

Documentation project, Bedbug extermination user manual

Bedbug extermination: A guide to best practices for detecting and eliminating bedbugs in your home (user manual)

This user manual project was a class assignment. The project involved many “firsts” for me: it was my first experience writing a complete set of supporting documentation to aid the development of an extensive primary document. It was also my first experience incorporating conceptual, procedural, and reference information into a single document, as well as my first time writing a glossary and an index.

This user manual is intended for home owners who are concerned that they might have bedbugs in their home or who knowingly have bedbugs. It is meant to guide readers to detect and eliminate bedbugs in their home while feeling calm and in control.

BEDBUG EXTERMINATION



**A guide to best practices for detecting
and eliminating bedbugs in your home**

By Tara St-Laurent

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Bedbug Extermination

A guide to best practices for detecting and eliminating bedbugs in your home

Tara St-Laurent

Montreal

Editor: Peter Ferguson

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Notices

With advances in research and with the development of new bedbug detection and elimination tools and methods, best practices may change.

The author, publisher, and editor are not liable for any damage to persons or property from using any information contained in this guide.

For my parents

Thank you for your emotional, physical, and financial support

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Introduction

Bedbug Extermination: A guide to best practices for detecting and eliminating bedbugs in your home is designed to give you the information you need to exterminate bedbugs in your house quickly and effectively.

Who should use this guide?

You should use this guide if you have bedbugs in your house or if you suspect you might have them. This guide is primarily meant for house owners. Tenants living in houses or apartment buildings may also find this guide helpful; however, if you are a tenant or if you live in a large building (for example a high rise building), some of the practices may not be feasible.

You should use this guide if you are willing and able to spend \$2000-\$5000 (if bedbugs are detected) in order to completely eliminate your bedbug problem with certainty.

Why should you use this guide?

Dealing with bedbugs can be stressful, demanding, and overwhelming—especially when you do not have the proper resources. If bedbugs are not treated, or if unsuitable treatment methods are used, the bedbugs will multiply. They have the potential to spread throughout your home and to other people and locations outside of your home.

You should use this guide to help you exterminate your bedbugs as quickly and effectively as possible, so that you can stop worrying about them and go back to living and sleeping with peace of mind. You should use this guide if you are uninformed about how to best manage your bedbug problem. Alternatively, you should use this guide if you have too much information or conflicting information, and it's causing you to be confused or overwhelmed.

What you will find in the *Bedbug Extermination* guide

This guide provides information about bedbugs and their habits, and gives you information about best practices for detecting and eliminating bedbugs. The guide gives you steps that you can take directly, and also gives you information about when and how you should implicate an extermination company to help you manage your (suspected) bedbug problem. The information presented in this guide is based on bedbug biology and behaviour as well as evidence-based research of effective (and ineffective) bedbug extermination methods.

Best practices. Bedbug extermination methods are **not** equally effective. The effectiveness of bedbug extermination methods can be divided into three categories:

- **Highly effective** methods are able *detect* bedbugs, even if there are only a few of them in your home. Highly effective methods *eliminate* all of the bedbugs and bedbug eggs in your home and on your belongings in a short amount of time, with no or minimal loss of your personal belongings, and with no or minimal risk of spreading the bedbugs.
- **Moderately effective** methods have variable, hard-to-predict results. Most extermination methods are moderately effective. Moderately effective *detection* methods may only be able to detect bedbugs if a large number of them are present. Moderately effective *elimination* methods may reduce the number of bedbugs or may eliminate all bedbugs and bedbug eggs. The time needed for the extermination process is variable, and there is a low-to-moderate risk of spreading bedbugs.
- **Ineffective methods** only *detect* bedbugs if a large number of them are present, or may not be able to detect bedbugs at all. Ineffective *elimination* methods will eliminate no or only some bedbugs and will not eliminate bedbugs eggs. Ineffective methods take a variable amount of time. They have a high risk of spreading bedbugs throughout your home and/or of spreading them to others.

Best practices, which are the practices you will find in in this guide, involve *using highly effective extermination methods and avoiding ineffective extermination methods that cause bedbugs to spread at a fast rate.*

Finding information in the guide. *Bedbug Extermination: A guide to best practices for detecting and eliminating bedbugs in your home* is organized into these sections:

- Section 1: About Bedbugs
- Section 2: Detecting bedbugs
- Section 3: Eliminating bedbugs
- Appendix A: Dos and Don'ts
- Appendix B: Comparison tables of extermination methods
- Appendix C: What to look for in an exterminator
- Appendix D: Resources

How to use this guide

To find the information you need, you can look through the *Contents*, or use the *Index* at the end of the guide.

If you are very anxious about your (suspected) bedbug problem and you want to start managing it immediately, then you may want to start by reading *Appendix A: Dos and Don'ts*. It gives you a quick guide of what to do and what **not** to do for detecting, eliminating, and minimizing the spread of bedbugs. You can refer to it throughout your bedbug extermination process to make sure that you are on track. Optionally, read *Section 1: About bedbugs* for background information about bedbugs; by understanding bedbugs and their habits, you can make informed decisions about how to exterminate them. Key points from *Section 1: About bedbugs* are repeated throughout the manual in sections where they will be most useful to you.

Read the *Take-away messages* that conclude each *Section* for a summary of the most important information and most useful steps for you to take.

Throughout the guide, you will see these symbols:



This is the *note* symbol. It gives you important information about a topic or procedure. Important concepts from paragraphs may be repeated here.



This is the *tip* symbol. It gives you useful facts, ideas, or alternative methods for performing a procedure.



This is the *warning* symbol. It alerts you to potential personal injury, potential damage to belongings, activities that might worsen your bedbug problem, or to illegal activity.

SECTION

I About Bedbugs

This section gives you information about the bedbug species (scientific name: *Cimex lectularius*). By understanding bedbugs' basic characteristics and behaviours, you will be better equipped to exterminate them in your home.

Reading this section is useful, but not essential. It gives you background information that will help you understand the bedbug problem you are dealing with, but it does not give you any direct advice for managing your bedbug problem. Key information from the *About Bedbugs* section is repeated in other sections of the *Bedbug Extermination* guide when it helps to explain related information or procedures.

This section gives you information about:

- What are bedbugs?
- Bedbugs and you: Possible effects
- Take-away messages

What are bedbugs?

Definition

Bedbugs (*Cimex lectularius*) are nocturnal, wingless, oval insects that feed on the blood of live, warm-blooded animals and that almost always live in close proximity to humans.

Feeding habits

Bedbugs feed primarily on humans, and usually at night. They can also feed on other animals in or near the home, such as family pets (for example, cats, dogs, birds, and rodents), or farm animals (Sutherland, Choe, & Lewis, 2014). They will feed during the day if they are desperate.

If a food source is readily available, a bedbug will feed every 5-10 days. Bedbugs feed by piercing the skin and sucking the blood of their host; they often pierce more than one spot of their host's skin (Sutherland et al., 2014).



The term bedbug *bite* is used throughout this manual for simplicity. Please note that bedbugs do not actually bite; they pierce their host's skin and suck out the blood with their clypeus (mouthpart).

