This material is based upon work that is supported by an interagency agreement between The US Dept. of of Housing and Urban Development’s Office of Healthy Homes and Lead Hazard Control and The National Institute of Food and Agriculture, U.S. Department of Agriculture. The materials contained herein present a research-based, balanced, and objective approach to pest management in affordable housing. Products, vendors, or commercial services mentioned or pictured in the trainings or presentations are for illustrative purposes only and are not meant to be endorsements.
What’s IPM?

- Inspect & Monitor
- Identify
- Use Multiple Tools
- Scale the Response
- Evaluate Success

Why Bedbugs Are Back

- More travel/mobility of people
- Lack of preparedness of society in general
- Resistance is well-documented and widespread to DDT and pyrethroid insecticides
- **Pyrethroids remain a primary control tool for bed bugs**
How Do We Fight Bed Bugs?

- Bed bugs do not transmit disease under normal living conditions.
- Stress, loss of work, loss of productivity, loss of sleep, and financial burden
- Cause secondary infections after people scratch their bed bug bites

What Bed Bugs Eat and Drink

Blood
Where Bed Bugs Live

- Only inside homes and buildings
- In any crack or crevice where a credit card edge could fit
- On any item near where people rest

Mattress piping
Stuffed animals
Switch plates
Couch cushion zippers

A Little Biology

- Female bed bugs
  - Lay ~200 eggs in a lifetime
  - 1-5 eggs per day
- From egg to adult
  - 5 weeks to 4 months
- Molt 5 times
  - Feed before each molt
Bed Bug Life Cycle

Fed

Not recently fed

The Feeding Process

Start 3 mins 9 mins 12 mins

Photo: Whitney Cranshaw
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...

Signs of Bedbugs: Bites

- Prefer feeding during darkness
- Bites often painless
- Infestations cannot be confirmed by bites alone
  - Live bed bugs must be found
**Signs of Bedbugs: Fecal Spots**

- Bed bug droppings
- Different from cockroach frass
- A current bed bug infestation cannot be confirmed by fecal spots alone.
- Live bed bugs must be found

*A bad infestation*

**Signs of Bedbugs: Shed Skins**

*Bed bug signs on a mattress seam*
Signs of Bedbugs: Dead Bed Bugs

How Do Bed Bugs Spread?

- **Actively** crawl along wires, pipes, and under doors
- **Passively** on anything coming from an infested unit
Areas At Risk

**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 min without detection
- Hide in cracks or folds

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Personal Protection

**In Units**
- Apply repellent
- Avoid potentially infested surfaces
- Wear PPE when moving infested items
- Inspect after leaving

**Main Office/Community Areas**
- Avoid fabric-covered furniture
- Have residents set belongings in plastic totes
- Vacuum office regularly
- Use monitors
Integrated Pest Management For Bed Bugs

Pesticides
Mechanical controls (encasements, barriers, vacuum)
Physical controls (heat, cold)
Pest proofing / Sanitation
Education and Awareness

What’s Working...

1. Develop a Proactive Program
2. Non-Chemical Tools
3. Find a Good Contractor and Provide Oversight
4. Assemble and Train Your Team
1. Develop a Proactive Program

Many don’t report because:
- They are afraid they will be charged $ or evicted
- Embarrassed to complain
- Unaware of the signs
- May not react to bites

A recent Rutgers study found managers unaware of almost 70% of infestations

Use monitors and proactive inspection

Early Detection is Key

- Early infestations of bed bugs are usually close to the bed and typically take 2-3 treatments.
- Advanced infestations spread further, cost more to control.
- 5 or more chemical treatments?

