

2015
NANT SYMPOSIUM
Las Vegas, NV

**"Become the Expert on
Bedbugs In One Hour"**

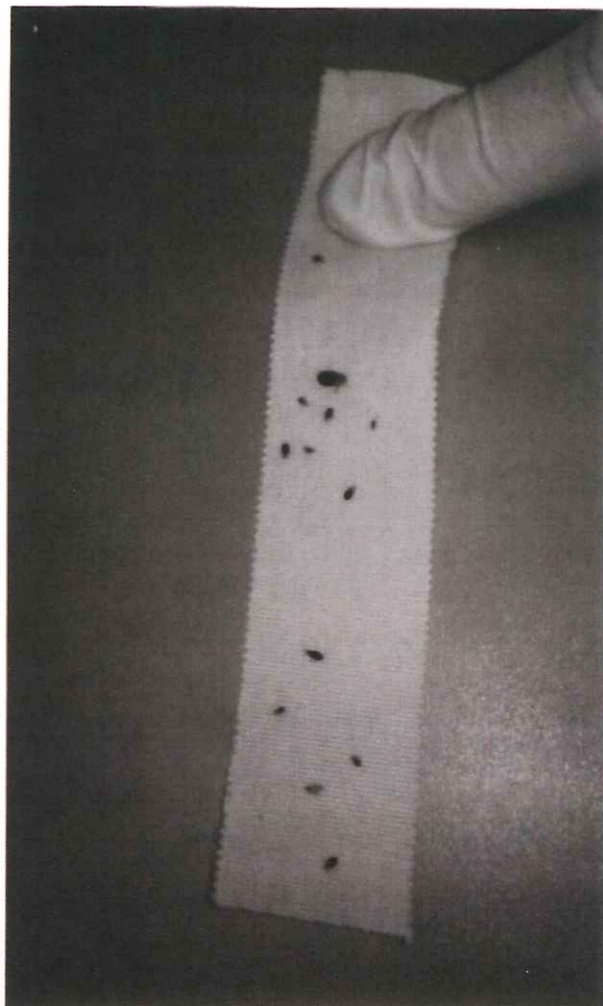
***History / Identification/
Assessment / Control***