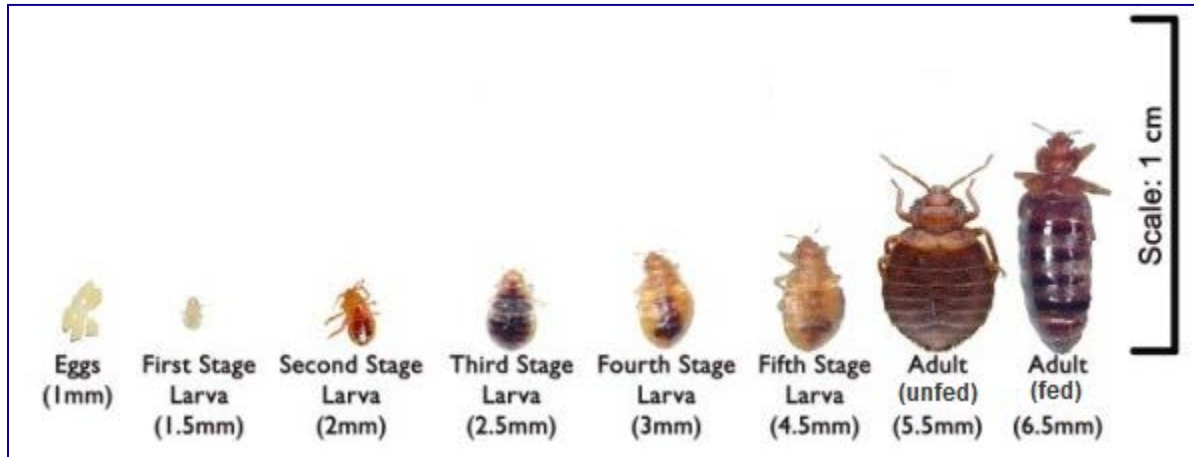
See *Appearance and life cycle*, directly below, for more information about how feeding relates to the bedbug life cycle.

Appearance and life cycle

Bedbugs are oval insects that **do not** have wings. Bedbugs walk; they move about as fast as an ant. They cannot jump, fly, or burrow into the skin of their host ("FAQ list"). An adult bedbug is about the size of an apple seed.

Bedbugs look different depending on their life cycle stage. Also, adults look different from each other depending on whether they are fed (engorged) or unfed. *Figure 1*, below shows the size and appearance of bedbugs throughout their life cycle. You will notice that bedbug larvae are yellowish, and adult bedbugs are reddish-brown. Fed bedbugs are longer and less flat than unfed bedbugs.

Figure 1: Appearance of bedbugs at different stages in their life cycle



(Figure created from an image retrieved from hi-techpestcontrol.com)

Bedbugs can live for a year or longer, but for less than two years. Female bedbugs lay an average of 2-5 eggs per day. Eggs hatch 10-15 days after being laid. After hatching, bedbug larvae require a blood meal to molt and grow from one stage of the life cycle to the next (EPA, 2015).

Bedbugs feed every 5-10 days if given the opportunity (“FAQ list”). Both males and females need to feed at least once every 14 days in order to continue mating and laying eggs “FAQ list”). However, bedbugs can survive for up to 400 days **without** feeding, depending on temperature and humidity. During this time, the bedbugs become inactive until they detect a food source.



Although bedbugs prefer to feed on a human every 5-10 days, bedbugs can live for over a year *without* feeding.

Living conditions and habits

Bedbugs thrive in particular global conditions (based on climate and population density). They also have particular preferences and habits when living within a home.

Global living conditions. Bedbugs live worldwide, but are more prevalent in northern climates, including Canada. For the past 10-20 years, many cities throughout Canada and the United States have had increased occurrences of bedbugs, especially in major cities where many people live in close proximity (Doggett, Dwyer, Peñas, & Russell, 2012). The reasons for the bedbug increase are not fully understood; however, widespread insecticide resistance,

global travel, and spreading through personal contact and infested items have probably contributed to their resurgence (Sutherland et al., 2014).

Any home can get bedbugs; bedbugs are not indicative of an unclean living environment. Other than in homes, bedbugs can also be found in movie theatres, hotels, and other heavily frequented public areas.

Bedbugs prefer temperatures that are between 21°C and 28°C. Bedbugs and bedbug eggs cannot survive in temperatures under -18°C and over 45°C for more than a few hours (“FAQ list”).

Living conditions and habits in homes. Many people who have a bedbug problem will never actually see a bedbug. Bedbugs spend most of their lives in hiding. They find resting sites that are out of sight, but that are in close proximity to where people sleep or rest. They usually only leave their resting site to feed (Shindelar, & Kells, 2011). Most resting sites contain groups of bedbugs within 8 feet of where people sleep or rest; however, bedbugs may move to more distant resting sites as the bedbug population increases (Shindelar, & Kells, 2011).

Common bedbug resting sites include:

- **Beds:** in the box spring, at bedframe attachment points (including the headboard and baseboard), along mattress seams, in pillow cases and bed skirts, and in bedding.
- **Room structures:** in cracks of floors, under floor molding, in electrical outlets, under carpets, in curtains, and under loose wallpaper.
- **Furniture and personal belongings:** In furniture close to your bed (such as dressers and bedside tables), in upholstered furniture, and in books.

Bedbugs are often, but not always found in the bedroom. For example, if you spend a lot of time reading, napping, or watching TV on your living room couch, it’s possible that bedbugs will find a resting site somewhere on or in the couch.

Bedbugs prefer resting sites that are made of wood, paper or fabric (Sutherland et al., 2014), but they sometimes find resting places in metal or plastic objects, such as alarm clocks, telephones, and picture frames.

Bedbugs are also known to “hitchhike” — lone bedbugs or groups of bedbugs can be transported to other locations via clothes, luggage, furniture, toys, and other personal items.

Bedbugs and you: Possible effects

Dealing with a bedbug problem can result in unwanted physical and emotional effects, and can complicate your daily activities.

Physical effects

There are **no** recorded cases of bedbugs transmitting diseases of any kind. If a bedbug bites you, you will likely develop an itchy irritation on your skin. After you are bitten, an irritation can take up to 7 days to develop. The appearance of the irritations can vary drastically from person to person: they can look like mosquito bites, they can appear as tiny specs, they can appear as large swollen lumps, or they can not appear at all; some people never develop skin irritations or itchiness.

Often, bedbug bites appear in clusters or in a line; however, single bite marks also occur. Bedbugs can bite wherever skin is exposed.



It is **not** possible to distinguish bedbug bites from other types of bites, for example, mosquito bites, spider bites, or flea bites (Sutherland et al., 2014).

Another physical symptom that you may experience is lack of sleep; lack of sleep can be caused by the itchiness of the irritations or from psychological factors, such as anxiety.

For photos and for more in depth information about the physical effects that bedbugs can cause, refer to *Inspecting your body*, on page 12, in *Detecting Bedbugs*.

Psychological and emotional effects

If you have bedbugs or suspect you have bedbugs in your home, you might experience unwelcome psychological and emotional symptoms. In fact, research shows that having bedbugs can leave people with symptoms that are characteristic of anxiety, depression, and paranoia (Eveleth, 2014).

Examples of sources of negative psychological and emotional symptoms include:

- Worrying that the bedbugs will bite you while you sleep; this can cause a lack of sleep.
- Worrying that the bedbugs will continue to multiply.

- Worrying and obsessive thinking about not knowing the extent of your bedbug problem. For example, not knowing which of your personal belongings have bedbugs and which are bedbug-free (since many people have bedbugs without ever seeing one).
- Worrying about how to eliminate the bedbugs or worrying about whether the bedbug elimination method was effective.
- Worrying about spreading bedbugs to others, and not knowing if you have done so.
- Worrying about the social stigma of having bedbugs.

