



Today we are going to talk about bed bugs.....

For the past several decades Michigan, the United States, and most of North America were virtually bed bug free. Bed bug infestations had become so rare that many public health and pest management professionals had never seen a live specimen, and bed bugs were no longer considered a public health threat. This was due primarily to improved sanitation and widespread use of insecticides like DDT after World War II. Many people believed that these parasites were just an imaginary specter from a popular bedtime phrase, "...sleep tight, and don't let the bed bugs bite!"

Recently, however, bed bugs have made a dramatic resurgence. Safety and environmental concerns have led to greater restriction of pesticides, and bed bugs have developed resistance to many widely used pesticides. Couple this with the transient nature of many segments of society and increased tourism, domestic and international travel; and we have a recipe for the rapid spread of infestations. In the past few years, bed bugs have increasingly been found in hotels, shelters, hospitals, universities, schools, apartments, and homes. Bed bugs don't discriminate, and will infest any human dwelling, from the most cramped student apartment to the most luxurious four-star hotel.

Bed bugs are difficult to control because they are so skilled at hiding, which allows

them to travel in our belongings (clothing items, luggage, furniture, electronics, etc.) without our knowledge. Most people do not even realize they have visited somewhere with an infestation, and bring the bed bugs back to their residence unwittingly. Once established in a residence or unit in a building, the bed bugs can travel between rooms or apartments easily on people's clothing or other belongings.

This presentation aims to educate people about bed bugs, how to inspect for them, and how to safely eradicate them. It was developed by a coalition of federal, state, and local experts at the front lines of the bed bug resurgence.

Detroit Bed Bug Coalition

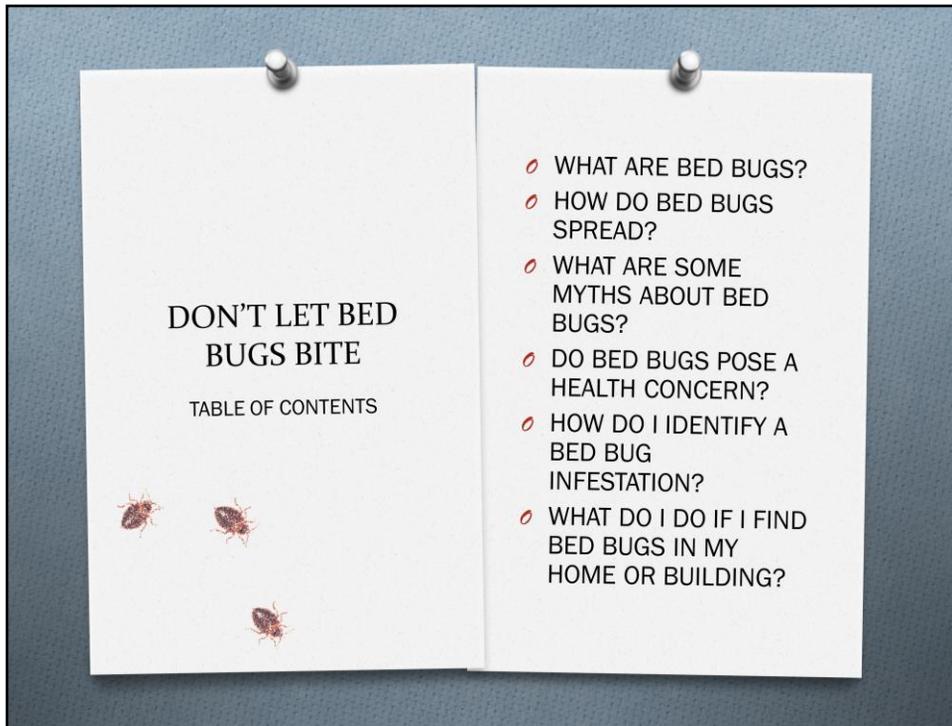
Mission:

To increase awareness about bed bugs and their community effects within the City of Detroit; reduce bed bug infestations through timely, efficient, and healthy pest management practices; and promote sustainable relationships between community organizations and local governmental agencies.



The U.S. Environmental Protection Agency (EPA), the Michigan Department of Community Health (MDCH), and the City of Detroit feel that bed bugs are an emerging public health issue. To that end, education about safe and effective Integrated Pest Management is essential to not only stamping out bed bugs, but also keeping our community healthy. The MDCH and the City of Detroit have recently established a “Bed Bug Coalition”, the agencies highlighted on this slide are all partners in this endeavor.

The mission of the Bed Bug Coalition is to: *“increase awareness about bed bugs and their community effects within the City of Detroit; reduce bed bug infestations through timely, efficient, and healthy pest management practices; and promote sustainable relationships between community organizations and local governmental agencies.”*



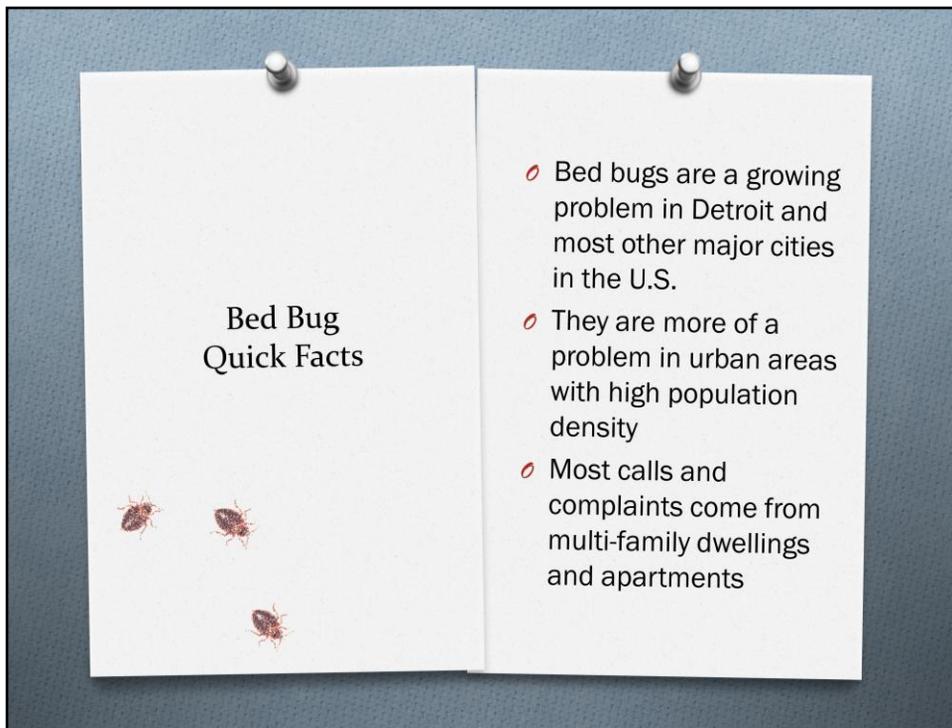
Bed bug infestations are on the rise throughout the U.S. and the state of Michigan. The city of Detroit and the surrounding suburbs are highly affected by bed bugs. Today we will learn about:

- 1) What bed bugs are
- 2) How bed bugs spread
- 3) Myths about bed bugs
- 4) Health concerns related to bed bugs
- 5) How to identify a bed bug infestation
- 6) What to do if you have bed bugs in your home or building

Why are bed bugs a problem now?

- Increases in global travel and commerce
- Bed bugs have gained resistance to commonly used insecticides
- Lack of public knowledge
- Lack of institutional knowledge





Bed bugs are a problem in urban areas because, a) high population density, b) high percentage of multi-unit housing, which allows bed bugs to spread from unit to unit, c) high turnover in the housing market.....

Can be a bigger problem in low income areas, because, a) **lack of housing choice may cause infestations to go unreported or untreated (e.g. subsidized housing).** People may believe that they can be evicted due to bed bugs, they may feel ashamed of an infestation. B) extermination costs may be beyond the financial capability of low-income residents. Another problem with the cost

of extermination is a potentially higher rate of injuries and illness due to “do it yourself” or unlicensed pest control by uneducated residents. C) Access to current educational materials may be limited

Bed Bugs Myths #1
True or False?

Bed bugs are so small that you can't see them.

FALSE



Bed bugs are visible to the naked eye. The picture above shows the smallest size bed bug (1st instar nymph) feeding on a finger.

