

The Affordable Housing Resource Guide

The complete bed bug resource guide for
Affordable Housing Associations



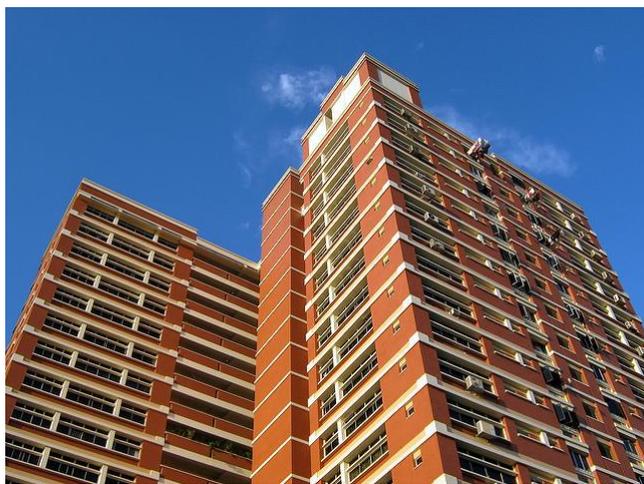
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Bed Bugs in Public Housing

Bed bugs have been plaguing public housing for years and yet it seems to be becoming more and more difficult for management to get ahead of the situation. However, for several housing authorities across the United States, interceptors and lures have made a tremendous impact on their ability to detect and inspect for bed bugs.

“Bed bugs being found in more than 10 percent of apartments within public housing is becoming more common and these building-wide infestations can be extremely challenging to correct,” said Jeffrey White, BedBug Central’s Director of Innovation and Technical Content. “Many times tenants aren’t proactively reporting the bed bug problem, which allows the infestations to incubate and become extreme by the time they are found. When infestations become extreme the bugs often spread to other units within the building which can end up costing thousands of dollars to properly treat.”



According to Rutgers University’s Dr. Changlu Wang, “The early detection of bed bugs is essential to helping prevent the spread of bed bugs in buildings. The best approach for early bed bug detection is to conduct periodic monitoring within buildings with bed bug infestations. Pitfall style interceptors are cost effective tools for detecting bed bugs.”

With so many housing authorities facing persistent bed bug infestations, what are some ways that they can get ahead of the situation? Are there ways to slow the spread of infestations within multi-unit buildings?

Top bed bug experts explain just how beneficial bed bug pitfall interceptors and lures can be within the Affordable Housing industry.

What is a Bed Bug Pitfall Interceptor?

A pit-fall styled interceptor is a trap used to capture bed bugs while they are moving throughout an environment. Depending on the type of interceptor, it can either be used under-the-leg of beds and furniture or placed next to the furniture legs, along baseboards or within corners in a room. The bugs will climb up the interceptor and then be trapped within the interceptor, whether it is an under-the-leg or free-standing.

What is a Bed Bug Interceptor Used For?

As the name implies, an interception device can intercept a bed bug's movement as it travels throughout an environment. As they search for a host, or while they are traveling to or from their resting areas, these devices can capture them.

Actual photo of a SenSci Volcano® bed bug interceptor with a SenSci Activ® bed bug lure used in an affordable housing unit



Photo Credit: Jeff King, Pest Rangers

There are many benefits to using an interception device including:

- Bed bug detection
- Continuous monitoring for bed bugs
- Provide relief to individuals who are experiencing bites by catching the bugs before they enter the bed.
- Rutgers University research has shown pit-fall interceptors to help contribute to control of low-level (10 or less live bed bugs) infestations with mass-trapping.

What Are Under-the-Leg Interceptors?

As the name implies, these interceptors are primarily used under the legs of furniture to capture bed bugs. An example of these are the ClimbUp® or [SenSci BlackOut®](#) interceptors. These pit-fall styled interceptors are typically round in design (although some designs are square) to provide circular coverage around the leg of furniture.

Free-Standing Interceptor Design

As opposed to under-the-leg interceptors, the [SenSci Volcano®](#) is a free-standing device that can be used next to the leg of furniture, along baseboards, in corners, and much more.

Its “volcano-like” style provides the visual cues to attract bed bugs. Along with the sides being angled, they are also a black, textured material that bed bugs typically prefer.

This type of material promotes the continuous movement of bed bugs up the sides of the volcano and encourages the commitment to fall into the trap. Inspection with the Volcano is also very simple because of the clear bottom design. Since the design is so unique and discreet, it offers property management personnel a tool that can be hidden and unknown to their customers, all while providing effective detection of any possible infestations that may occur.

What is an Active Bed Bug Lure?

According to Jeff White, Director of Innovation and Technical Content for BedBug Central, the SenSci Activ® bed bug lure is designed to “mimic the chemicals found on the surface of the skin.” The lure would be equivalent to the attraction of a sweaty t-shirt on your floor for bed bugs. The scent of sweat is one thing that attracts bed bugs to their host.

Dr. Changlu Wang, of Rutgers University, was one of the researchers that developed the SenSci Activ bed bug lure.

“The lure was created to help improve the efficacy of bed bug traps,” he said. “Passive monitors do not have lures. Passive monitors only trap bed bugs when they accidentally encounter the traps. Finding an effective and affordable lure was urgently needed to help detect bed bugs. It is known that bed bugs are attracted to human odor when they search for hosts. The SenSci Activ lure is created to mimic the host odor.”



Research Shows Bed Bugs are TWICE as Likely to Be Attracted to Dirty Laundry

According to research out of the University of Sheffield in the UK, experts found that bed bugs were **twice as likely** to aggregate towards dirty clothes as opposed to clean clothing items!

“In the absence of a human host, bed bugs were twice as likely to aggregate on bags containing soiled clothes compared to bags containing clean clothes,” bug behavior expert William Hentley and colleagues wrote in their report, published in the journal Scientific Reports.

“Bedbugs are attracted to the odor of sleeping humans and we suggest that soiled clothing may present a similarly attractive cue, allowing bedbugs to ‘hitch-hike’ around the world after aggregating in the laundry bags of travelers,” the research article stated.

