

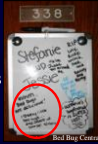
gers University



## Quickly spread into residential sector



Colleges &  
Universities



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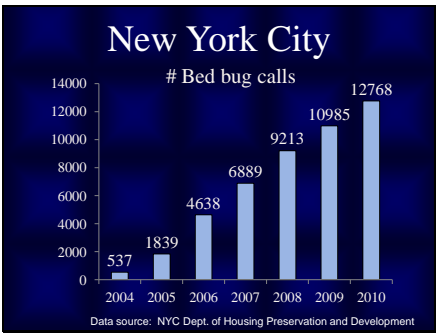
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## Now bed bugs are found everywhere

- Hotels & motels
- Apartments
- Private homes
- College dorm rooms
- Schools and day care
- Used furniture outlets
- Furniture rental stores
- Moving/delivery vans
- Health care facilities
- Nursing homes
- Churches
- Airplanes & cruise ships
- Public transportation
- Laundries & dry cleaners
- Movie theaters
- Fire stations
- Youth hostels
- Jails

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## What caused resurgence of bed bugs?

- Loss of effective pesticides (i.e. DDT)
- Resistance to insecticides
- Changes in pest control practices (targeted versus broad spectrum treatments)
- Frequent travel to and from areas where bed bugs are prevalent

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## Factors that promote spread

1. Lack of education and public awareness (introduction, reintroduction)
2. Not detected quickly enough
3. Infestations controlled but not eliminated
4. Reactionary approach rather than pro-active community wide approach.

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## HUD Notice: PIH-2012-17

- Best practices for prevention and control of bed bugs
- Rights and responsibilities of housing management and residents



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## A few basic facts

- Feed exclusively on blood
- Do not feed every day, seek a blood meal once every week or so
- Can survive many months without feeding
- Lay 1-3 eggs each day (hatch in 7-10 days)
- Nocturnal & very secretive

Richard Naylor

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## What they look like



John Chermant



John Chermant



John Chermant



John Chermant

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## Feeding

- Usually feed at night while you are sleeping
- Hungry bed bugs will feed any time
- A blood meal takes 3-10 minutes
  - May change feeding sites on same person during one meal
- Digested blood is excreted as black or brown fecal spots



Richard Naylor



Changli Wang

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## Medical importance

- Do not transmit human diseases
- Reaction to bites vary
  - Delayed or no symptoms
  - Itching
  - Swelling
  - Pustules
  - Scarring
- Emotional impact
  - Loss of sleep
  - Nightmares
  - Stress/anxiety



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## How bed bugs disperse

- Transported from infested areas on personal belongings
- Crawl from feeding sites to other areas in apartment
- Crawl to neighboring units through walls, utility pipes and hallways.



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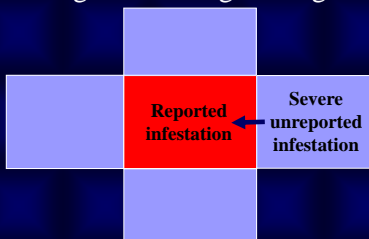
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Reported infestations may be coming from a neighboring unit



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## How does this happen?

Occupants unwilling or not capable of reporting the problem:

1. Trying to avoid attention
  - unauthorized occupants
  - illegal activities taking place in unit
2. Mentally handicapped
3. Ashamed or embarrassed

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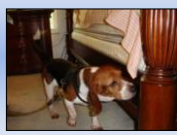
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## How to find bed bugs?

- Interview
- Visual inspection
- Monitors
- Scent dogs



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## Interviews

- Advantages
  - Provides information on the infestation and treatment history
  - An opportunity for educating residents
- Disadvantages
  - Unreliable
  - Some residents do not report infestations or do not recognize the presence of bed bugs

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## Visual inspections



Just because you don't find them  
doesn't mean they are not there!

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Most bed bugs are found on  
beds and upholstered furniture



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Not likely to readily find bed bugs on  
exposed parts of mattress unless  
infestation is well established



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**Bed Bugs Inhabit  
Areas of Least  
Disruption First**

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### Items near bed



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### Bugs on furniture next to bed



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### Bugs on wheelchair



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Resident's activities will influence bed bug distribution



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Bugs in unpredictable locations



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## Monitors: Interceptor devices under legs of beds and upholstered furniture



Capture bugs as they seek a blood meal  
(uses most effective lure - "the host")

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## Canine scent detection



- Offsets limitations of a visual inspection
- More efficient than visual inspection or monitoring devices
- Large scale inspections economically practical with immediate results

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## Canine scent detection has limitations!

1. Bugs & eggs will not be detected if scent is not available to the dogs nose
2. False alerts can be a problem




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## Verification of Alerts

1. Visual inspection to confirm activity
2. Continued monitoring in areas of concern

Red Bug Control

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Any suspicious samples should be saved for positive identification



Spider beetle      Book louse      Roach      Dermestid shed skin

There are many similar looking pests.  
It may not be a bed bug!

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## How do you control bed bugs?