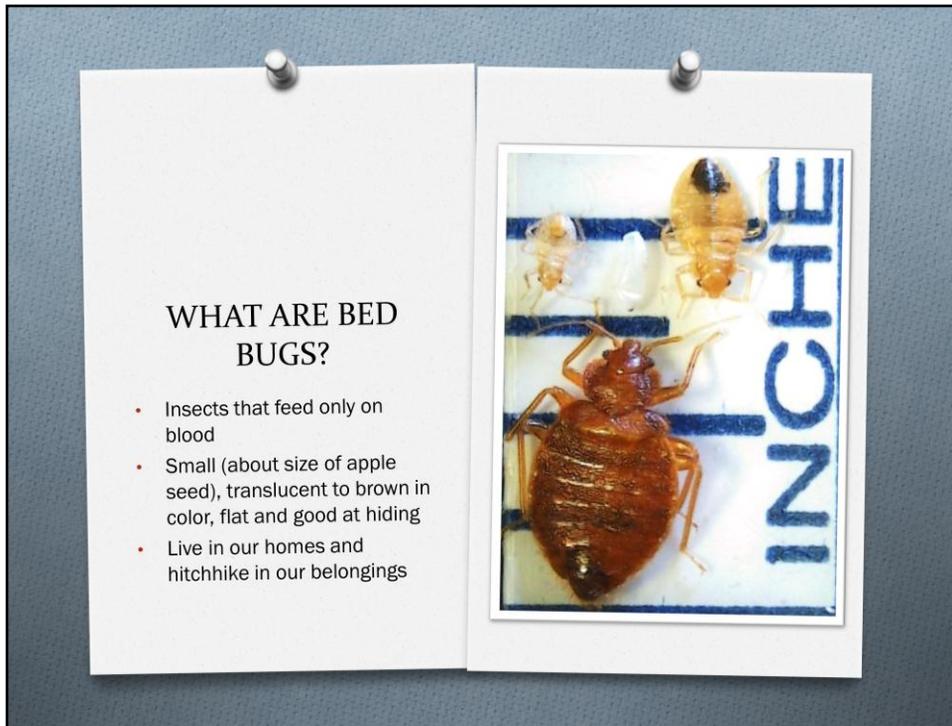
The later stages get bigger and bigger and the adult bed bug is about the size of an apple seed.

Do you think this statement is true or false?:

Bed bugs are so small that you can't see them.

This is false.

Many people think that bed bugs are too small to be seen, often confusing bed bugs with dust mites. The picture at right highlights the smallest, or 1st instar, bed bug nymph. It is small, but still visible to the naked eye. As bed bugs progress through their life stages (4 nymphal stages) they become larger. Adult bed bugs are about the size of an apple seed, as seen in the following slides....



Bed bugs **HAVE** to feed on blood to grow and to multiply. They do **NOT** eat crumbs, skin cells, or other food-stuffs in the home. Bed bugs are flat, so that they may hide in small cracks and crevices. They do not have wings (cannot fly), and they do not jump. The smallest stage bed bug as shown at right is approximately 1mm in size. The smaller stages, or nymphs, are tan in color and darken as they progress to the adult stage. Bed bugs that have recently fed will appear swollen, and reddish in color. Bed bugs live **INDOORS**, can fit in any crack or crevice the width of a credit card edge or larger, and can easily be transported from place to place in our belongings (they are great hitchhikers).

The bed bug life cycle

- Bed bugs progress through five life stages called nymphs.
- Every stage requires at least one blood meal to grow to the next.
- Can reproduce in as little as five weeks.



The picture above shows the stages of bed bug development compared to a human hand. Every stage must feed on blood to progress to the next. Once they become adults, bed bugs may feed intermittently (every few days) and mated adult female bed bugs will lay several eggs each time they feed. A bed bug generation can be completed in as little as 5 weeks. As seen in the photo, fed bed bugs will swell and elongate and take on a reddish color.

Where do bed bugs live?

Not just in the bed!!

- o In and amongst furniture, electronics, and the structure of the home
- o Near where they feed, usually within two-meters
- o Hide in any crack or crevice larger than the edge of a credit card
- o Do not like to be disturbed



Bed bugs don't just live in the bed as their name suggests. Bed bugs do not like to be disturbed in their resting areas, and because of this they are more commonly found in the box spring, as it is disturbed less often, and provides many cracks and crevices to hide in. Bed bugs like to be close to where they feed. They will normally be found within 2 meters of where a person is sleeping. This includes bedrooms and other living areas (ie. Living room if people sleep on couch or recliner). They can hide in any crack or crevice larger than a credit card edge. They can travel from room to room in search of food or mates, so moving to another bedroom or the living room will not "starve" the bed bugs. They will eventually find you! Bed bugs will also take up residence in clock radios, tv's, lamps, picture frames, and other items near where people sleep.

How do bed bugs feed?

- o Bed bugs have “beak-like” mouthparts
- o Bed bugs find people by seeking out warmth and carbon dioxide
- o Bed bugs will come out of their hiding places late at night
- o Most people can not feel bed bug bites
- o Bed bug bites may look like many other types of insect bite



Bed bugs typically come out at night when people are fast asleep. They find their victim by sensing their body heat and the carbon dioxide that they breath out. Once they find their victim they will search for a site to bite, typically an exposed area of skin. Bed bug mouthparts are similar to mosquito mouthparts, but tend not to bite through clothing because the “beak like” mouthpart is too short. They feed by piercing the skin and sucking out blood. Normally their bites are painless because while they are feeding they are also injecting various chemicals to numb the bite and keep the blood flowing. The raised, red, itchy bites are because of these chemicals. After bed bugs feed (normally 5-10 minutes), they will leave the person and go back to their hiding place. Once they get back to their hiding place, they digest the blood meal, and will defecate out a portion of blood. This will leave characteristic dark “rust” spots which can be seen on bedding or surfaces where they hide, and may be the first sign of a bed bug infestation. Bed bugs MAY come out during the day when there is a heavy infestation, or they are disturbed, or they are very hungry. Leaving the lights on in a bedroom while you sleep will not keep the bed bugs away.

It is impossible to say whether you have bed bugs just by looking at bites. The only way to know for sure that your bites are from bed bugs is if you find live bed bugs in your sleeping area.



In general, bed bugs do not live on people's bodies. They only visit the human body for a few minutes every couple of days, and spend most of the rest of their time hiding in dark, tight places.

Unfortunately these hiding places can be nearly any belonging that we have in our home or carry with us

If we move these items around, the bed bugs will move with the items. So a person living in an infested home could unknowingly take a few bed bugs to work with them in their briefcase, or to the library in a book. You could also bring bed bugs into your home if you acquire an infested furniture item, or bring them home from an infested hotel in your suitcase.

So they can be anywhere, what is the most common way they spread?

One of the biggest reasons for bed bugs spreading is when people don't know about the risks, or when people don't acknowledge the infestation and report and/or treat that infestation.

The list below shows common ways that people can get bed bugs:

- o Bringing used, uninspected and untreated items into the home
- o Visiting a residence that has a bed bug infestation
- o Staying in a hotel/motel that does not inspect or treat their rooms appropriately
- o In multi-family housing, bed bugs will spread to adjacent units through visiting, on items, or through walls

So now that we know that bed bugs can “hitchhike” in almost any item, but how do bed bugs most commonly spread?

One of the most common ways that people get bed bugs is by purchasing or picking up used, uninspected, and untreated items. These items could be furniture, clothing, bedding, even electronics. The riskiest items are things that have been in someone else's sleeping area. The best way to avoid bringing bed bugs into your home in items is to do a very thorough inspection looking for signs of bed bugs (we will talk about those signs in a little while) and refusing to purchase items that are infested, or cleaning/treating the items before they come into the home.

When you visit a residence or stay at a hotel that has an infestation, you are at risk of bringing bed bugs home with you in your belongings. Bed bugs do not get into your belongings because they “want” to travel home with you, they may get into your items by chance because the items are another location in the environment for them to hide. If you are visiting a place that might be infested, don't sit on upholstered furniture or beds and don't carry personal items into the residence and if you do, set them down in high traffic areas such as entry ways or kitchens and bathrooms that are less welcoming to bed bugs. If you are traveling and will be staying overnight (this applies to hotels as well): carefully inspect the bed, headboard, nightstand, and do

not place your belongings on the bed.