As bed bugs are traveling through an environment, they will sense the scent from the Activ lure and travel to it. When the lure is placed into an interception device like a SenSci Volcano®, SenSci BlackOut® or ClimbUp®, bed bugs will then fall into the device and be captured.

“SenSci Activ can be used in various types of pitfall monitors such as ClimbUp, Blackout, Volcano,” Dr. Changlu Wang said. “Bed bugs searching for a host will more likely to fall in the pitfall style monitors when the center of the pitfall traps has a lure that is attractive to bed bugs.”

Be sure to place the interceptors equipped with the Activ lure in locations where bed bugs are most likely to travel, such as next to the legs of the bed or along a baseboard near a sleeping or resting area.

Case Study: Using SenSci Volcanos in Public Housing

Looking to stay ahead of any potential bed bug infestations, the [Akron Metropolitan Housing Authority](#) (AMHA) searched for a tool that would detect bed bug infestations before they could spiral out of control in their 5,000 unit housing authority in Akron, OH.

Pest control technicians for AMHA decided that the SenSci Volcano® was the perfect fit for their need because of its versatility as well as the ease of installation and inspection it offered. The interception device soon became their go-to tool when it came to detection before and after treatments.

“We use the Volcanos for detection,” an AMHA pest control technician said. “We get calls from tenants that say they have bed bugs but sometimes we can’t find any evidence of them so we place the Volcanos out to help detect if the bugs are present.”

The technician for AMHA went on to add, “We detected units that had infestations with the SenSci Volcanos that we missed with visual inspections.”

Jeff King, President of [The Pest Rangers](#) in Wilkes-Barre, PA, has single-handedly seen how impactful interceptors and lures have been for the several housing authorities he services.

“When we took over the accounts for the housing authority, we met with management who already had the ActivVolcanos installed from the previous pest control professionals,” King said. “There was no maintenance program set in place with them, so the interceptors and lures that were installed had been sitting for over eight months. To our surprise, the lure was still working and the devices were overloaded with bed bugs!”

King explained that they decided to continue using the SenSci Volcanos along with the Activ lure, developed by Rutgers University, in the high-rise public housing units because they were proving to be an effective pair. Together with management, King developed a maintenance program within the units for the monitors and lures.

“We put together a service for the housing authority,” King said, “and convinced them to start using interceptors and lures in other buildings as well because we had proof that they were working. Once the management saw the products in action and the effectiveness, they believed in it and the program. We continue to have incredible success with the ActivVolcanos in all of our public housing accounts.”



Case Study (continued)



Check out our YouTube Channel for more information!

Click to view our *BedBug TV* episode on *"The Impact of People Not Reporting Bed Bug Infestations."*

In this episode, bed bug expert Jeff White discusses how recent research by Rutgers University shed light on how frequently in multi-family housing situations bed bugs are not reported to management. These infestations that are not reported often grow to large infestations and can serve as a source for building-wide problems.

Walter Rose, an inspector for the [Bering Straits Regional Housing Authority](#), also agrees with both King and the AMHA that interceptors with lures are the perfect combination for an effective bed bug detection tool in their public housing units.

"We chose to use the SenSci Volcano traps and attractant because they work," he said. "They are quickly proving to be a valuable tool for us. Volcano traps enable us to verify bed bugs are present, even in small numbers, before embarking on an expensive, time consuming, bed bug eradication effort. They also enable us to detect and eliminate bugs early, before the infestation gets out of hand."

Both AMHA and King agree the cost, ease of installation and inspection have been major benefits when using the interceptors and lures in their public housing accounts.

"We love using the SenSci™ products in our units because they deliver a quick and easy installation as well as inspection, which helps cut down drastically on our labor," AMHA said.

Even though previous research has shown that as little as one interceptor per unit can help detect bed bug infestations, Wang suggests that housing authorities use more than one interceptor and lure per dwelling.

"Although one pitfall fall trap per room can detect the presence bed bugs in some cases, it is always much better to install more pitfall traps," Wang said. "I suggest installing a minimum of four traps under the legs of each bed or sofa that is used for sleeping. The cost of pitfall traps is low and they can be recycled. To save on the cost of monitors, housing authorities can hire experienced staff or professionals to conduct brief resident interviews and cursory visual inspections first and determine which apartments need monitors."

White added, "The interceptors should be left in place for the foreseeable future because you never know when bed bugs will be introduced," White said, "so having them in place continuously you'll be able to detect infestations early on."

Although interceptors should be left out for on-going monitoring, bed bug lures should be replaced every three months to maintain their effectiveness.



Experts Say Bed Bug Monitors Detect Better Than Visual Inspections for Low-Level Infestations

According to an article in the Journal of Integrated Pest Management titled “[Pest Management Strategies for Bed Bugs \(Hemiptera: Cimicidae\) in Multiunit Housing: A Literature Review on Field Studies](#),” evidence shows that in multifamily housing units preventative bed bug measures are the most effective treatment in reducing the spread of bed bugs among the building.

The article addresses the use of chemical and non chemical treatments, in addition to the importance of ongoing monitoring with bed bug interceptors.

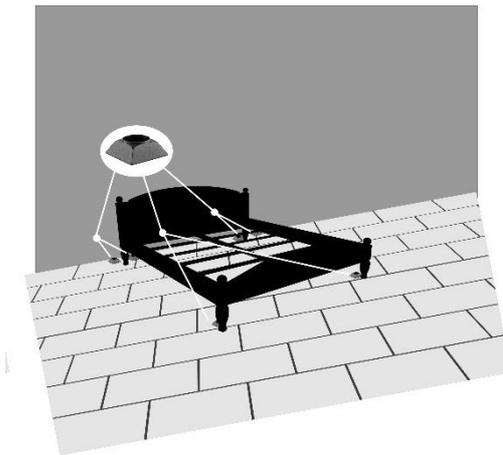
According to the article, most Pest Management Professionals (PMPs) rely on the use of visual inspections to detect bed bug infestations, however, experts state that bed bug monitors can be more effective at detecting low-level infestations than visual inspections.

