**Course Content**

**Course Start**

Welcome to the computer-based training course titled, *Don’t Let the Bed Bugs Bite*. This program is part of the Home Care Institute aide series and provides guidelines on identifying, preventing, and managing bed bug infestations in the home setting.

The intended audience for this course is home health and hospice clinicians.

To receive credit for this program, the full course must be viewed and the post-test passed with a score of 80% or greater. Once the course has been successfully completed, the aide should print the Application Activity Worksheet and complete the critical thinking exercises in collaboration with the agency’s supervising registered nurse. The application activity should be placed in the agency’s inservice binder or the aide’s personnel record.

Course handouts, the Application Activity Worksheet, and a Facilitator Guide for use by the supervising RN are available to be downloaded and printed from the Course Start Page.

Course completion requires that the full course be viewed and the post-test passed with a score of 80% or greater.

**Objectives**

At the completion of this course you will be able to:

- Identify signs of bed bug infestations.
- Describe measures to manage bed bug infestations.
- Discuss actions to prevent the transfer of bed bugs from infested homes to the clinician’s car, other patient homes and the clinician’s home.

**Introduction**

Growing up, as your parents tucked you into bed and turned out the lights, they may have wished you, “Good night. Sleep tight. Don’t let the bed bugs bite.” This popular bedtime phrase evolved from times when bed bug infestations were common. But with improved living standards and widespread use of insecticides like DDT, bed bug infestations became rare in the United States after World War II.

Over the last several years, however, bed bugs have made a dramatic resurgence. This is due to several factors including:

- Safety and environmental concerns related to the use of pesticides, which have encouraged a reduction in their use.
- Increased resistance of bed bugs to many widely used pesticides.
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- Increased second-hand furniture and clothing trade.
- Greater domestic and international travel.

Today, an increasing number of bed bug infestations have been identified in hotels, shelters, hospitals, long-term care facilities, assisted living facilities, universities, schools, child care centers, apartments, and homes.

### Home Health and Hospice Implications

Since home care and hospice clinicians are in and out of patient homes each day, they are at increased risk of being exposed to bed bugs and spreading this infestation. If a clinician is exposed to a bed bug infestation, the bugs can travel on clothing, equipment, and inside supply bags, resulting in a spread of the insects to the clinician’s car, other patient homes, the office, and the clinician’s own home.

The risk of being exposed to bed bugs is concerning for most people. Caring for a patient when a bed bug infestation has been identified or is suspected is especially frightening.

However, before clinicians refuse to care for someone in this situation, it’s important to understand that exposure to bed bugs is not fatal and the needs of the patient are critical.

Many patients depend on home health and hospice clinicians for their comfort, well-being, and in many situations, their very lives. By being knowledgeable of bed bugs, clinicians can stay safe, prevent the spread of infestations, and most importantly, help patients to resolve a very distressing situation.

### The Challenge of Controlling Bed Bugs

Bed bugs are difficult to control because they are very small, reproduce quickly, can move from location to location, and are skilled at hiding in a variety of places. They can bury in the folds and creases of mattresses and linens, they can crawl into cracks and crevices throughout the home or facility, and they can travel across wide areas in luggage, handbags, medical supply bags, and the folds of clothing. Over time, they’ve become resistant to many pesticides, making control difficult.

Although bed bug manifestations are common in areas with poor sanitation, they don’t discriminate and have been found in million dollar homes and five-star hotels. Because bed bugs are so small, it’s common to come in contact with a significant infestation and not be aware of the exposure. Exposed individuals can then carry the bed bugs to other places where they continue to spread.

### Risk Factors for Bed Bug Infestations

Common risk factors for bed bug infestations include:
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- Bringing uninspected used or second-hand furniture, mattresses, linens, and clothing into the home.
- Frequent travel with overnight stays at hotels and other lodging facilities.
- Occupations that require exposure to homes and facilities at risk for bed bug infestations.
- Residing in overcrowded and unsanitary conditions.
- Poverty that precludes individuals from taking necessary actions to prevent or resolve an infestation.

## The Bed Bug Species

Bed bugs have been described for thousands of years. They are parasitic insects that prefer to feed on the blood of humans and other warm-blooded animals.

