



BED BUGS

The Issues, Challenges and Facts

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Bed bugs have resurged in the last decade, damaging business reputations and bottom lines. Take control with a smart action plan—before the bed bugs bite.

FROM NURSERY RHYME TO MEDIA DARLING

In a 2010 bed bug study, 95 percent of U.S. pest control companies surveyed reported finding at least one bed bug infestation in the past year.¹ And 2011 isn't looking any different. In fact, at Rollins, we performed over 8,000 bed bug treatments in the first quarter alone.

Bed bugs continue to sweep the news and are on the rise in almost every environment, from the bedroom to the board room. A quick Google search on bed bugs reveals nearly 4,000 news results in 2010, and their search volume is up 450 percent in the past six years (*see graph: "Bed Bugs" Google Search Volume*).

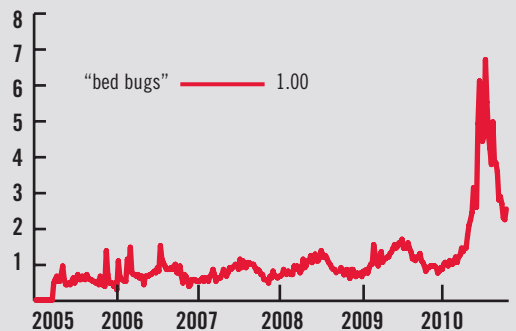
Thought to be introduced with the early colonists, reports of bed bugs resurged about a decade ago in hotels and homes. Researchers attribute the resurgence to increased international travel and fewer broad-spectrum pest control options. In addition, bed bugs have been able to build up a resistance to insecticides.²

Now bed bugs can be found anywhere there are people and especially high turnover rates, such as offices, apartments and dormitories. A 2010 analysis of the U.S. pest control industry showed pest specialists treated for bed bugs primarily in single-family homes, apartments and hotels/motels (*see graph: Type of Customer Account Treated*). But in the past few years, we've treated for them in places that may surprise you—movie theaters, trains and even ambulances. That said, with all the media mania, what's a business to believe?

The objective of this report is to help sort through the media hype and truly understand the challenges and facts around bed bugs—as well as ways to prepare for and address bed bug issues, should they arise.

¹National Pest Management Association and the University of Kentucky (2010, July 26). 2010 Comprehensive Global Bed Bug Study.

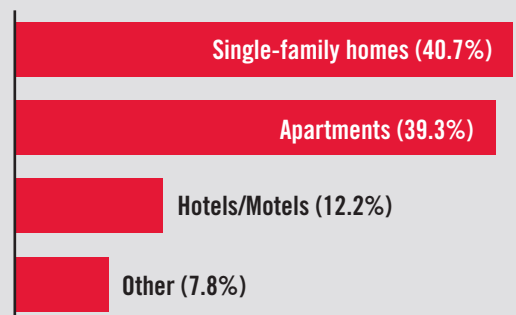
"BED BUGS" GOOGLE SEARCH VOLUME



Source: Google Trends

Scale is based on average, worldwide traffic for the search term "bed bugs" from January 2004 to December 2010.

TYPE OF CUSTOMER ACCOUNT TREATED

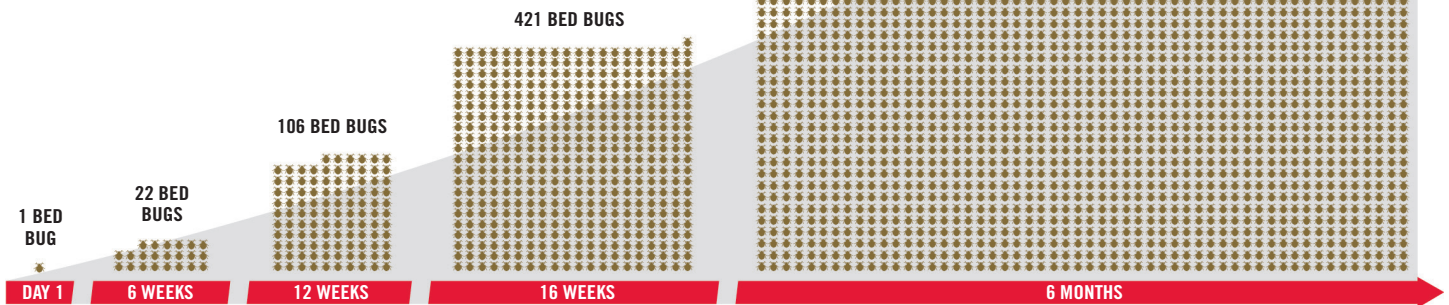


Source: Specialty Products Consultants, LLC. (2011). A Strategic Analysis of the U.S. Structural Pest Control Industry: The 2010 Season.