March 17, 2015

***Lawrence K. Park,
Vice President***







Inches

1



15

14

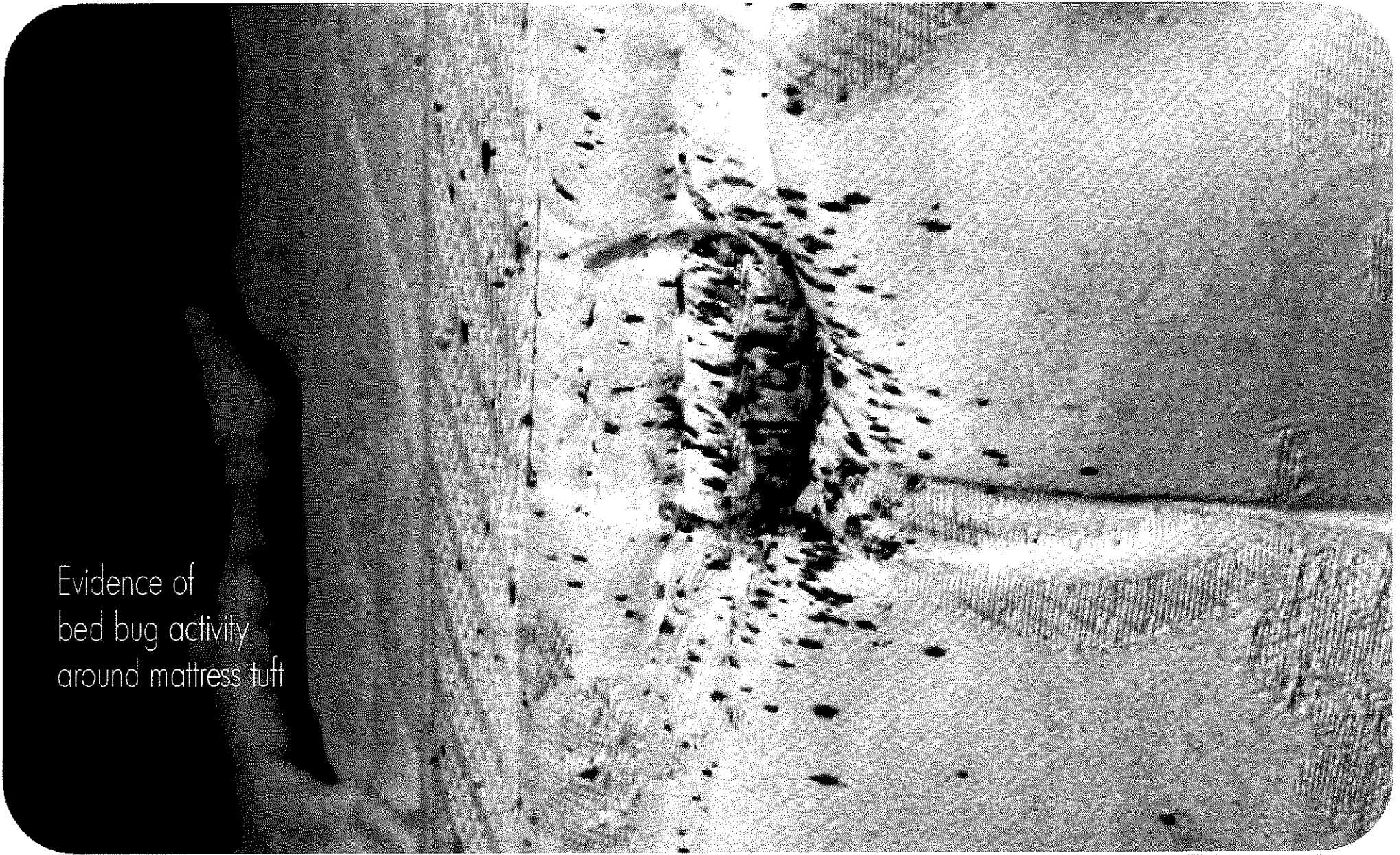
13

12



Evidence of bed bug
activity on box spring

Evidence of
bed bug activity
around mattress tuft





Evidence of bed bug activity in box spring



Evidence of bed bug activity on baseboard

Evidence of bed bug activity around electrical outlet





Bed bug on its unsuspecting human host

History of Bed Bugs:

- ❑ Thought to be introduced with early colonists.
- ❑ Thought to be gone after 1960 in US.
- ❑ As of 2003, bed bug infestation reported in 35 states in US.
- ❑ As of 2004, bed bug infestations reported in 43 states in US.
- ❑ As of 2005, bed bug infestations reported in 47 states in US (except Alaska, North Dakota and South Dakota).
- ❑ In 2010, 95 percent of US pest control companies reported finding at least one bed bug infestation in past year.

History of Bed Bugs (cont'd):

- In 2010, a quick Google search on “bed bugs” revealed nearly 4,000 news results and search volume up 450 percent in past 6 years.
- In 2011, one pesticide company had performed over 8,000 bed bug treatments in 1st quarter alone.
- New issue that is challenging:
 - 76 percent of pest control companies surveyed said “bed bugs are most difficult pest to treat”.
 - In 6 months, an unchecked infestation can proliferate into more than 13,000 bed bugs.

Current Litigation Climate of Bed Bugs:

- ❑ Affect health, business reputation, bottom line, public perception.
- ❑ Bed bug fears soared 11 percent from 2009 – 2010 in US hotels.
- ❑ July 2010 – one bed bug infestation closed a Hollister shop in NY.
- ❑ Landmark 2003 case awarded 2 bed bug victims \$382,000 for bed bug bites sustained in Chicago motel room.
- ❑ January 2011 – a Waldorf Astoria guest filed a \$10 million bed bug lawsuit against luxury hotel.

Current Litigation Climate of Bed Bugs (cont'd):

- Avg amount of settlement for bed bug victim in hotel is \$8 – 10K according to a University of Nevada source.

