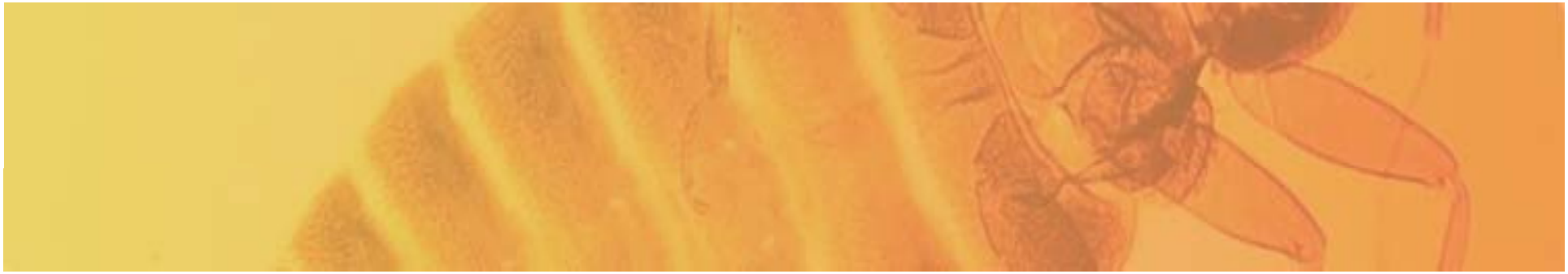


What's Working for Bed Bug Control in Multi-Family Housing

Allison Taisey
and
Tom Neltner
National Center for Healthy Housing

Report Background

- Funded by U.S. Environmental Protection Agency thanks to Kathy Seikel.
- Supported by U.S. Department of Housing and Urban Development (EPA).
- Allie Taisey—primary author.
- Tom Neltner—supporting author.
- Released February 2010; updated March 2010.
- See www.healthyhomestraining.org/ipm and click on link in blue box on right or www.healthyhomestraining.org/ipm/NCHH_Bed_Bug_Control_2-12-10.pdf

Purpose of Report

- Designed for health, housing, and pest management professionals.
- Summary and evaluation of control methods.
- Not best management practices.
- Does not cover bed bug biology.
- Based on:
  - Peer reviewed research – See † note; and
  - Trade publications and interviews – See ‡ note.

Treatment Methods Covered

Pros, Cons, and Recommendations are discussed for

- Inspection,
- Monitoring,
- Non-Chemical Treatment Options,
- Unit Preparation, and
- Pesticides.

Also Included in Report

- Executive Summary
- Case Studies
- Solutions for Compliance
- Questions for Further Research
- Author's Thoughts

Recurring Themes

- There must be communication and cooperation among residents, staff, and the pest control contractor.
- Never start control efforts (dispose of items, launder, pesticide use) before a professional has a chance to inspect and recommend a course of action.
- Cannot depend on residual from treatment; plans for preventing reinfestation must be in place.

1. Inspections

- *Intent*: Determine the extent of the infestation and condition of the unit in order to plan a site-specific treatment.
- *Methods*:
  - Visual Inspections
  - Inspections Using Bed Bug Detection Canine

Visual Inspections

- *Pros*: Effective when done by a trained inspector. Opportunity to educate residents.
- *Cons*: May miss bed bugs or severely underestimate the number.
- *Recommendations*: Essential for early detection and a well planned treatment. Include adjacent units. Conduct monthly. Residents need to know what to look for, where to look, and what to do if a bed bug is found.

Where to look
(in order of most to least often infested)

1. Beds
2. Bedding
3. Baseboard/carpet edges
4. Furniture
5. Upholstered furniture
6. Walls and ceilings
7. Clothing
8. Appliances

