

Bed bugs have been around for centuries. The earliest historical citations go back to 423 B.C. In the United States, bed bugs were thought to come over with the first explorers and were quite a problem until the first major advance in bed bug control was introduced in the late 1930's - Chlorinated Hydrocarbon / known as DDT.

Prior to the 1950's bed bugs were common pests in many households throughout the United States and got their name because of their preferred habitat, mattresses, couches, easy chairs and other soft furnishings where people relax.

Treatment using DDT, Chlordane and Lindane were used in mass quantities to remove bed bugs from our lives and they were no longer the menace that they are resurging as today. We got a break for about 40 years from bed bugs until the late 90's where they started to show up in hotels, apartment complexes, businesses and homes throughout many countries including documented cases in Australia, Canada, Europe and parts of Africa.

As the years continue to pass, the numbers of new sightings and the severity of bed bug infestations continue to grow exponentially throughout the world. Known for their "elusive behavior", proper bed bug identification and elimination is an ongoing process of education.

IDENTIFICATION, DESCRIPTION AND PHYSICAL CHARACTERISTICS

Bed bugs, scientifically known as *Cimex lectularius* (Cimicidae) are small wingless insects that have a flattened dorsal. Bed bugs have evolved as "nest" parasites from inhabiting the roosts of bats and nests of birds' centuries ago. Since bed bugs feed upon warm blood, we as humans are perfect hosts.



The common bed bug (*Cimex lectularius*) has five developmental life stages. Each immature life stage (called nymphs or instars) must take a blood meal in order to develop into the next life stage. Because bed bugs, like all insects, have their skeleton on the outside of their body (exoskeleton) they have to shed their exoskeleton in order to grow larger. This shedding of the exoskeleton is called Ecdysis or molting. After molting its translucent, soft-body is exposed and within a couple of hours, the cuticle hardens and darkens. Since growth is constrained by the rigidity of the exoskeleton, it is during this short molting phase that the bed bug grows. A bed bug in any stage must take a blood meal to molt into the next stage successfully. After growing through five instar molts,

the bed bug becomes an adult. Adult bed bugs, both male and female, must also take regular blood meals to reproduce.

The development process from an egg to an adult can take place in approx. 22 to 36 days at optimal temperatures (72° F). In most abstracts written about bed bugs you will find that adult bed bugs have a remarkable ability to survive from 4 months to 2 years depending on regular access to blood meals and favorable temperatures. But newer data and test are being conducted daily throughout the world on "new generations" of bed bugs and their previous findings are now questioned.



It is very important to know what bed bugs look like compared to similar insects as the treatment options and costs are very different. The adults can easily be seen with the naked eye. Adult bed bugs are reddish brown in color, wingless, and are about the size of an apple seed.

Although Bed bugs move swiftly in horizontal and vertical positions, they don't fly and they don't jump. But they move fast!



The youngest stage of life and the most difficult to see is the first instar nymph freshly hatched. Newly hatched nymphs are translucent, pearl whitish in color and become browner as they molt and reach maturity. These first nymphs are so small that they are difficult to see unless they are moving or have recently fed (bright red when full of blood).



Unless you are Superman, the bed bug eggs are not very visible with the human eye and are similar to the size of a poppy seed. These eggs are encased in a sticky substance. The eggs are a pearl white translucent color and have obvious eyespots only when older than 5 days.



Depending on their feeding status, bed bugs look very different. An unfed bed bug looks more like a flat disk but when after taking a blood meal they increase in size to approx. 3 to 4 times that of their original size. Fully fed, the bed bug takes on the shape of a torpedo with an elongated trunk bright in color. As digestion progresses the bed bug darkens in color and flattens out until the next blood meal.

Depending on the extent of infestation and usually only in severe infestations, bed bugs are known to produce a peculiar musty sweet odor.

NOTE: Bed bugs are relentless and have the tenacity of a bull.

Bed bugs are sloppy housekeepers leaving telltale signs whenever they are present and wherever they go. They congregate in colonies, excrete liquid fecal matter (old blood meal) and molt where ever they please.

SLEEPING AND HIDING HABITS



As their name implies, bed bugs are commonly associated with areas where we sleep but may spread to adjacent rooms. Bed bugs usually move via hitchhiking and often hide within 15 feet of bedding areas but can move more than 100 feet to obtain a blood meal.

Bed bugs can live in the seams of mattresses, bed frames, headboards, and box springs, but they are not just in beds. They can be in chair cushions, sofas, behind electrical outlets, cracks and crevices around baseboards, behind wall paper or picture frames and in or under any clutter or objects near a bed or lounging area.