Recognizing A Bed Bug

(Cimex lectularius):

a) Appearance:

- Newly hatched – semi transparent, light tan in color, size of poppy seed (1/32 inch long).
- Adult – flat, rusty red colored oval bodies, size of apple seed (3/16 inch long).

b) Markings, Droppings & Eggs:

- Blood stains, droppings and eggs found in:
 - Mattress seams, sheets, pillow cases, upholstered furniture, curtains, behind headboard
 - Baseboard of walls, drawers, sofas, behind cove molding and loose wall paper
- Dark brown or reddish colored fecal spots

Recognizing A Bed Bug

(Cimex lectularius) (cont'd):

c) Bite:

- Small bumps or large itchy welts. Most welts heal in a few days (3-10 days)
 - 80% of population will develop allergic reaction to bite
- Resembles bite of other blood feeding insects such as mosquitoes, mites, gnats
- Does not have a red spot in center as bites do from fleas
- Not known to transmit infectious disease to humans (although >20 human pathogens with bed bug bite)
- Bites typically occur on head and neck of host
- Feeds every few days if hosts available
- Takes a blood meal in 3-10 minutes (3 times its body weight when feeding)

Recognizing A Bed Bug *(Cimex lectularius) (cont'd):*

c) Bite (cont'd):

- Travels 15 – 20 feet each way nightly to feed
- Often excretes part of previous meal while feeding

How Bed Bugs Grow and Reproduce:

- ❑ Most active when we sleep.
- ❑ Feed on human blood.
- ❑ Crawl onto skin, inject mild anesthetic and sucks up a small amount of blood.
- ❑ Bed bugs need blood meal to grow and lay eggs.
- ❑ Female bed bug lays 5-7eggs / week.
- ❑ Eggs take 10 days to hatch.
- ❑ Egg to adult life cycle takes about 21 days.
- ❑ Bed bugs fully grown in 2-4 months and can live as long as a year (with feedings).

How Bed Bugs Grow and Reproduce (cont'd):

- ❑ Adult bed bugs can live for months without feeding.
- ❑ Nocturnal
- ❑ Remains fully active at 45°F, favorable condition is 70° - 90° F.

Preventing Bed Bug Infestation:

- Bed bugs crawl but have difficulty climbing.
- Inspect for bed bugs, blood stains, droppings and eggs:
 - 10 – 20 feet around where you sleep or sit (distance a bed bug will travel)
- When traveling and staying at hotels:
 - Set suitcase off of floor on luggage holder provided
 - Leave suitcase zipped
 - Inspect bed – pull back covers, sheets, mattress pad and look for signs – dark spots left by bed bug feces
 - Launder clothes on high heat or dry clean them
 - Use stiff brush to remove eggs and vacuum

Preventing Bed Bug Infestation (cont'd):

- ❑ Clean, disinfect and eliminate common bed bug hiding places.
- ❑ Avoid crowded / cluttered conditions as well as poorly sealed baseboards, crown moldings, window frames, painted walls, etc.
- ❑ For residential:
 - Remove all headboards, pictures from walls including electrical wall outlet /switch covers
 - Repair / seal all openings in floor / walls
 - Remove all mattresses and box springs from frames and discard if necessary

Preventing Bed Bug Infestation (cont'd):

- ❑ Bedding, window treatments and clothing should be placed in plastic bags.
- ❑ Vacuum floors.
- ❑ Remove all storage and debris from furniture, walls and floors.
- ❑ Steam clean and then vacuum carpets.
- ❑ Loosen floor covering around floor edges so treatment can be applied directly to floor area where it meets the walls.

Preventing Bed Bug Infestation (cont'd):

- Utilize active bed bug monitors to determine if bed bug infestation is present in facility:
 - Releases attractants for multiple days (carbon dioxide cylinder used with monitor) which assists in attracting bed bugs
 - Results evaluated each morning
 - Bug captured can be evaluated
- Limit personal belongings being brought into clinic (blankets, bags, purses, clothing, etc.). This also includes wheelchairs from infested home.

