

“DO NOT DISTURB”

The lyrics from The Eagles’ legendary hit song Hotel California — “You can check out anytime you like, but you can never leave!” — not only resonates with classic rock fans across the globe, but also offers an ironic commentary on the challenges currently facing the hospitality industry when it comes to a most unwelcome guest — *bed bugs*.

Bed bugs check-in and check-out in the luggage, clothing and backpacks of unsuspecting guests all across America every day of the year. And their presence in hotels, motels and resorts has been a major problem for managers, front desk personnel and housekeeping staff at large and small properties alike, creating a significant market opportunity for PMPs willing to think outside-the-box when developing control programs for these ubiquitous pests.

The resurgence of bed bugs started nearly a decade ago and the cost to the hotel industry can be measured in lost revenue, costly litigation and broken brand images. A recent University of Kentucky study surveyed more than 2,000 frequent business and leisure travelers to determine their preferences when choosing a hotel and how bed bugs influence their decisions.

The report revealed that on average a single report of a bed bug lowers the value of a room by \$38 per night for business travelers and \$23 for leisure travelers, respectively. The study also showed that the monetary value for travelers’ concerns about bed bugs makes it one of the most important considerations when select-

ing or grading a hotel on Internet review sites.

This should make hotel general managers and operations directors sit up and take notice because business travelers represent the industry’s most coveted market segment since they offer the potential for repeat business and are willing to pay a premium price for quality accommodations.

When asked what they would do if they read an online review of a property that mentioned bed bugs, the majority of both business and leisure travelers, not surprisingly, responded they would book a room elsewhere. And what happens if a guest finds evidence of bed bugs in their room after checking in? The study identified three actions that typically occur:

1. Guests ask to switch rooms and receive additional compensation (room upgrade, discounted rate, etc.).
2. They would leave the hotel.
3. They would report the incident on social media.

While the first two actions represent a direct loss of revenue to the individual property, the third action has much larger ramifications, posing a significant threat to the corporate brand. The swift current of social media makes a negative post — whether accurate or not — a real concern for hoteliers, as evidenced by a recent article in The New York Times referencing pro basketball player Kyrie Irving’s encounter with bed bugs at an Oklahoma City hotel, stating, “In an age of online reviews and social media, what was a quietly simmering issue has become a potentially toxic problem for hotels.”

The hospitality industry is under siege from bed bugs. Could a preventive treatment program be the answer to managing populations, while lowering treatment and litigation costs?

By Jeff Fenner



Hotel managers also must be concerned about ending up on the wrong side of a lawsuit brought by unhappy guests. A recent settlement in Chicago saw a brother and sister awarded \$382,000 after being attacked by bed bugs while staying at a Chicago hotel and a guest at a budget hotel near Washington, D.C., was awarded a \$100,000 settlement following an encounter with bed bugs.

What does this all mean for hotel managers? Co-author of the University of Kentucky report Dr. Michael Potter says the hospitality industry is caught between a “rock and a hard place” when it comes to bed bugs. Constant guest turnover and the ability of bed bugs to hitchhike from location to location will inevitably lead to periodic bed bug infestations in all types of accounts, from five-star resorts to local bed-and-breakfasts. The key is to identify the problem before it gets out of hand, according to Potter.

“Many hotel chains already take bed bugs seriously in terms of prevention and early detection,” Potter says. “The results of this study underscore the importance of hotel management being hyper-vigilant when it comes to bed bugs.”

A CHALLENGING FOE. What is it like battling bed bugs in a hotel? The in-house pest management manager for a major national hotel chain knows the challenges all too well, but it hasn't deterred him from thinking “outside-the-box” to diminish the bed bug threat.

This individual, who agreed to talk on the condition that his name not be used because of the sensitive nature of the topic, has four decades of experience in the pest management industry, owning and operating his own pest control company before joining the hotel chain 20 years ago.

The hotel, a large convention facility in the southern United States that attracts both domestic and international travelers, started seeing increased incidents of bed bugs in its sleeping rooms a number of years ago. The veteran PMP knew it would take a multi-faceted approach to get the problem under control, as well as ongoing training of the hotel's housekeeping staff.

“It took a little while to convince company executives that training housekeepers and other staff that work in guest rooms to report bed bug sightings was the way to go, but it ultimately paid off,” he says.

RESEARCH FROM OHIO STATE INDICATES PYRETHROID-RESISTANT BED BUGS LAY FEWER EGGS WHEN EXPOSED TO ACTIVEGUARD

Products that claim to control bed bugs have been on the market for years. Some work, and some don't. Dr. Susan Jones, a professor of entomology at Ohio State University, knows this as well as anyone, after having tested many such products for years.



