Bed Bugs
Sleep Tight, Don’t Let the Bed Bugs Bite!
Bed Bugs are a re-emerging pest throughout the US!!!

- Common pest in the US at the turn of the century
- Essentially eradicated in 1940-50 due to DDT
- Resistance documented to DDT, malathion, carbamates and pyrethroids
- They are back. We should not be surprised!
Possible Factors In Bed Bug Resurgence

• Mobile society
• More immigration
• Changing pest control products and methods
  – Less use of any residual pesticides, esp. last 15 + yrs
  – Significant switch to baits for roaches & ants (1980s)
  – Resistance: pyrethroids used in most accounts are repellent
    - Bugs do not get a lethal dose (esp. in deep cracks)
    - Harborages easy to miss in first survey
    - Bugs may detect & avoid residual treatments
    - Bug population often “split” or move from such treatments
• Many are still not very familiar w/ bed bugs
  – Inadequate survey, wrong ID, incomplete treatment
• People may call any unknown bite - “bed bugs”
Public Health Significance

• No known disease transmission (ex. HIV or Hepatitis B)

• Mental health issues
  – Sleeplessness
  – Agitation
  – Anxiety

• Secondary allergic reactions in some and/or secondary bacterial infections from scratching
Injury from Bed Bugs

• Initial bite is painless
• Bite reactions vary from person to person
• Some people have an allergic reaction to the injected saliva
  – Swelling
  – Welts
  – Severe itching (hours to days)
• Scratching of bites increases inflammation, can lead to secondary bacterial infections
Physical Identification:

- Six legs
- Oval bodied
- Beak-like mouthparts
- Brown to red in color
- Wingless
- Flattened top to bottom (unfed). Body swollen after feeding
- No formal nesting site
- Adults: ~ 1/4 – 3/8 inch long
- Young nymphs (immature bugs): tiny, << 1/10 inch long; nearly colorless
- Eggs: white and hard to see with the naked eye; glued to rough surface

Bed bug (actual size = 3/8")

From USDA Leaflet 453 “How to Control Bed Bugs”
Bed Bugs
*Cimex lectularius*

- External parasites
- Blood feeders
- Typically feed at night
- Prefer to feed on humans
- May also feed on
  - Rodents
  - Bats
  - Birds
  - Pets (cats, dogs, etc.)
Biology

• Feed only on blood – mammals or birds
• Attach small (1 mm long) whitish eggs to surfaces in harborages where the bugs hide in loose clusters
• 5 nymph stages (Need at least 1 blood meal each stage)
• Life cycle takes 4-5 weeks (egg-to-egg) in ‘good’ conditions (75-80% humidity; 83-90°F)
• Female may lay 200-500 eggs in her lifetime; in batches of 10-50; eggs hatch in 10 d. ave.
• Adults can survive >1 yr. w/o feeding (nymphs 3-4 mo.)
Life Cycle

Note: Bed bugs take 3-10 minutes to complete feeding

Egg
(1 mm long)

First Stage Larva
(1.5 mm long)
Takes a blood meal then molts.

Second Stage Larva
(2 mm long)
Takes a blood meal then molts.

Third Stage Larva
(2.5 mm long)
Takes a blood meal then molts.

Fourth Stage Larva
(3 mm long)
Takes a blood meal then molts.

Fifth Stage Larva
(4.5 mm long)
Takes a blood meal then molts.

Adult
(5.5 mm long)
Take repeated blood meals over several weeks. Females lay up to 5 eggs per day, continuously.

