

- Vacuum to achieve initial knock-down and remove pests and evidence
- Visit every room
- Spend time in focus units
- Communicate with the resident
- Leave detailed recommendations on the service report

## Focus units & maintenance

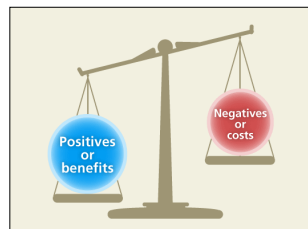
- "Exclusion" or "pest-proofing"
- Door sweeps
- Screens
- Seal around plumbing/electrical wall penetrations
- Seal cracks and crevices in kitchens and bathrooms
- Follow PMP's recommendations

## Maintain and expand pest-free housing

- Inspect new residents' homes within 90 days of move-in
- Ensure the PMP gets access to units
- Teach everyone to prevent, inspect, and monitor so introductions never turn into infestations
- Expand program to other sites

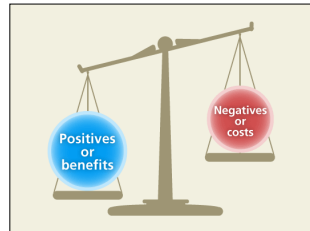
## Program costs

- An IPM budget includes
  - Materials for caulking and sealing holes
  - Free items for residents in need: cleaning supplies, mattress encasements, monitors, etc.
  - An IPM contract, including inspection and monitoring



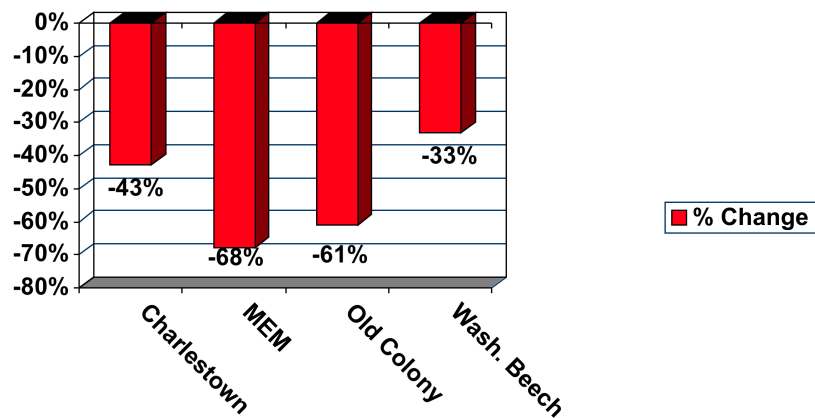
## Expected program outcomes

- Increased cooperation and communication
- Decreased pesticide applications
- Infestations limited to periodic introductions—no high-level infestations
- Increased partnership with outside agencies



## Boston's success

Percent Change in Total Pest Work Orders



## What we've learned in public housing

- Executive management must be supportive
- Start your IPM program at a pilot site
  - Licensed pesticide applicator
  - Enthusiastic property manager
  - Staff time and funding
  - Small enough to cover the entire building/AMP

## What we've learned

- Educate staff, residents, home health aides, and community partners—give everyone the basics and have each person commit to doing their part
- Have a continuity plan for staff and resident turnover

## What all long talks need

- A 15 minute break




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## Integrated Pest Management (IPM)

1. Inspect and monitor
2. Identify
3. Determine the scale of response
4. Respond
  - Non-chemical control
  - Changing people's behavior
  - Chemical control
  - Biological control
5. Evaluate effectiveness



# Cannot ignore the issue




**Governor Chris Christie**  
NJ Home | Services A to Z | Search [All of it](#)

STATE OF NEW JERSEY  
**DEPARTMENT OF ENVIRONMENTAL PROTECTION**  
DEP Home | About DEP | Index by Topic

**news releases**  
FOR IMMEDIATE RELEASE  
January 31, 2011

Contact: Lawrence Lawrie



### The Bedbug Registry

look up + report alerts city maps resources about faq blog

The Bed Bug Registry is a free, public database of user-submitted bed bug reports from across the United States and Canada. Founded in 2006, the site has collected about 20,000 reports covering 12,000 locations.

You can find us on Twitter as [@bedbugregistry](#).

**New! Report bedbugs on cruise ships. Search coming soon.**

**Check For / Report Bugs:**

Hotel name:

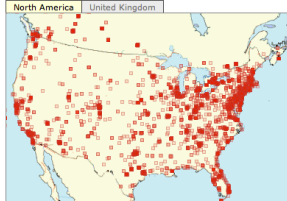
City and state:

Street Address:

City and State:

Check Address:

North America United Kingdom



click on any region to see an interactive map of infestations

Like 31,031 people like this. Be the first of your friends.