If you have already experienced some of these thoughts or symptoms, know that this is normal. By following the practices in *Bedbug Extermination: A guide to best practices for detecting and eliminating bedbugs in your home*, you will be able to alleviate many or all of your concerns.

Impact on daily activities and personal belongings

Managing a bedbug problem can complicate and interfere with your daily activities, since you will need to take precautions in order to minimize the risk of spreading the bedbugs. Daily activities, such as leaving and entering your home, having guests over, visiting others, and even working can be affected.

For example, when you have bedbugs, you should invite guests into your home only with caution; guests should avoid using your furniture, especially in the room known to have the bedbugs.

Minimizing the risk of spreading bedbugs while waiting for treatment, on page 28, in *Detecting Bedbugs* has more information about how to modify your daily activities while managing a bedbug situation.

Bedbugs may leave feces on your belongings. Feces can be removed with a disinfecting cleaning agent. Overall, damage to or loss of personal belongings will be minimal or nonexistent if you use best practices for bedbug extermination. However, this may come at a significant financial cost (\$2000 or more).

Take-away messages

Bedbugs are insects that live close to where people sleep and rest, but that stay out of sight. Bedbugs feed on humans; if a bedbug bites you, you will likely develop an itchy irritation on your skin. Bedbug bites can be uncomfortable, but they are **not** dangerous. There are **no** recorded cases of bedbugs transmitting diseases of any kind.

By learning about bedbugs' characteristics, habits, and impacts on humans, you have a better understanding of the insects you are dealing with. The background information you gained in this section will be useful when you learn about detecting and eliminating bedbugs.

Information points from the *About Bedbugs* section are selectively repeated throughout the manual, and are used to explain and validate specific concepts, options, and procedures.

If you are feeling worried or anxious, know that these are normal feelings, and that they can soon be over. By obtaining accurate information and following effective procedures, such as the information and procedures included in this *Bedbug Extermination* guide, you will be able to completely eliminate any bedbugs you have and regain some peace of mind.

SECTION

2 Detecting bedbugs

Detecting bedbugs means determining, with certainty, that you have bedbugs in your home. Even if you have never seen a bedbug, it's possible that you have bedbugs in your home. This is because bedbugs spend most of their time in resting sites that are close to where you rest or sleep, but that are out of sight. They usually only come out at night, in order to feed (Shindelar, & Kells, 2011).

Even if you have never seen a bedbug, you may be able to find other evidence that there are bedbugs in your home. Based on the evidence, you may strongly suspect that you have bedbugs, but you cannot be completely sure until a professional extermination company has confirmed their presence.

This section gives you information about:

- Collecting evidence of bedbugs
- Confirming the presence of bedbugs
- Take-away messages

Collecting evidence of bedbugs

If you are concerned that you might have bedbugs, it's useful to look for concrete evidence of them. You may have noticed signs which initially lead you to suspect that you might have bedbugs. Often, inexplicable itchy bites are sign that lead people to suspect that they might have bedbugs.

Bite marks are evidence of bedbugs that you can find on your *body*. You should look for other evidence by inspecting your *home*.

By collecting evidence of bedbugs, you will be able to decide whether your suspicions were unfounded or whether it's worthwhile to continue to investigate. If you find any evidence of bedbugs, your exterminator will be able to use it to help to confirm the presence of bedbugs, and to exterminate them.

Inspecting your body

When you inspect your body, you look for skin irritations that may be caused by bedbug bites. While bedbug bites can be itchy and unsightly, it is important to keep in mind that they are **not** dangerous: there are **no** recorded cases of bedbugs transmitting diseases of any kind.


Skin irritations are an indicator of the presence of bedbugs in your home, but it is **not** possible to confirm or deny the presence of bedbugs based on skin irritations **alone**:

- **You can have skin irritations without having bedbugs:** It is not possible to conclusively distinguish bedbug bites from other types of bites (for example mosquito bites, spider bites, or flea bites). Even dermatologists cannot confirm that a skin irritation is caused by a bedbug with certainty.
- **You can have bedbugs without having skin irritations:** Some people who get bedbug bites never develop skin irritations. Furthermore, not everyone who has bedbugs gets bitten by bedbugs, especially if they share a bed. (Some bedbugs show preferences for feeding on particular people, so if you share a bed, it's possible that only one person will get all of the bedbug bites) (Sutherland et al., 2014).

Even though inspecting your body does not result in conclusive evidence of bedbugs, it is still worthwhile to do it. Skin irritations can still be a useful hint to the presence of bedbugs in your home, especially if the irritations are paired with other evidence. *Table 1*, below, shows you what to look for when you are inspecting your body.

Table 1: Indicators of bedbug bites on skin

Indicator	Example
<p>Circular skin irritations that are itchy, red, and/or swollen.</p> <p>Irritations may appear as tiny specs, like other insect bites (such as mosquito, spider, or flea bites), as large and swollen lumps, or as a combination of these.</p>	<p><i>Figure 1: Sample of the range of skin irritations caused by bedbug bites</i></p>  <p>(Figure created from images retrieved from mayoclinic.org, ipm.ucdavis.edu, & webmd.com)</p>
<p>Small clusters or lines of irritations.</p> <p>Bedbug bites often appear in groups, but lone bedbug bites are also possible.</p>	<p><i>Figure 2: Bedbug bite groupings—cluster and line</i></p>  <p>(Figure created from images retrieved from tripadvisor.com & aafp.org)</p>

Indicator	Example
<p>Irritations that appear on areas of exposed skin, such as your face, neck, hands, wrists, feet, or ankles.</p> <p>Bedbugs cannot bite through fabric. It is rare, but possible that they will travel under your clothing to bite you.</p>	<p><i>Figure 3: Sample of common locations for bedbug bites—neck and ankle</i></p>  <p>(Figure created from images retrieved from myhealthlyfeeling.com)</p>

To inspect your body:

- Look at all of your skin for indicators of bedbug bites.



Refer to **Table 1: Indicators of bedbug bites on skin**, above, for descriptions and photos of the types of evidence to look for on your body.



If you find any indicators, take a photo. Photos provide an accurate visual record and timeline of the evidence. (Most cameras also record the date that photos are taken.)



Every member of a household should inspect their body. Parents can inspect the bodies of their children.

Regardless of whether you found evidence of possible bedbugs when inspecting your body, you will probably also want to inspect your home for other evidence of bedbugs.

Inspecting your home

Any home can get bedbugs; bedbugs are found in homes worldwide, and can be found even in very clean homes. If you have bedbugs in your home, they will leave evidence in your home, but the evidence can be hard to spot.

Even if you have bedbugs, you may never actually see one, because bedbugs spend most of their lives in hiding. Bedbugs find resting sites that are close to where you rest or sleep, but that are out of sight, and they usually only leave their resting sites at night, in order to feed. (Shindelar, & Kells, 2011).

Most resting sites contain groups of bedbugs within 8 feet of where people sleep or rest (bedbugs.umn.edu). Bedbugs are often, but not always found in the bedroom. They prefer resting sites that are made of wood, paper, or fabric (Sutherland et al., 2014), but they sometimes find resting places in metal or plastic objects.