While there have been some flops in the past, she and her colleagues have found one that looks promising as a new tool for bed bug control programs. The results of their research are published in an article in the *Journal of Medical Entomology*.

Active mattress liners sold under the trade name *ActiveGuard* are impregnated with an insecticide called permethrin, which is considered safe for humans and other mammals. Permethrin — which belongs to a class of pesticides called synthetic pyrethroids — is found in medical creams to treat scabies, shampoos for head lice, and it's the active ingredient in some flea-control products for dogs and cats.

In recent years, however, some bed bug populations have developed resistance to some synthetic pyrethroids and related pesticides, making them less lethal. But for Jones and her team, killing bed bugs is only one part in the effort to control them.

“Death doesn't have to be the end-point that we measure in studies,” Dr. Jones said. “Physical or behavioral changes can significantly affect the impact of bed bugs before death even occurs.”

One of these things is fecundity — the bed bugs' ability to lay eggs and reproduce. In order to lay eggs, female bed bugs must first have a bloodmeal, so the Ohio researchers set out to test *ActiveGuard's* effects on bed bug feeding.

“Feeding in bed bugs and fecundity are very tightly coupled,” Jones said. “If a female bed bug doesn't feed, then she is unlikely to lay eggs, and if she doesn't lay eggs, then the life cycle is interrupted.”

Surprisingly, they found the *ActiveGuard* fabric to be extremely effective, even with bed bug populations that were resistant to pyrethroids. Bed bugs that were exposed to the fabric for ten minutes were significantly less likely to even attempt feeding compared to those on untreated fabric, and the majority were unable to feed successfully. Even when they were successful, their bloodmeals were only half the size of bed bugs that were not exposed to the fabric.

Even more surprising, out of 52 females tested, only one laid a single egg.

“We were totally shocked, and we were also shocked by how quickly we started seeing these sublethal effects,” Jones said. “After just one minute of being on the fabric, their probing behavior was reduced, and by ten minutes they just weren't feeding much. If a female bed bug doesn't feed, she doesn't lay eggs.”

The researchers do not yet know how or why the *ActiveGuard* fabric affects female bed bug feeding and fecundity — it may disorient or irritate them, but at this point that is only speculation.

“We are still trying to figure out what is going on,” Jones said. “That will be a future paper.”

Previous research by Dr. Jones showed that *ActiveGuard* was very effective at killing some bed bug populations, but was less so with ones that were resistant to synthetic pyrethroids. The results of this study suggest that even sublethal exposure can have far-reaching consequences.

READ MORE AT: Sublethal Effects of *ActiveGuard* Exposure on Feeding Behavior and Fecundity of the Bed Bug (Hemiptera: Cimicidae)

(Source: *Entomological Society of America's Entomology Today*, www.entomologytoday.org)

Supplier's note: Allergy Technologies understands that the active ingredient used in the product, permethrin, is best characterized as compatible with human use. Further, while frequently used in pest control products for flea control in dogs, permethrin is not to be used in conjunction with cats.



Dr. Susan Jones

The in-house manager took the initiative to train the housekeeping staff, instructing them to call him immediately if they suspected a bed bug problem in a room, offering a \$5 reward for every bed bug sighting that was confirmed before it came to the attention of a guest — money well spent in his opinion. The initiative was an instant success, resulting in a number of calls that paid dividends immediately, although he warns that training must be constant since turnover is high among housekeeping staff.

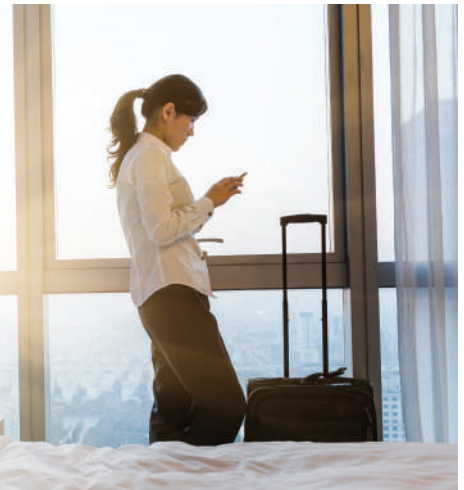
In addition to staff training, the in-house pest manager also inquired about ActiveGuard Mattress Liners after seeing an ad for the product in a national trade magazine. As a test, he installed the liners — which are impregnated with permethrin — in a handful of rooms with known bed bug infestations, and within 45 minutes to an hour the bed bugs were lethargic and soon after they were dead.