The bed bug most commonly found in the United States is from the species, *Cimex lectularius*.

They are not known for transmitting communicable diseases, although their bites can lead to skin rashes, allergic reactions and secondary infections.

Bed bugs are brown in color but develop a reddish hue after feeding. They have a flat back and stomach, do not have wings, and resemble an apple seed.

They are typically less than 7 mm (1/4 inch) in length. Severe infestations may be associated with a sweet, musty odor.

Bed bugs go through five stages from egg to adult. They require at least one blood meal at each stage to survive. Females require a blood meal to produce eggs. Generally bed bugs feed every 3-7 days, although they can survive several months without a blood meal. Adults may live over a year with females producing over 500 eggs in their lifetime.

The insects are extremely resilient and easily tolerate most weather conditions in the United States, including freezing temperatures and hot, humid climates. However, they are unable to survive temperatures of 120° F or greater, which makes the use of steam and heat an important control measure.

## Bed Bug Feeding Characteristics

Bed bugs are attracted to people by their warmth and the carbon dioxide exhaled when breathing. They normally feed late at night or early morning when the person is in deepest sleep. However, they may feed and move around at any time.
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They have piercing, sucking mouthparts to feed on plant juices, other insects, or the blood of mammals. They feed for 3-15 minutes and then leave the host, usually undetected.

Although they will bite any part of the body, they prefer uncovered skin. Unlike lice and ticks, bed bugs have a difficult time moving through hair. While they may commonly bite the face and neck, they rarely move into the hair.

After feeding, bed bugs move to their protected hiding place where the blood meal is digested. During this process, they will defecate, leaving reddish brown spots on walls, linens and other nesting areas. These reddish brown spots are characteristic of bed bug infestations.

## Identifying Bed Bug Infestations

Home care and hospice clinicians are in key roles to identify bed bug infestations. They should be alert to the possibility of bed bugs when admitting and caring for all patients. Admission and recertification assessments should include a screening for bed bugs, particularly in situations when patients are residing in crowded, unsanitary, and congregate living settings. Examples include low-income housing, apartment complexes, and assisted and independent living facilities.

Because bed bugs can hide in the smallest cracks and crevices, a detailed inspection is necessary to identify an infestation. The majority of bed bugs can be found in mattresses, box springs, bed frames, nightstands, and upholstered furniture. However, they may hide in any dark crack or crevice.

It’s important to look for bed bugs, eggs, shed (molten) skin, reddish brown fecal stains and droppings. Eggs and freshly hatched nymphs can be as small as 1 mm in length and translucent, making it difficult to see them.

A flashlight and magnifying glass are recommended when inspecting dark cracks and crevices. If cracks and crevices are too deep to inspect, a metal spatula or other small probe can be used to scrape the area and drive bed bugs out into the open.

Because fecal droppings are classic signs of bed bug infestations, if reddish brown spots are seen, the area can be rubbed with an alcohol swab. If the rubbed area dissolves into a reddish brown color, this may indicate bed bug droppings. It would be important to continue inspecting the area, looking for live bed bugs.

When inspecting mattresses, box springs and linens, the focus should be on seams, under mattress handles, between the mattress and box spring, and inside folds of linens. It’s also important to inspect night stands, electronics, electrical outlets, switch plates, light fixtures, curtains, moldings, and furniture around the sleeping area.

If insects are identified that may or may not be bed bugs, they should be
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<table>
<thead>
<tr>
<th>The Aides Role in Identifying Bed Bug Infestations</th>
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| Home care, hospice and private duty aides play an important role in identifying potential bed bug infestations. Any skin lesions or welts that resemble insect bites or allergic reactions should be reported to the aide’s supervisor or the patient’s case manager.  

Bed bug bites should be considered when a patient is experiencing welts or rashes in which other causes have been ruled out and typical treatments have failed. Since bed bug infestations can occur in any home, aides should make it a routine practice to inspect linens and areas around the bed for signs of bed bugs. |

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<thead>
<tr>
<th>The Clinician’s Role in Preventing the Spread of Bed Bugs</th>
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| Home health and hospice clinicians can take steps to minimize the likelihood of transferring bed bugs if they become exposed to an infestation. This begins with attempting to identify the problem before making the first home visit.  