Being unique in their hiding ability and that some people sustain no adverse reaction to the bites, they can go unnoticed for a long time or until a serious infestation occurs. That is why inspection and treatment methods need to be more thorough. Once settled in, bed bugs do not like to be disturbed, so low to moderate infestations are found in areas less likely to be disturbed. Instinctively, they will seek shelter in dark cracks and crevices when they are disturbed.

Sanitation has nothing to do with whether you get them or not. Bed bugs don't care if it's clean or dirty. They prefer constant temperatures (i.e. paper, cloth) and do not like drafty areas where there is air movement and will move from those areas. They love rough materials, unfinished wood, paper, cloth and dark areas hidden away in cracks and crevices. It is not uncommon to find a lone isolated bed bug in a certain area. Like vampires in the night, these insects normally lay dormant during daylight hours in small cracks and crevices and come out at night to feed on blood. Peak activity usually occurs from midnight to 7:00 A.M. Cluttered areas have significant impact on how efficiently you eliminate them.

REPRODUCTION "WE HAVE A PROBLEM HOUSTON"



To fight the war against bed bugs, it is important to know the bed bug's life cycle and to understand their reproduction habits. Bed bugs reproduce through "traumatic insemination", and their cycle of reproduction is very high. The male pierces the abdomen of the female and ejaculates into the body cavity. Some male bed bugs attempt to inseminate other male bed bugs. They release an alarm pheromone consisting of (e)-2-octenal and (E) -2-hexenal to repel the attempt.

Theoretically, the female bed bug can lay from eight to twelve eggs a day or 200 to 500 eggs in a life time. Once the eggs have been laid, they can take from 3 to 10 days to hatch. Their development will be rapid, growing to full size adults in approx. 22 to 36 days. So if your new pests go unnoticed and continue to reproduce, a fully-fledged stage 3 infestation can occur within 120 days.

Warm weather and high humidity will cause bed bugs to go through their life cycle faster so if you live or travel to hot and humid places take extra precautions for bed bug introductions.

BED BUG FEEDING HABITS AND BITES

Bed bugs are drawn by warm temperature and carbon dioxide and feed on exposed skin while you sleep. A bed bug pierces the skin of its host with two hollow feeding tubes called proboscis. With one tube it injects its saliva, which contains anticoagulants and anesthetics, while with the other it withdraws the blood of its host, yet the person seldom knows they are being bitten.



Bed bugs are known for “dining and dashing”, once bed bugs have a full blood meal they scurry off quickly to return to their hiding place dropping their last meal as fecal matter on the way as they digest their fresh blood meal.



Some people do not react to bed bug bites and others can retain serious rashes or even blisters. Even two people sharing the same bed can be affected differently. The skin lesion produced by the bite of a bed bug resembles those caused by many other kinds of blood feeding insects, such as mosquitoes and fleas. Therefore bed bug bites, can rarely be identified by the appearance of the bites alone and the culprit must be found to be positively bed bugs. Approximately 50 to 70% of people develop an allergic reaction to the saliva injected by the bed bugs as they feed. This reaction usually results in small, flat or raised bumps, red swollen and itchy skin. If scratched, the bite areas can become infected.

HEALTH EFFECTS

Due to the decline of bed bugs in the later part of the 20th century, research on public health effects of bed bugs has been very limited. To date there is no empirical evidence showing that bed bug bites cause any transfer of disease or the spread of any pathogens.

However, there is evidence that secondary infections from bed bug bites can cause significant problems for the victim:

- severe inflammation and serious rashes
- bulbous or blistering eruptions, staph infections or impetigo
- allergic reactions
- potential serious immune problems in sensitive people
- anemia and iron deficiencies (especially with babies and young children)
- anxiety and severe loss of sleep

According to the University Of Florida Institute Of Food and Agricultural Sciences’ Department of Entomology and Nematology, bed bugs are “suspected” carriers of leprosy, oriental sore, Q-fever, and brucellosis but have never been implicated in the spread of disease to humans.

Repeated exposures to bed bug bites during a period of several weeks and months can cause some people to become sensitized to the saliva and continued bites may result in mild to intense allergic reactions.

Bed bugs may also affect the mental health of people living in infested homes. Reported effects include anxiety, insomnia and systemic reactions.

FINANCIAL ECONOMICS, SOCIAL IMPLICATIONS, EDUCATION

Society is feeling the financial economic burden of bed bug infestations. Increasing daily, the economic losses from treatments for elimination, health care, lost wages, lost business revenue and reduced productivity can be quite substantial. It is important to correctly identify and inspect for live crawling bed bugs since many other bugs are frequently mistaken for bed bugs.