Nationwide surveys recently revealed that visual inspection is the most common method used by PMPs to find bed bugs (Fig. 4; Potter et al. 2015, Sutherland et al. 2015). Although this method can be time-consuming and labor-intensive, PMPs report that visual inspection is an accurate way of detecting infestations (Sutherland et al. 2015). However, some devices have proven to be useful in detecting bed bug infestations not apparent during visual inspection (Wang et al. 2011, Lewis et al. 2013; D. H. G., unpublished data). Lewis et al. (2013) showed that several detection devices were effective at catching bed bugs foraging within a simulated field environment arena during a 24-h period. Pitfall-type interceptors (such as the ClimbUp Insect Interceptor, Susan McKnight, Inc., Memphis, TN; Fig. 4) are relatively inexpensive and effective tools for detecting bed bug infestations as well as for evaluating the effectiveness of bed bug management programs (Wang et al. 2011, Cooper et al. 2015). Attractant-based traps have also been proposed for bed bug detection (Anderson et al. 2009; Singh et al. 2012, 2013a, 2015). A few studies have compared the effectiveness of visual inspections with that of bed bug monitoring devices in detecting bed bugs in multiunit housing communities (Wang et al. 2009a, 2011). Research conducted in low-income housing suggested that both passive (interceptors) and active traps (with attractants, e.g., CDC3000 Cimex Science LLC, Portland, OR; Night Watch, BioSensory Inc., Putnam, CT; SenSci ActivVolcano™ Bed Bug Detectors with Lures, BedBug Central, Lawrenceville, NJ) were more effective than visual inspections when detecting the presence of small numbers of bed bugs (Wang et al. 2011, 2016; Gouge, unpublished data).

How to Effectively Detect for Bed Bugs in Buildings

Bed bugs are known to travel along seams and edges. Bed bugs will follow baseboards in a room until they gain access to their host on a bed or couch. Therefore, to increase the chance of detecting bed bugs with a monitor, place monitors in areas of suspected travel such as corners of the room or along baseboards near sleeping areas. Monitors should also be placed next to legs of the bed or couch to increase your odds of detecting bed bugs.

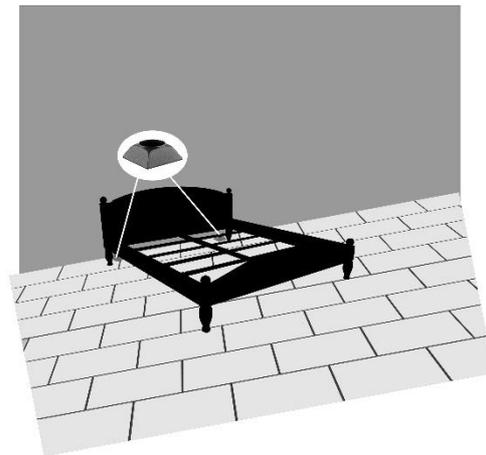
Place SenSci Volcano or ActivVolcano (Volcano with Activ lure) flat on any surface bed bugs are known or suspected to travel or hide. Possible locations include, but are not limited to, along the baseboard and next to bed and couch legs. Inspect the monitor periodically for the presence of bed bugs. If bed bugs are found, dispose of bugs by flushing down the toilet or disposing of them in a sealed bag in an outdoor trash can.



Reactive Bed Bug Monitoring

During or After an Active Infestation – Beds

Place a SenSci Volcano or ActivVolcano next to each leg of the bed as well as on the floor against the baseboard on each side of the bed.

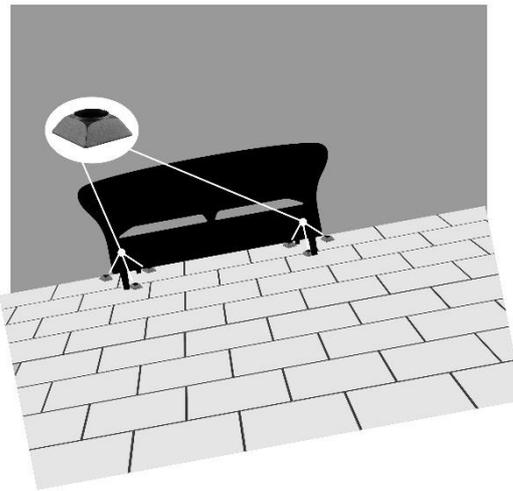


Proactive Bed Bug Monitoring

Ongoing Monitoring – Beds

Place one SenSci Volcano or ActivVolcano next to each leg at the head of the bed (typical bed has 2 head legs).

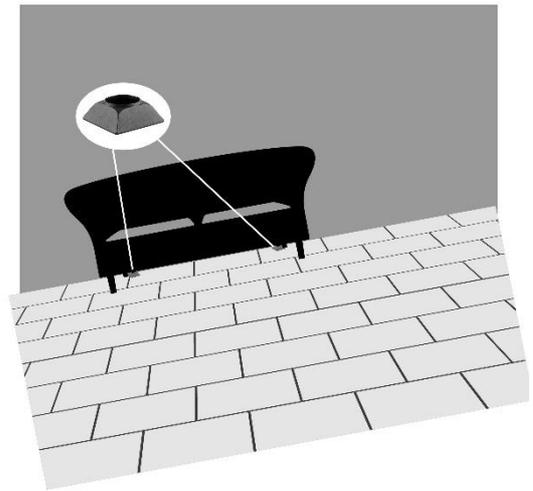
How to Effectively Detect for Bed Bugs in Buildings (continued)



Reactive Bed Bug Monitoring

During or After an Active Infestation – Couches/Furniture

Place a SenSci Volcano or ActivVolcano next to every couch leg as well as on the floor against the baseboard on each side of the back of the couch.



Proactive Bed Bug Monitoring

Ongoing Monitoring – Couches/Furniture

Place one SenSci Volcano or ActivVolcano next to each leg on the back corners of the couch



Learn How to Detect Bed Bugs in Surrounding Units with the Use of Monitors

In this BedBug TV episode, Jeff White highlights how important bed bug monitors can be for detecting bed bugs in surrounding units and slowing the spread of bed bugs throughout buildings.