Common bedbug resting sites in homes include:

- **Beds:** along mattress seams, at bedframe attachment points (including the headboard and baseboard), in the box spring, in pillow cases and bed skirts, and under blankets and sheets.
- **Room structures:** in cracks of floors, under floor molding, in electrical outlets, under carpets, in curtains, and under loose wallpaper.
- **Furniture and personal belongings:** In furniture close to your bed (such as dressers and bedside tables), and in living room couches or other upholstered furniture. Books, alarm clocks, telephones, and picture frames are other (less common) sites.




When you inspect your home, you will primarily be looking for evidence in the locations listed above.





Skin irritations caused by bedbug bites can take up to 7 days to appear. This means that if you have a skin irritation caused by bedbugs, every location you have slept or rested in for the past 7 days is a possible source of the bedbugs.

Several types of evidence may be present in your home; they are described in the table below:

Table 2: Evidence of bedbugs to look for in your home

Evidence type and description	Appearance
<p>A live or dead <i>adult</i> bedbug.</p> <p>Live and dead bedbugs look the same. They are about the size of an apple seed; they do not have wings.</p> <p>Bedbug eggs and larvae are extremely difficult to see with the naked eye, which is why you should not focus your inspection on them.</p>	<p><i>Figure 4: Adult bedbugs</i></p>  <p>(Figure created from an image retrieved from hi-techpestcontrol.com)</p>
<p>A bedbug shell.</p> <p>The molted shell of a bedbug has the same shape as a live bedbug, but it is translucent and empty.</p>	<p><i>Figure 5: molted bedbug shell (not to scale)</i></p>  <p>(Image retrieved from nbedbugs.com)</p>
<p>Bedbug feces.</p> <p>Bedbugs leave feces near their resting site. They can also leave feces near their feeding site.</p> <p>Typically, the more feces you find, the more bedbugs you have.</p>	<p><i>Figure 6: Items with a large amount of feces — mattress and wood</i></p>  <p>(Figure created from images retrieved from bedbugexterminatorpro.ca)</p>

Evidence type and description	Appearance
	<p><i>Figure 7: An item with a small amount of feces — mattress</i></p> 
<p>Blood stains (spots or streaks).</p> <p>If you see blood stains on your bedding, bedclothes, or mattress, it's possible that you (unknowingly) crushed a bedbug while it was feeding.</p>	<p><i>Figure 8: Blood stains</i></p>  <p>(Figure created from an image retrieved from bedbugdot.com)</p>

When you inspect your home, you will be looking for the types of evidence depicted in the table above.



When inspecting your home, as soon as you think you have spotted a bedbug or a bedbug shell, **stop inspecting, and contact a professional exterminator**. If you keep inspecting, you may disrupt other bedbugs, causing them to spread.



If you find any evidence, take photos. Bag molted bedbug shells and dead or live bedbugs (if possible) for example, by trapping them in a sealable zip-lock baggie. Photos and actual bedbugs and bedbug shells provide an accurate visual record of the evidence. Your exterminator will use them when confirming the presence of bedbugs in your home.

To inspect your mattress:

1. Move your bed away from any walls or furniture until you have enough space to walk around the perimeter of the bed.
2. Gently move all of the bedding on your bed into a pile in the centre of your bed.

The seams along the edges and corners of your mattress are exposed.

3. Slowly walk around your entire bed while closely looking along the mattress seams for evidence of bedbugs, including bedbugs, bedbug shells and feces, and blood stains.



Refer to **Table 2: Evidence of bedbugs to look for in your home**, on page 16 for descriptions and photos of the types of evidence to look for.

4. Walk around your entire bed again; this time, pull the ridge of the bed seam outwards as you walk along it looking for evidence.



(Image retrieved from entomology.ca.uky.edu)



Carefully inspect all creases; make sure to look above and below the ridge of the seam.

You can see into the creases of the bed seam.



You can also perform the procedure outlined above on your **box spring** to do a preliminary inspection of your box spring. Complete inspections of box springs are difficult and are best left to professional exterminators.

To inspect your bedframe:

- Carefully look at all bedframe attachment points for evidence of bedbugs.



Bedframe attachment points are places in which 2 bedframe parts join, such as the leg to the support beam, or parts of the headboard to each other.



Evidence includes bedbugs, bedbug shells, bedbug feces, or blood stains. (Refer to **Table 2: Evidence of bedbugs to look for in your home**, on page 16 for descriptions and photos of the types of evidence to look for.)

To inspect each blanket on your bed:

- Lay a clean white (or pale coloured) sheet on the floor beside your bed.
- While keeping it on your bed, fold your blanket into a loose pile.
- Pick up the folded blanket from your bed.
- Carry the blanket so that you are holding it above the sheet on the floor.
- Shake out the blanket.

Substances (for example dirt) contained in the blanket have fallen onto the sheet below.

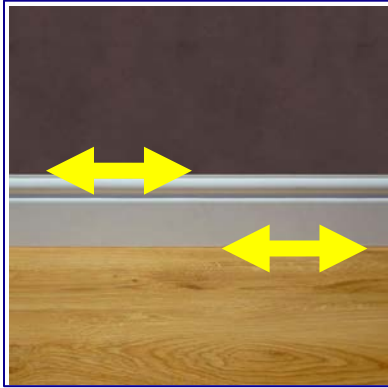
- Look closely at the sheet on the floor for bedbugs and bedbug shells.
- Look closely at the blanket (that you shook) for evidence of bedbugs, including bedbugs, bedbug shells and feces, and bloodstains.



Refer to **Table 2: Evidence of bedbugs to look for in your home**, on page 16 for descriptions and photos of the types of evidence to look for.

To inspect your floor and walls

- Slowly walk around the perimeter of your room while closely looking along the floor molding for evidence of bedbugs.



(This image was retrieved from infloor.co.uk, arrows added)

- Look in cracks of floorboards for evidence of bedbugs.
- If you have carpeting, look closely at any parts of the carpet that are ripped or detached from the floor for evidence of bedbugs.



(This image was retrieved from tripadvisor.com, arrow added)

- If you have wallpaper, look closely at any parts of the wallpaper that are ripped or detached from the wall for evidence of bedbugs.



Refer to **Table 2: Evidence of bedbugs to look for in your home**, on page 16 for descriptions and photos of the types of evidence to look for.



Even though you will be looking for evidence of bedbugs, it is only through a professional extermination service's examination of the evidence that the presence of bedbugs can be confirmed with certainty.

Confirming the presence of bedbugs

Any evidence of bedbugs that you collected by inspecting your body and your home will be useful for confirming the presence of bedbugs. Refer to *Collecting evidence of bedbugs*, on page 12) if you have not looked for evidence of bedbugs. However, **for now, all you can be sure of is that the evidence you collected suggests that you *may* have bedbugs in your home.** For example, maybe the bites on your neck are really just mosquito or flea bites, or maybe the bug you found was a tick and not a bedbug.

Figure 9: Bedbug (left) and deer tick (right)



(Figure created from an image

retrieved from mcdonaldpestcontrolblog.com)

It is only through an inspection performed by an extermination service that the presence of bedbugs in your home can be confirmed. They will use the evidence you collected as part of their analysis, and look for more evidence, if needed.

Obtaining extermination services for bedbug detection

You need to contact an extermination company so that they can take the steps needed confirm the presence of bedbugs. Different extermination companies offer different services. Best practice for bedbug detection for extermination companies to use two methods:

- a canine-lead inspection of your home and belongings, during which a dog (managed by an exterminator) searches for the scent of bedbugs in your home, **AND**
- a visual inspection of your home and belongings, conducted by a trained exterminator.