In apartment communities and other types of facilities where people live adjacent to each other, bed bugs can spread quickly through walls and through social interaction. If bed bug infestations are not noticed or reported quickly, bed bugs can move through hollow interior walls, along pipes and conduits, and be carried into common areas such as dining areas and activity halls. It is extremely important for tenants in multi-unit housing to report bed bugs to building management as soon as possible, and for building management to respond quickly.

Bed Bugs Myths #2
True or False?

Only people with dirty houses
have bed bugs.

FALSE

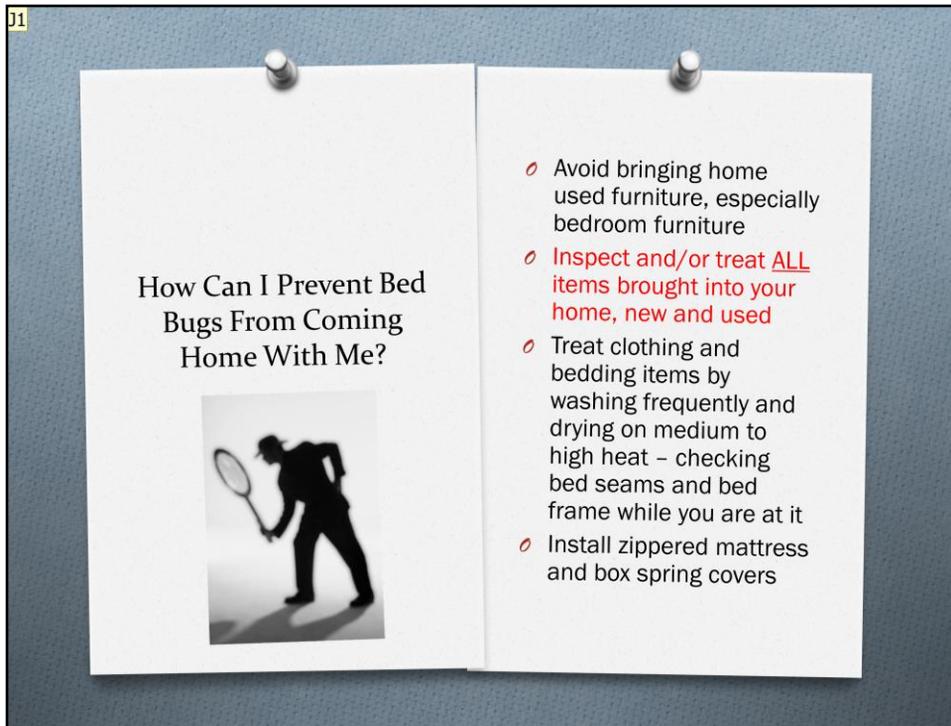


Bed bugs can infest any environment, BUT if there are many items or clutter, bed bugs will have more places to hide.

This will make it more difficult to eradicate the bed bugs.

One common myth is that bed bugs are a sign of uncleanliness or poor housekeeping. This is not true. Given the opportunity, bed bugs will infest ANY home, clean or dirty.

The tiny grain of truth to this myth however, is that clutter gives bed bugs more places to hide. So if you have bed bugs, it helps to reduce your clutter as much as possible. When trying to eradicate a bed bug infestation, you must check EVERY potential hiding place, and your treatment must be able to hit the bed bugs from all of those locations.



How Can I Prevent Bed Bugs From Coming Home With Me?



- o Avoid bringing home used furniture, especially bedroom furniture
- o Inspect and/or treat **ALL** items brought into your home, new and used
- o Treat clothing and bedding items by washing frequently and drying on medium to high heat – checking bed seams and bed frame while you are at it
- o Install zippered mattress and box spring covers

Unfortunately, since bed bugs are so good at hiding, it can be tough to be 100% sure they are not traveling home with you.

However, there are a few steps you can take to avoid bringing them home with you, and to improve your chances of finding them right away if you do.

First of all, try to avoid bringing home used furniture, especially furniture that has been left on the curb. The old owners may have gotten rid of the furniture because of bed bugs. If you do purchase or bring home used furniture, be sure to give it a careful inspection BEFORE you bring it inside.

You will be more likely to catch an infestation early if you launder your bedding frequently, and check your bed for signs of bed bugs when you do so. Installing zippered covers can help keep bed bugs out of your mattress and box spring, which can help you find bed bugs sooner and also makes it easier to treat an infestation.

Bed Bugs Myths #3
True or False?

People can get serious infectious diseases from bed bugs.

FALSE



Bed bug bites can cause a range of skin reactions, and may cause serious stress and anxiety, HOWEVER bed bugs have not been shown to transmit diseases to people.

Having bed bugs can cause significant health effects, but fortunately bed bugs have not been shown to transmit diseases to humans.

What are the health risks?

Bites

- o Reactions to bites may vary widely
- o The most common symptom is itchy welts

Secondary Infection

- o Scratching welts may cause infection
- o Possible exacerbation of asthma symptoms

Psychological

- o Anxiety and unhealthy stress
- o Sleeplessness
- o Phantom Itching

Anemia has been reported in children and older adults who have been severely bitten

Contact doctor for treatment –

The bed bug's direct medical impact is mainly limited to the itching and inflammation from their bites. When they bite, they inject two tubes. One sends in a chemical to anesthetize the area. The other draws out the blood. The saliva chemical may cause an allergic reaction – at first a welt. Upon repeated bites, there may be a systemic allergic reaction, including exacerbation of asthma symptoms. Bites can become infected if people scratch the sores, and sometimes may result in needing a prescription for antibiotics. Antihistamines and corticosteroids may be prescribed to reduce allergic reactions, and antiseptic or antibiotic ointments to prevent infection. Over the counter itch remedies and ointments to keep wounds clean can also be used, however unless the bed bugs are eradicated, bite symptoms will often persist. Bed bugs DO NOT transmit diseases in their bites.

A secondary medical impact of bed bug infestations is stress and anxiety. People may lose sleep, become less productive at work, become socially isolated, or even have “phantom itching” where they feel bugs crawling on them that aren't there. One thing we want to be careful about is not using products in our homes or on our bodies that might be harmful. There are many sad examples of people destroying their belongings or hurting themselves with chemicals trying to treat their homes or bodies for bed bugs. We MUST remember two things: first, there is no medication, cream, chemical, or oil that someone can put on their skin that will get rid of bed

bugs. Bed bugs do not live ON our bodies. And second, when trying to eradicate bed bugs on our own we MUST first make sure that ANY product we use is labeled for use on bed bugs, and indoors, and to apply the product according to the label directions.

Common Skin Reactions

Reaction times and severity may change with repeated exposures, some people react immediately, some people have delayed reaction:

- No reaction w/barely visible bite
 - There is some evidence that older individuals have depressed reaction to bed bug bites
- 2-5 mm itchy, red, raised, inflamed lesions
 - Usually resolve within a week (if bed bugs are eradicated)
- Some patients experience complex skin reactions (hypersensitivity, secondary bacterial infection, keloid formation, etc)



People's bed bug bites may vary depending on the individual. It is much like the way people react differently to mosquito bites. Some people are more "sensitive" to bed bug bites than others and will react immediately with red, itchy welts. Other people (~30%) do not react at all. Bed bug bites can also have a delayed reaction, you can be bitten one night and not react for several hours or days. People often report that they are getting bitten by bed bugs, but their spouse/significant other sleeping in the same bed is not. The spouse/sig other is also getting bitten, just not reacting to bites.

It is important not to scratch the bites, as they may become infected. This is easier said than done, so when touching or treating the bites, always wash hands first.

Are there skin treatments for bed bugs?

The treatment of bite symptoms associated with bed bugs is only supportive. Bed bug bites will only truly resolve when all of the bed bugs have been eradicated.

OK TO USE

Antihistamine creams: help with itching and reaction to the bites

Antibiotic creams: help if bites are infected

Topical Steroids: help to relieve inflammation

Individuals suffering from bed bug bites can use normal over-the-counter topical creams to help with the itching, just like they would with other insect bites. If excessive scratching has caused the bites to become infected, a healthcare provider should be consulted about the need for antibiotics. An over the counter antibiotic ointment may be used as well.

Remember, the best way to stop the bites is to get rid of the bed bugs.

Are there skin treatments for bed bugs?

