



BED BUGS 101: PRACTICAL “DO IT YOURSELF” PROCEDURES FOR TREATING PERSONAL ITEMS INFESTED WITH BED BUGS

Notes compiled from recent literature by Allegheny County Health Department,
Housing & Community Environment Program, 2018

Bed bugs, *Cimex lectularius* L., are a fast-growing pest of public health importance in the United States. In multi-family housing units, bed bugs spread by active dispersal between apartments, by bed bug-infested furniture being brought into the building, by travel, resident turnover, and by visits from friends & family of residents. Recent research found that 53% of apartments that were adjacent to infested apartments were also infested. In addition, 50% of the interviewed residents who had infestations were unaware of the bed bug problem in their own apartments.¹ Clearly, there is an urgent need for public education, early detection, and adoption of more effective bed bug monitoring and intervention programs to curb the exploding problem of bed bug infestations.

The Allegheny County Health Department has witnessed the desperation and suffering that people endure as a result of bed bugs. The following are some practical suggestions gleaned from published research on dealing with bed bugs. We hope these ideas help residents and landlords begin to deal with the problem and encourage them to implement a thorough, comprehensive bed bug control program with a commercial pest control contractor.

- 1) It takes a lot of time & effort to get rid of bed bugs. They can hide inside of anything and may survive without feeding for one year. Do not assume they are gone until 8 weeks have passed since the last bite.
- 2) You do not need to throw away a perfectly good mattress. Instead, clean & treat the mattress, then purchase a high quality, bed bug proof encasement for your mattress and box spring (“Protect-a-Bed”, “Mattress Safe”, etc.). Bed bug traps (“Climb up”, etc.) placed under the legs of the bed, catch bugs before they crawl on or off the bed. They also help you see how well your control effort is working.
- 3) Female bed bugs glue their eggs in hidden areas, making it difficult to remove 100% of them with a vacuum cleaner. Move & scrape the crevice tool along seams, folds and along the edge of wall-to-wall carpet. Discard heavily upholstered furniture. Remove clutter to eliminate bed bug hiding spots.
- 4) Bed bugs survive cold temps well, but do succumb to heat. Cleaning laundry in water at least 160°F is effective on all life stages. Tumble drying on hot cycle (120°F) for at least 30 minutes. Some items may go in the oven on low (120°F) for several hours. Dry cleaning chemicals kill bed bugs.
- 5) Pesticide products labeled for bed bugs will kill bugs on contact. A combination of liquid spray, dust & aerosol pesticide formulations is best. Rubbing alcohol may kill bugs on contact, but it is flammable and has no residual effect. Two essential plant oil pesticides, “Eco-Raider” and “Bed Bug Patrol”, with clove, peppermint, cedar, and geraniol, have proven almost as effective as commercial grade pesticides.² They work slower but kill all stages, including eggs and provide residual effect on cotton for several days. To date, they are only sold on the internet and e-commerce (Home Depot) websites.

Mattresses, box springs, luggage and small furniture may be treated with a “Hot Shot Mattress & Luggage Treatment Kit” available online and in hardware stores. The kit contains a pesticide strip and a large sealable plastic bag. Items sealed inside the plastic bag are exposed for 7 days to a controlled-release vapor of an organophosphate pesticide called Vapona (also known as Dichlorvos or DDVP). It kills all stages of bed bugs. Always follow the directions for use on the label.

- 6) Items that cannot be laundered or treated with conventional pesticides may be treated with heat from a heat gun, hair dryer, or commercial grade steam cleaner.
- 7) According to a 2013 study, DEET, the most commonly used insect repellent, provided a high level of repellency against bed bugs. When a host cue (carbon dioxide) was present, the minimum DEET concentration to repel $\geq 94\%$ of the bed bugs for a 9-hour period was 10%. The longevity of repellency of DEET was concentration dependent. However, DEET has a strong smell and dissolves certain plastic materials.³

¹ Changlu Wang, Kurt Saltzmann, Eva Chin, Gary W. Bennett, and Timothy Gibb, “Characteristics of *Cimex lectularius* (Hemiptera: Cimicidae), Infestation and Dispersal in a High-Rise Apartment Building,” *Journal of Economic Entomology* 103 (Feb. 2010): 172-177.

² Narinderpal Singh, Changlu Wang, Richard Cooper, “Potential of Essential Oil-Based Pesticides & Detergents for Bed Bug Control”, *J. of Economic Entomology*, 107 (6) 2014.

³ Changlu Wang, et al., “Repellency of Selected Chemicals Against the Bed Bug,” *Journal of Economic Entomology* 106 (Dec. 2013): 2522.

Excerpt from “Sleeping with the Enemy” by Walecia Konrad
Published 7/10/09 in the New York Times

ENCASE YOUR MATTRESS ... All bed bug experts agree that you must encase your mattress and box spring with a durable, leak-proof cover that will trap existing bugs inside the bedding and prevent new bugs from entering. (Even if you don't currently suspect bed bugs, you might want to do this preventively, if you live in a highly infested area.)

The best covers are made from tightly woven cloth and have enclosed zippers and zipper locks to ensure there are no openings anywhere on the covering. A good cover will cost \$70 to \$150, depending on the size of your bed. Don't bother with cheaper covers made of vinyl, which is uncomfortable to sleep on and is likely to crack and tear over time.

