

Day-to-Day Prevention

- ◆ Bed bugs are excellent hitchhikers, so be extra careful when traveling (see tips below).
- ◆ Change and wash bedding regularly.
- ◆ Do not bring second-hand furniture into your home unless you have thoroughly inspected and cleaned the items first.
- ◆ Reduce clutter.

Traveling Tips

- ◆ Inspect mattress and headboard with flashlight.
- ◆ Keep bags, luggage, and backpacks off the bed. Inspect and then use a luggage rack.
- ◆ Never place clothes, or jackets, on bed or couch. Do not store clothes in dresser.
- ◆ If you are concerned about exposure, after travel, seal all items in plastic bags until time for washing or treatment.
- ◆ Unpack clothes directly into washer / dryer.
- ◆ Inspect luggage closely with flashlight and magnifying glass for bed bugs upon returning home.

Bites and Disease

Bed bugs are not known to transmit disease. Bites are often painless and occur at night while you are sleeping. Some people suffer allergic reactions and develop painful swelling.

Pesticide Safety First!
Read the Label.

How to Hire a Pest Control Operator

- ◆ Call several licensed and insured companies, compare services and get written estimates.
- ◆ Insist on and check references.
- ◆ Look for companies that:
 - offer an IPM solution
 - offer both chemical and non-chemical treatment options
 - give a pre-treatment check-list
 - perform pre-treatment inspection
 - recommend both interceptors and encasements
 - offer two or more service visits and follow-up



Before Using Pesticides

- ◆ Some pesticides are considered minimum risk. EPA does not register and check for effectiveness of these products. These products do not have EPA registration numbers on the label.
- ◆ Never use outdoor pesticides indoors.
- ◆ Some pesticides and total release foggers are highly flammable. Improper use may cause a fire.
- ◆ Never overuse pesticides. More is not better!
- ◆ Read, understand, and follow the label-use directions.

Bed Bug Prevention, Detection and Control

Bed bugs are parasites that seek out sleeping people or animals for a blood meal. After feeding, they hide. It is challenging, but not impossible, to prevent, detect and control bed bugs due to their small size and ability to squeeze into cracks and crevices, where they are often unnoticed.

Pesticides alone generally will not eliminate bed bugs. Effective bed bug control requires Integrated Pest Management (IPM). IPM is an environmentally sensitive approach to pest management that relies on knowledge of the pest, plus common sense practices, such as inspection, monitoring, reducing clutter, the use of physical barriers, and the judicious use of pesticides.



Be Alert, Be Aware,
Bed Bugs Could be Anywhere!



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For more information on bed bugs and IPM go to:
www.epa.gov/bedbugs
Pesticide Poisoning: Call 1-800-222-1222

The important thing is to act fast —
before they have time to multiply.



Actual size



Bed Bug Identification

- ◆ Eggs: tiny, white, and glued to surfaces.
- ◆ Nymphs are light colored, from 1/16th".
- ◆ Adults are rusty red, apple seed sized, 3/8".
- ◆ Six legs, oval, flattened from top to bottom.
- ◆ Do not jump or fly, but are good runners.
- ◆ They tend to congregate together.
- ◆ They can live several months without a blood meal.
- ◆ **Important:** Capture several examples of the pest and have them identified by a qualified expert before taking any further actions.

Signs of Bed Bugs

- ◆ Small, whitish shed skins and rusty spots on bed linens which are droppings and blood stains from crushed bugs.
- ◆ Live bed bugs of any size.
- ◆ Eggs and casings among droppings or in crevices where adults hide.
- ◆ An offensive, sweet, musty odor from the bed bugs when infestations are severe.
- ◆ You may have red, itchy welts or rashes from bites; however, bite marks are **not** a reliable indication of a bed bug infestation.

Bed bugs are no one's fault. They don't discriminate - anyone can have them.

Early detection and prompt response will avoid larger problems.

Where do Bed Bugs Hide?

- ◆ Mattresses, box springs, bed frames and head boards (along seams and piping, under handles and labels).
- ◆ Under the thin dust cloth on bottom of box spring.
- ◆ Seams and fabric folds in curtains and under furniture, including chairs and sofas.
- ◆ Under wall-to-wall carpeting and padding.
- ◆ Anywhere there are cracks, crevices or nail holes in walls, and under wood moldings and baseboards.
- ◆ Under loose wallpaper and seams, and where ceiling and wall meet.
- ◆ In and behind picture frames and mirrors.
- ◆ Clothing and clutter stored in closets, under beds and elsewhere.
- ◆ Inside switch plates, electrical outlets, clocks, computers, phones, televisions and smoke detectors.
- ◆ On and in recently used luggage, backpacks and bags.