Preventing Bed Bug Infestation (cont'd):

- ❑ Use large containers with smooth inner surface and lockable lids to hold patient belongings and patient clothing if needed while receiving dialysis as bed bugs cannot climb smooth surfaces very well.
- ❑ Provide patient with disposable gown to wear during dialysis treatment.
- ❑ Provide instructions to patient for treatment of home and belongings that have had bed bugs.
- ❑ Provide community resources to assist patient with home treatment (Dept. of Health and Dept. of Aging, AKF, NKF, Salvation Army or Goodwill, Church groups).

Preventing Bed Bug Infestation (cont'd):

- ❑ Cover dialysis chair with white paper to easily identify bed bugs.
- ❑ Use dialysis chair at end of floor to best isolate bed bugs.
- ❑ Keep everything off of floor in vicinity of chair to isolate bed bugs.

Options for Eliminating Bed Bugs:

- a) Confirm identity of insect to be bed bug
 - Entomologist confirmation
- b) Use of pesticides / insecticides / alcohol:
 - DNA testing for bed bugs (swab samples monthly, up to 1 year, monthly charge could be up to \$250; 24-48 hour turnaround)
 - Foggers / bug bombs (application of natural pyrethrin and requires area treated to be vacated for several hours)
 - Alpine Dust Insecticide – BASF – dinotefuran, diatomaceous earth

Options for Eliminating Bed Bugs

(cont'd):

- SteriFab – Noble Pine Products Co
 - Recommend review of MSDSs of proposed insecticides/pesticides as to safe applications in health care occupancy and on items in affected areas (i.e. – flame retardant properties of dialysis chairs, molecular size and absorption rate, etc)
- c) Use of heat / high temperature / steam
- Force bed bugs out of cracks / crevices with putty knife or playing card; hot air from blow dryer on low setting
 - Heat infected articles at least 113°F for 1 hour
 - Catch bed bugs with sticky packing tape

Options for Eliminating Bed Bugs

(cont'd):

- Heat from blow dryer will kill bed bugs after 30 seconds of continuous contact
- Wash all items showing bed bug stains in hot water at 140°F and dry on highest setting for at least 20 minutes
- Commercial steam cleaner
- During heat treatment, heat is pumped continuously into area with trailer or mobile heat generating unit (for generalized infestation)

Options for Eliminating Bed Bugs (cont'd):

- Heat penetrates areas three dimensionally into cracks and crevices of furniture
- For heat to be effective must reach a high enough temperature – core temperature of 125°F for minimum of 1 hour
- Heat treatment could cause damage to equipment / furniture and present a fire hazard / activate sprinkler heads

Options for Eliminating Bed Bugs *(cont'd):*

d) Use of freezing

- Bagging and placing delicate materials in freezer for several days
- Below 0°F for at least 4 days

e) Use of industrial vacuum

- Vacuum using brush and crevice tools and empty vacuum bag outside of facility

f) Use of caulk

- Apply caulk to seal crevices and joints in baseboards and gaps on shelving or cabinets

Options for Eliminating Bed Bugs (cont'd):

- g) Use of structural fumigation
- Tarping the entire structure, vacating for several days while fumigant gas is released into tented structure
 - Must be licensed
 - May be restricted by regulatory agencies in certain states
 - May not be ideal for health care occupancies

Options for Eliminating Bed Bugs

(cont'd):

h) Portable heating units

- All stages of bed bugs are susceptible to temperatures above 120°F
- Small portable heating unit to heat belongings that may have bed bugs on them
- Place patient belongings in these units

i) Insect Interceptors

- Small trays placed under legs of bed and couches and chairs designed to intercept bugs as they travel to and from beds, couches and chairs

Options for Eliminating Bed Bugs (cont'd):

j) Alcohol

- Isopropyl alcohol solution can be lethal when applied to bed bugs
- 91% alcohol is recommended

k) Enzyme product

- In trial stages

Additional Guidance and Resources:

- a) US Centers for Disease Control and Prevention

<http://www.cdc.gov/nceh/ehs/Topics/bedbugs.htm>

- b) US EPA

<http://www.epa.gov/pesticides/bedbugs/>

- c) NY City Dept of Health

<http://www.nyc.gov/html/doh/html/vector/vector-faql.shtml>



Additional Guidance and Resources:

d) National Pest Management Associates

www.pestworld.org/bed-bugs

e) Bed Bug Central

www.bedbugcentral.com