DO NOT USE

- o Head lice or scabies treatments are **INEFFECTIVE** against bed bugs:
 - o Bed bugs **DO NOT** live on people, they live in our environment
 - o Prescription of these creams to patients suffering from bed bug bites is **NOT INDICATED**
 - o The use of these products may be dangerous to patients if used more often than label recommendations



BUT, you **DO NOT** get rid of the bed bugs by applying pesticides to your body. Since bed bugs don't live on your body, treating your body with things like scabies creams and lice shampoos do not work. Furthermore, these treatments are intended to be used for just one or two applications spaced one to two weeks apart, not for frequent use. Using them frequently could make you sick.

Bed bugs and stress

- o Bed bug infestations may cause severe stress and anxiety
 - o Loss of sleep
 - o Decreased work productivity
 - o Stressors to social relationships
 - o Economic hardship
- o The stresses of bed bug infestations may lead people to dangerous activities that may harm themselves

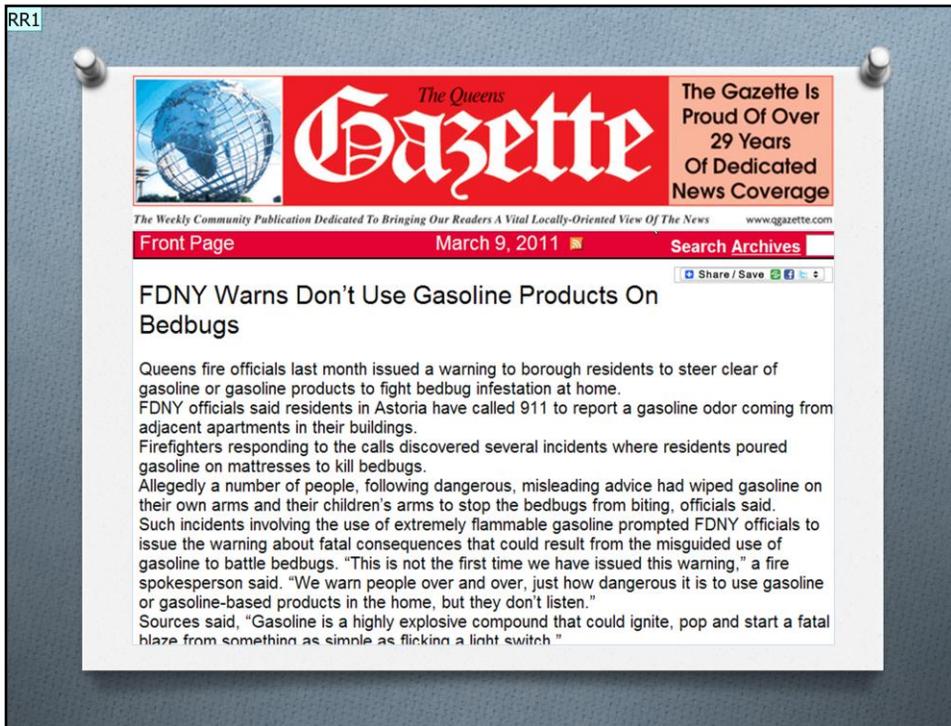


Having a bed bug infestation is very upsetting, and it is normal to feel anxious or stressed.

This stress can lead to loss of sleep, decreased work productivity, strained family and social relationships, and financial hardship. These problems can further compound an already challenging situation and make the bed bug victim feel overwhelmed and hopeless.

In some cases, individuals may be so desperate for relief that they resort to dangerous treatment methods. People often try to treat their homes with the 'most toxic' product they can think of (bleach, ammonia, pesticides, formaldehyde, gasoline, etc.), assuming that this will be effective against bed bugs. Unfortunately, this causes serious harm to the people who are exposed.

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Here's an example of what can happen residents resort to desperate measures to control their bedbugs: This is a news report about a case where people wiped gasoline on their bodies under the mistaken idea that doing so would stop bedbugs from biting.

Other activities/products to avoid

- o Using “bug bombs”
- o Using kerosene or other flammable products
- o Applying alcohol or other pesticides to your body
- o Using pesticides labeled for outdoor use inside the home
- o Buying “special” pesticides from unlicensed businesses
- o Over-applying dusts such as diatomaceous earth or boric acid to the home
- o Ultrasonic pest repellent devices

“Bug bombs” (also known as total release foggers) are not effective against bed bugs, even if they say “Bed bugs” on the label – they can’t get the pesticide into the spaces where the bed bugs live. They won’t kill the bed bugs, but they can cause the bed bugs to move into new areas of your home, making your infestation more difficult to treat. Because they don’t work, people tend to use them over and over, which also exposes residents to pesticide residues that may be harmful.

Kerosene and other gasoline products are dangerous to your house and highly flammable. There are many safer products to use.

Many people use alcohol to kill bed bugs. Although it may kill bugs if sprayed directly on them, it has no lasting (residual) effect once it evaporates. Spraying alcohol on clothing, furniture, etc, will not prevent bed bugs from infesting those items. Alcohol is also highly flammable, and people have caused fires in their homes by using alcohol excessively while smoking or in the presence of an open flame or spark. There are other, less flammable sprays that can also kill bed bugs on contact; the important place to spray for bed bugs is where they are hiding.

Sometimes people will buy pesticides labeled for outdoor use and use them inside their homes in the mistaken belief that they will be more effective than pesticides

labeled for indoor use. This is not safe because the chemicals in these products are not approved by the Environmental Protection Agency for indoor use due to health and safety concerns. Often times this is because the concentration of the active ingredient is too high for humans to breath or touch.

Furthermore, you should never buy unlabeled pesticide products from somebody claiming that they are “highly effective.” Without the original label, you won’t know what the product really is, how to safely apply it, or if it is dangerous. It is also illegal to mix and repackage insecticides for sale to the public. For example, to combat cockroaches in the city of Detroit, somebody created a product called “Roach Milk”. This was an illegal mixture of the outdoor agricultural product methylparathion. This product made people sick and EPA officials in Michigan and Ohio spent more than five million dollars in decontamination efforts to clean it up.

If you are concerned about these types of products in your community, contact the Michigan Department of Agriculture and Rural Development at (517) 241-6666. They have inspectors that can follow up on pesticide related complaints. They can also be helpful if you believe that a pest management company is conducting unsafe business or operating without a license.

One other problematic issue is overuse of dusts. First of all, boric acid is meant to be eaten by the bugs, and bed bugs don’t eat it so it doesn’t work as well for bed bugs as it does on other bugs. Diatomaceous earth (also known as “fossil shell flour”) can be effective for bed bugs, but works BETTER when used in small amounts. Often people put large piles of it on the floor or on surfaces, thinking that more product will work better. These dusts can cause lung problems when inhaled, so they should be used in cracks and crevices where the bed bugs hide and not disturbed by pets or people.

Ultrasonic pest repellent devices don’t work for bed bugs. At all.

Make your bed an island to decrease bites!



Move bed away from wall

Clean bed frame and headboard/footboard

Zippered encasements on mattress AND box spring

Cups under legs of bed

Freshly washed bedding that doesn't hang onto the floor

It can be extremely stressful to live with bed bugs. One of the first things we want to do is help you to get a decent night's sleep without worrying about being bitten. Making your bed an island can help you to get some rest and be more effective at eradicating your bed bugs.

Here is how to make your bed into a "bed bug-free zone" (or "island"):

-Move the bed away from the wall, so bed bugs can't get to you by climbing up the wall

-Clean the bed frame and headboard or footboard to eliminate any bed bugs or eggs.

-Encase your mattress AND box spring with zippered encasements. If you cannot afford to buy encasements designed for bed bugs, then any zippered encasement will work as long as you put duct tape over the whole zipper. Encasements keep bed bugs outside your mattress from getting in, and keep bed bugs already inside your mattress from getting out to bite you.

-Put cups or bowls or store-bought interceptor devices (shown on the slide) under all of the legs of your bed. Dust the insides of the bowls or interceptors with talcum powder. For platform beds you could put a long piece of double-sided carpet tape all the way around the outside of the bed. This is intended to prevent bed bugs from crawling up onto your bed from the ground.

-Launder all of your bedding (or at least tumble in the dryer on medium or high heat for 30 minutes). When you put it back on your bed, make sure it does not hang over

onto the floor, or bed bugs may be able to climb up it onto your bed.