A POTENTIAL INFESTATION

This graphic illustrates unimpeded life cycle replication under ideal conditions based on published scientific literature.

One adult female that lays eggs on day 1 can lay 7 eggs per week for 52 weeks. After 30 days, the first hatchlings have matured and can begin laying eggs at the same rate. Assuming each hatch includes 4 male and 3 female offspring, this is a picture of what the infestation could look like.



Source: Certified Orkin Entomologist research data, © 2011 Orkin, LLC

BED BUGS 101

Before we explore bed bugs' business impact, it's important to understand more about the pests themselves. Bed bugs are small, wingless insects about the size of an apple seed. They are attracted primarily to carbon dioxide from living organisms, which bed bugs can detect four to six feet away from the source. They are also attracted to body heat and feed on human blood when possible, but are also known to feed on pets. Nocturnal in nature, they come out at night to feed when people are sleeping. They can live for long periods—more than a year—without a blood meal, their only food source. Both males and females feed on blood whereas with some insects, like mosquitoes, only adult females feed on blood.

Bed bugs are elusive creatures, often found in mattresses and box springs, behind headboards and in couch cushions or other soft furniture. They can “hitchhike” rides on clothing or luggage, leading to their spreading. To find evidence of bed bugs, look for tar or rust-colored stains and the cast skins (empty shells bed bugs shed as they grow from one size to the next) they leave behind on bedding, soft furniture, in buckling wallpaper, carpet, on wall surfaces and around or behind wall switch plates.

²Kolb, A., Needham, G.R., Neyman, K.M., & High, W.A. (2009). Bedbugs. *Dermatologic Therapy*, 40:347-52.

³Goddard, J. & DeShazo, R. (2009). Bed bugs and clinical consequences of their bites. *Journal of the American Medical Association*, 301(13):1358-66.

A MISUNDERSTOOD MYSTERY

A conversation about bed bugs can often present more questions than answers—from concerns around public health to sanitation implications. After more than a decade treating bed bugs, here are the facts from our vantage point:

- **Although bed bugs have been found to carry more than 30 different human pathogens, there is no evidence that they transmit disease to humans.**³ Some people can experience skin irritations from bed bug bites or, in areas of high infestation, respiratory issues, but many do not react to the bites at all.
- Bed bug presence has nothing to do with cleanliness or an establishment's sanitation practices. Bed bugs can be found anywhere there is a food source (typically where people are). However, clutter *can* hide bed bug introductions, which can lead to more severe infestations.
- Bed bugs cannot be completely prevented because people can bring them into an establishment at any time on their personal belongings. Once inside, they can spread quickly (*see graph: A Potential Infestation*). Early detection and treatment is the best thing a business can do in the absence of true prevention options.
- Bed bugs can be found anywhere, not necessarily just in beds. We've seen bed bugs in living rooms, kitchens and even outside of hotels and homes—from trains to planes.

The average amount a bed bug victim ... could expect to receive in an out-of-court settlement is \$8,000 to \$10,000.

RESPONSE AND RESPONSIBILITY

Bed bugs can present a challenge for a business because they are so elusive and transient. Proactive detection is key because once an infestation occurs, bed bugs can spread quickly and so can word of an outbreak. An angry customer or poor online reviews can spark media attention that can ultimately harm a business's reputation and bottom line—one bed bug infestation caused the actual closure of a Hollister shop in New York in July 2010. And according to *USA Today*, bed bug fears and awareness are on the uptick, with mentions of the pests soaring 11 percent for U.S. hotel reviews on TripAdvisor.com between 2009 and 2010.⁴

Apart from damaging publicity, litigation can be another costly concern for business owners. Proving an establishment does or does not have bed bugs can be a gray area. Everyone reacts differently to bed bug bites, and sometimes people don't react until a week later. A landmark 2003 case awarded two bed bug victims \$382,000 for bites sustained in a Chicago motel room. More recently, in January 2011, a Waldorf-Astoria guest filed a \$10 million bed bug lawsuit against the luxury hotel. The average amount a bed bug victim at a hotel could expect to receive in an out-of-court settlement is \$8,000 to \$10,000,⁵ according to Christian Hardigree, a lawyer and professor of hospitality law at the University of Nevada at Las Vegas. Hardigree also recommends business owners obtain specific supplemental insurance for bed bugs, as most general liability policies will exclude damages as a result of bed bugs. While proactive pest control service comes with a cost, the potential costs of litigation and insurance claims could be much greater.

Another issue that businesses should keep in mind is responsibility when it comes to bed bug remediation. Apartments, for example, have a tough time with bed bug treatment because there is a delicate balance between the resident's and property manager's responsibility to treat the infestation. Sometimes residents don't want (or feel they don't have) to cooperate. Because bed bugs can spread so easily, it's imperative that a potential infestation is resolved quickly, so time is of the essence.