Don't pass bed bugs onto others!

Caulk cracks and spaces Interceptor under leg



Integrated Pest Management

1. Physical Control Methods

- ◆ Vacuuming reduces bed bug populations.
- ◆ Clean and vacuum bed bug prone areas daily.
- ◆ Immediately seal and dispose of vacuum bag.
- ◆ Install encasements on mattress and box spring.
- ◆ Install bed bug interceptors under bed and furniture legs.
- ◆ Make the bed an island: Keep bed away from wall and do not let bedding touch the floor.
- ◆ Remove clutter where bed bugs can hide.
- ◆ Isolate infested items in sealed plastic bags or containers. Treat items in hot dryer for 30 min.
- ◆ Clean and scrub seams / folds with detergent.
- ◆ Seal cracks where bed bugs can hide.
- ◆ If you live in an apartment or other multi-family dwelling, and you see a bed bug, contact your landlord immediately.

2. Non-chemical Controls

Items that cannot be washed or dried may be steamed, heated or frozen using specialized equipment. Raising the indoor temperature with a thermostat or space heaters will not work, nor will placing items in the home freezer. Contact a bed bug management professional for advice.

3. Pesticide Controls

Pesticides are an important part of the IPM toolbox. Please view cautions listed — over.



Mattress and box spring encasements

Top Ten Bed Bugs Tips

1 **Make sure you really have bed bugs, not fleas, ticks or some other insect.** You can compare your insect to the pictures on our bed bug Web page or show it to your local extension agent.

2 **Don't panic!** Eliminating bed bugs is difficult, but it's not impossible. Don't throw out all of your things because most of them can be treated and saved. Throwing stuff out is expensive, may spread the bed bugs and could cause more stress.

3 **Think through your treatment options – Don't immediately reach for the spray can.** Try other things first. Integrated pest management (IPM) techniques may reduce the number of bed bugs and limit your contact with pesticides. If pesticides are needed, always follow label directions or hire a professional. There is help available to learn about treatment options.

4 **Reduce the number of hiding places – Clean up the clutter.** A cluttered home provides more places for bed bugs to hide and makes locating and treating for them harder. If bed bugs are in your mattress, using special bed bug covers (encasements) on your mattress and box springs makes it harder for bed bugs to get to you while you sleep. Leave the encasements on for a year. Be sure to buy a product that has been tested for bed bugs and is strong enough to last for the full year without tearing.

5 **Regularly wash and heat-dry your bed sheets, blankets, bedspreads and any clothing that touches the floor.** This reduces the number of bed bugs. Bed bugs and their eggs can hide in laundry containers/hampers, so clean them when you do the laundry.

6 **Don't rely on do-it-yourself freezing as a reliable method for bed bug control.** While freezing can kill bed bugs, temperatures must remain very low for a long time. Home freezers are usually not cold enough to kill bed bugs. Putting things outside in freezing temperatures can kill bed bugs, but it can take several days when the temperature is 0° F and almost a week when the temperature is 20° F.

7 **Use heat to kill bed bugs, but be very careful.** Raising the indoor temperature with the thermostat or space heaters won't do the job. Special equipment and very high temperatures are necessary for successful heat treatment. Black plastic bags in the sun might work to kill bed bugs in luggage or small items, if the contents become hot enough (about 110°F for at least 3 hours).

8 **Don't pass your bed bugs on to others.** Bed bugs are good hitchhikers. If you throw out a mattress or furniture that has bed bugs in it, you should slash or in some way destroy it so that no one else takes it and gets bed bugs.

9 **Reduce the number of bed bugs to reduce bites.** Thorough vacuuming can get rid of some of your bed bugs. Carefully vacuum rugs, floors, upholstered furniture, bed frames, under beds, around bed legs, and all cracks and crevices around the room. Change the bag after each use so the bed bugs can't escape. Place the used bag in a tightly sealed plastic bag and in an outside garbage bin.

10 **Turn to the professionals, if needed.** Hiring an experienced, responsible pest control professional can increase your chance of success in getting rid of bed bugs. If you hire an expert, be sure it's a company with a good reputation and request that it use an IPM approach. Contact your state pesticide agency for guidance about hiring professional pest control companies.