You should hire an extermination company that uses both of these bedbug detection methods.



To help you find an extermination company that uses best practice methods for detecting and eliminating bedbugs, use the information in *Appendix B: Comparison tables of extermination methods*, on page 34, and *Appendix C: What to look for in an exterminator*, on page 37.



Check with your insurance company to determine whether you have coverage for bedbug extermination. According to *Canadian Underwriter*, bedbug extermination is **not** typically covered by **standard** home insurance in Canada).

To obtain extermination services for bedbug detection:

1. Search for an extermination company in your city.



Use the yellow pages or perform an internet search to find an extermination company in your city, or perform an internet search.



Check the company's website to find out about the services they offer.

2. Call the company.
3. Ask the company's representative if the company offers visual inspections *and* canine-lead inspections for bedbugs.
4. IF they offer both visual and canine-lead inspections, then schedule an appointment.

IF they do not offer both visual and canine-lead inspections, then search for another extermination company.

Take-away messages

There are many possible signs of bedbugs, including skin irritations on your body, and the presence of bedbugs, molted bedbug shells, bedbug feces, and blood stains in your home.

You **should** look for this evidence; however, only a professional exterminator will be able to confirm that you have in fact detected bedbugs in your home.

If you find an insect in your home that you suspect is a bedbug (based on the photo on *page 16*) call a professional exterminator immediately. If possible, capture the bug (for example, in a zip-lock baggie) so that the exterminator can identify it.

Even if you have not seen a bedbug in your home, if you have any other evidence of bedbugs, then you should contact a professional exterminator.

Choose an extermination company that offers both visual **and** canine-lead bedbug detection methods. The exterminator will perform a thorough inspection and will be able to tell you whether or not you have bedbugs.

If you do not have any signs or evidence of bedbugs in your home, and have no reason to suspect that you might have bedbugs, then calling an extermination company is not necessary.

SECTION

3 Eliminating bedbugs

Living with bedbugs can cause unwanted physical and emotional effects, and can complicate your daily activities. (Refer to *Bedbugs and you: Possible effects*, on page 8 in *Section 1: About Bedbugs*, for more information on the potential impacts of living with bedbugs.)

If you have detected bedbugs in your home, it is necessary to eliminate them **completely** in order to end your bedbug problem. If even a few bedbug eggs or a lone pregnant female bedbug remain, then the bedbugs can continue to multiply.

Because of the unwelcome effects bedbugs bring, and because of the importance of eliminating all of the bedbugs and bedbug eggs in your home, it is important for you to choose the most effective bedbug elimination possible. You will want to hire an extermination company that uses best practices for bedbug elimination, so that after the treatment, you can rest assured that **all** of your bedbugs and bedbug eggs have been eliminated.



To help you find an extermination company that uses best practice methods for detecting and eliminating bedbugs, use the guidelines in *Appendix C: What to look for in an exterminator*, on page 37.

Specifically, you should use a company that offers **thermal treatment that involves tenting and heating your entire building (i.e. complete thermal treatment)**. This is a best practice method that uses heat to kill bedbugs and to make their eggs unviable (Pereira et al., 2009). With complete thermal treatment, the temperature of your entire building is brought to 45°C or higher; bedbugs have nowhere to escape to. Bedbugs and bedbug eggs cannot survive in temperatures over 45°C for more than a few hours (“FAQ list”).

If you live in a stand-alone house, this will involve tenting and heating your entire house. If you live in an attached house, all attached houses will have to be tented and heated at the same time as yours. (If you live in a very large building, such as a high rise building, then complete thermal treatment will probably not be a feasible bedbug elimination method for you. Refer to *Other resources for eliminating bedbugs*, in *Appendix D: Resources*, on page 39 for information about positive steps you can take if you are not able to follow the best practices described in *Bedbug Extermination: A guide to best practices for detecting and eliminating bedbugs in your home*.)



Certain methods meant to eliminate bedbugs may actually cause them to spread. Ineffective elimination methods can worsen your bedbug problem, or spread bedbugs to others.

Bedbugs can travel from room to room through cracks in your floorboards, and they can make resting sites **in** your walls. Using insecticides or getting heat treatment on a single room may not be effective; bedbugs may be able to escape the insecticides or heat by going into these cracks (EPA, 2015).

Avoid the actions in the *Don'ts* list in *Appendix A: Dos and Don'ts*, on page 32 in order to minimize the likelihood of spreading bedbugs. To understand why complete thermal treatment is the most effective bedbug elimination method, and to understand what other options are available to you refer to *Appendix B: Comparison tables of extermination methods*, on page 34.

Complete thermal treatment is highly effective; however, it will probably not be possible for you to get your bedbug elimination treatment on the same day that bedbugs are detected in your home. After the exterminator detects bedbugs, you will likely have to wait one or multiple days to get your thermal elimination treatment.

This section gives you information about:

- Collaborating with your exterminator
- Minimizing the risk of spreading bedbugs while waiting for treatment
- Take-away messages

Collaborating with your exterminator

You will need to collaborate with your exterminator in order to eliminate the bedbugs in your home. Your exterminator will take charge of the bedbug elimination process, but you need to be cooperative for the process to work. It is important that you follow the instructions that your exterminator gives you. He or she will likely give you instructions for preparing for your thermal bedbug elimination treatment and instructions for carrying out the treatment.

If you do not yet have an exterminator, please refer to *Obtaining professional extermination services for bedbug detection*, on page 21 and *Appendix C: What to look for in an exterminator*, on page 37.

Preparing for your thermal bedbug elimination treatment

Before the exterminator can carry out the bedbug elimination treatment, you need to prepare for it. Preparing for your bedbug elimination treatment involves scheduling an appointment for it, preparing your home, and preparing your belongings.

To schedule a bedbug elimination treatment

- If bedbugs have been detected in your home, then call your exterminator to schedule the earliest possible date for your thermal bedbug elimination treatment.



Your exterminator may have scheduled an elimination treatment with you already, as soon as he or she detected bedbugs in your home.



Refer to *Minimizing the risk of spreading bedbugs while waiting for treatment*, on page 28 for steps that you can take while you wait for your scheduled bedbug elimination treatment.

To prepare your home

- Follow the instructions that your exterminator gives you.

To prepare your belongings



Certain items, such as candles, aerosol cans, lotions, and delicate clothing items should not be in your house during thermal treatment, because they can melt or explode when heated. Your exterminator will give you a complete list of items to remove from your home before treatment.

- Follow the instructions that your exterminator gives you.

Carrying out your thermal bedbug elimination treatment

Now that you have prepared your home for your thermal bedbug elimination treatment, you are ready to collaborate with your exterminator in order to carry out the treatment.

To carry out your bedbug elimination treatment

- Follow the instructions that your exterminator gives you.

All of the bedbugs and bedbug eggs in your home are destroyed.

Minimizing the risk of spreading bedbugs while waiting for treatment

You should schedule your thermal bedbug elimination treatment for the earliest possible date. Once your home has been treated, all of the bedbugs and bedbugs eggs in your home will be eliminated, and you will no longer be at risk for spreading bedbugs to others. Refer to *Collaborating with your exterminator* on page 26 for more information about scheduling a treatment appointment.