I think I have bed bugs, so
what do I do now!?



What NOT to do!

Do NOT:

- o Immediately throw out your bed or other furniture
 - o Most furniture can be treated and saved
 - o If you simply replace furniture, bed bugs will infest the new furniture
- o Purchase bug bombs for bed bug control
 - o Bug bombs are not effective for bed bug control; they may spread bed bugs further
- o Move out of your home or apartment
 - o You will bring the bed bugs with you

When people find out that they have bed bugs, they often think that they can get rid of them by just throwing away the bed (or other furniture). However, since bed bugs can live in other areas besides the bed, this does not work and the remaining bed bugs will simply infest any new furniture. In most cases, it makes more sense to encase and treat the old furniture rather than throw it away and buy new. If you want to buy new furniture, wait until you have gotten rid of the bed bugs. If you throw away infested furniture, PLEASE mark it or make it unusable so that others don't bring it to their home. This can cause bed bugs to spread throughout the community.

As we discussed earlier, bug bombs do not work for bed bugs and can actually make the problem worse.

Moving out before you eradicate the bed bugs from your belongings will only bring your infestation to your new home. If you have to move from your residence before bed bug treatment can be completed, see the informational pamphlet on our website (www.michigan.gov/bedbugs) for helpful tips to avoid bringing bed bugs with you.

What TO do depends on your housing situation

Owned Single Family Home

- o Conduct an inspection or get an inspection by a licensed pest management company
- o Modify your behavior so you are not spreading bed bugs
- o Begin preparing your home for treatment

Rental housing/multi-unit housing

- o Report the situation to your landlord or property manager immediately
- o Modify your behavior so you are not spreading bed bugs
- o Begin preparing your unit for inspection and treatment

- If you think you have bed bugs, the first things you should do will differ depending on whether you rent your home or own it. You will need an inspection to ensure that bed bugs are really the pest you are dealing with. If you rent your home, you will need to contact your landlord or property manager to have them schedule an inspection with a pest management professional (PMP) to verify that you have bed bugs. If you own your home, you can either conduct your own inspection or call a PMP yourself – for more information on choosing a PMP, see the informational brochure on our website (www.michigan.gov/bedbugs). You should also start taking precautions to avoid spreading bed bugs, such as:

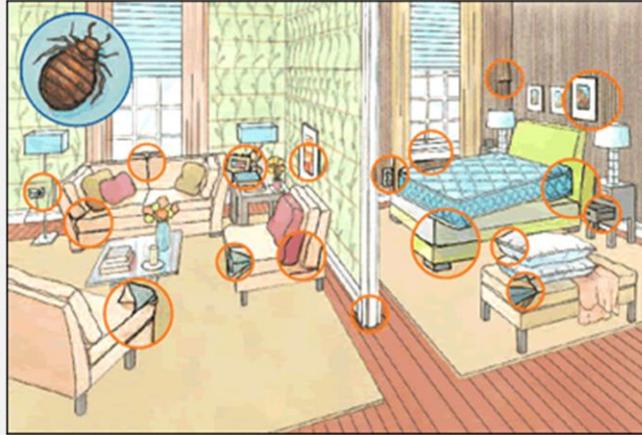
If you do have bed bugs, it's best to hire an experienced PMP. However, if you cannot afford to hire a PMP, then the following slides will help you safely and successfully treat the infestation yourself.

If you are having a PMP inspect and/or treat, ask your landlord or the PMP what you need to do to prepare. You may be asked to move furniture, confine pets, organize belongings, etc. These instructions are very important because they allow the PMP to find any bed bugs quickly and to make a plan to eradicate them.



Inspection

Where/how to look



Look for bed bugs, blood stains, droppings and eggs (a flashlight and magnifying glass will help). Start by looking in an area 10-20 feet around where you sleep or sit. That's the distance a bed bug will usually travel.

Keep a written record of every room and location where you find signs of bed bugs. Check mattresses, box springs, bed frames and bedding

- Check the top and bottom seams, tufts and any rips in the covers of mattresses and box springs.
- Look underneath the bed and along the bed frame and headboards.

Check cracks and crevices in bedroom furniture, floor boards and baseboards, windows and door frames

- Use a flash light to inspect cracks and crevices of furniture, windows and door frames.
- Swipe a putty knife, an old subway or playing card into cracks and crevices to force bed bugs out. A hot blow dryer on a low setting will also work. If live bugs do come out, crush them with a paper towel and throw them away outside your building.

• Remove drawers from furniture and check the inside, top and bottom, joints and even screw holes.

- Remove and check zippers, seams and tufts in cushions of upholstered furniture,

and their frames.

Check walls and wall hangings

- Using crevice tools, check paintings, posters, pictures and mirrors.
- Check cracks in plaster and peeling wallpaper.
- Inspect the face plates of electrical outlets and light switches (by eye only – do not insert anything into areas with wires). Look in phones, clocks, smoke detectors and toys

Bed bug evidence



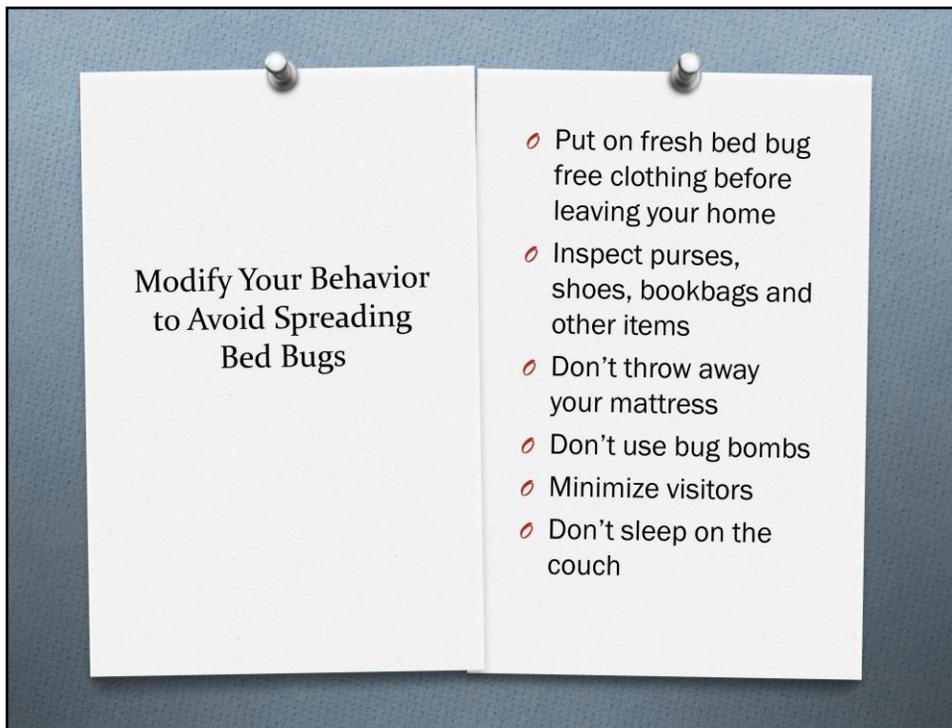
Fecal Stains

Bed Bugs

Cast Skin

Eggs





- Inspecting your clothing and personal items before you leave home
 - You can bag freshly laundered items in sealed bags to put on right before you leave the home
 - Remember, you can put almost any soft item in the dryer for 30 minutes to kill all bed bugs and eggs
- Wait for the results of the inspection before giving away or throwing away your mattress or other belongings
- Don't use bug bombs
- Avoid having visitors until the infestation is verified/treated, and warn any visitors that you may have bed bugs in your home
 - This may be difficult because of the stigma associated with bed bugs, you may not want to tell ANYBODY....but ask yourself this question, "would I want my neighbor or my visitor to get bed bugs in their home because I had too much pride to mention it?" REMEMBER – bed bugs can infest any home and it's not because anyone living there is dirty.
- Although it may be hard to continue sleeping in your bed, you should try to do so (use the "making your bed an island" approach) rather than sleeping on the couch. Bed bugs will travel to other rooms to seek out their host, so if you start sleeping on the couch the bedbugs will just spread to the couch, which is harder to treat

than your bed.