Canines

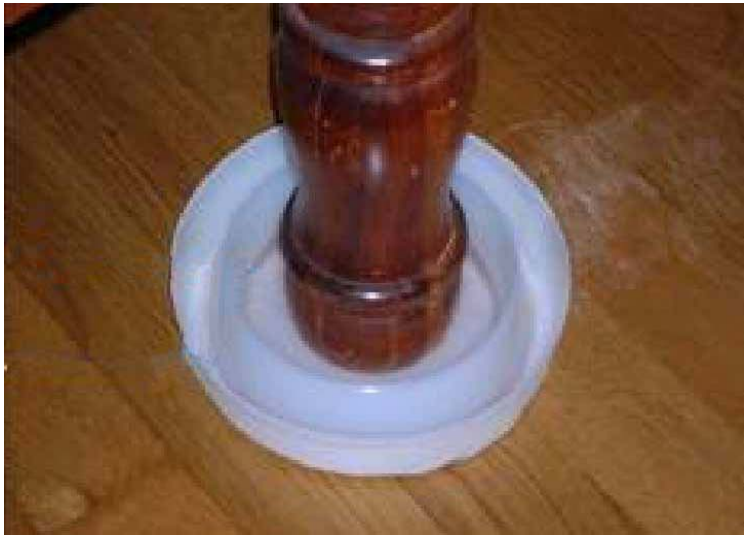
- *Pros*: Effective at assessing and monitoring situation quickly.
- *Cons*: Cost. Concern with false positives. Dog needs special care and regular training. Can have a bad days too.
- *Recommendations:* Use for property-wide inspection, monitoring, verifying treatment success, and investigating reported problems when visual inspection fails to find a bed bug.
- Look to recommendations put forth by NPMA and NESDCA

2. Monitors

- *Intent*: Identify the presence of a bed bug infestation.
- *Methods*:
  - Moat-style Interceptors
  - Portable Monitoring Devices

Moat-Style Interceptors

- *Pros*: Design traps bed bugs. Cost effective. Reassures residents.
- *Cons*: Requires maintenance, not made for all beds, can be compromised, and new to the market.
- *Recommendations*: Should be used as a complement to other methods.



Portable Monitoring Devices

- *Pros*: May be more effective than interceptors because it does not depend on humans to attract bed bugs.
- *Cons*: Expensive. Can get bed bugs on them. New to the market.
- *Recommendations*: Useful in vacant units. Needs more research.

3. Non-Chemical Treatment Methods

- *Intent*: To Kill bed bugs and eggs and eliminate harborage without pesticides.
- *Methods*:
  - Clutter Removal
  - Disposal of Infested Items
  - Isolation in Plastic Containers or Bags
  - Petroleum Jelly
  - Metal Furniture
  - Cleaners
  - Laundry
  - Steam
  - Mattresses and Box Spring Encasements
  - Freezing
  - Vacuums
  - Ambient Heat Treatment
  - *Ineffective Methods*

Clutter Removal

- *Pros*: Reduces ability of bed bugs to hide from visual inspection.
- *Cons*: May be daunting to residents and staff. May disrupt bed bugs.
- *Recommendations*: Essential. But before initial visit, residents should do only a basic cleanup to avoid dispersing bed bugs.

Disposal of Infested Items

- *Pros*: Gets rid of unsanitary items and bed bugs.
- *Cons*: May be daunting to residents. May disrupt bed bugs.
- *Recommendations*: Let the professional determine what needs to be thrown away. When removing: wrap up, take out, and destroy.

Isolation in Plastic Containers or Bags

- *Pros*: Simplifies treatment. Keeps items from becoming infested. May reassure residents.
- *Cons*: Items must be well contained. Can get expensive and inconvenient.
- *Recommendations*: Good option based on extent of infestation, and resident capabilities and needs, and available treatment methods.

Petroleum Jelly as Barrier

- *Pros*: May isolate hard-to-protect items.
- *Cons*: Not proven. Messy. Could damage surfaces.
- *Recommendations*: Consider other methods.

Metal Furniture

- *Pros*: Hinders bed bug movement. Facilitates inspections compared to wicker or wood.
- *Cons*: Must be kept clean, rust-free, and holes may need to be sealed.
- *Recommendations*: Option to consider when purchasing items in area likely to be infested.

Cleaners

- *Pros*: Makes area more sanitary. Makes evidence found on subsequent visits more informative.
- *Cons*: Use standard detergents not disinfectants.
- *Recommendations*: A supplement to a control program, not a way to kill bed bugs and eggs.
- NOTE: Don't use rubbing alcohol / isopropyl alcohol. Rubbing alcohol does not have a pesticide label and is flammable.