Since your thermal bedbug elimination treatment will destroy all of the bedbugs and bedbug eggs in your home, you do not have to worry about spreading bedbugs within your home. In contrast, it is important for you to take precautions to avoid spreading bedbugs to other people and locations.

You should follow the instructions that your exterminator gives you about minimizing the risk of spreading bedbugs. You might have to modify some of your daily activities, such as leaving your home and having visitors into your home. As long as you are inside of your home, you can continue to use your belongings as you normally would; using your belongings within your home will not increase the risk of spreading bedbugs and will not make it more difficult to eliminate bedbugs.

Having visitors in your home

It is best to avoid having visitors over when you know you have bedbugs. If you need to have someone come into your home, then you should take precautions to minimize the risk of spreading the bedbugs to your visitor.

To have visitors in your home:

- Have visitors into your home only if it is necessary.
- Tell your visitors that there are bedbugs in your home (before they enter it).
- Tell your visitors that they should **not** use your furniture.
- Keep visits as short as possible.

Leaving your home for outings

While waiting for your bedbug elimination treatment, you may have to leave your home. For example, you may have to run errands, take your kids to school, or to go to work. By following the procedure below, you will minimize the likelihood that you will spread bedbugs to others when you are in locations outside of your home.



Check school and workplace policies. Though it's not typically the case, some schools and workplaces prefer or require your absence if you have bedbugs.

To leave your home:

1. Shower.
2. Dry yourself with a clean towel.



Dry towels and clothing at high heat for 45 minutes (in your clothes dryer) to make sure that they are clean and bedbug-free. The heat will eliminate any bedbugs and bedbug eggs.



For easy access to clean towels and clothing when you need them, dry a batch in advance. Store them in a tightly sealed bags (for example doubled plastic bags with a tight knot) until you need to use them.

3. Put on clean clothing.
4. Leave your house.



Leave your house immediately; touch as few items as possible.

Using your belongings

If you have bedbugs, you may wonder if it's ok to use your belongings, such as furniture, books, and clothing. You can continue to use your belongings as you normally would when you are within your home. You can continue to sleep in your bed and to use your furniture.

To use your belongings:

- When you are inside your home, continue to use your belongings (as usual).



If the thought of sleeping in your bed is causing you anxiety, then try to schedule your thermal bedbug treatment as soon as possible. Until then, you can sleep in another room—it's possible that you will spread the bedbugs to that room—but once your home is treated, **all** of bedbugs in your home will be eliminated.

Even if you don't sleep in your room, you **should** sleep in your own home so that you do not risk spreading bedbugs to other homes.

Take-away messages

Do not try to eliminate your bedbugs on your own; hire an extermination company that uses best practice bedbug elimination methods. Specifically, you should use a company that offers a thermal treatment that involves tenting your entire building. Use the guidelines in *Appendix C: What to look for in an exterminator*, on page 37 to help you choose an extermination company.

While you are waiting for your bedbug elimination treatment, follow the instructions that your exterminator gives you. You can continue to use your belongings as usual, **when you are in your house**. You can sleep in your bed, but if the thought of sleeping in your bed makes you uncomfortable or anxious, it is ok to sleep in another room of your home. You should not sleep at a family member or friend's house, or at a hotel, because you risk spreading the bedbugs to these locations.

Your exterminator will take charge of the thermal bedbug elimination treatment; you should follow the instructions that your exterminator gives you.

Once the treatment has been completed, all of the bedbugs and bedbug eggs in your home will be eliminated, and you can have more peace of mind.

APPENDIX

A Dos and Don'ts

This section offers a quick guide for best practices for detecting and eliminating bedbugs.

For detecting bedbugs

✓ Do

- ✓ Inspect your body for signs of bedbug bites on your skin
(Refer to *page 12*, in *Section 2*.)
- ✓ Inspect your home for evidence of bedbugs.
(Refer to *page 15*, in *Section 2*.)
- ✓ Stop searching for new evidence and contact an exterminator if you think you have seen a live or dead bedbug.
(Refer to *page 17*, in *Section 2*.)
- ✓ Contact an exterminator if you have seen signs of bedbugs in your home even if you have not seen a bedbug.
(Refer to *page 16*, in *Section 2*.)
- ✓ Always contact an exterminator in order to confirm that you have bedbugs.
(Refer to *page 21*, in *Section 2*.)
- ✓ Make a record of the evidence you find.
(Take photos and bag evidence.)
(Refer to *page 17*, in *Section 2*.)

✘ Don't

- ✘ Don't assume that unexplained irritations on your skin means you have bedbugs.
(Refer to *page 12*, in *Section 2*.)
- ✘ Don't continue to look for bedbugs if you have already found and contained (in a sealed bag) a bug that you believe to be a bedbug.
(Refer to *page 17*, in *Section 2*.)
- ✘ Don't assume that you don't have bedbugs just because you have never seen one in your home.
(Refer to *page 15*, in *Section 2*.)

For eliminating bedbugs and minimizing the risk of spreading bedbugs

✓ Do
<ul style="list-style-type: none"> ✓ Hire a professional exterminator (Refer to <i>page 24</i>, in <i>Section 3</i>.) ✓ Schedule your bedbug extermination appointment at the earliest open date. (Refer to <i>page 26</i>, in <i>Section 3</i>.) ✓ Choose an exterminator who offers complete thermal treatment, which involves tenting and heating your entire building. (Refer to <i>Appendix C</i>, on <i>page 37</i>.) ✓ While waiting for treatment: Inform houseguests that you have bedbugs. (Avoid having guests if possible). (Refer to <i>page 28</i>, in <i>Section 3</i>.) ✓ While waiting for treatment: Shower and put on clean clothes that have been dried at high heat (for at least 45 minutes in a clothes dryer) if you have to leave your home. (Refer to <i>page 29</i>, in <i>Section 3</i>.)

✘ Don't
<ul style="list-style-type: none"> ✘ Don't assume that the bedbugs will go away on their own. (Refer to <i>page 24</i>, in <i>Section 3</i>.) ✘ Don't assume that you can eliminate bedbugs without the help of a professional exterminator. ✘ Don't use store bought insecticide sprays or bug bombs.* ✘ Don't hire an exterminator who uses insecticides.* ✘ Don't hire an exterminator who uses partial thermal treatment.* (Refer to <i>Appendix B</i>, on <i>page 34</i>.) ✘ Don't let guests use your furniture or spend the night. (Refer to <i>page 28</i> in <i>Section 3</i>.) ✘ Don't visit others if you are still wearing the clothes you slept in.

*Insecticides (including bug bombs) and **partial** thermal treatment (thermal treatment that involves tenting only **some** belongings and rooms) can cause bedbugs to spread: the bedbugs can escape the insecticide and heat and travel to other rooms by going into the cracks in floors and baseboards. If you live in a stand-alone house, this is not a major issue **if** you subsequently get **complete** thermal treatment. However, since complete thermal treatment is not feasible for very large buildings, spreading can be a major issue if you live in a large, multiunit building; the bedbugs might spread to neighbouring units and throughout the building.

APPENDIX

B Comparison tables of extermination methods

Various methods for exterminating bed bugs exist. Some methods are significantly more effective than others. This section compares the effectiveness of methods for detecting bed bugs and for eliminating bed bugs. Best practices are highlighted in yellow.