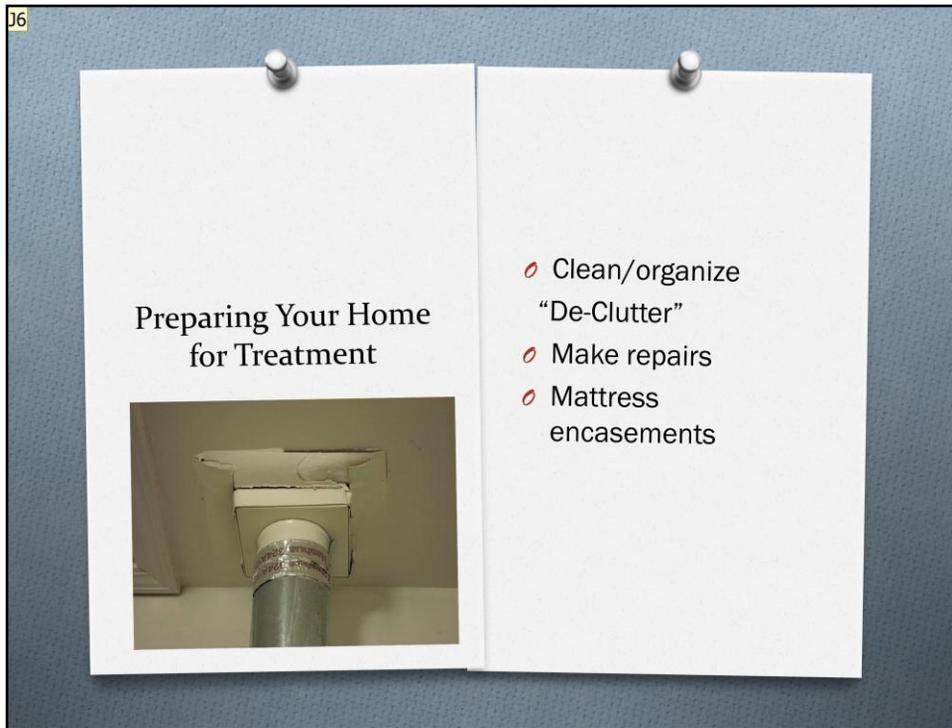


As we mentioned before, the only way to know for sure that you have bed bugs is to find live bed bugs in your home. “Bites” can not reliably prove that you have bed bugs – you may be getting bitten by other bugs or having an allergic reaction to something in your home. We only recommend treating your home for bed bugs if you find actual bed bugs.

However, bed bugs are somewhat small and look similar to several other kinds of bugs. Can you identify which of these bugs is a bed bug?

Trick question: none of them are (clockwise from top left: carpet beetle, cockroach nymph, book louse, stink bug, American dog tick, and bat bug – bat bugs look almost exactly like bed bugs and it takes an expert to tell them apart)

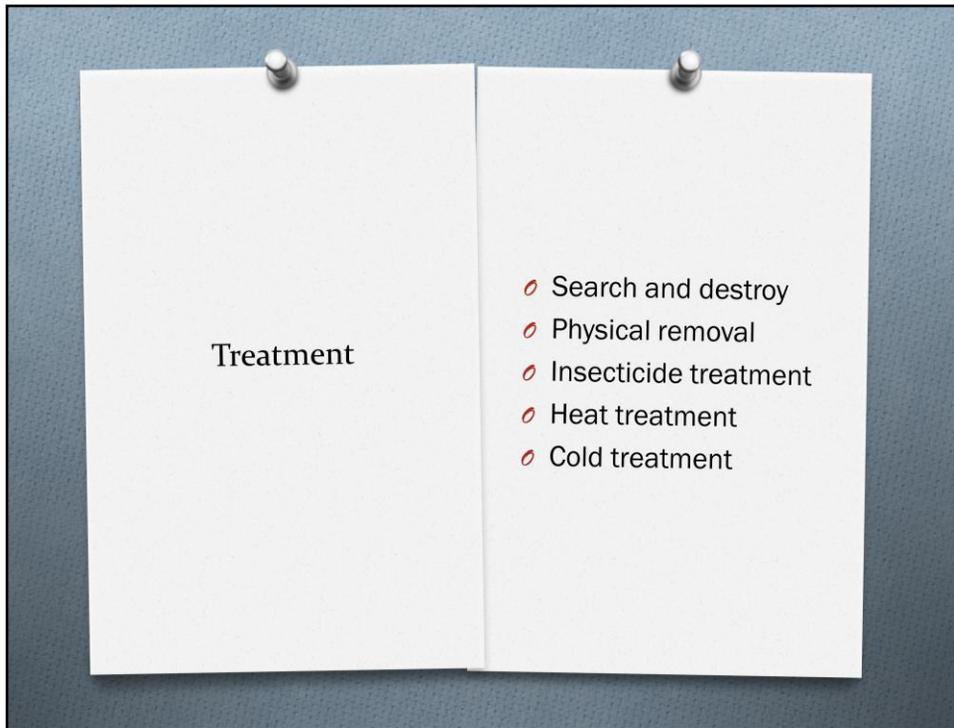
When you do your inspection, save any bugs you find and show them to an expert who can identify them for you. MSU Extension (pestid.msu.edu) can identify them, and many pest control companies will also identify bugs for free. This is important because the treatment plan for bed bugs is difficult and only works for bed bugs. If you don't actually have bed bugs, you will be wasting your time and not taking care of the real problem.



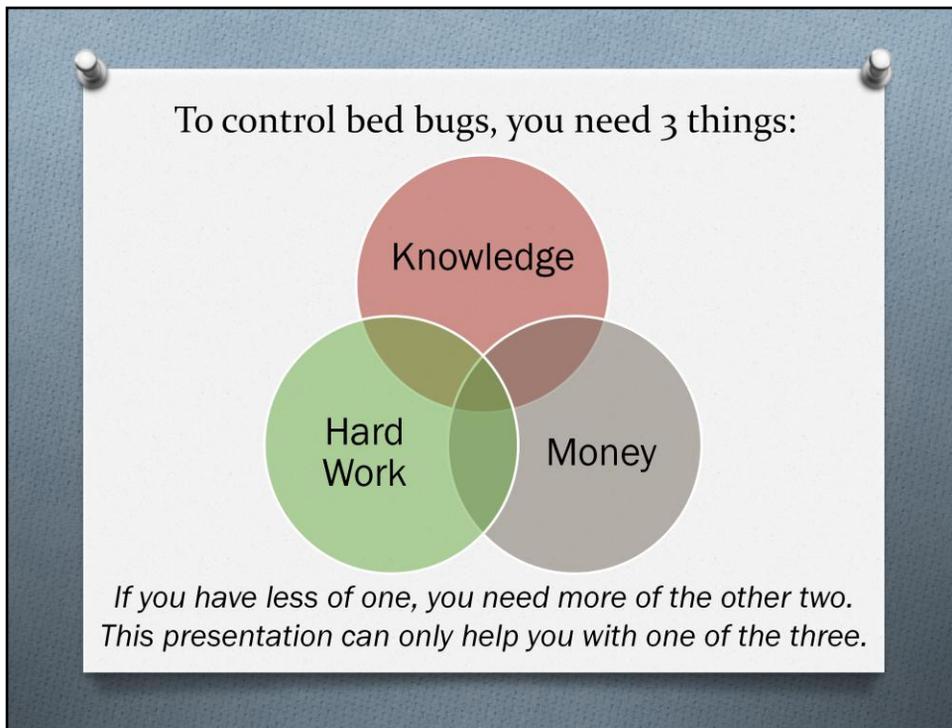
Before you treat your home, there are some steps you need to take to prepare. This is the time to clean and organize the infested area to the best of your ability. Clutter offers bed bugs lots of places to hide, so it's important to clear out any clutter in your sleeping area.

You also want to make repairs to your home to make it less bed bug friendly. Caulking and sealing up any openings or gaps in your walls keeps bed bugs from getting in and hiding in there. The picture here shows an example of an area you would want to seal up.

Mattress encasements should be put on and left alone – once you put the encasement on, you will not take it off. Bed bugs trapped inside the encasements will eventually starve and die, but this can take a very long time (a year or more). Check them regularly for tears or holes, which you can patch up with duct tape.



There are a few different approaches to treating a home for bed bugs. None of these methods is perfect, so you will need to use several of them together in order to get the most effective treatment possible.