**DEP ISSUES MAJOR PENALTY AND SEEKS LICENSE REVOCATION OF NEWARK FIRM FOR IMPROPER BEDBUG SPRAYING**

**(11/P13) TRENTON** - An \$860,000 penalty was imposed today by the Department of Environmental Protection on TVF Pest Control of Newark for misapplication of hazardous pesticides in residences to control bedbugs, Commissioner Bob Martin announced.

The DEP is seeking permanent revocation of TVF's pesticide business license and revocation of individual applicator licenses for the company's responsible pesticide applicator Javier Godoy and company owner Josimar Ferreira. The DEP also has charged TVF \$10,625 for the cost of DEP chemical sampling in this matter, and levied a \$10,000 penalty against TVF corporate officer Marta Braga for an applicator licensing violation.



# Should not ignore the issue

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**The New York Times**  
Sunday, January 8, 2012

**N.Y. / Region**

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**FOR THE WELL-CONNECTED FASHIONISTA**

**City Room**

May 17, 2011, 5:56 PM

**Cockroaches May Help Explain Asthma Outbreaks**  
By ANEMONA HARTOOLIS

Sometimes, Kafkaesque reactions of dread and disgust toward creatures like cockroaches are scientifically justified.

At least that is one possible spin on a new study by [Columbia University's Mailman School of Public Health](#) that finds that higher exposure to cockroach dust may explain why some New York City children have [asthma](#) while others, who grow up just blocks away, do not.

The researchers collected dust — containing cockroach, mouse and cat allergens — from the upper half of the

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**Genetics Explain How Bedbugs Infest a Building--or a Country**

New genetic profiles of bedbugs help to explain how they have spread, and how inbreeding has helped them flourish

By Katherine Harmon | December 7, 2011

Share | Email | Print

PHILADELPHIA—When you have [bedbugs](#) (*Cimex lectularius*), less interesting is the question of how they got there than the conundrum of how best to get them out. Ridding homes and businesses of [these pests](#) has become a multimillion dollar industry in many cities in the U.S. and throughout the world.




## Making homes healthy

- IPM is part of a nationwide Healthy Homes movement to reduce housing-based health hazards
- A healthy home is:
  - Dry
  - Clean
  - Ventilated
  - Safe
  - Contaminant-free
  - Maintained
  - **Pest-free**

The Surgeon General's Call to  
Action To Promote Healthy Homes

2009



U.S. Department of Health and Human Services

## Priority pests

- Cockroaches cause asthma in infants, trigger asthma attacks, and contaminate food
- Rodents such as mice and rats carry diseases, bite, destroy property, may cause fires, and may trigger asthma attacks
- Bed Bugs and their bites are a nuisance and are expensive to eliminate



## Other public health pests

- Mosquitoes transmit West Nile Virus
  - Need standing water
- Ticks transmit Lyme Disease
  - Get on people from bushes and rodents
- Fleas cause itchy welts
  - Come into buildings on pets and wild animals
- Bird and rodent mites make us itch
  - May move into a unit when the wild host moves out
- Lice make us itch
  - Spread on used or shared items and via person-to-person contact
- Dust mites cause asthma
  - Flourish with high humidity and poor sanitation

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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

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## 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

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## 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

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## 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

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## What bed bugs eat and drink

Blood



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## 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

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## Signs of bed bugs

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



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## Bites

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



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## Fecal spots

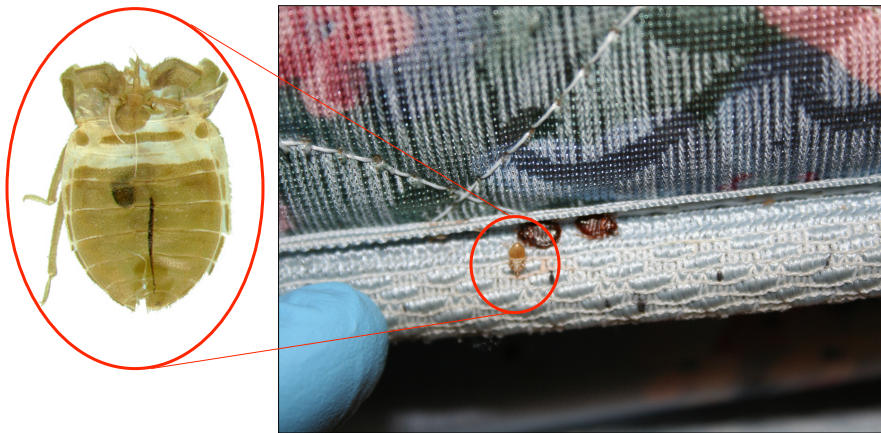
- Fecal spots are bed bug droppings
- Different from frass—frass is gritty, fecal spots are smooth.
- A current bed bug infestation cannot be confirmed by fecal spots alone
- Live bed bugs must be found



