Bed Bugs:

Management and Prevention

What can you do?

Bed Bug Management History

- *Cimex lectularius*
- Fossilized bed bugs unearthed dates back more than 3,500 years
- First reported in England in 1583 and hitchhiked to America with explorers and settlers
- In the 1930's and '40's, became a community-wide problem and were eradicated after World War II with the development of the potent pesticide DDT
- DDT was banned in the 1970's
- Now they are BACK!

Common Bed Bug Myths

- You cannot see a bed bug.
  - You should be able to see adult bed bugs, nymphs and eggs with your naked eye.
- Bed bugs live only in dirty places.
  - Bed bugs are not attracted to dirt and grime; they are attracted to warmth, blood and carbon dioxide. However, clutter offers more hiding spots.
- Bed bugs transmit diseases.
  - There are no cases that indicate bed bugs pass diseases from one host to another. Lab tests have shown that it is unlikely that the insect is capable of infecting its host.
- Bed bugs won't come out if the room is brightly lit.
  - While bed bugs prefer darkness, keeping the light on at night won't deter these pests from biting you.

Common Bed Bug Myths

- Pesticide applications alone will easily eliminate bed bugs infestations.
  - Bed bug control can only be maintained though a comprehensive treatment strategy that incorporates a variety of techniques and vigilant monitoring. Proper use of pesticides may be one component of the strategy, but will not eliminate bed bugs alone. In addition, bed bug populations in different geographic areas of the county have developed resistance to many pesticidal modes of action. If you're dealing with a resistant population, some products and application methods may only serve to make the problem worse.

2010 most bed bug-infested cities:*

1. New York
2. Philadelphia
3. Detroit
4. Cincinnati
5. Chicago
6. Denver
7. Columbus, Ohio
8. Dayton, Ohio
9. Washington, D.C.
10. Los Angeles
11. Boston
12. Indianapolis
13. Louisville, Kentucky
14. Cleveland
15. Minneapolis, Minnesota

*Developed by Terminix and created by compiling and analyzing market-specific call volume about bedbugs to the 350 Terminix service centers throughout the United States

Signs of Bed Bugs

- Live bed bugs of all sizes (poppy seed to apple seed size)
- Blood stains from crushed bugs
- Confirm that what you find is a bed bug
- Droppings in the form of dark, rusty-colored stains on cloth or bumps on hard surfaces
- Shed skins
- Eggs and eggshells, although very small, will be found among droppings or in crevices where adults hide
- An offensive, sweet, musty order from the bed bug scent glands may be detected when infestations are severe

Where to Look

Nearly anywhere where there are cracks or cervices can be a hiding place for the insect and its eggs

- Beds, box springs, bed frames and head boards
- Seems and fabric folds of beds and sofas
- Under the edge of wall-to-wall carpeting (particularly behind beds and furniture)
- Cracks in and under wood molding and baseboards
- Ceiling-wall junctures
- Behind wall-mounted picture frames and mirrors
- Under loose wallpaper
- Clothing and clutter stored in closets and under beds
- Inside switch plates, electrical outlets, clocks, phones, televisions and smoke detectors
- Luggage (which may have been the original vector of infestation)
- Roosting or nest areas (if wild animals are a suspected vector)

Mattress Inspection

- Along the top and bottom seams, and along each side of the piping material sewn onto these edges
- Under mattress handles and along or inside air holes
- Between the mattress and box spring, platform or frame
- Inside folds of material and under buttons
- If mattresses are covered in vinyl plastic, look inside seams and rips in material
- Use alcohol or baby wipes to rub suspected bed bug droppings. If the spots dissolve into a reddish brown color, this could indicate bed bug droppings and should be a reason to continue inspecting until a live bed bug is found.
- They may be found along piping seams, under pillow tops, between the mattress and box spring, inside air holes, or underneath mattress handles. Do not overlook tears in the fabric or stitching holes when inspecting for bed bugs