Controlling bed bugs takes hard work, knowledge, and money. All three are needed, although if you have less of one, you can compensate with more of the other two. This presentation cannot help you with the hard work or the money. However, by increasing your knowledge about bed bugs, we hope that you will be able to have success with less money and less work.

Search (and destroy)

- o This is a slow and detailed process
- o If PMP is inspecting/treating, they will need to do this
- o If you are self-treating, you will do this

- o The goal is to find and and remove as many bed bugs as possible
 - o You can vacuum them up, or kill with a contact killer
 - o You probably won't find them all, but other treatment methods will take care of the few that you didn't find

The first step to DIY bed bug control is the same as the first thing that a professional would do: you are going to search every nook and cranny of your sleeping area for bed bugs, and vacuum or kill every single one you can find. This is a slow and detailed process that needs to be done very carefully and very systematically. It will take several hours. As you do this, you will understand why we recommended decluttering earlier.

You start with the bed, and you will need to remove all of the bedding and launder it (or at least put it through the dryer). Pillows can go in the dryer too. Then you will take the mattress and box springs off of the bed frame and carefully check every crack, corner, and hole in the bed frame. You can use the hose attachment on the vacuum to suck up any bugs you find, or you can kill them with a contact killing spray.

Once you are done with the bed, you will move outwards from the bed, inspecting furniture and items near the bed. You will want to look for bed bugs in any bedside furniture, in the crack where the floor meets the wall, behind any picture frames, and in window coverings. You will want to unscrew outlet covers and light switch plates to check for bed bugs. You should vacuum any carpeting or rugs in the sleeping area.

Physical Removal of Bed Bugs

- o The vacuum can be your best friend!
 - o Use a brush or crevice attachment with a scraping motion to dislodge bed bugs or eggs
 - o You can use a knee-high stocking to catch bed bugs in the vacuum hose before they go into the bag or canister



Physical Removal of Bed Bugs

- o Some types of furniture are extremely difficult to treat for bed bugs. These include:
 - o Upholstered chairs
 - o Couches
 - o Recliners

- o It may be necessary to remove these items from the home. If you do so, follow these steps:
 - o Wrap the item in plastic or other material so that bed bugs do not fall out of the furniture as you are taking it out
 - o Mark the furniture as “Infested” or “Bed Bugs” or make the furniture unusable by damaging or breaking it. This will keep someone from picking it up and taking it home.

Insecticide Treatment

- o Dusts
- o Sprays
- o Aerosol sprays
- o Strips
- o Fumigation (pros only)
- o NO BUG BOMBS
- o Read the label



Once you have found and killed every bed bug you can, you will want to apply some insecticides in order to kill any bed bugs that you missed. These insecticides can be found at a local hardware store or from reputable online sources. The main categories of insecticides that work for bed bugs are: Dusts, sprays, aerosol sprays and strips. Some PMPs also use fumigation, which is NOT THE SAME AS BUG BOMBS, but fumigation is not something you can do yourself. Again, bug bombs are a bad idea and they don't work.

Before you use any insecticide, you **MUST** read the label first. If your insecticide doesn't have a label, then you shouldn't use it. If you have trouble reading or understanding the label, you can ask a store employee to help explain it to you or you can call the National Pesticide Information Center at **800-858-7378**. Always make sure you understand how to safely use a pesticide before you begin using it.

Insecticide Dusts

- o Insecticide dusts for bed bug control work in two ways:
 1. They cut up the bug's exoskeleton and the bug eventually dies (eg. food grade diatomaceous earth)
 2. They may have chemicals that kill bugs upon extended contact (eg. Delta Dust)
- o Dusts should be used instead of liquids around sensitive areas such as electronics, electrical wiring, and furniture that may stain
- o Dusts should not be over-applied in piles as it may be kicked up into the air and breathed in – **more is not necessarily better**
- o Best if applied using a pesticide duster



Insecticide dusts work in two different ways: They cut up the bug's outer layer (which kills them by drying them out), and they can also contain chemicals that stick to the bug and poison it over time. The best places to apply dusts are in the hidden cracks and crevices where bed bugs might

Dusts can be safely used on electronics and electrical outlets, where you shouldn't use sprays, but it should not be applied in large quantities to open areas. A very fine dusting works best. If bed bugs can see a large pile of the dust they may just avoid it. Another reason not to over-apply dusts is that it can harm your lungs if you inhale it, so wear a mask while you apply it and be careful to only use it in places where the dust won't be disturbed.

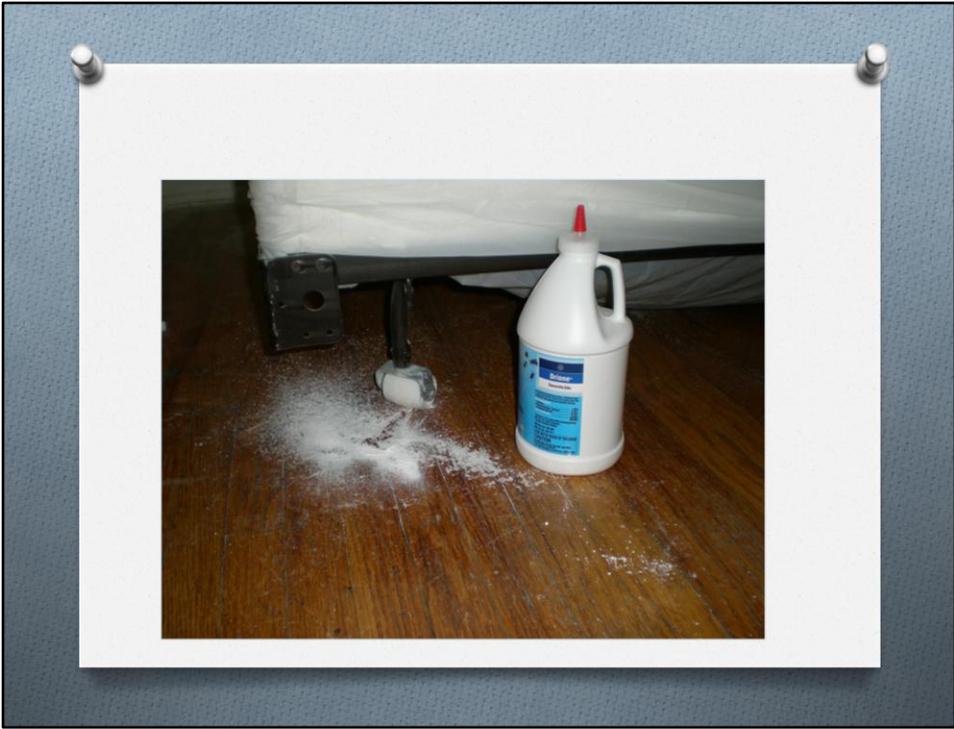
For example, you might choose to puff dust behind the light switch plates in your bedroom or underneath your box spring, but you wouldn't want to use dust on your pillows.

Applying pesticide dusts

Some examples of where dusts may be used:

- Inside electrical boxes (switches and outlets)
- In cracks and crevices that are difficult to treat with liquid formulations (underneath baseboards)
- On bed frames and rails
- Inside dressers, and on the rails of drawers





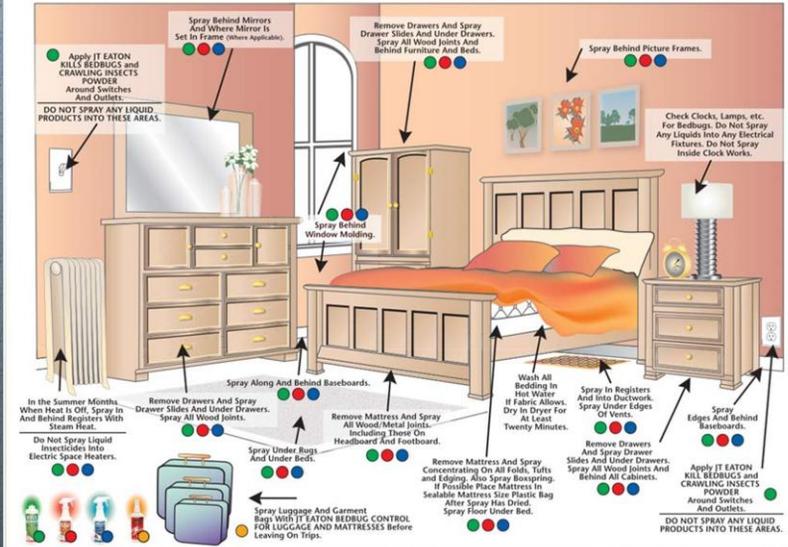
Insecticide Sprays

- o Many available types, but most belong to the pyrethroid class
 - o A synthetic form of a natural toxin from Chrysanthemum flowers
 - o Some bed bug populations have developed resistance to pyrethroids
- o Sprays don't last as long as dusts but often have a more immediate effect

Insecticide sprays contain chemicals that can kill bedbugs after they have dried. One problem with sprays is that many bed bugs have developed resistance, meaning that the bed bugs have to be exposed to the spray for a long time in order to be killed. For this reason, it is better to apply sprays to areas where you think bed bugs would be likely to hide. If you found a lot of bed bugs hiding behind your headboard, then it would be smart to use a spray on the back of your headboard. However, spraying a large amount of spray onto bare walls probably won't help, because bed bugs won't spend enough time in that area for the spray to kill them.