Clinicians should make it a habit to ask patients whether they’ve had any pest infestations in the past six months. The subject should be approached in a tactful, matter-of-fact manner as a routine topic asked of all patients. If pests are confirmed, the patient should specifically be asked about the presence of bed bugs.  

Identifying any pest problem in the home can help the clinician prepare for the visit. This involves wearing appropriate personal protective equipment, minimizing supplies and equipment brought into the home, and actions to take in the home to reduce the risk of exposure to the bed bugs. |

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<th>General Attire to Minimize Transferring Bed Bugs</th>
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| Wearing simple clothing when visiting a patient’s home can help reduce the likelihood that pests will be transferred from the patient’s home to the clinician’s clothing. Clinicians should select form-fitting clothing with as few pockets and buttons as possible. They should avoid wearing cargo pants, pants with cuffs, and hems that touch the floor. Accessories such as scarves, jewelry and handbags should not be worn. Simple shoes are recommended that can easily be thrown in the dyer. Shoes with deep treads and laces should be avoided.  

Clinicians may consider wearing disposable booties as a routine practice when entering each patient’s home. If booties are worn, they should be disposed of in a sealed bag immediately after leaving the patient’s home. |

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<tr>
<th>Personal Protective Equipment Against Bed Bugs</th>
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<td>Clinicians routinely wear personal protective equipment as part of standard</td>
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<tr>
<td>precautions to prevent the transmission of bloodborne and other pathogens. This equipment also serves as an important safeguard against the transfer of bed bugs.</td>
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<tr>
<td>Personal protect equipment appropriate for use in the presence of actual or suspected bed bug infestations include:</td>
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<tr>
<td>• Disposable gloves</td>
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<td>• Disposable booties</td>
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<tr>
<td>• Disposable coveralls or a Tyvec® suit</td>
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<tr>
<td>In most situations, coveralls are only necessary when a severe infestation is identified, or when a clinician will be coming in close contact with the bed or carrying patient equipment that may have been exposed to bed bugs. An example would be an aide assisting a patient with personal care.</td>
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<tr>
<th>Precautions During a Patient Visit</th>
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<tr>
<td>In addition to wearing personal protective equipment, clinicians can take other precautions to avoid transferring bed bugs from an infested home. The supply bag should be kept in the car and only items that are necessary for the visit brought into the home. Supplies and equipment should be carried in a sealed plastic bag or container or in a fanny pack.</td>
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<td>A barrier should be used if equipment or supplies must be placed on a surface in the patient’s home. All re-usable equipment should be carefully inspected for bed bugs and cleaned with alcohol or another agency-approved cleaner before being placed back in the supply bag. Clinicians should avoid placing any items on upholstered furniture, bedding, or on carpeted floors. If there is any doubt that items have been exposed to bed bugs, they should be kept separated from other medical supplies in a secure container until they can be appropriately inspected and disinfected.</td>
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<tr>
<td>When in the patient’s home, clinicians should avoid sitting or leaning on upholstered furniture or the bed. Even hard chairs can be hiding places for bed bugs. If a bed bug infestation is suspected or confirmed, it’s recommended that clinicians remain standing or bring in their own hard chair. After the visit, the chair should be inspected for bed bugs and wiped down with an approved cleaner.</td>
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<th>Precautions After a Patient Visit</th>
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<tr>
<td>Personal protective equipment should be removed after leaving the home, placed in a sealed plastic bag, and discarded in the patient’s trash. If coveralls or a Tyvec® suit was worn during the visit, it should be removed by turning it inside out to trap any bed bugs inside, and then discarded in the sealed plastic bag. If a trash container outside the patient’s home isn’t available, the bag should be placed in a plastic container with a sealed lid in the clinician’s trunk and discarded in the agency’s biohazardous waste container.</td>
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Clinicians should inspect their clothing for bed bugs before entering the car. A mirror can be used to observe hard-to-see areas. It’s important to check the back of the pants, shoe treads, laces, socks, cuffs, pockets, buttons and the collar. If an insect is found, it should be collected with an alcohol wipe and placed in a sealed plastic back for identification or disposal.