“ActiveGuard features a unique and proprietary delivery system that offers

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sustained bioavailability of permethrin for two years,” observes Dr. Jim Ballard, owner of Ballard Pest Management Consulting, which conducted some of the early field trials of the product. “New research from Ohio State University (see related story,

page 112) supports that after limited exposure to ActiveGuard of only 10 minutes, bed bugs — regardless of their level of resistance — begin to show significant reductions in feeding and a dramatic inability to lay eggs.”



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A STEP FORWARD. The initial success of the preventive program, along with some additional in-house testing, led the longtime PMP to propose to upper management that they acquire liners for all 1,600 sleeping rooms. “I had to show them investing in active mattress liners would justify the cost of the program,” he says, “reducing their litigation costs and the costs associated with compensating and relocating guests due to bed bugs.”

He knew the liners would pay for themselves over time and while the upfront \$100,000 investment was sizable, it was less expensive than settling multiple six-figure lawsuits with guests. “Corporations and management companies are initially hesitant to lay out this type of money on a commodity because they can’t visibly see the profit they would get in return,” he says. “But once they see the long-term financial savings they don’t need convincing anymore.”

He hired an outside firm to install the liners on the box springs where most of the activity was taking place, and marked the date they were installed — a process that took nearly two months. Now he has all the hotel’s beds and mattress liners on a regular rotation program. “We get the necessary residual control for up to two years and we catch the majority of activity before it gets out of hand,” says the in-house pest manager, who also oversees the work of a national service provider that visits the property weekly. “I can honestly say we don’t call it a bed bug infestation any more, we just call it bed bug activity.”

THE FUTURE. There is no “magic bullet” when it comes to solving bed bug problems in hotels. Active mattress liners, however, do provide a proven preventive solution when combined with other IPM techniques, including regular monitoring, according to the in-house PMP. For example, if a hotel management company is taken to court over a bed bug issue the opposing counsel likely will ask, “What did you do to prevent bed bugs in the facility?”

“If the company has installed active mattress liners in the rooms they could point to a very specific action that was taken to protect their guest without inconveniencing them,” according to Joseph Latino, president of Allergy Technologies. “And it could be an action worth its weight

DO THE MATH

The financial impact bed bugs have on hospitality clients can be significant...and not in a good way. The costs, both to the bottom line and to the brand, can be steep and reach into six figures. In the following cost-benefit analysis, Allergy Technologies illustrates how after an initial up-front investment, *ActiveGuard* Mattress Liners can save a hotel a significant amount of money over the long term.

Joseph Latino, president of Allergy Technologies, describes two hotel scenarios below. The first represents the savings realized by installing *ActiveGuard* on box springs throughout a 1,600-room hotel; the location referenced in an advertorial appearing in the December 2015 issue of PCT entitled, “*ActiveGuard* Mattress Liners for Bed Bug Control in a Large Metropolitan Hotel” and discussed by the in-house pest management manager quoted in this article.

The second scenario represents a more prototypical hotel setting of 200 rooms/400 beds. Even in these modest-size accounts, Latino says, the savings can be substantial for a pest control company’s hospitality clients.

Assumptions	Hotel Featured in Advertorial	Hypothetical Smaller Hotel
Room revenue per diem	\$200	\$150
Number of rooms in facility	1,600	200
Average number of beds per room	2	2
Number of infestations per year	100	12
Number of rooms removed from service per infestation	5	5
Number of days of lost revenue per infestation	7	7
Cost for pest management services per infestation	\$1,000	\$500
Cost of <i>ActiveGuard</i> per room (2 liners at an annual cost pro-rated over two-year life of product)	\$80	\$80
Illustration based on number of <i>ActiveGuard</i> Mattress Liners installed:	3,000	400
Lost revenue (at 80% occupancy) per annum due to infestations	\$560,000	\$50,400
Pest management costs	\$100,000	\$6,000
Total cost per annum	\$660,000	\$56,400
Cost of <i>ActiveGuard</i> per year amortized over two years	\$128,000	\$16,000
Savings per annum	\$532,000	\$40,400
*Projected savings per annum if <i>ActiveGuard</i> prevents 80% infestations	\$425,600	\$32,320

in gold in front of a judge or jury.”

PMPs can play a key role in curbing the severity of bed bug problems in hospitality accounts by developing and marketing preventive programs that focus on key hot spots like the mattress and box spring. “We know they (bed bugs) like to congregate on the bed skirt and with an active mattress liner covering the box spring it stops them from going

any further,” says the in-house pest manager. “And I know it’s saved our hotel a lot of money by preventing additional bed bug treatments, taking rooms out of service and providing customers with complimentary rooms after they’ve encountered a bed bug infestation in their room.” **PCT**

The author is a frequent editorial contributor to PCT.