Table 1: Detection

Method	Level of effectiveness	Reasons
Visual inspection by humans	Moderately effective	<ul style="list-style-type: none"> • Bedbug resting sites can be hard to find. • Bed bug eggs are almost impossible to see. • Visual inspections performed by trained exterminators are more likely to be successful than visual inspections by home owners. • Visual inspection by humans is more likely to be successful if you have a large number of bedbugs in your home.
Canine-lead inspection (With visual confirmation by the exterminator)	Highly effective (97%) (bedbugs.org/dogs/)	<ul style="list-style-type: none"> • Dogs have a keen sense of smell and can sniff out bed bugs that may be missed by visual inspection by humans. • Visual confirmation by the exterminator safeguards against potential canine error.

Table 2: Elimination by exterminator

Method	Level of effectiveness	Reason
Partial Thermal treatment (heating certain rooms/belongings)	Ineffective to moderately effective	<ul style="list-style-type: none"> Highly effective for the bedbugs and bedbug eggs that get trapped in the heat, but high likelihood that bedbugs and eggs will be missed or escape.
Complete thermal treatment (heating your building)	Highly effective	<ul style="list-style-type: none"> Bedbugs cannot escape or spread. Eliminates all bedbugs and bedbug eggs.
Insecticides	Ineffective to moderately effective	<ul style="list-style-type: none"> Typically eliminates some bedbugs in the home but causes others to spread. Most insecticides do not eliminate bedbug eggs.

Table 3: Do-it-yourself elimination

Method	Level of effectiveness	Reason
Inaction	Ineffective	<ul style="list-style-type: none"> Bedbugs will continue to feed and multiply. (As the population increases the likelihood of spreading increases.)
Vacating your room or home temporarily	Ineffective	<ul style="list-style-type: none"> Bedbugs may spread (to look for food). Bedbugs can live for a year or more without feeding. When you return, the bedbugs will continue to feed.
Applying store bought insecticides (sprays, bombs)	Ineffective (to moderately effective)	<ul style="list-style-type: none"> Typically eliminates some bedbugs in the home but causes others to spread. Store bought insecticides do not eliminate bedbug eggs.
Encasing your box spring and mattress and with protective covers	Moderately effective—difficult to determine	<ul style="list-style-type: none"> Ineffective if bedbug resting site is not on the box spring or mattress, or if there are any stray bedbugs. Effective if all bedbugs are on the box spring or mattress—hard to know. Does not repel bedbugs so will not <i>cause</i> spreading, but bedbugs will continue to multiply and may spread if they are not trapped in the cover.

Method	Level of effectiveness	Reason
Freezing belongings	Moderately effective—difficult to determine	<ul style="list-style-type: none"> • Highly effective if all items that have bedbugs are frozen for several hours. • Ineffective if bedbug resting site is not on the frozen item or if there are any stray bedbugs.
Using a carbon dioxide trap (Refer to <i>page 40</i> of <i>Appendix D</i> for information)	Moderately effective—difficult to determine	<ul style="list-style-type: none"> • Can lure and trap many bedbugs. • May not lure and trap all of the bedbugs—hard to know. • Draws bedbugs in; does not repel them—will not cause spreading.
Applying dust (silicon dioxide or diatomaceous earth) (Refer to <i>page 40</i> of <i>Appendix D</i> for information)	Moderately to highly effective	<ul style="list-style-type: none"> • Does not repel bedbugs—does not increase likelihood of spreading. • Bedbug must touch the dust for it to take effect. • Does not eliminate bedbugs instantly (once a bedbug touches the dust, the dying process takes a few days) so the bedbug can continue to feed and breed before being eliminated.
Vacuuming	Moderately effective—difficult to determine.	<ul style="list-style-type: none"> • Highly effective if all bed bugs and bed bug eggs are vacuumed, and if vacuum bag is properly disposed of. • Ineffective if bedbugs or bedbug eggs are missed by the vacuum—hard to know, but very likely. • Does not repel bedbugs so will not <i>cause</i> spreading, but bedbugs will continue to multiply and may spread if they are not vacuumed.

APPENDIX

C What to look for in an exterminator

Various methods for exterminating bed bugs exist. Some methods are significantly more effective than others. It is important to choose an extermination company that uses **best practices** for exterminating bedbugs so that you can be sure that your bedbugs are detected and completely eliminated.

This section shows you what to look for when selecting a bedbug extermination company.

In general

- Experience with exterminating bedbugs.

For detection

- Canine-lead detection of your home and belongings, involving the use of dogs that are trained to detect the smell of bedbugs.

AND

- Visual inspection of your home and belongings, conducted by a trained exterminator.

For elimination

Thermal (heat) treatment, involving:

- Tenting your entire building— not just some of your belongings or individual rooms. Make sure the company is able to tent your entire house (and any attached houses).
- A backed-up guarantee—Companies often guarantee that they will completely exterminate all of your bedbugs and bedbug eggs. Reliable companies back-up their guarantee by offering to re-inspect your home (at no extra cost) in the months following the treatment. They also offer re-treat your home if needed (also at no extra cost), even though they are confident that it will not be necessary.
- Heating your entire house to 45°C or hotter.
- Several hours of treatment—the amount of time needed depends on the target temperature and the size of the home being treated, but treatment should never take less than two hours (Pereira, Koehler, Pfiester, & Walker, 2009).

APPENDIX

D Resources

This section shows you where to find more information about bedbugs; the resources listed in this section provide accurate and reliable information about bedbugs. Whether you have followed best practices for bedbug extermination or not, you may want more information about bedbugs, bedbug extermination, and bedbug prevention.

Resources for best practices for exterminating bedbugs

The resources listed in this section provide information about best practices for detecting and eliminating bedbugs.

Detection

For information about canine detection of bedbugs, including how it compares to human detection. Bed Bug Dogs: <http://www.bedbugs.org/dogs/>

Elimination

For more information about thermal treatment, including how it compares to other types of treatment. Killing Bed Bugs with Heat: <http://www.bedbugs.org/heat/>

For research and information about thermal treatment. Lethal Effects of Heat and Use of Localized Heat Treatment for Control of Bed Bug Infestations, by Roberto M. Pereira, Philip G. Koehler, Margie Pfiester, and Wayne Walker, University of Florida Department of Entomology: <http://www.pureenvironmental.com/wp-content/uploads/2012/06/Lethal-Effects-of-Heat-and-Use-of-Localized-Heat-Treatment-for-Control-of-Bed-Bug-Infestations.pdf>

Other resources for eliminating bedbugs

It is not always possible to follow best practices for bedbug elimination. Perhaps you live in a high rise building that cannot be tented or you cannot afford complete thermal treatment. The resources listed in this section provide information about positive steps you can take if you are not able to follow best practices.

Bedbug Dust

For steps and tips for applying dust to eliminate bedbugs. Bed Bug Dust.

<http://www.badbedbugs.com/bed-bug-dust/>

For research and information about the effectiveness of dust. Evaluation of Two Least Toxic Integrated Pest Management Programs for Managing Bed Bugs With Discussion of a Bed Bug Intercepting Device, by Changlu Wang, Timothy Gibb, and Gary W. Bennett, Center for Urban and Industrial Pest Management, Department of Entomology, Purdue University.

<https://extension.entm.purdue.edu/bedbugs/pdf/BedbugIPMJMEntomol.pdf>

Carbon dioxide traps

For steps to make a bedbug trap using carbon dioxide, and information about why carbon dioxide traps can work. DIY Bedbug Trap: Cheap, Easy, Effective, by Ed Young, for National Geographic.