Box Spring Inspection

- Points where the box spring sits on the bed frame (lift slowly to avoid scattering bed bugs)
- The top surface of the box spring, inside folds of material
- Along seams and where the material is tacked to the frame
- Turn over the box spring and remove the thin cloth layer on the underside
- Use a flashlight, a hand lens and a crevice tool to check the spaces between box spring frame parts
- Look around and beneath furniture staples and tacks
- Double faced tape or carpet tape can be placed on the underside of furniture to capture wandering bed bugs (this is a monitoring tool, not a control strategy)

Bed Frame and Headboard Inspection

- Wood beds (especially captain's beds) and head boards (especially wicker) are preferred hiding spots for bed bugs over metal bed frames, but bed bugs will hide in crevices on metal and plastic, or where a mattress touches a metal frame
- Visually inspect and use the crevice tool in all joints of the frame where parts meet
- Turn the frame over and inspect from the underside
- Check screw and nail holes for bed bugs
- Take the bed apart to check between parts
- Remove the headboard from the bed and check for bed bugs along the joints and on the wall behind it
- Wicker furniture provides infinite hiding spots for bed bugs. Anything made of wicker should probably be discarded

Inspecting Other Furniture and Storage Areas

- Empty drawers and shelves of the furniture closest to the bed
- Wood furniture on the undersides and interiors of chests where drawers slide
- Place items into plastic bags to be inspected and cleaned
- Pull out drawers and inspect every corner and the undersides, using the crevice tool to check under the metal drawer guide
- Use the crevice tool to inspect gaps wherever the tool will fit, such as between the shelf and bookcase frame
- Turn over all furniture to inspect the underside
- Be sure to inspect screw and nail holes
- Plastic and metal furniture may harbor bed begs, follow the same inspection procedures
- Electronics (lamps, remote controls, alarm clocks, and radios) should be placed into plastic bags for further inspection. If bed bugs are found in the frame of the furniture where the radio or clock sits, further inspections of those items and possible treatment are warranted
- Office-style chairs should be inspected by turning them over and looking under seams where fabric attaches to the frame. Also check screw holes

Inspecting Plush Furniture

- Inspect pillows and cushions, particularly the seams, the folds around zippers and edges of cushions
- Look at and under legs of chairs and couches
- Turn over the furniture and remove the thin cloth backing under each piece
- Pay special attention to staples and where material is stapled to the frame
- Look inside at all wood parts of the frame
- If the piece is highly infested, consider disposing of it in a proper manner

Inspecting the Room Perimeter

- Inspect everything hanging on the walls. If framed art or photos are present and there is evidence of bed bugs nearby, open the frame to inspect inside or under the paper backing
- Check under loose wall paper and areas of peeling paint
- Take down curtain rods and inspect inside them and underneath hardware on the walls
- Look at closet, bathroom and other door frames, along hinges, and in the bore hole for the latch on each door
- Make a note if bed bugs are found on walls. Ceiling lights and fixtures with bed bugs could indicate that they are moving from the upper floor unit
- If bed bugs are on walls, they may hide under ceiling moldings and in smoke detectors and thermostats

Inspecting the Room Perimeter

- Once established, bed bugs will spread toward the perimeter of the room (walls, moldings and rugs) and can also hide among items stored under beds
- Look at moldings or the joint between the floor and wall closest to the bed
- Use the crevice tool to check behind moldings. The tool will chase bed bugs out of hiding if used in a sweeping upward motion
- Fold back the edges of wall-to-wall carpets to inspect for signs of bed bugs
- Pay attention to the tack strip of carpets
- Look under the edges of area rugs
- Using a screwdriver, remove electrical switch and outlet, and phone jack plates to inspect. If bed bugs are hiding in these areas, signs may be evident along the edges and on the back of the plate

Inspecting Unusual Locations

- Television and other remote controls, in the battery compartment
- Telephones, cell and cordless phones
- Lamps and alarm clocks
- Computers and other electronics
- Cardboard boxes in closets and under the bed
- Children's toys and stuffed animals
- Jewelry boxes
- Brick walls and "popcorn" or other textured ceilings
- Books, magazines, newspapers and files
- Inside hollow doors
- Ceiling light fixtures, smoke detectors
- Heating units, air conditioners and ducts
- Wheelchairs

Now that we know what they look like...