A bad infestation

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## Shed skins



Bed bug signs on a mattress seam

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## Dead bed bugs



Bottom



Top

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## 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



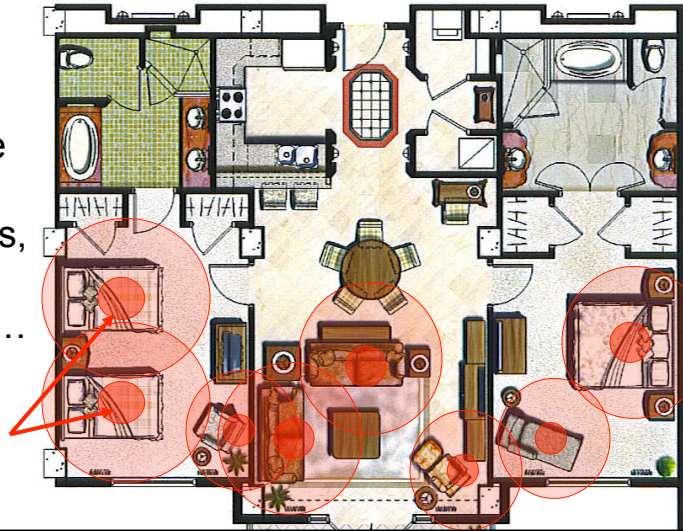
Switch plates

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## 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

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## 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

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## 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

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## 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

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## 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

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## Monitoring

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



Passive, moat-style interceptor

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## 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
  - Spray
  - Dust
  - Fumigation
- Heat
  - Dryer
  - Steam
  - Container
  - Whole unit
- Freezing
  - Liquid CO<sub>2</sub>
  - Chest freezer
- Vacuuming
- Isolation
  - Encasements
  - Clear bags
  - Closed plastic containers
  - 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

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

## Questions?

### **In-house options (minimum training)**

- ☛ Encasement
- ☛ Monitoring
- ☛ Quick (15 min) visual inspection
- ☛ Steam
- ☛ Clothes Dryer
- ☛ Vacuum
- ☛ Heat chamber (FL model)
- ☛ Diatomaceous Earth  
(APPLICATOR'S LICENSE)
- ☛ Resident training/support

### **Leave it to the experts**

- ☛ Canine inspection
- ☛ Whole-unit heat treatment
- ☛ Pesticide application
- ☛ Thorough inspection
- ☛ Active Monitoring

## A review of what you should do

- Educate everyone about what they can do to prevent bed bugs
- Prepare before bed bugs are reported by minimizing clutter and installing encasements and monitors
- Respond rapidly with a professional before the infestation grows and spreads

## Get it?

What's "integrated" about IPM?

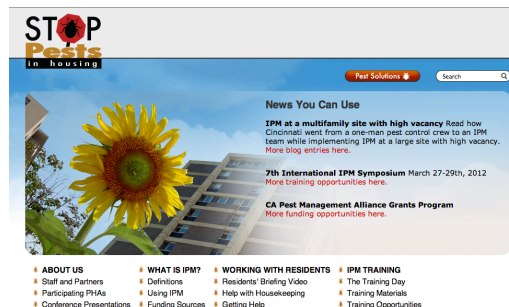
1. combining or coordinating separate elements so as to provide a harmonious, interrelated whole
  2. organized or structured so that constituent units function cooperatively" (dictionary.com)
- Every person who lives, works, and plays on-site has a role in pest management
  - Treatment never relies on one approach: integrate chemical and non-chemical options
  - Preventative measures and non-chemical treatments work on multiple pests.

## How IPM is different from conventional

- 🐜 Proactive vs. reactive
- 🐜 Routine pesticide application is not IPM
- 🐜 Inspection and monitoring in every unit and building area
- 🐜 Identification of pest before treatment
- 🐜 A team approach
  - Educated and aware site staff, residents, pest management professionals, and other stakeholders
  - Responsibilities divided among the team members

## IPM for your properties

- 🐜 PIH 2011-22: Promotion of Integrated Pest Management (IPM)
- 🐜 Notice H 2011-20/PIH 2012-17: Guidelines on Bed Bug Control
- 🐜 [www.stoppests.org](http://www.stoppests.org)



## 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. Train site IPM team members using resources from [www.stoppests.org](http://www.stoppests.org)
3. Inspect and monitor every unit to identify focus areas

## 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

## 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/hpfi/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/>



Questions?



Good Luck! ■ ■

The end.



Thank you for having me!