It’s a good idea to have an extra set of clothing available in the event it’s suspected that clothing has been contaminated during a patient visit. To protect the car until clothing can be changed, it may also be helpful to have a plastic covering to place on the driver’s seat.

If clinicians find insects on their clothing during a post-visit inspection or suspect that their clothing has been contaminated, they should stop at a public restroom and remove their contaminated clothing. Precautions should be taken to avoid contaminating the restroom. Removed clothing should be placed in a sealed bag and then secured in a plastic container with a sealed lid in the clinician’s trunk.

After arriving home, the contaminated clothing and the clinician’s shoes should be immediately machine-washed and dried at the hottest temperature for at least 30 minutes. It would also be important to discard the plastic covering used to cover the car seat in a sealed bag and thoroughly vacuum the car or have the inside of the car professionally cleaned. The clinician should then shower with warm, soapy water.

On an ongoing basis, clinicians should keep their cars clean, clutter-free, and regularly vacuumed to prevent the spread of bed bugs and other insects and pathogens.

### Reactions to the Bed Bug Bite

Bed bugs generally feed at night on exposed skin not covered by clothing.

Welts caused by bed bug bites do not have the characteristic red spot in the center that is commonly seen with other insect bites.

When they feed, bed bugs inject a small amount of saliva under the skin of the host. Their saliva contains desensitizing agents that prevent the host from feeling the bite, so people don’t typically realize that they’ve been bitten unless the bite mark becomes inflamed.

In most situations, a person will not react initially to bed bug bites and some people never develop a reaction. In others, the protein in the saliva can stimulate an immune response, leading to red, itchy swelling at the sight of the bite. Individuals may become sensitized over time with repeated exposures, leading to more severe localized or even generalized allergic reactions. Reactions may occur immediately or up to 14 days after the bite.

### Medical Conditions Associated with Bed Bug Bites

While bloodborne pathogens have been detected in recently fed bed bugs,
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Evidence has not shown that bed bugs can transmit diseases. However, their bites can lead to physical and psychological discomfort.

In addition to rashes and allergic reactions, bites have been found to cause anemia in the elderly, children and immunocompromised individuals. They can also cause asthmatic attacks in sensitive people. It’s also common to suffer severe anxiety, distress and sleep disturbances when becoming aware of being bitten by bugs while asleep. These problems can become heightened as individuals face the challenge of managing the infestation, especially if they have limited resources to address the problem.

### Ruling Out Other Potential Causes

Rashes and welts are common skin reactions that may be caused by many factors. Examples include reactions to topical or systemic allergens such as laundry detergent, lotions, perfumes and allergic reactions to other materials in the environment. Individuals may also have been exposed to other insect bites like mosquitoes, spiders, biting flies, fleas, ticks, mites (scabies), and lice (pediculosis).

Clinicians should not assume that the presence of rashes and welts indicates exposure to bed bug bites, especially if signs of an infestation have not been found. If evidence of bed bugs cannot be located in sleeping areas after multiple inspections, other biting pests should be considered. A thorough medical evaluation is also required to rule out other causes of allergic-type skin reactions.

Bed bug bites frequently become inflamed and itch. Treatment should include washing the area with warm soapy water, rinsing well, and then patting the area dry. Applying a topical or systemic antihistamine, corticosteroid, or anti-inflammatory medication can reduce the inflammation and itching.

### The Challenge of Controlling Bed Bugs

In many situations, especially with heavy infestations, controlling bed bugs can be extremely difficult and expensive. Total elimination typically requires an integrated pest management (IPM) process, which begins with early detection of bedbugs; removing clutter, vacuuming and cleaning the environment; washing and drying infested linens and clothing at the hottest temperature; and extermination by an experienced professional.

Extermination may include use of pesticides, steaming, vacuuming, and freezing.

Circulating dry, convection heat is the only non-chemical treatment currently available that is effective against bed bugs in all of their hiding places. It’s important to note that topical insecticides and repellants, such as those used for mosquitoes, head lice and scabies, have no effect on bed bugs, and their use in the hope of preventing further bites may be dangerous.