Bed Bug Mattress and Box Spring Encasements: A Necessity for Affordable Housing

Are you using mattress and box spring encasements for your bed bug treatments or are you skimping out on them? Nationally recognized bed bug expert Jeffrey White explains how important these tools are for treatment but also for early detection in affordable housing units.



What makes encasements so valuable for bed bug jobs?

Jeff White: In essence, they simplify the complicated box spring. Encasements help ease the treatment process when it comes to the box spring because there are so many hiding places for bed bugs within a box spring. They are also able to salvage infested mattress and box springs so people do not have to throw out their bedding in addition to protecting new bedding.

Why should encasements be used in Affordable Housing?

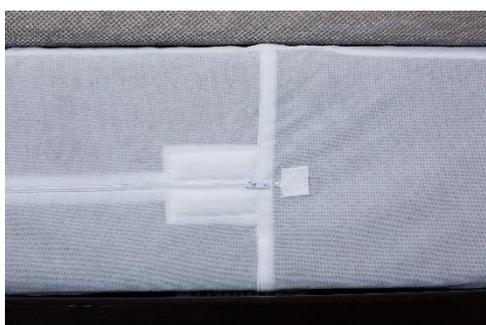
JW: For many people, replacing a mattress and box springs due to bed bugs can be a very costly expense that they just don't have the finances for. By installing encasements, it will help prevent people from having to throw away their mattresses and box springs, unless, of course, they are heavily damaged. Encasements can also be used to help with early detection in units by making the bed bugs more obvious to see on the white surface.

Should encasements be used on every bed bug treatment?

JW: Absolutely, especially on the box spring because they are very complicated in terms to the number of all the possible hiding places that bed bugs have on them. Box springs are also the most common item to find infested inside of a home, so by using an encasement on them, it simplifies the treatment of the box spring and often can reduce the costs by doing so.

What are the benefits to using encasements?

JW: Overall encasements are very beneficial for the Affordable Housing sector for a number of reasons. Encasements help salvage bedding, protects new bedding, makes bed bug treatments easier which in terms reduces time and cost as well as assisting with early detection.



Bed Bug Mattress and Box Spring Encasements

Bed Bug Proof Box Spring Encasement



Q & A with Dr. Richard Cooper on Community-Wide Bed Bug Program

We sat down with Dr. Richard Cooper to discuss his Community-Wide Bed Bug Program, the benefits of the program, obstacles you may encounter and ways to successfully implement the program into your properties.

Question: What is the Community-Wide Program?

Rick Cooper: The Community-Wide Program, also known as the Building-Wide program, is an assessment-based pest management approach to understand where bed bug problems exist within a community and then respond to those problems rather than waiting for residents to report the bed bug infestations.

The Community-Wide approach is moving from a reactionary program to a proactive stance. Most properties tend to wait for residents to report bed bug activity in their apartments then they move forward with treatments. They aren't proactively looking for bed bug infested apartments in the building.

Rather than watching bed bugs continue to spread, reacting to reports and budgets that continue to escalate, as well as infestation rates continuing to climb, community wide is an approach that brings the entire apartment complex under control.

What was your inspiration for doing the community-wide program?

RC: We were looking to identify how to successfully manage bed bugs at a building or community level because, to date, it wasn't being done, especially in the high-rise senior and disabled living.

We chose to work in senior and disabled high-rise affordable housing because they have the highest infestation rates and the highest disproportionate infestation rates compared to other types of housing. They can also have some of the more severe problems.

We were seeing that these communities were failing to bring their infestation rates down. The infestations continued to remain level or increased over time, but there weren't declining. So I knew from my research that the only way you were going to really get control of these buildings was to go in and do this type of assessment throughout the entire building because we were confident there were a lot of problems that existed that either residents didn't know about or weren't reporting for one reason or another. If you couldn't identify those units and the unreported infestations, then the bed bugs would continue to spread throughout the building and you would never get control.

The other inspiration behind the program was that we really wanted to provide a better quality of life for people in these communities. Personally, it was upsetting to see ineffective pest management being done in these underserved communities.



Q & A with Dr. Richard Cooper on Community-Wide Bed Bug Program

We sat down with Dr. Richard Cooper to discuss his Community-Wide Bed Bug Program, the benefits of the program, obstacles you may encounter and ways to successfully implement the program into your properties.

Q: If you were a property manager, how would you recommend implementing the program?

RC: It's an assessment-based program to go out and find where problems exist. The reason it is so important is because our research tells us that the majority of problems (about 2/3 of infestations are not reported), while property managers believe residents would be reporting the problem, the reality of it is that infestations are not being reported. Unfortunately, if you don't know where the infestations are, you can never successfully manage the problem at a building-wide level.

Not all communities are the same so you may need to vary your approach and evaluate the return on investment. My recommendation is that if it is high-rise affordable housing, especially senior and disabled housing, and my known infestation rate was at 5% or more, you need a building wide assessment. The closer and closer you get to a 1% known infestation rate, then it becomes more of a decision on the return of investment. As you approach 5%, if you're not doing it, it's a mistake.

In garden-styled family housing, I may use more of a hybrid approach. You can look at the historic data and apartments that have had bed bugs within the past year, I am going to inspect those units and any neighboring units that share a common wall, floor or ceiling.

By doing this, you are only inspecting a fraction of the community but it's the percentage that is most at risk for spreading bed bugs. Then you're also relying on resident education, which is an important aspect so they can recognize the problem and report the problem.

Q: What type of detection methods are available and how effective are they?

RC: During our research, we discovered that there are very different levels of detection. If you're predominantly relying on resident reporting of bed bug infestations, your detection rate may only be about 26%. If you decide to conduct resident interviews by going to every apartment, that detection rate only improves slightly to 29%.