THE BOTTOM LINE—AND PROTECTING YOURS

There's no question that bed bugs can negatively impact a business. But the fact remains that proactive detection can help protect an establishment from these pests.

We have a long history of understanding bed bug management, having treated for bed bugs since the early 2000s, when they first began to reappear in numbers. Experts with years of bed bug experience train our pest specialists at our award-winning, national training center. We also supplement this training with localized field training. Outside Rollins, we work closely with scientists, researchers, manufacturers and academia on the latest technology and treatment options for bed bugs. The University of Kentucky, University of Minnesota, Ohio State, North Carolina State, University of California, Texas A&M, University of Florida and other leading learning institutions have all helped us stay ahead of the curve when it comes to bed bug research and development.

We continue to invest heavily in field testing, tracking and quality assurance to constantly refine our bed bug processes and procedures. In the next section, we will address detection and remediation techniques that we have found to be most effective for our clients.

OUT OF YOUR CONTROL?

Over the past few years, we have seen a real shift in bed bug management from remediation of an infestation to proactive detection. As a business, you can control bed bugs today but unfortunately they may be brought in on luggage, clothing or in used furniture tomorrow.

Should a business suspect a bed bug infestation, it's important to have a licensed pest control company inspect because a bed bug's reproduction rate is astounding. A female can lay over 400 eggs in her lifetime, which has been known to span one year. This means that in six months, an unchecked infestation can proliferate into more than 13,000 bed bugs (*see chart: A Potential Infestation on page 2*).

⁴De Lollis, B. (2010, Sept. 2). Bed bug mentions soar 11% this year on TripAdvisor. *USA Today Hotel Check-in*.

⁵Miller, K. (2007, Nov. 8). The cost of bedbugs. *Bloomberg Businessweek*.

⁶Pfiester, M., Joehler, P.G., & Pereira, R.M. (2008). Ability of bed bug-detecting canines to locate live bed bugs and viable bed bug eggs. *Journal of Economic Entomology*, 101(4):1389-96.

THREE ADVANCED DETECTION OPTIONS

Let's explore three options for detection: visual inspection, DNA testing and canine inspection.

1 Visual Inspection

If a business suspects it has a bed bug problem, a traditional inspection from a trained, licensed pest control company is a critical step. The pest control operator should conduct a thorough visual inspection focused heavily on the bed, surrounding furniture, carpet edges, baseboards, curtains and cracks and crevices. The customer should also be involved in the inspection by removing clutter as recommended by the pest control company and providing access to areas where bed bugs may hide. The provider may recommend monitors for any areas that have had past bed bug infestations and in adjoining rooms. There are many types and designs of bed bug monitors available: one type has an attractant that will help determine bed bug presence, while another type, a passive monitor, provides the insect a place to hide and be trapped. Monitoring can help determine if bed bugs are present and how well the last service was performed.

2 It's in Their DNA

One of the most exciting advances in bed bug technology is DNA testing. We can now determine whether bed bugs have been in a room by swabbing areas of the room for their DNA. The upside of DNA testing is that it's extremely reliable and provides a history of what occurred in that area. It also allows a business to keep a room, or other areas of an establishment, out of service for a much shorter period of time. **The DNA test is 99.7 percent effective in detecting whether bed bugs are currently or have been in the room.** You can narrow the activity dates if the room is properly denatured and wiped down (to establish a sterile environment or baseline of zero) prior to sampling. However, DNA testing requires very thorough swabbing, and results can take 24 to 48 hours to turn around. From a liability standpoint, DNA provides businesses with real data and confirmation of bed bug presence (or the lack thereof) in a particular room or area. So if one of your customers claims there's a bed bug problem, you can use DNA swabbing to investigate whether the claim is true or false. This is advantageous for businesses that want to protect their brands.

3 Sniffing Out the Problem

Another enhancement to traditional inspection is canine detection. Used for years to locate people trapped in buildings, sniff out bombs, locate drugs and even find termites, canines' keen sense of smell can also detect live bed bugs and viable eggs when properly trained. A canine inspection can be done quickly, which is a great benefit to clients who wish to keep areas out of service for shorter periods. And, it's extremely effective. Researchers from the University of Florida report that in a lab setting, well-trained dogs can detect live bed bugs with 98 percent accuracy.⁶

A SNAPSHOT OF DETECTION OPTIONS

Visual Inspection

A visual inspection should focus on the bed and surrounding area.



DNA Testing

DNA testing is 99.7 percent effective in detecting whether bed bugs currently are or have been in the room.



Canine Inspection

Well-trained dogs can detect live bed bugs with 98 percent accuracy.





TREATING WITH HEAT

Heat treatment is especially effective for sensitive environments. During treatment, heat is pumped continuously into the area with a trailer or mobile heat-generating unit (shown above).