Laundry

- *Pros*: Practical and effective, especially when used with dissolvable laundry bags.
- *Cons*: May spread bed bugs on the way to or in the laundry room.
- *Recommendations*: After PMP has given instructions on what to wash, use dissolvable bags and the hottest setting for the washer and dryer that fabrics can handle. Place clean laundry in plastic bag. If resources are limited, skip the wash and dry for 30 minutes.

Steam

- *Pros*: Kills bed bugs and eggs without chemical residue.
- *Cons*: Does not penetrate materials very deep. Pressure may spread bed bugs. Moisture may damage materials. Time consuming.
- *Recommendations*: Vacuum first, then steam. Use for hard to treat items such as sofas and wheelchairs. Option to consider but use with care.

Mattress Encasements

- *Pros*: Reduce hiding places and make visual inspections easier. Also reduces dust mites.
- *Cons*: Must be kept on for one year. $50 may be cost prohibitive.
- *Recommendations*: Practical and effective. Don't go cheap. Make sure it fits snugly. Pesticide-impregnated liners unproven by peer-reviewed research and may further resistance.

Freezing

- *Pros*: Dry ice may be effective without leaving chemical residue.
- *Cons*: Unproven and costly. May not penetrate materials. May disperse bed bugs.
- *Recommendations*: Using a household freezer or the outdoors is not recommended. Dry ice machine is and option, but is not as vetted as steam. Take care to avoid burns when handling.

Vacuums

- *Pros*: No chemical residues. Removes the bed bug.
- *Cons*: Difficult to vacuum where bed bugs hide. May not get eggs. Vacuum may become infested.
- *Recommendations*: Use HEPA filter and pre-treat with insecticidal dust. Vacuum while inspecting.

Ambient Heat Treatments

- *Pros*: Useful where unit preparation is difficult or unlikely. No chemical residues.
- *Cons*: Difficult to effectively heat entire unit to more than 120^{o}F. Bed bugs may spread to adjacent units. Costly.
- *Recommendations*: Complicated so must be done by a trained professional. A viable option.

Ineffective Non-Chemical Methods

- Increasing the heat in the infested area with a thermostat.
- Putting items in black plastic bags and leaving them in the sun for a day.
- Rubbing Alcohol
- Petroleum Jelly

4. Unit Preparation

1. Professional scheduled to inspect infested and adjacent units.
2. Resident 48 hour notice instructions – clean and organize as if for a housekeeping inspection.

Unit Preparation (cont.)

3. Pest management professional inspects with property management or maintenance.
    - If a light infestation
        - Treat using least toxic, most effective method; and
        - Schedule next visit.
    - If an extensive infestation or clutter
        - Give resident site-specific instructions; and
        - Schedule next visit.
4. Conduct follow-up inspection.

5. Pesticides

- *Intent*: Kill bed bugs and eggs using chemicals. Leave residue that keeps killing.
- *Methods*:
  - Pyrethroids
  - Dusts
  - Fumigation
  - Chemistries Being Registered for Bed Bugs
  - Chlorfenapyr
  - Insect Growth Regulators
  - Essential Oils

Pesticides

- *Pros*: Quicker and cheaper than many other control methods if you can find the bed bugs.
- *Cons*: No silver bullet. Bed bugs are becoming resistant to several types. Residual exposures.
- *Recommendations*: Don’t use total release foggers. Have a licensed professional apply. Address residents' potential misuse of over-the-counter products.

Conclusion

- Include bed control as part of a property-wide integrated pest management program.
- Prevention, early detection, and prompt professional treatment are the goals.

For More Information:

- Allison Taisey
  bedbugworks@gmail.com
- Tom Neltner
  National Center for Healthy Housing; 443-539-4160; and
  tneltner@nchh.org
- Comprehensive Integrated Pest Management (IPM) Training:
  www.healthyhomestraining.org/ipm or www.stoppests.org
- Locally developed educational materials: try your health department, cooperative extension office, and university entomology department.
- Pesticide questions: The National Pesticide Information Center at http://npic.orst.edu or 800-858-7378