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## Summary of treatment options

- Vacuuming
- Isolation
  - ✓ Encasements
  - ✓ Contain infested items
  - ✓ Make the bed an island
- Freezing
  - ✓ Liquid CO2
  - ✓ Chest freezer
- Heat
  - ✓ Clothes dryer
  - ✓ Steam
  - ✓ Container
  - ✓ Whole unit
- Pesticides
  - ✓ Spray
  - ✓ Dust

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## Bed bug prevention

- Avoid picking up discarded or second-hand items (especially beds & furniture)
- Avoid sitting on furniture when in infested apartments & limit what you bring in with you
- If itchy welts occur, immediately conduct a thorough inspection



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## Encasements & interceptors as early detection tools



Exposed bugs are easily detected

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## Methods for dealing with infested beds



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Not necessary to discard or treat beds with pesticides!



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## Encasement of mattresses & box springs



Encasements used to salvage infested beds

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### Discarding of heavily infested furniture or items



1. Wrap bed tightly in plastic before discarding
2. Mark discarded bed as being "Infested"

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Steam is very effective and overcomes limitations of vacuums



Destroys all stages including eggs!

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### Applying steam to upholstered furniture



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Hot laundering or drying destroys  
bed bugs and their eggs!



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Heat items that can't be  
laundered



Portable heat chambers, plug into a wall  
outlet for 4-8 hours

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Freezing infested items  
also kills bugs and eggs



Freeze items for 4 days

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## Eliminating clutter is essential!



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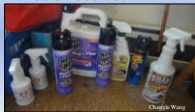
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## Discourage application of consumer spray products by residents

- Many bed bug populations are resistant to insecticides.
- Application of sprays may cause bed bugs to disperse making them harder to eliminate.
- **Foggers/bug bombs can be dangerous are not effective!**



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## Avoid excessive application of diatomaceous earth dust



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Pesticide applications are best left to licensed applicators



Staff should not apply pesticides unless they are licensed by the State Pesticide Control Program

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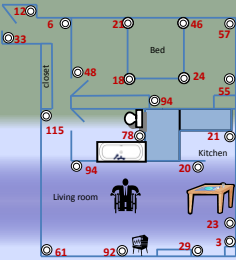
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Don't limit treatments to suspected areas only



Trap count after 15 days. 950 bugs

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100% elimination of bed bugs is rarely achieved in a single visit

**A Follow-up Program is Critical:**

Follow up every two weeks until the bed bugs are eliminated

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## How do you know when they are really gone?



“Bug Free” & “Bite Free” 6 weeks

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## Community-wide results requires a proactive plan!

**An effective plan will:**

1. Provide cost effective elimination
2. Manage spread
3. Achieve long-term results

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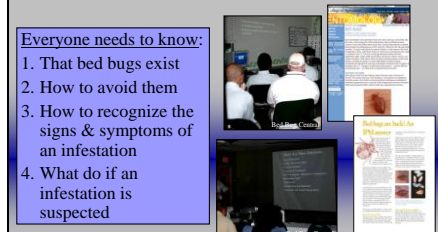
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## Education of apartment community (staff & residents)

**Everyone needs to know:**

1. That bed bugs exist
2. How to avoid them
3. How to recognize the signs & symptoms of an infestation
4. What to do if an infestation is suspected




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### Conduct a baseline community wide inspection program

#### 360-unit apartment building

- 19 infestations reported by residents
- 43 additional infestations identified through building wide inspection & installation of interceptors (7-d)
  - 85% (43/62) of the infestations were not reported by residents!

Conduct annual building-wide inspections if >10% infestation rate

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### History has a tendency to repeat itself, use it to your advantage

#### Conduct periodic inspections of “at risk units”

- ❖ Any unit with activity within past year
- ❖ Residents that failed to report infestations
- ❖ Residents that were uncooperative are prone to population rebound and/or re-infestation

If you turn your back on unit with bed bug history you will get burned!

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### Catch bed bugs at the gate: implement a new resident program:

1. Build education into resident orientation:
  - educational videos, presentation & fact sheets
  - bed bug management policy and procedure
2. Visual inspection of beds and upholstered furniture at time of move in
3. Monitor and inspect apartment within 30 days of move in (monitor for 2 weeks)

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## Procedure for vacating units

Implement policy to inspect and monitor units when a tenant notifies the leasing office that they will not be renewing their lease.

Identifying infestations prior to unit vacating gives you time to eliminate the infestation while a host (tenant) is still present!

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## When infestations are identified...

Respond quickly and be sure to:

- Remind residents what they can do to help
- Get involved if a resident is not cooperating or obstructing eradication efforts
- Include surrounding units in scope of service
  - visual inspection and monitoring
  - continue inspecting until primary infestation eliminated
  - encase mattresses & box springs if budget permits
- Make sure the treatment program is designed to see problem through to “elimination”

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Remember:  
successful control is  
a team effort



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## Additional information

- Web site
  - <http://www.epa.gov/bedbugs/>
- E-mail questions and suggestions to [cwang@aesop.rutgers.edu](mailto:cwang@aesop.rutgers.edu)

Funding of this program is provided by U.S. EPA

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