If you use visual inspections, which can be very labor and time consuming, you can expect to detect anywhere from 50-70% of bed bug infestations. If your building tends to have more of low-level infestations (10 or less live bed bugs) then your visual inspection detection rate is closer to the 50%, whereas if you have more moderate to high-level infestations, that detection rate may be closer to 70%.

By using bed bug interceptors, you can expect to detect 80 to 90% of all bed bug infestations. For under-the-leg interceptors, you can detect up to 90% of infestations in as little as two weeks and free-standing interceptors can detect up to 80% of infestations within four weeks of installation. From our research, the highest detection rates have always been with interception devices.



Q & A with Dr. Richard Cooper on Community-Wide Bed Bug Program

We sat down with Dr. Richard Cooper to discuss his Community-Wide Bed Bug Program, the benefits of the program, obstacles you may encounter and ways to successfully implement the program into your properties.

Q: How can property managers overcome any obstacles in they may encounter with the program?

RC: The biggest obstacle implementing the Community-Wide Program will be dealing with all the infestations you didn't know were there. You need to understand, prior to implementing, financially what you need to do to address the problems that you identify. You have to plan for that but once you have done this, your community will have a very low infestation rate. You are basically stopping the spread of bed bugs and if you're doing an assessment on an annual basis, your costs should drop by 2/3.

Q: What are the benefits property managers can expect once they successfully implement the program?

RC: The benefit of implementing the Community-Wide Program is that the community is no longer suffering from bed bug infestations, you're improving the quality of life and managing your financial expenses associated with bed bug management.

If you don't get it under control, then your annual expenses are going to remain high and the infestations will remain stable or even climb. As a Property Manager, you can continue spending a lot of money every year on treatments and never make any progress on your infestations. Or you can make an investment into assessing the community, identify problems that you didn't know about, address those issues and have long term success while decreasing your financial investment.



Community-Wide Bed Bug Management Program

Multi-Step Process of identifying occupant units within a structure that are infested with bed bugs

- Installation of eight (8) to twelve (12) interception devices (BlackOut®) under the legs of furniture in all units
- Inspection of units at an established time interval after installation at which time units with bed bugs present will be identified
- A distribution study (bed bugs throughout the complex) is submitted to the management of the complex identifying all units with bed bugs present.



Service Program

Establishment of a service program for each of the units with bed bugs present.

Initial Service

1. Installation of additional interception devices throughout the unit (total of 26-28 interception devices to include the original devices installed during building wide inspection)
2. Encasing all mattresses and box springs in bed bug approved mattress encasements
3. Treatment of the unit using no prep service model

Follow-up Service

- Follow-up services every two weeks to include inspection of all interception devices
- Follow-up services continue until six consecutive weeks occur without the presence of bed bugs in the unit

The system described above will be refined during the period of the provisional patent and additional steps may be added.



Model RFP For Complex-Wide Management Of Bed Bugs In Multifamily Housing Communities

This model RFP is based upon results of Academic research regarding tools and methods proven to be effective in the detection and treatment of bed bugs. The specifications for detection and treatment should be updated as new tools and techniques become available and have been proven effective through scientific methods.

The goal of this RFP is not to just outline effective methods to eliminate bed bugs but is also designed to limit the impact that bed bugs have at the community-level within housing complexes. The extent of proactive inspections will vary based upon the infestation rate within a housing community as well as the infestation rate associated with individual buildings within a housing community. At the adoption of this RFP, all buildings within the housing community will receive a proactive inspection to establish the level of bed bug activity that has not been reported. The extent of the proactive inspection will depend upon the known history of bed bug activity with each building. Buildings with a known history of less than 5% bed bug infestation rate over the previous 12 months can receive a brief visual inspection of all units that can be conducted by any trained personnel. Monitoring in buildings with a known infestation rate below 5% can be limited to only those units where evidence suggests bed bugs may exist. Buildings with a known infestation rate of 5% or greater require a more comprehensive proactive inspection.

The model RFP also recognizes that effective bed bug management requires a cooperative effort between property management, the pest management professional, and residents. However, in some cases residents are unable or unwilling to follow important recommendations necessary for the elimination of bed bugs from their apartment. When this occurs, property management must take an active role to support the bed bug management program. Without the support of property management, community-wide success is unlikely to be achieved.

Areas highlighted in red indicates opportunities where costs can be reduced by housing staff carrying out these activities. Any activities that will be carried out by housing staff should be specified with the pricing structure of the bid.

Specifications of Bed Bug Management Program

1. EDUCATION

Education about bed bugs including information on their biology, behavior, prevention, detection, and what to do (and what not to do) if bed bug activity is identified or suspected will be provided on an annual basis to all residents and key staff members, including anyone interacting with residents or conducting bed bug related activities. Education can be provided through

- a. Educational fact sheets or brochures
- b. Live or recorded presentations
- c. Educational Posters



Model RFP (continued)

2. INITIAL INSPECTION OF APARTMENTS AT ONSET OF BID CONTRACT (START OF YEAR ONE)

a. Inspection in buildings with a known infestation rate below 5%:

At the onset of the contract, all buildings with fewer than 5% of the apartments treated for bed bugs within the past 12 months will receive a proactive inspection of all units, for identification of well-established infestations that have not been reported. **The inspection can be conducted by in-house staff that has been properly trained in the detection of bed bug activity or by a contracted party.** Conditions that create obstacles to control such as cluttered conditions around sleeping and resting areas, hoarding, or mattresses in direct contact with the floor, should also be noted during this inspection.

Inspections will be conducted in the following manner:

i. Inspections will be limited to a brief (1-2 minute) visual inspection of beds and upholstered furniture to identify bed bug infestations that are readily observed on accessible areas of beds and upholstered furniture. Inspection is limited to the corners of the mattress beneath fitted sheets and visibly accessible areas of the box spring and upholstered furniture and does not involve the removal of mattresses and box springs, or the turning over of upholstered furniture. During the inspection, residents that are home will be asked if they are aware of any bed bug activity or suspect bed bug activity.

ii. Apartments will be monitored by placing interceptors at beds and upholstered furniture if 1) the apartment has been treated for bed bugs within the past 12 months, 2) has visible evidence of bed bug activity (i.e. fecal spotting, shed skins, hatched eggs, dead bugs) but no live bed bugs observed, or 3) the resident indicates bed bugs are present or suspects activity but no live bed bugs are observed during the brief visual inspection.