Early infestation

Advanced infestation

44% on bed and sofa

70% on Bed and sofa

23% within 5 ft

56% other harborages

7% Other harborages

Picture: BASF Corporation
Inspection Schedule

- Buildings with a history of BB - quarterly
- Buildings with no history of BB – at least yearly
- Homes or buildings with current bed bug infestation – every 2 weeks

Inspection

- Two types
  - Visual – always use a flashlight!
  - Scent detecting canine
Quick Visual Inspections in All Apartments

- Staff can inspect beds and sofas, focus on signs which are easy to detect
- Faster than detailed inspections
- Suspicious but no live bed bugs found? Leave interceptor traps

Canine Inspections

- Relatively fast, can detect low-level infestations
- Quality of inspection varies greatly
- Subject to false positives
- Can be expensive
Proactive: Monitors in Action

Active monitor, includes lure (SenSci Activ Volcano)

Interceptors plus visual inspection can detect up to 95% of infestations

Passive, moat-style interceptor (ClimbUp)

If Bed Bugs Are Found ...

- Inspect and place monitors
  - All adjacent units
  - Across the hall
  - Diagonal units
- No routine treatment without signs of bed bugs
2. Non-Chemical Tools (Know Your Treatment Options)

- Vacuuming
- Isolation
  - Encasements
  - Clear bags
  - Closed plastic containers
  - Make the bed an island
- Freezing *not as reliable as heat
- Heat
  - Clothes dryer
  - Steam
  - Container
  - Whole unit

Why Vacuum?
**Mattress Encasements**

- Vacuum
- Cover any sharp points
- Cover mattresses and box springs
- Ensure a snug fit
- Leave it on for 1 year
- Can eliminate the need to treat mattresses

**Heat**

- Whole unit
- Portable chambers
- Steam
- Clothes dryers

Building staff at a property in Pennsylvania test out their new ZappBug portable heat chamber.
Steam

- Provides immediate kill of all life stages
- Penetrates into cracks and 1-2 cm into fabric, up to 6 cm in cracks
- No pesticide residue

3. Find a Good Contractor and Provide Oversight

**Property Manager**
- Oversee PMP contractor
- Keep records of progress and pest population reduction

**PMP**
- Decide which units need attention
- Confirm elimination
- Report monitoring results
The Role of The Professional

- Inspect the reporting unit
  - Adjacent areas
- Provide site-specific preparation guidelines
- Follows the pesticide label
- Re-inspect *every two weeks* and treat if bed bugs are found
- Follows-up until bed bugs are not found for two consecutive visits

Consider: Resident Capabilities and Preparation Options

**Minimal Prep**

- PMP gives all instructions
- Avoid moving bed bugs
- Best option for low and moderate infestations
- PMP guides customers on how to handle clothing, curtains, etc. after inspection
- Unable/unwilling?
Chemical Tools
(Know Your Treatment Options)

- Vacuuming
- Isolation
  - Encasements
  - Clear bags
  - Closed plastic containers
  - Make the bed an island
- Freezing* not as reliable as heat

Heat
- Clothes dryer
- Steam
- Container
- Whole unit

Pesticides

Pesticides should be applied only by a licensed PMP*
- The label is the law
- EPA does not assess effectiveness, only risk/benefit when used in accordance with the label
Only PMPs Use Sprays

- Not effective when used by residents for bed bug control
- Over-the-counter-sprays and foggers cause the bugs to scatter so the problem becomes harder to deal with

Chemical Treatments

- **Sprays**
  - Most work only on contact
  - Limited residual
  - Combination products are most effective
    - (neonicotinoids + pyrethroids)
- **Dusts**
  - Preventative
  - Effective when kept dry

*Must be Rotated*
New Product: Aprehend

Treatment Costs

- Vary by infestation level, clutter level, and treatment strategy.

- **Pesticide Treatment:**
  - ~$350-$1000 per unit
  - 3 treatments typical, at 2-week intervals

- **Whole Unit Heat:** ~$800-$1500 per unit
Mix It Up

- Heat
- Pesticide-based
- Vacuum and encasements for all treatments

Keeping Records

- Which units need to be serviced?
- Who decides?
- Do new techs know which units to focus?