Life Cycle of the Bed Bug
Cimex lectularius
Adult Female
Adult Male
Nymph
Eggs and Droppings
How to Eliminate Bed Bugs

• Pesticides alone, or any single method, will not eliminate bed bugs
• Essential for strategy to include a number of methods for effective bed bug control
• Integrated Pest Management (IPM):
  – Inspect infested areas, plus surrounding living spaces
  – Correctly identify the pest
  – Keep records, including dates when and locations where pests are found
  – Clean all items within a bed bug infested living area
  – Reduce clutter where bed bugs can hide through storage and/or disposal of items
  – Eliminate bed bug habitats; wrap mattresses in plastic casings
  – Physically remove bed bugs through cleaning
  – Pesticide use, careful and according to the label directions
  – Follow up inspections and possible treatments
  – Raise awareness through education on prevention of bed bugs
How to Eliminate Bed Bugs

- Cooperation of management to focus on the problem
- Accurate identification to be sure it is bed bugs and not another pest
- Identification of the source (especially if bed bugs are moving from an adjacent room)
- Thorough inspection and identification of all possible hiding spots
- Cleaning and organization of area
- Reducing clutter
- Bagging and removal of bedding and clothing from the affected area
- Washing sheets and blankets and drying on HOT setting
- Encasing the mattress and box spring in a zippered encasement
- Washing or treating the headboard and bed frame
- Cleaning and removing bed bugs from other items
- Isolating the cleaned (bed bug free) items until bed bugs are gone
- Careful and targeted use of insecticides, following label instructions
- Inspection and treatment of all surrounding adjacent units
- Follow up inspections and all other procedures as needed (there should be at least one follow up inspection 3 weeks after initial treatment)
Inspection
First element of treatment

- Probably most difficult element
- Most time consuming
- Must be accurate
What do you do if bed bugs found?

• Close the room so the hotel cannot rent until cleaned/treated

• Refer the hotel/motel to a licensed exterminator
  – A more general insect treatment, or cockroach treatment is unacceptable. It must specify treatment for bed bugs since they can be resistant to the normal chemicals used for roaches.

• Re-inspect after the room has been treated
  – Re-inspect adjoining rooms as well
  – Early sign of re-infestation are spots on sheets
Bed Bug Detection

- Visual detection difficult
- Early infestations go unnoticed
- Early control more likely to succeed, and these infestations are less likely to spread and are cheaper to control
Bed Bug Infestations

• Active
  – Live bed bugs
  – Eggs
• Inactive
  – Dead bed bugs
  – Blood spots
  – Fecal stains
  – Cast skins
Initial Inspection

• Searching for any indication of infestation
  – Live insects
  – Cast skins
  – Blood spots
Post treatment Inspection

• More difficult inspection
  – Early sign may be spots on the sheets
  – Must look for live insects and eggs
  – Must search further away from bed
Where to Look?
Primary Bed Bug Harborage ~70%

Secondary Bed Bug Harborages ~23%

“Other” Bed Bug Harborages ~7%

5 feet
Possible Primary Harborages

- Mattresses
- Bed Frames
- Box Springs
- Linens and dust ruffles
- Headboards and wall mounts
Primary Bed Bug Harborage
~70%

Secondary Bed Bug Harborages
~23%

“Other” Bed Bug Harborages
~7%

5 feet
Possible Secondary Harborages

- Night stands
- Dressers
- Chairs
- Tables
- Carpet and baseboards
Primary Bed Bug Harborage
~70%

Secondary Bed Bug Harborages
~23%

“Other” Bed Bug Harborages
~7%

5 feet
Other Harborages

Smoke detectors

Picture Frames

Wall outlets

Popcorn Ceilings

Anywhere !
A Proper Inspection

Before

After
Inspection Challenges
Resources

- CDC: http://www.cdc.gov/nceh/ehs/Topics/bedbugs.htm
- Cornell University: http://www.nysipm.cornell.edu/publications/bb_guidelines/
- US Environmental Protection Agency: http://www.epa.gov/pesticides/bedbugs/
- Identify US: http://identify.us.com/bed-bugs/
- Univ. of Minnesota Extension, Preventing bed bugs from hitchhiking to your home: http://www.extension.umn.edu/distribution/housingandclothing/M1196.html
- Univ. of Kentucky Bed Bug Fact Sheet: http://www.ca.uky.edu/entomology/entfacts/entfactpdf/ef636.pdf
Source:

• Arkansas Department of Health
  • http://www.healthy.arkansas.gov/programsServices/environmentalHealth/generalSanitation/Pages/BedBugs.aspx
Good night, sleep tight,
Don't let the bed bugs bite.
Wake up bright
In the morning light,
To do what's right
With all your might.