Bed bug infestations may fall under the authority of state and local laws that
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address public health nuisances or sanitary housing conditions. These laws may mandate that infested areas be treated by owners or occupants. Housing laws may also authorize officials to inspect premises, require compliance, and take action against an owner or occupant where conditions are a “public nuisance” or detrimental to the health of the occupants.

If bed bug infestations are identified or suspected by home care and hospice clinicians, it’s important to involve the agency’s social services department. The social worker can address local and state laws that may impact the situation and assist the patient to obtain the necessary resources to resolve the infestation.

**Immediate Actions to Address Bed Bug Infestations**

If a bed bug infestation is identified in a patient’s home, actions can be taken to minimize the problem until formal measures to eradicate the infestation can be implemented.

These include:

- Thoroughly vacuuming the patient’s home to reduce the number of bed bugs present, especially around and under the bed and in the sleeping areas.
- Eliminating clutter in the home.
- Vacuuming, scrubbing and disinfecting headboards, bedframes, side tables and other hard surfaces in the sleeping area.
- Encasing the mattress and box spring in a bed bug-approved plastic casing.
- Moving the bed and other furniture away from walls and removing bed skirts and other linens that touch the floor.
- Placing petroleum jelly or double-sided tape on parts of the bed that touch the floor to prevent bed bugs from climbing onto the bed.
- Replacing wooden beds with metal framed beds, since bed bugs have difficulty climbing up metal surfaces.
- Caulking or sealing cracks and crevices around the room and on furniture.
- Storing clothes, shoes, plush toys, pillows, and bedding into large, sealed plastic bags or plastic tote bins with airtight seals. Thoroughly inspect these items for bed bugs before removing.
- Laundering all clothing, shoes, linens and area rugs at the hottest heat settings for washing and drying as possible.
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Since carpeting can harbor bed bugs, residents of homes infested with bed bugs that have wall-to-wall carpeting should consider removing the carpeting. Carpet padding, tape and tacking strips should also be discarded.

Vacuuming is a critical component of an overall plan to resolve a bed bug infestation. It's recommended that a HEPA-equipped vacuum be used that is dedicated only to pest control. Although a regular vacuum is acceptable, a HEPA-equipped vacuum will reduce the spread of the infestation and more effectively eliminate the pests. A crevice tool should be used with a suction that can capture insects in small spaces, cracks and crevices.

Once the area has been vacuumed, the vacuum bag or container should be placed in a sealed plastic bag or container and properly disposed of to reduce the likelihood of spreading the infestation. Brush attachments and hoses should be cleaned with hot water and detergents. The vacuum should be thoroughly inspected for the presence of bed bugs before moved or used in other areas.

#### Disposing of Infested Items

When disposing of items infested with bed bugs, it's important to take precautions to ensure the pests aren't spread to other areas. This involves destroying the items when possible. If items cannot be destroyed, they should be wrapped in plastic wrap, secured with duct tape and labeled as "INFESTED WITH BED BUGS" before being disposed of in the general waste.

#### Pesticides and Bed Bugs

Pesticides are chemicals designed to repel or kill a wide range of animal and insect pests. These chemicals are potentially harmful to people and other animals. Pesticides are registered at the federal and state level and are required to contain a label that outlines how and where they are to be used, as well as the pests they are intended to control. It's a violation of federal and state laws to use a pesticide in any way other than as directed on the label. Pesticide application by a licensed pest management company with experience treating bed bugs is recommended.

In many situations, bed bugs have developed “pesticide resistance,” making them difficult to kill with certain pesticides. Testing has shown that up to 80% of bed bug populations are resistant to pyrethroid pesticides, which are the most common class of pesticides on the market today in both professional and consumer products.

Despite this resistance, the use of pesticides is typically necessary to eradicate a bed bug infestation. However, it's often necessary to use pesticides in combination with other methods, such as dry or steam heat; removal of infested materials and furniture; and cleaning, removing and repairing nesting and hiding places. Cleaning should always occur before pesticides are applied.
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Only pesticides with a label indicating that they are intended for treating bed bugs should be used. The chemical should not be directly applied to mattresses or to surfaces that may come in direct contact with a person, unless the label instructions specifically state to do so. In most situations, bug bombs or total release foggers are not effective in treating bed bugs since they do not reach the cracks and crevices where beg bugs hide. Their use may also put people and pets at risk.