BEFORE YOU TOSS ... Often, the first response to bed bugs is to throw stuff out. But replacing contaminated furniture, clothes and other possessions can be one of the biggest unnecessary bed bug expenses.

“Nothing kills bed bugs and their eggs better than high temperatures,” said Mr. Bloom, “so the dryer is your new best friend.”

Bedding, clothes, stuffed animals, backpacks and anything else you can fit into the clothes dryer can be decontaminated by 20 minutes on the high setting. Carry the items to the dryer in a cloth laundry bag that you can throw into the machine. If you use a plastic bag, discard it immediately; bed bugs or eggs might be lurking.

For items that can't go in the dryer, consider packing them in plastic bins or bags and storing them for a year to make sure any hidden insects die.

For furniture and other large items, you may want to consider a professional fumigation service that will decontaminate the items away from your home and return them within a week or so. This can easily add \$1,000 to your bed bug bill. But for antiques, heirlooms and other hard-to-replace items, it may well be worth the cost.

Use interceptor cups/traps on furniture that may be infested with bed bugs

Unless they are feeding, bed bugs like to remain hidden from view. Unfortunately, bed bugs are attracted by the carbon dioxide you exhale while sleeping.

Interceptor cups are designed to trap bed bugs while they're moving from their hiding places to their food source. The cups work on the principle that bed bugs can effectively move over rough or textured surfaces but are helpless to climb smooth surfaces. The cups consist of a smaller inner container and a larger outer container. Bed bugs are able to enter these traps (either from the infested bed or from their hiding places in walls, floors and other areas of the home) but are unable to escape them. By placing a trap under each bedpost (or each leg of an infested piece of furniture), you can effectively trap bed bugs while you and your family sleep.

You can find commercially manufactured traps at certain online retailers, but most have not been proven effective by reliable testing methods. You can also make your own interceptor trap using such common household materials as plastic food containers, masking tape and talcum powder (or car polish). The University of Florida Institute of Food and Agricultural Sciences (UF/IFAS) posted an instructional video on how to construct these traps.

These interceptors are great tools for monitoring furniture you suspect may be infested and confirming if you have a bed bug problem that requires professional treatment. They will not catch bed bugs that are already present on the same side of the trap as the host, and the most common places to find bed bugs are on the headboard and mattresses.

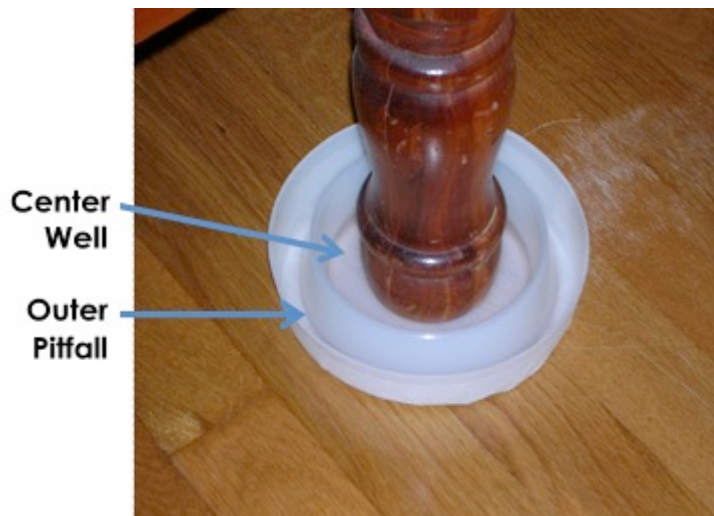
Climbup™ Insect Interceptors are just one of many types of bed bug traps that are sold on-line and at local hardware stores, such as Lowes and Home Depot.

Installation: When handling the devices only touch the outer wall of the device. The inner walls are pre-lubricated with talc which can be easily rubbed off when handled.

- Place Climbup™ devices under each leg of the furniture where people sleep or rest (beds, sofas, armchairs etc.) so that the leg rests within the center well of the device (See figure 1). Eliminate all other pathways for bugs to access furniture. “Bridges” for bed bugs to travel on will be created if the furniture is touching a wall or another object, or anything is hanging off of the furniture onto the floor. For example, all sheets and comforters should always be tucked in, and no items should be allowed hang down and touch the floor. All electric cords should be disconnected between bed and wall. Any items on the furniture that are touching the floor or wall will provide bed bugs a “bridge” to access the furniture bypass the Climbup™ devices. It is important that the only avenue onto the furniture is via the legs that are contained within the Climbup™ insect interceptor.

- The monitors should be left in place for a minimum of 21 days to provide the best opportunity to intercept bed bugs as they move around your home. Ideally, the monitors should be left in place indefinitely so that they are continually monitoring for bed bugs.

Figure 1: ClimbUp Trap set under the legs of a bed.



These recommendations are provided only as a guide for managing bed bugs until a more comprehensive program is implemented by a professional pest control contractor. It is always the pesticide applicator's responsibility, by law, to read and follow all label directions for any pesticide being used. No endorsement is intended for products mentioned, nor is criticism meant for products not mentioned. The author and the Allegheny County Health Department assume no liability resulting from the use of these recommendations.

If you have any questions about the products or information provided in this document, please call the Housing and Community Environment Office at 412-350-4046.