- What they are capable of....
- And where to find them....
  - Now, what do we do??

Bed Bugs in Apartments

- Bed bugs can invade even the most luxurious apartment communities
- An inspection of a unit should be conducted prior to occupancy and periodically throughout a lease term
- Contract a pest management professional (PMP) and create a community-wide bed bug awareness program

What to Look for When Hiring a Pest Management Professional (PMP)

- The pest management company should be licensed by the state and insured
- Technicians should be fully licensed in the state and certified pest management professionals
- The company should be a member of a professional organization, such as the National Pest Management Association
- The Company should have a staff entomologist or access to one
- Technicians should have experience with bed bug management
- Choose a company based on their quality of service, not the price
- A pre-inspection should be conducted to assess the scope of the work
- The proposed work should follow the steps of integrated pest management (IPM), not just pesticide application
- Understand what guarantees are being offered

Integrated Pest Management Approach (IPM)

- Inspect infested areas, plus all surrounding living spaces
- Correctly identify the pest as a bed bug
- 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
- Physically remove bed bugs through cleaning
- Pesticide use, carefully and according to the label directions
- Follow-up inspections and possible treatments
- Raise awareness through education on prevention of bed bugs
  - Prevention through education of clients, residents, facilities managers and landlords
  - You want people to know what bed bugs are, what the signs are, how bites can look different on different people, how some people do not have itchy reactions but may have infestations all the same, how bugs can be very hard to find and catch

Things to Include in Your Bed Bug Awareness Program

- Printed literature describing bed bugs and their evidence using color pictures
- Make sure the document is available in English, Spanish and other languages and go over it with them in person to make sure that they know what to look for
- Signs posted near the dumpster warning residents about bed bugs in discarded furniture and show how to mark or damage infested furniture so people will leave it alone
- Notices encouraging tenants to report bed bug infestations right away and let them know they will not be penalized or charged for bed bug treatment unless they fail to provide access to their apartment, or do not cooperate with bed bug management efforts and requests by the PMP
- Give a copy of your bed bug action plan to each resident, so that they understand what will take place in their apartment during bed bug treatment and let them know their responsibilities regarding access and preparation of their unit
- Place signs in laundry area warning residents not to put bed bug infested plastic bags in the trash and these bags need to be put in the dumpster outside

Responsibilities of Residents

- Read and follow all guidelines given by building management for reporting signs of bed bugs, and for cleaning and room preparation
- Cooperate with staff and management in preventing and controlling bed bugs whether your individual living space is infested or not
- Know the signs of bed bugs and check constantly for signs of them in your living space
- Encourage other tenants to follow guidelines and cooperate with management

Responsibilities of Building Management and Staff

- Encourage tenants or guests to report bed bugs (unreported and uncontrolled bed bugs will spread quickly)
- Keep records of bed bugs (or other pest) complaints on site in a log book
- Respond quickly to complains with an inspection and intervention
- Develop an aggressive bed bug control protocol with elimination as the goal
- Raise tenant or guest awareness about bed bugs and how to prevent them
- Institute a prevention program, centered on awareness
- Refer tenants and guests to the proper sources of help (medical, mental health, financial, and social services)

Management should keep information records for all types of pests, including:

- Date of the complaint
- Type of complaint (bites, bug sightings, damage to property)
- Unit or room number
- Date of first pest inspection
- Results of the inspection, what was found, how much was found
- Dates of pest management activities
- What pest management strategies were used, such as cleaning, pesticide treatments, resident education

Recommended Inspection Tool Kit

- Magnifying glass (preferable a 10 power)
- Strong flashlight (preferably a bright LED-type)
- Plastic zip-top bags for collecting specimens
- Tie-type plastic garbage bags
- A probe, such as a “credit card tool”, made by cutting any plastic card into a long triangle, for check in narrow spaces
- Pyrethrin or compressed air (for cleaning computers) for flushing bed bugs from cracks and crevices
- Screwdrivers for removing light switch and electrical plates
- Other tools (a small tool kit) for disassembling furniture
- Alcohol, glass-cleaning or baby wipes, for evidence that stains are bed bug droppings
- Cotton swabs for checking stains in crevices
- Sticky traps may be useful if placed under the bed and check regularly.