FOCUS UNIT TRACKING LOG

<table>
<thead>
<tr>
<th>Date</th>
<th>Unit / Location</th>
<th>Name of Staff Member / Technician</th>
<th>Pest Level</th>
<th>Repairs Needed</th>
<th>Recent or Current Focus Unit?</th>
<th>Housekeeping / Lease Compliance</th>
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Note any pests and circle the level of infestation. Involve your PM.

Type of Pest:
- Light
- Moderate
- Heavy

G F P

Action taken (e.g., met with tenant, sent violation notice)
Service Tickets

Can tell you a lot!

Technicians visited 61 units from 9:00am to 2:30pm. 
330 minutes 61 = 5.4 minutes (3 minutes per unit)

Records Must Be Reviewd

Unit 808 -

Initial Treatment: February 23, 2015
Retreats:
- March 9, 2015
- March 24, 2015
- April 10, 2015
- April 24, 2015
- May 8, 2015
- May 21, 2015
- June 5, 2015
- June 29, 2015
- July 13, 2015
- July 27, 2015 – next scheduled treatment
Unit 808: Treated 11 Times

- Still being chemically treated.
  - What could be going wrong?
  - More sense to spend $1500 on a heat treatment?

Contractor Oversight

- What are you getting for your money?
- Get **proof of pest reduction**
  - Monitors will tell you
- Resident’s lack of sanitation is not an excuse for bad pest control
What’s In Your Contract?

**Apartment Treatments:** The technician uses three different chemicals in the unit. They are as follows:

- **Delta Dust:** EPA #432772; .05% - The wall outlets are removed by the technician and one puff of this fine dust is in the wall. It spreads throughout the entire wall void reaching cracks and crevices.

- **Residual Liquid:** Suspend SC EPA #432763; .06% - This is sprayed on carpet and baseboards. It leaves a residual to help keep killing between treatments. Also used on the bed rails and frames.

- **Pyrocide 100:** EPA #10211424; 1.0% - This is a fumigant that is used throughout the entire unit. It is sprayed on furniture, inside drawers, closets, corners, etc. Once the unit is sprayed no one is allowed in the unit for four hours. After four hours the fumigant has dissipated and the tenant may return to their unit.

**Monitoring:** Each apartment in the facility has been given a monitoring device that is placed between the mattress and box springs. Our pest control technician also sprays for roaches each month and during the roach spraying these monitors are visually checked for bed bug activity.

What Should Be In the Contract?
Proactive Inspection Schedule
(don’t rely on reports of pests)

Use of Monitors
What Should Be In the Contract?

- Number of technicians
- How often treatments occur
- Record keeping requirement and periodic review of records
- How elimination is confirmed
- Any guarantee that there will be pest reduction post-treatment
- Multiple tools used

Bed Bug Central’s Model RFP

http://www.bedbugcentral.com/sites/default/files/RFP%207.9.18.pdf
4. Assemble & Train the IPM Team

- Property Manager
- Janitorial/Custodial Services
- Landscaping Services
- Maintenance Crew
- Pest Management Professional
- Resident Support Services
- Procurement Specialist
- IPM Coordinator
- Resident

Keep Talking With Tenants

- Provide Classes & Keep it Simple
  - DO: Inspect, report, launder bedding regularly, and vacuum
  - DON’T: Throw out furniture or bring in discarded furniture
- Posters and brochures:
  - Help ID and encourage reporting
- One-on-one intervention:
  - When needed

New York State IPM Program created picture-based, step-by-step bed bug management instructions in English and Spanish for residents.
www.nysipm.cornell.edu
Keep Talking With Staff

What role can staff play?

- Review your work order system and how you flag units for follow-up
  - Does it work?
  - Is it complaint-based or inspection-based?

Keep Talking With Contractor

- Review your contract
  - Know what’s in it
- Outline the service you want in your next RFP
- Keep/review service tickets and records
  - Direct time & resources to heaviest infestations
  - Evaluate success or failure to eliminate pests

Hold Your Contractor Accountable