The economic cost of bed bug treatment versus other pests is like night and day. The very nature of the bed bug sets it apart from the rest. Multi-family home control is much more difficult than in single family homes because bed bugs frequently travel between units, either by direct human transport or through

voids in the walls. There are additional costs and complexities associated with coordinating and encouraging participation from multiple residents. This means battling bed bugs is remarkably different from other bugs in cost and treatment. Once infected it is critical to ensure that the bugs are correctly identified by an independent and competent source BEFORE you attempt to take action. Being that bed bug infestations are hard to eradicate it's often quite expensive to gain control in even small households once an infestation has taken hold. Adding to the financial burden is the fact insurance companies are not pitching in to alleviate costs.

THE SOCIAL IMPLICATIONS OF BED BUGS

The social implications of bed bugs are a serious threat to the public's state of health. From the encounter of the bed bug, to the public's compromised health, to social stigma, isolation and stress, to the financial economics attached to them. The implications of this bed bug epidemic worldwide will continue to have serious adverse outcomes as time goes on if we do not take the time to educate the masses in ways to treat against and prevent infestations BEFORE they occur. Health problems:

- Allergic reactions
- Secondary infections/antibiotics/scaring
- Losing sleep
- Losing weight
- Sickness and reactions to pesticides
- Physical and emotional daily stress Loss of personal belongings/credibility:
- Like a house fire, some people have to get rid of items infested and purchase new

If renting and have to move out – risk “bed bugs” following you and reputation Social Stigma:

- Being “black listed” from going to a friend's house, work, church, school
- Friends not wanting to come to your house
- Identity impact: The feeling of being “dirty” beat up, or cornered
- The feeling of degradation
- Obsessive behavior
- Sense of shame and fear Panic (attacks)
- Isolation
- Family disruption
- Anxiety
- Decreased quality of life for household
- Desperation
- Embarrassment “Branded”
- Fear of traveling or socializing

These reasons and barriers can throw people into serious financial, emotional, health crises, or breakdown.

Once the general public worldwide becomes aware of the serious implications of bed bug infestations, collectively, we can all take the necessary steps to prevent the spread and protect our future. There will be no more fingers pointing to who carried them in and who is responsible to take them out.

MISUSE OF TOXIC PESTICIDES

Bed bugs infesting United States households on a scale unseen in more than a half a century have become largely resistant to common pesticides. As a result, some home owners and pest control operators are turning to more hazardous chemicals that can harm the central nervous system, irritate the skin and eyes, cause cancer, fires and explosions.

Also, pest control operators have fewer weapons in their arsenal than they did just a few years ago because of a new law that requires older pesticides to be re-evaluated based on more stringent health standards. The re-evaluations led to the restriction of several pesticides.

Some bed bug populations have developed a resistance to pesticides that are used today. Also, there was evidence of pesticide resistance many years ago. <http://www.cdpr.ca.gov/docs/listserv/sub1113.htm>

Desperate people have tried to kill bed bugs by applying extremely toxic lawn-and-garden chemicals and even flea and tick bombs inside their homes.

TOXIC PESTICIDES AND ALTERNATIVE METHODS OF TREATMENTS

Most toxic pesticides pose more dangers than any perceived short-term benefit for bed bugs. Even pesticides registered by the U.S. Environmental Protection Agency (EPA) for bed bug use are linked to acute poisoning, cancer, hormone disruption, asthma, neurotoxicity, organ damage, and more. Ohio deemed its state an “emergency” in 2009 and asked the EPA for an unregistered use of Propoxur. Propoxur is a neuro-toxin and a cancer causing insecticide that has been denied usage from the EPA.

(CAUTIONS), such as this one is posted on widely used pesticides Do NOT apply any insecticide or pesticide to mattresses or to surfaces that would be in direct contact with a person, unless the label instructions specifically state that the product can be applied in that manner. Some products can be harmful to people, pets the environment, and to your home. READ and UNDERSTAND the instructions and warnings on the label.

The environmental impact of using toxic pesticides goes beyond what we can fathom. When pesticides were first introduced, they also were heralded as absolutely safe and as a miracle cure for consumers and farmers. Decades later the technology has revealed its truer lethal implications. Here the potentially lethal implications are much broader. The following list of pesticides are also divided into several easily referred-to sections, namely on health, environment. <http://www.beyondpesticides.org/gateway/about.htm>

METHODS OF BED BUG TREATMENTS

Toxins-Pesticides: Natural and synthetic pyrethrins: derived from dried Chrysanthemums. Unfortunately, there is documented proof that a certain strains of bed bugs have developed a resistance to pyrethroids.

Dusts: (Wikipedia) DE Diatomaceous earth is a naturally occurring, soft, siliceous sedimentary rock that is easily crumbled into a fine white to off-white powder. It has a particle size ranging from less than 1 micron to more than 1 millimeter, but typically 10 to 200 microns. This powder has an abrasive feel, similar to pumice powder, and is very light, due to its high porosity. Diatomaceous earth consists of fossilized remains of diatoms, a type of hard-shelled algae. It is used as a mechanical insecticide. DE works by dehydrating bed bugs. This can take sometimes up to 3 weeks. DE should not be inhaled or placed where there is a possible breeze that can blow it around. It is not advised to use it on fabrics, couches and mattresses.