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<tr>
<th>Non-chemical Measures to Manage Infestations</th>
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<tr>
<td>Many non-chemical measures can be implemented to manage infestations and reduce the likelihood of transferring bed bugs to other locations. When properly applied, steam and heat can kill all life stages of bed bugs and their eggs. Steam and heat can be applied with steamers, clothes dryers and convection heating units.</td>
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<td>Although the use of freezing treatments have been shown to kill bed bugs, the results are usually less effective than steam and heat treatments.</td>
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<th>Post-Treatment Evaluation</th>
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<tr>
<td>Bed bug management is a time-consuming and challenging task. To rid a home of bed bugs in a timely manner, it’s necessary to evaluate the effectiveness of the treatment methods used and adjust the strategy as indicated. After physical repairs, cleaning, and treatment have been conducted, it’s important to monitor for surviving bed bugs. If a significant reduction in bed bugs is not observed after the first treatment, it may be necessary to consider a combination of methods or an alternative to the plan being used.</td>
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<tr>
<td>Even with a thorough approach, surviving eggs will likely hatch. This is to be expected and doesn’t mean the treatment was ineffective. As these eggs hatch, continued monitoring and follow-up treatments will be required. In many situations, management of bed bugs will progress over several weeks.</td>
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<th>Preventing Bed Bug Infestations</th>
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<tr>
<td>Since resolving a bed bug infestation is often difficult and expensive, it’s important to take steps to prevent an infestation. The following recommendations can help keep homes free of these pests:</td>
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<tr>
<td>- Avoid purchasing second-hand mattresses.</td>
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<td>- Inspect second-hand furniture carefully for signs of an infestation and sanitize the item thoroughly before bringing it into the home.</td>
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<tr>
<td>- In areas of risk, replace wood and plush furnishings with metal and plastic items. Avoid wicker furniture.</td>
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<tr>
<td>- Select bedding and pillows that can easily be placed in the dryer at a hot setting.</td>
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- Use white and light-colored sheets to make early detection of bed bugs easier.
- Select vinyl-covered or seamless mattresses; or encase mattresses and box springs in bed bug-proof coverings. Keep in mind that the box spring is more likely to harbor bed bugs than the mattress.
- If second-hand clothing or linens are purchased, wash and dry them on the hottest heat setting immediately upon bringing them into the home.
- If visiting high-risk areas, remove clothes and shoes immediately upon entering your home and wash and dry them on the hottest heat setting.

### Reporting Bed Bug Infestations

Once an actual or suspected bed bug infestation has been identified, the home health or hospice agency should proceed with a course of action that typically includes:

- Reporting of the suspected or actual infestation to agency leadership.
- Notification of the infestation to other clinicians who may access the home.
- Facilitation of inspection of the home by a qualified individual.
- Confirmation of the infestation.
- Reporting of the infestation to the landlord, property manager, and anyone else who is responsible for the home or may become exposed to the infestation.
- Reporting of the infestation to local authorities as required by law.
- Facilitation of cleaning and treatment of the infested areas.
- Education to support future preventative actions.
- Follow-up to ensure the problem has been resolved.
- Documentation of the incident based on agency protocol.

### Conclusion

In this course, you learned about bed bugs, including how to identify an infestation, steps to prevent transfer of bed bugs from the site of an infestation, measures to address the infestation, and actions to prevent an infestation. Bed bugs are distasteful and frightening to both those involved in
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<td>the infestation, as well as clinicians who care for patients in infested homes. Home health and hospice clinicians play an important role in not only positively impacting the lives of those exposed to bed bugs, but also in helping to stop a widespread problem that is quickly reaching epidemic proportions.</td>
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Thank you for completing this course. To receive credit, you will now need to take the post-test. A score of 80% or greater is required for successful completion. Click the right arrow now to begin the post-test.