<http://news.nationalgeographic.com/news/2013/08/130809-bedbug-diy-trap-detector-science/>

Mattress covers

For information about protective mattress covers, including things to consider when choosing a mattress cover. Bed Bug Mattress Covers.

<http://www.bedbugs.org/bed-covers/>

Resources for best practices for preventing bedbugs

If you have followed the procedures listed in this guide, then you have eliminated all of the bedbugs and bedbug eggs in your home, and they are not at risk of spreading. However, it is always possible to get a **new** batch of bedbugs in your home. The resource listed in this section gives you tips and guidelines for minimizing the likelihood that you will get bedbugs in your home again.

For information and steps on preventing bedbugs, including tips for shopping for second-hand items, tips for travelling, and more. Bedbugs: Prevent Infestations. <https://myhealth.alberta.ca/Alberta/Pages/How-to-prevent-bed-bug-infestations.aspx>

Glossary

Bedbug (also called *bed bug*, *Cimex lectularius*): Bedbugs are nocturnal, wingless, oval insects that feed on the blood of live, warm-blooded animals, and that almost always live in close proximity to humans. They usually feed on humans, but can also feed on other animals such as pet dogs, cats, birds, or rodents.

Bedbug problem: The presence of bedbugs in your home (in any number). The term infestation is not used in this guide, because infestations are used to signify that “a huge number” of bedbugs are present.

Bedbug shell: The outer shell (exoskeleton) that bedbug larvae lose when they molt. The molted shell of a bedbug has the same shape as a live bedbug, but it is translucent and empty.

Bedding: All sheets, fitted sheets, blankets, pillows, and pillow cases on your bed.

Bite, bedbug bite, irritation, skin irritation: The term bedbug bite is used throughout this guide for simplicity. However, bedbugs do not actually bite; to feed, they pierce the human’s skin with their clypeus (mouthpart) and suck out the blood. When they feed, bedbugs often, but not always cause circular, itchy irritations on their host’s skin. The irritations caused by bedbugs cannot be conclusively distinguished from irritations caused by other types of bites.

Bug bomb, fogger: A bug bomb is a type of insecticide that is released from a can all at once. Bug bombs create a fog over the entire room in which they are released. Bug bombs are ineffective at eliminating bedbugs. Although they may eliminate some bedbugs, they will not eliminate bedbug eggs and they will cause other bedbugs to spread (for example, bedbugs can escape to other rooms by traveling through cracks in your floor molding).

Carbon dioxide trap (also called *carbon dioxide lure*): A moderately effective do-it-yourself method for eliminating bedbugs. The home owner creates carbon dioxide in a bottle (by mixing sugar, yeast, and water), and places the bottle in an upturned dogfood bowl. The bedbugs are lured by the carbon dioxide. They mistake the carbon dioxide created by the yeast solution for carbon dioxide present in breath (i.e. a food source). The bedbugs travel into the upturned dogfood bowl in search of the food source and are not able to escape.

Canine detection (also called *canine-lead detection*): A highly effective bedbug detection method that uses dogs trained for detecting the scent of bedbugs. The dog smells your bed, room, furniture, and clothing, and makes an alert if it smells a bedbug (usually by barking and pointing its nose to the location of the smell). The exterminator can then target his or her visual inspection to that location.

Detection, detecting, detect: Detecting bedbugs means determining, with certainty, that you have bedbugs in your home. Home owners can collect evidence of the presence of bedbugs, which will help to detect them, but only an exterminator can detect bedbugs.

Dust (also called *insecticidal powder, silicon dioxide powder, diatomaceous earth*): A moderately to highly effective do-it-yourself tool for eliminating bedbugs. The home owner applies the dust around their bed and room, and in their box spring. When a bedbug touches the dust (i.e. walks through it), it dries up and dies; the dying process can take several days.

Elimination, eliminating, eliminate: Elimination is a process by which all bed bugs and bedbug larvae are either killed or removed from your home, *and* by which all bedbug eggs are made inviable or are removed from your home. (Technically, bedbug eggs cannot be killed because they are not alive. For simplicity, the term “eliminate” or “kill” is used in this guide in reference to both bedbugs and bedbug eggs).

Exterminate, extermination: The process by which bed bugs and bed bug eggs are detected and eliminated.

Exterminator: A person who is trained to detect and eliminate bedbugs (or other unwanted insects and rodents) from buildings; a company that specializes in detecting and eliminating bedbugs (or other unwanted insects and rodents) from buildings.

Floor molding (also called *floor moulding, baseboard, skirt, skirting board, base molding*): The decorative trim at the base of a wall, where it meets the floor.

Freezing: A moderately effective do-it-yourself method for eliminating bed bugs by which home owners place belongings that they know or suspect to have bed bugs on them into their freezer for several hours.

Hitchhiker: Bedbugs are said to be hitchhikers because lone bedbugs or groups of bedbugs can be transported to new locations via clothing, luggage, furniture, or other personal items. Even a lone bedbug can become a problem; if it is pregnant, then a bedbug colony can start.

Insecticide, insecticide spray: A substance, usually liquid or powder, used for killing insects. As a bedbug elimination method, insecticides range from ineffective to moderately effective. The effectiveness of an insecticide depends on the insecticide used and the way in which it is applied. In general, insecticides will not eliminate bedbug eggs, and the use of insecticides often causes bedbugs to spread and/or to develop insecticide resistance.

Larva, larvae: A bedbug larva is a young bedbug that has not yet developed into its adult form. Bedbug larvae are yellowish and are smaller than adult bedbugs, which are reddish-brown.

Mattress cover (also called *protective cover, mattress encasement*): A moderately effective do-it-yourself tool for eliminating bedbugs. The home owner encases his or her mattress and box spring in sealed encasements to trap the bedbugs within it. The bedbugs that were on the bed remain on the bed, but are contained by the encasement and cannot feed; in time, they will die.

Molt, molting: Molting is a process of shedding skin, hair, feathers, or a shell, usually for the purpose of allowing growth. For bedbugs, bedbug larvae must molt their shell (several times) in order to grow and become adult bedbugs. Bedbugs require a blood meal before each molt.

Resting site (also called *harbourage*): The location in which bedbugs spend most of their time. Bedbugs typically use resting sites that are out of sight, but that are in close proximity to where people sleep or rest. Popular resting sites include mattress seam creases, box springs, bed frames, cracks in floors, floor molding, living room couches, and in the cracks of wooden furniture close to your bed. Bedbugs do **not** use humans or animals as resting sites.

Seam: ridge and creases that are created when two pieces of fabric are sewn together.

Spread, spreading: To spread bedbugs means to cause bedbugs to leave their resting site for another resting site. Bedbugs can spread throughout your home and to other (attached) homes. When bedbugs spread, they have not been eliminated and can continue to multiply.

Thermal treatment (also called *heat treatment, thermal remediation*): Thermal treatment consists of a range of methods for eliminating bedbugs, all of which involve the use of heat to kill bedbugs. **Complete** thermal treatment involves heating an entire building (for example, a stand-alone house). **Partial** thermal treatment involves heating only belongings known or suspected to have bedbugs, or heating individual rooms. Complete thermal treatment is a best practice for bedbug extermination; partial thermal treatments are not. Partial thermal treatments can cause bedbugs to spread. When partial thermal treatments are used, bedbugs escape the heat and travel to other room via baseboards.

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