NOTE: An alternative to visual inspection is the use of canine scent detection. If canine scent detection is used as the inspection method, all positive alerts by dogs must be verified by confirming live bed bug activity through either visual inspection. If bed bug activity is not confirmed through visual inspection, interception devices should be installed at beds and upholstered furniture and inspected for bed bug activity 2 or 4 weeks after installation (depending upon the device used).

Apartments where live bed bug activity is detected will be scheduled to be treated according the methods described below in #4 Treatment of apartments with confirmed bed bug activity).

b. Initial inspection in buildings with infestation rate of 5% or more:

Any buildings where 5% or more of the apartments have been treated for bed bugs over the past 12 months will receive a proactive inspection that includes a combination of detection methods (visual or canine scent detection* and installation of interception devices) to identify infestations of all levels, that have not been reported. **Visual inspection and monitoring with interception devices can be conducted by in-house staff that has been properly trained in the detection of bed bug activity or by a contracted party.** The inspection is intended to identify all level infestations, including low-level infestations that are often missed through visual inspection alone. Conditions that create obstacles to control such as cluttered conditions around sleeping and resting areas, hoarding, or mattresses in direct contact with the floor, should also be noted during this inspection.



Model RFP (continued)

Inspections will be conducted in the following manner:

- A brief visual inspection or canine scent detection inspection (verification of live activity is required for canine alerts, see * below) of all apartments as described in #1 above.
- Interceptors will be placed in all apartments where bed bugs have not been detected visually and inspected for bed bug activity 2 or 4 weeks after installation (depending upon the device used).

Apartments where live bed bug activity is detected will be scheduled to be treated according the methods described below in #4 Treatment of apartments with confirmed bed bug activity).

NOTE: If canine scent detection is being used as the inspection method, all positive alerts by dogs must be verified by confirming live bed bug activity through either visual inspection or monitoring if necessary. If monitoring is done, bed bug interception devices should be installed at beds and upholstered furniture and inspected 2-4 weeks later for bed bug activity.

3. ONGOING INSPECTIONS:

All apartments in buildings with an infestation rate of 5% or greater will be inspected annually as described in #2b above. In buildings with infestation rates below 5%, inspections can be limited to apartments in the following categories:

- a. Apartments that have been treated for bed bug activity within the past six months, along with apartments above, below, adjacent and across the hall from the treated unit, will be inspected 6-9 months after the date of the final bed bug treatment. Inspections will include at least 2 proven methods of detection (visual inspection, interceptor traps for 2 – 4 weeks, or canine scent detection*).
- b. Apartments with bed bug activity reported to property management or identified by a housing staff member, as potentially having bed bug activity.

NOTE: If canine scent detection is being used as the inspection method, all positive alerts by dogs must be verified by confirming live bed bug activity through either visual inspection or monitoring if necessary. If monitoring is done, bed bug interception devices should be installed at beds and upholstered furniture and inspected 2-4 weeks later for bed bug activity.

4. TREATMENT OF APARTMENTS WITH CONFIRMED BED BUG ACTIVITY Preparation of apartments

Preparations should be required on an as-needed basis. Prior to the first treatment, apartments should be cleared of dirty laundry on the floor or any other obstacles complicating treatment of the beds and couches. If items such as dressers, nightstands, closets are found to have bed bug associated with them, then these areas need to be addressed by the resident prior to the next follow-up service. Preparations should be required on an as-needed basis, based upon the type and location of bed bug activity. The degree of infestation should be evaluated on the first treatment and additional preparation requests made for the next service based upon where bed bugs are noted or evidence of infestation is present. The following are examples of suggested preparations based upon evidence:



Model RFP (continued)

Treatment of apartments

The following is a list of activities that will be done in all apartments with confirmed bed bug activity. These activities are further described in the sections below the list.

- Elimination of visible bed bugs and eggs using vacuums and steam.
- Removal of dead bed bugs and caste skins with vacuum
- Treatment of entire apartment with an emphasis on rooms with beds and upholstered furniture.
- Encasement of mattresses and box springs (see below for discussion about encasement of box springs only)
- Installation of interception devices at beds and upholstered furniture
- Follow-up visits at approximately 14 day intervals until infestation is eliminated
- Implementation of an elimination protocol.

A multidisciplinary approach is necessary to eliminate most bed bug infestations due to their complex life cycle, behavior, and propensity for developing resistance to pesticides. The sections below elaborate upon the required methods for treatment of apartments with bed bug activity.

Methods to address bed bugs and their eggs

Bed bug eggs are difficult to see due to their small size, are adhered to the surface they are laid upon and research has noted that many pesticides may have little to no effect on them. Because of these factors, tools such as steamers, vacuums and others should be used as part of a bed bug treatment to address any eggs that are noted or treat areas where eggs are suspected but cannot be seen with the naked eye. Using pesticides alone is not a suitable approach to treating bed bug eggs.

Encasements

Bed encasements designed for use with bed bugs are recommended for the treatment of infested beds as well as the proactive protection of uninfested bedding. Encasements being used should completely enclose the mattress and box spring and the zipper and zipper end-stop (the area where the zipper stops when the encasement is closed) should be designed to keep bed bugs from escaping the encasement. Encasements should be installed on all mattresses and box springs within an infested home. Encasements should remain on the infested bedding for at least one year from the date of installation. Applying a dust pesticide to the inside of the box spring (if label directions permit) should be considered to address any bed bugs trapped inside. Lastly, all sharp edges on bed frames should be addressed by adhering felt or other padding so that the edges do not compromise (tear) the encasements.

In apartments with low level infestations (below 20 bed bugs during initial inspection), the Housing provider reserves the right to encase box springs only.