Canine inspection may not be ideal for every establishment. Some businesses have restrictions that do not allow canines into their facilities. Another consideration is that canines only sniff areas along the floor. So, if the air current is moving away from the dog, it potentially won't be able to pick up the scent of bed bugs more than a few feet above the floor. That's why it's important to pair canine inspection with a well-trained handler and think of it as a team approach to detection.

When it comes to bed bugs, remember: **a dog and technology can help find the problem, but it requires a well-trained technician to help solve the problem.** Let's take a look at three treatment options that we believe are the most effective.

TREATMENT OPTIONS

The 2010 Comprehensive Global Bed Bug Study reported that 76 percent of pest control companies surveyed said bed bugs are the most difficult pest to treat.¹ While we agree, new technologies are helping providers fight back.

Conventional Treatment

Traditional chemical bed bug treatment remains the most common form of remediation. We use non-toxic, alcohol-based products to kill bed bugs in any areas that come into contact with humans. Inside hard furniture or wall voids, or

in other areas unlikely to have any human contact, we use products registered by the EPA for use against bed bugs to provide control. Product labels acknowledging registration are available from the technician.

Heat Treatment

Heat treatment is also an effective bed bug treatment option, especially for sensitive environments that prefer not to use traditional control methods.

Heat penetrates areas three-dimensionally in the cracks and crevices of mattresses and furniture. Depending on the infestation's location, the provider will use a trailer or mobile heat-generating unit to pump heat into the area.

For a heat treatment to be effective, you must reach a high-enough temperature, creating a low relative humidity over a minimum length of time.⁷ At Rollins, we recommend a core temperature of 125°F for a minimum of one hour. Because the treatment is difficult to conduct and may present a fire hazard or cause damage to furniture if not managed correctly, only a trained, licensed professional should perform heat treatment.

As a client, there will be several items you'll be asked to prepare ahead of heat treatment, such as moving electronics or turning off sprinkler heads. Your provider will help assess whether your establishment is suitable for heat and whether you need to prepare any areas before treatment begins.

ENCASEMENTS: AN EXTRA LAYER OF PROTECTION

To help stop bed bug infestations from spreading and help guard against future infestations, we recommend clients use mattress, box spring and pillow encasements. Encasements for other furniture such as sofas, love seats and recliners may be used as well.

⁷Harlan, H., Faulde, M., and Baumann, G. (2008). Bedbugs. In: Bonnefoy, X., Kampen, H., and Sweeney, K. *Public Health Significance of Urban Pests*. Copenhagen: World Health Organization. 131-154.

RECOMMENDATIONS AND OUTLOOK

Bed bugs are becoming an increasingly serious problem, and the fact is they are more a reality than media hype. It's important that companies do what they can to protect themselves. Although bed bugs are everywhere and can pose a significant risk to businesses, an establishment can help protect itself by being proactive and having a bed bug program in place *before* a crisis occurs.

We recommend three action steps when it comes to managing bed bugs within your establishment:

1. **Establish a bed bug risk management plan.**
2. **Educate your employees.**
3. **Communicate with your service provider and follow their instructions and guidelines.**

Establish a Bed Bug Risk Management Plan

If a customer, guest or resident claims they were bitten by or have seen bed bugs, would you know what to do? It's critical that businesses have a bed bug risk management plan in place. Companies should work with their providers and legal departments as needed to develop policies customized to their establishments. Whether training employees to be observant, inspecting proactively or treating reactively, document everything.

Business owners need to understand their insurance—and their vendors' insurance. Make sure to also review the details of the pest control provider's service agreement. Lastly, from an employee relations standpoint, it's important to understand the human resources implications of bed bugs, and establish a bed bug policy for your employees. For samples of bed bug plans and policies, and more information on litigation and risk management, visit bedbugbusinessplan.com.

Educate and Communicate

Businesses should train their staff to recognize the signs of bed bugs. Some pest control providers will offer this training free of charge. Encourage employees and maintenance staff to monitor for bed bug signs and alert the provider immediately. Should they spot a bed bug or telltale signs, or worse, report an infestation, your pest management professional needs to provide a thorough inspection and work with you on a plan for remediation.

For more information on education and communication, including webinars, resources on how employees can help spot bed bugs, tenant and resident education tip sheets and other helpful videos, visit the bed bug section of orkincommercial.com or bedbugbusinessplan.com.

Bed bugs aren't going away anytime soon. **The bottom line on bed bugs: act now. Knowledge and preparation will go a long way toward protecting your bottom line.**

ADDITIONAL RESOURCES

National Pest Management Association
www.pestworld.org/bed-bugs

Environmental Protection Agency
www.epa.gov/pesticides/bedbugs

Centers for Disease Control & Prevention
www.cdc.gov/nceh/ehs/Topics/bedbugs.htm

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