Read the label on your spray carefully, and don't use it on your bed if the label doesn't say it is safe to do so.

MOST EFFECTIVE AREAS TO APPLY KILLS BEDBUGS PRODUCTS



Heat Treatment

- o Whole house heat (pros only)
- o Container heat (Packtite)
- o Household appliances
 - o clothes dryer
 - o hair dryer
 - o steam

One of the most effective ways to kill bed bugs is with heat. Professionals can treat a home using special heaters that heat an entire home, but this is not safe to do yourself. Your options for using heat are to purchase a special heating container like a Packtite, or to use a household clothes dryer, hair dryer, or steamer. Clothes dryers work well – if you put soft items into a dryer on medium or high heat for 30 minutes it will kill all of the bed bugs and eggs. A Packtite is kind of like a clothes dryer except that it doesn't tumble the items inside, so it can be used on books, suitcases, and other hard items. Some people have reported using a hair dryer to kill bed bugs, but you have to keep it aimed on the area for 30 seconds and if it is blowing too hard you may accidentally blow the bed bugs away. A steam cleaner will also kill bed bugs, and can be especially useful for couches or upholstered furniture.

No silver bullet

- o You have to use multiple methods together
- o Use the right tool for the job (dusts in wall voids, heat for clothing, etc.)
- o Same goes for PMPs – they should be using multiple approaches mentioned here
 - o 20 minute “spray & pray” visit is not good enough
 - o Even a whole-house heat treatment should have some insecticides as a backup

So, to summarize, there are a variety of different treatment methods to consider, and you will need to combine multiple methods to be effective. It’s crucial that you use the right treatment “tool” to treat each item and area – for instance, use encasements for the mattress, use pesticide dusts behind electrical outlet plates, use a clothes dryer to heat treat your clothing, use steam and vacuuming on carpet, and so on...

As a side note, if you hire a PMP, they should be doing something very similar to what we have described here. A good PMP will use multiple treatment methods together (including the time-consuming “search and destroy”) to eliminate bed bugs. If your PMP shows up and just sprays around the baseboards and leaves after 15 minutes, then they are not doing a good job. Although a few techniques (such as whole-house heat and professional fumigation) available to professionals CAN kill all of the bed bugs and eggs at once, the PMP should still apply some residual insecticides as well, as a backup in case a few bed bugs survived.



Before you use a bed bug treatment method, ask yourself three questions:

Is this treatment safe to use in this location?

-If it is an insecticide, check the label to make sure it is safe to apply indoors and in the area you are treating (for example, some insecticide sprays say not to use them on bedding or couches). If you are using a flammable product, make sure there isn't anything around that could ignite it (don't smoke while using flammable products).

Do I have what I need to use this treatment safely?

-If you are applying a pesticide, check to label to see if you need a facemask or protective gloves. If you are using flammable products, make sure you have a fire extinguisher nearby. If you are using a dust, make sure you have a puffer so you can apply small amounts without inhaling it. Keep children and pets out of the area where you are using insecticides.

Will this treatment be effective in this location?

-Insecticide treatments should only be used in areas where bed bugs might actually spend time. So try to focus on getting the sprays and dusts into the areas where bed bugs would hide rather than jspraying entire walls or floors.

Monitoring

- Usually need to repeat treatment 2 weeks later
- Monitors can show if treatment is successful and monitors can help detect bed bug infestations early!

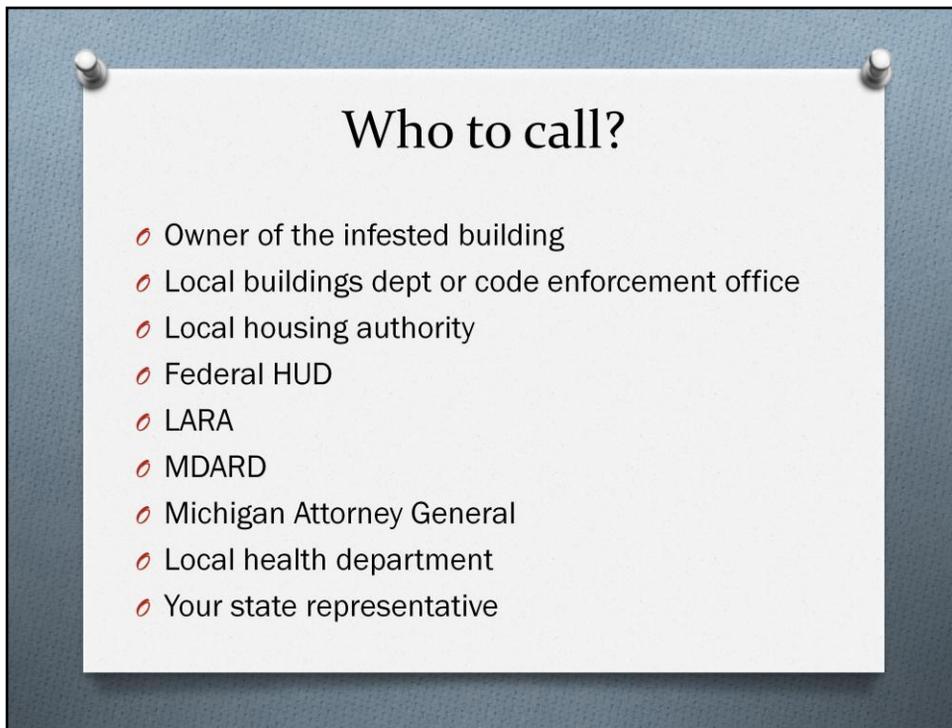


Even if you do a good job with treatment, you will still probably need to repeat the treatment 2 weeks later. This is because bed bug eggs are harder to see and harder to kill, so 2 weeks after your treatment the eggs will have hatched and you will have more baby bed bugs. Using monitors such as the ones shown here, or even just some pieces of tape placed sticky-side-up around the room can help you figure out if there are still bed bugs around. If you are still finding bed bugs in your monitors, or are still getting bitten, then you need to keep treating every 2 weeks until the bed bugs are all gone.

An experienced PMP can usually eliminate an infestation within 2 months, if they are treating every 2 weeks. If you are doing the treatment yourself, it will probably take a little longer. However, you should notice a significant improvement (fewer bites) right away once you start treatment and isolate your bed.

Tenant's Issues

- Subsidized Housing
- Market rental
- Facility



One of the most common questions that people have when they discover a bed bug infestation is: Who do I call to report this infestation?

The first place to call is always the owner of the infested building. If they do not deal with the problem to your satisfaction, then the next step depends on the type of building. If it is a residence, then you could call the local buildings department or local code enforcement office. If the residence is in a subsidized housing development, then you can report infestations to the local housing authority or to the U.S. Department of Housing and Urban Development. If the problem is in a licensed facility (like a nursing home, hospital, school, etc.), then you can contact the Michigan Department of Licensing and Regulatory Affairs. If the problem relates to misuse of pesticides, then you can contact the Michigan Department of Agriculture and Rural Development. If you have legal concerns, you can always contact the office of Michigan's Attorney General. And finally, if you have health concerns, you can try contacting your local health department.

Unfortunately, many agencies are hesitant to get involved in bed bug issues because it is not clear what authority they have to deal with an infestation. Another avenue to consider is to contact your state representative to let them know about your problem. So far, bed bugs have not gotten much attention from legislators – perhaps

if enough people contact them to share their stories, the issue will get more attention.