Monitoring

Monitors, such as interception devices and any others proven effective through research, should be installed on all bed bug treatments during the first service and remain in the infested unit until the bed bug infestation is eliminated. Monitors as part of a bed bug treatment capture bed bugs between services thus reducing the number of bugs within the home as well as reducing the number of bites received by the people within the home. In addition to reducing the number of bed bugs they also provide information on where bed bugs may be hiding thus expediting elimination of the infestation (if bed bugs are found in the monitor under the head, right leg of the bed, it suggests bed bugs are hiding somewhere in the direction of that leg).



Model RFP (continued)

Monitors should be installed under all bed and couches in all infestations and in bad infestations (over 100 bed bugs) they should be also placed throughout the home along baseboards and in corners of rooms.

Treatment of apartment with pesticides

Pesticides play an important role in bed bug management however, wide-spread resistance to pesticides exists in bed bugs making it necessary to choose pesticides that are known to be effective based upon the most current scientific research. Liquid residual and aerosol generated pesticides (excluding foggers/total release aerosols) should be limited to those that research has found to be effective for bed bug control. Liquid residuals should be rotated from treatment to treatment with a minimum of two products being rotated from treatment to treatment. Also, a dust pesticide should be used to treat all cracks and crevices according to label directions and products found to be effective for the treatment of bed bugs should be chosen.

Methods for dealing with infested personal items with bed bug activity

If bed bugs are suspected in personal items/clutter or evidence is noted on these items they should be treated according to the requirements of these items.

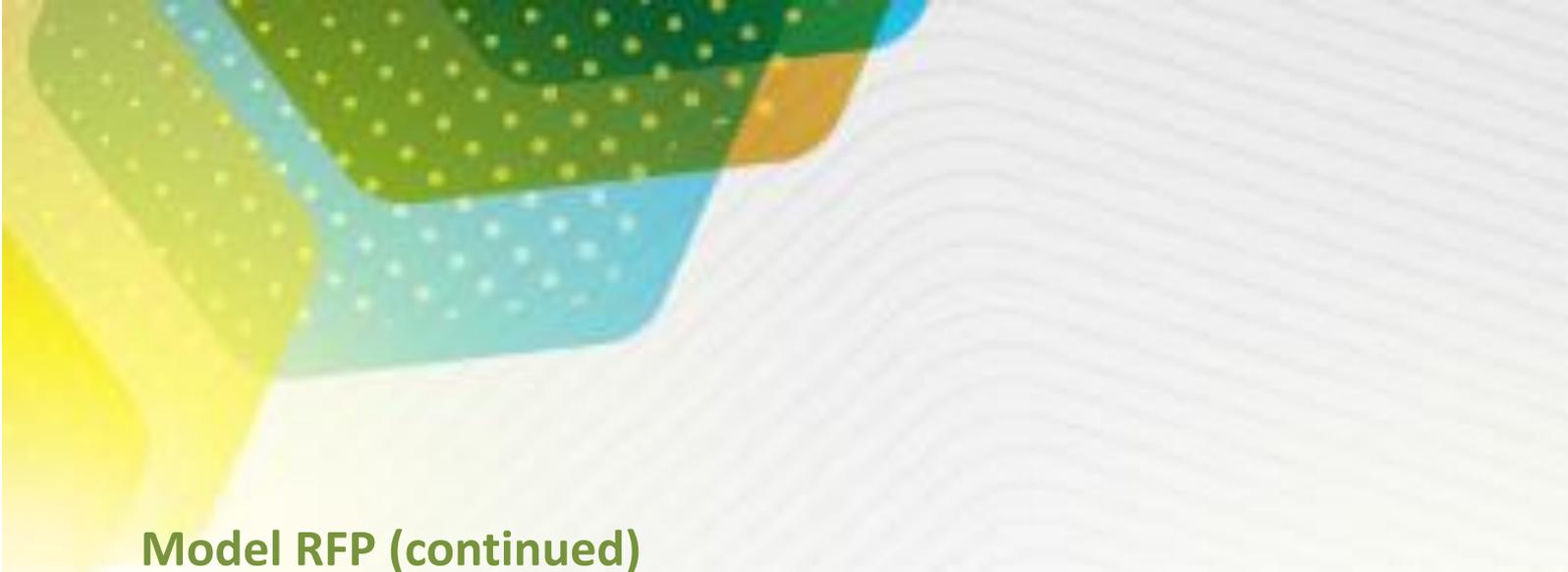
- i. Any item that can be placed in a hot dry cycle should be placed in a dryer and heated accordingly (a full-cycle is typically recommended).
- ii. Any items that can withstand temperatures in excess of 120 degrees but not to exceed 160 degrees can be treated using commodity heaters such as ThermalStrike Ranger or other equivalent heating device. In areas and during certain times of the year where the sun creates temperatures that can exceed 120 degrees, items can be placed in black garbage bags and left in the sun for an extended period of time. Items should be placed in bags and elevated off of the ground. Lastly, a temperature probe should be inserted within the bag to guarantee that the temperature within the bag achieved 120 degrees for a minimum of a few hours.
- iii. Items that can tolerate freezing temperatures can be bagged and placed in a freezer for a minimum of one week.
- iv. Nuvan Pro-strips or other equivalent pesticide "strip" can be used to treat items contained within a plastic bag. Pesticide label directions should be followed when using pro-strips and items should be left inside the bag for a minimum of two weeks to assure proper treatment.

Follow-up visits

All bed bug infestations should receive a minimum of one follow-up treatment. All follow-up treatments should be spaced approximately 14 days apart. Follow-up treatments should consist of a thorough inspection of the apartment along with inspection of all monitors. Treatments should be applied according to the evidence noted within the apartment.

Elimination Protocol

Follow-up visits can be terminated once bed bugs are no longer observed through visual inspection or in interception devices. Interceptors will be left in place once the follow-up program has been terminated. A final inspection will be conducted six weeks after termination of the follow-up program. This inspection will include a visual inspection of beds and upholstered furniture as well as checking interceptor devices for bed bug activity. If no bed bugs are observed treatment of the apartment can be concluded.