Preparation of a Room for Treatment

- Remove (but not move into an uninfested room) all blankets, sheets, covers, pillows, bath towels, and drapes/curtains from the bed and room and place them into bags for transport to the laundry
- Empty drawers and closets and place belongings into plastic bags. Place all clothing and coats into bags for transport to the laundry. Shoes, pillows, and children's plush toys should be bagged for the laundry
- Plastic toys, books, electronics, and anything that cannot be washed should be bagged separately for inspection
- The room should be empty of all cloth and plush items, except plush furniture. If possible, the pillows of plush furniture should be removed and laundered
- Move furniture at least 18 inches away from the walls (people may need help with this)

Preparation of a Room for Treatment

- Make sure the pest control professional can get to all furniture, closets, beds, and baseboards to inspect and treat
- Seal all clothing and linens in large clear plastic bags. Clear bags are good because bed bugs can be seen inside them
- Seal shoes, coats, pillows, children's plush toys, and small rugs and mats in large clear plastic bags
- Personal belongings should be inspected carefully, cleaned, and sealed in plastic bags or bins. Do not use cardboard boxes, bed bugs can hide in folds and will deposit eggs there
- All clothes, linens, pillows, shoes, coats, and children's plush toys should be treated by placing them into a HOT dryer for 30 minutes. Do not overstuff the dryer, heat must reach all items

Preparation of a Room for Treatment

- Remove outlet covers and switch plates on all walls
- Picture frames should be removed from the walls and cleaned or treated
- People and pets must leave the area during treatment and wait the stated amount of time before reentering, usually 4 hours
- If there is a fish tank in the household, it should be covered with a towel or plastic, because fish are very sensitive to pesticides
- All clothing, linens and other items must be cleaned (free of bed bugs) and kept isolated until the client is moved to a new room or location, or until the bed bug problem is eliminated
- Keep cleaned items separate from items that have not been checked or cleaned

Preparation of a Room for Treatment

- Unless you are sure that there are no bed bugs on personal belongings, these should remain in the bag or bin until they can be carefully inspected or washed
- The room should be emptied of all personal belongings and floors thoroughly vacuumed with a brush attachment (which should later be washed in hot water and detergent)
- The mattress and box spring should be vacuumed to remove any live bugs and debris and immediately encased or prepared for treatment – any bugs which happen to be inside are entombed and eventually will die
- Hard furniture, floors, and walls should be washed liberally with soapy water
- Outlets and electrical switch plates should be opened and inspected for signs of bed bugs, but not washed!
- Wash in and around any non-electrical heating units (such as steam pipes or radiators)

Treatment for an Infestation

A combination of the following steps will be needed for bed bug control:

- Clean and organize the bed, bedroom, other living areas, furniture and belongings, including elimination of clutter
- Physical removal of bed bugs and eggs using a vacuum
- Barriers, such as mattress encasements and sticky barriers (sticky traps may be useful for monitoring but will not help control bed bugs)
- Steam (to kill all life stages)
- Heat or cold treatments (to kill all life stages)
- Remove any wild animal roosts and bird nests that may be on or around the home or apartment

Treatment for an Infestation

- Eliminate bed bug hiding spots
  - Fix peeling wallpaper and paint
  - Caulk or seal cracks and crevices around the room and on furniture
  - Seal floors or the spaces between floor boards or tiles
  - Make other repairs to the living area to reduce hiding spots
- Chemical applications
  - Low risk pesticides
  - Professional use pesticides
  - Professional fumigation
- Prevention of reinfestation

Teamwork

Hard Work

Constant Vigilance