Fumigation: Fumigation is done by using toxic gases (e.g., sulfuryl fluoride). Your home or premises is emptied of people and pets and is tented like the tenting for termite fumigation. Not only will bed bugs be eliminated but other pests as well. Fumigation for bed bugs uses more the normal doses used in treatments for termites in order to kill all stages of bed bugs. Residents must move from the premises for a few days or until the gas concentration drops below toxic levels. There is no lasting residual effect to protect against future infestations and the cost is quite a bit higher than termite fumigation. Sadly enough bed bugs could have hitchhiked along with you when you left and can be re-introduced when you re-enter.

Heat: Bed bugs are very sensitive to and are rapidly killed when exposed to high heat. There are machines designed to heat up a room with temperatures that range between 113 ° -140 ° F (Anything not dishwasher proof has to be removed) It takes time to reach those temperatures and the bed bugs may scatter and hide

deep in cavities of walls while it is heating up. (It takes patience and time to reach these temperatures) As we experience more and more bed bug infestations, these companies have developed accurate methodologies and trainings to reach optimum temperatures and their success ratios using this method have climbed. Heat is a perfect non-toxic way to remove bed bugs in sensitive area like hospitals, schools and elderly care facilities.

Freezing: Some companies offer a “dry ice” treatment for bed bugs which can work well for “spot” treatment. As long as the bed bug or eggs are directly hit, it may work but will not work where bed bugs hide in the walls and between cracks and crevices. Bed bugs are cold-blooded insects and can hide in hibernation in seasonally used homes unheated until spring. Several factors come into play when considering using freezing treatments for bed bugs. Bed bugs will succumb to freezing conditions as long as these temperatures are maintained for a length of time. Seasonally used property must be prepared to avoid damage to plumbing during this time.

Steam: Again if the bed bug were sprayed directly by the steam with low water vapor and high heat it would be instantly killed. One problem with vapor sprays is if the operator doesn't know what they are doing and the volume is too strong it can “blow” the bed bugs and larva around. Complete bed bug control cannot be achieved by steam alone and is usually used for furniture and bedding. Pest control operators use a succession of a strong vacuum first to remove castings and live bugs then follow-up with a hot steam to remove eggs and remainder of the bed bugs before applying encasements’.

Bed bug detection dogs:

Bed bug detection dogs are specially trained by professional handlers to identify the scent of a bed bug. Finding bed bugs can be quite a challenge and with the increased focus of “green pest control”, bed bug detection dogs are becoming increasingly popular. Detection dogs have a keen sense of smell and are able to detect odors in parts per million. Being agile, and fit where humans don't, the bed bug detection dog can detect bed bugs' eggs, nymphs and adults in small and hidden places where bed bugs hide. In has been noted that a professionally trained bed bug detection dog is very effective in finding bed bugs and valuable for post treatment to make sure all bed bugs are gone.

LEGAL RESPONSIBILITY FOR PROPERTY MANAGERS AND LANDLORDS

In addition to dealing with bed bugs in our homes there are increasing law suits daily regarding people getting bit while traveling to hotels, time shares, hostels, businesses and rentals. Bed bug legal decisions have gained the attention of the nation with several lawsuits claiming millions of dollars in compensatory and punitive damages. People pursuing compensation are suing for negligence, recklessness, fraud, intentional infliction of emotional distress, nuisance and deceptive trade practices and are claiming that the bed bugs have caused lasting physical and mental problems.

To date, there are no “rules” regarding bed bugs and their resurgence and whether you can sue, or not, if you do get bit by one. But as infestations grow, new policies and procedures, and standards of care are being developed by state agencies, municipal health agencies, and housing authorities.

Governor Davis Patterson from New York State signed into law the Bed Bug disclosure act which forces landlords to disclose a one-year history of bed bug infestations. New fines are being levied to those who discard bed bug infested furniture into the streets and alleys.

Landlords and property owners face an entirely different set of problems and have specific legal obligations to provide safe, inhabitable accommodations for tenants. Having bed bugs are certainly not in that category. They do not have daily access to accommodations as do hotels. They are solely responsible to inform tenants on how to identify a bed bug and what steps to take to prevent infestations. Since bed bugs are such great hitchhikers, the problem begins with not being able to control who visits the property. New leases are being printed across the US that tries to hold renters responsible for sharing the obligation

of bed bugs and having to cooperate with landlords and owners. Overtime, this battle will work its way through courts and litigations.

To Schedule a FREE Consultation with a Bed Bug Removal Specialist:

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