Model RFP (continued)

Neighboring Apartments

All apartments sharing a common wall, ceiling or floor should be inspected for the presence of bed bugs at the start of treatment in the known infestation. In high-rise buildings directly across from a known infestation should also be inspected. It is recommended that the neighboring apartments are inspected again at the conclusion of treatment of the known infestation, especially if the known infestation was a high level infestation at the start (over 100 bugs). Inspections will include at least 2 proven methods of detection (visual inspection, interceptor traps for 2 or 4 weeks, or canine scent detection*).

NOTE: If canine scent detection is being used as the inspection method, all positive alerts by dogs must be verified by confirming live bed bug activity through either visual inspection or monitoring if necessary. If monitoring is done, bed bug interception devices should be installed at beds and upholstered furniture and inspected 2-4 weeks later for bed bug activity.

5. NEW RESIDENT INSPECTION PROGRAM

For residents moving into the community, Property Management will provide educational information about bed bugs and their control and educate the new resident about the apartment communities' bed bug management policies and procedures at the time of the signing of the lease. In addition to educating new residents, the following actions will be taken.

a. Furniture including beds, bedframes, head boards, footboards, and upholstered furniture will be visually inspected for bed bugs at the time of move-in by a Housing staff member trained to in the detection of bed bugs.

b. If evidence of bed bug activity is observed the following actions will be taken:

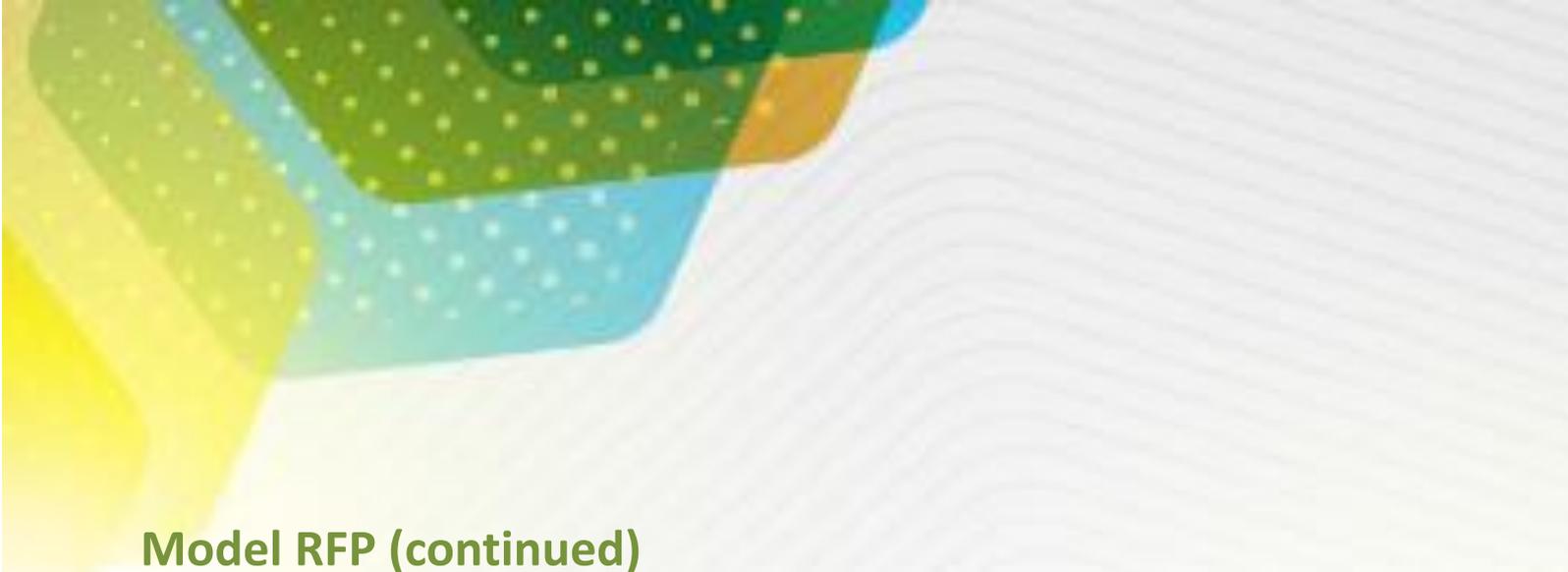
- Live bugs found on furniture during inspection should be removed or destroyed by a trained Housing staff member using a vacuum or steamer.
- Mattresses and box springs with visual evidence of bed bugs will be encased in bed bug encasement prior to be introduced into the new resident's apartment.
- The apartment will be scheduled for treatment.

Although not required it is highly recommended for properties with high infestation rates, to schedule the new residents' apartment for inspection approximately two weeks after the move in date. The inspection should include at least 2 proven methods of detection (visual inspection, interceptor traps for 2 – 4 weeks or canine scent detection).

6. RESIDENT MOVE-OUT PROGRAM

Upon notice that residents are discontinuing their lease and moving out, the apartment should be inspected for bed bug activity. The inspection will involve moving the beds and upholstered furniture so that the bottom of the furniture can be inspected. In addition to a thorough visual inspection, interceptor traps can be installed for 2 – 4 weeks or canine scent detection can replace the need for a visual inspection.

If live bed bug activity is observed at any time during the inspection or monitoring process, treatment should begin immediately. Apartments should also be treated if evidence of bed bugs is observed in an apartment not previously known to have bed bug activity. This process drastically reduces the chance that residents move-out and leave bed bugs behind in the vacant unit. It also provides pest professionals the opportunity to treat the infested unit while people are still present in the home (vacant homes infested with bed bugs are extremely difficult to effectively treat).



Model RFP (continued)

7. COMMON AREAS

Common areas within buildings should be inspected every 3 months for bed bug activity. Monitors should also be installed under all upholstered furniture and checked monthly for the presence of bed bugs. If bed bug activity is noted it will be treated according to the area noted and the sensitivity of the clients using that area. Treatment actions to consider are pesticide application, steam and vacuums, amongst others.

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