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Non-Chemical Bed Bug Management

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Introduction

Bed bugs have proven to be a very challenging pest. While most people would like to have a pest management professional come to their home and spray a magic potion that eliminates bed bugs forever, no such potion exists. Bed bugs are highly resistant to a number of insecticides, and their eggs are impervious to most insecticide formulations. Complicating the situation further is the human host. Many people live in highly cluttered environments providing bed bugs with many places to hide. Boxes, books, stuffed animals, and electronic equipment cannot be treated with insecticides so there are many safe locations where bed bugs find refuge. This is why we cannot rely on insecticides alone to cure bed bug problems. Pest management professionals have recently started using a variety of non-chemical tools to help manage bed bug infestations. Below is a discussion of the non-chemical methods that can be used as part of an integrated pest management program for bed bugs. This publication is not intended to endorse any of the products described below, however, these products are specifically mentioned because they are unique technologies and known to be effective.

Clutter Removal

Highly cluttered homes and bedrooms provide bed bugs with numerous places to hide, and makes treating the home with insecticides almost impossible. Therefore, reducing clutter will greatly improve your chances of eliminating



bed bugs. Before having your home treated for bed bugs, place piles of clothes that are laying on the floor into sealed bags for laundering. Remove all items from under the bed, but do not put anything on top of the bed or move items into another room (potentially spreading the infestation)*. Go through your closets. Bag and throw away any items that you no longer use. Do not move items from the closets into other rooms. Stack those items that you wish to keep in front of the closet door so that they can be inspected*. Items that have no value, such as old newspapers, junk mail, magazines, and broken electronic equipment should be bagged and thrown in the trash immediately. Your pest management professional may provide you with specific instructions on how to reduce clutter in your home or apartment. Be prepared to follow those instructions to the letter.

Dissolvable Laundry Bags*

Your pest management professional may provide you with dissolvable laundry bags or you can purchase them yourself. Dissolvable (GreenClean™) laundry bags are laundry bags that dissolve in the washer. You can pack your clothing and other washable belongings into the bags and put them directly into the washer without having to open the bag or dispose of a potentially infested bag in the laundromat*.

Bed Bug Detection

It is very important to catch a bed bug infestation before the population becomes large and difficult to control. But how do you monitor a home or apartment for bed bugs? You may have heard the old stories of how people used to put tuna cans full of water under the legs of their bed to prevent bed bugs from crawling up and feeding on them. Modern bed bug monitoring devices like the ClimbUp™ Insect Interceptor use that same idea to detect bed bugs before an infestation develops. For the ClimbUp™ device to work, the bed must be properly prepared. The bed must be moved away from the wall so that it is not touching the wall or another piece of furniture. There must be no dust ruffle or any other bedding touching the floor during the day or night. A ClimbUp™ interceptor is then placed under each bed leg (4-6 devices total) so that the leg sits inside the inner well of the device.



The ClimbUp™ interceptor is basically a dish that is rough on the outside and coated with talc on the inside. Hungry bed bugs coming to feed on the host crawl up the outside of the device and fall into the outer well where they cannot escape. The ClimbUp™ is an excellent tool for early detection because bed bugs moving in from the apartment next door may be found in the ClimbUp™ before anyone starts getting bitten. The ClimbUp™ device is also useful as a trap. The devices can capture hundreds of bed bugs as they attempt to approach the host. The ClimbUp™ will not eliminate an infestation, but it can catch enough bed bugs to actually reduce the population size.*

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Vacuuming

The value of vacuuming is not that it controls bed bugs, but that it makes inspections so much easier. In large infestations, bed bug harborages and aggregation sites are not only filled with live bed bugs, but also with their debris (dead bed bugs, molted skins, hatched egg shells, and feces). It is often difficult to distinguish what is alive from what is dead in a messy harorage, particularly after treatment. A high powered vacuum is very useful for removing this debris. While no vacuum is powerful enough to remove all of the bed bug eggs (eggs are cemented into place), the removal of the bed bug debris makes it much easier to see if anything is still alive in these harborages after they have been treated. Just make sure that the infested vacuum bag is thrown away outside of the building.

Steam

Bed bugs are easy to kill using heat. Their thermal death point is reported to be 114-115° F. Putting infested clothing in a hot dryer is an excellent way of killing bed bugs and their eggs. Heat can also be used to kill bed bugs and their eggs in furniture and carpeting. The most common method of killing bed bugs with heat is by using a steamer. Many pest management companies are using professional steam cleaners to kill bed bugs in infested apartments. The steamers are used to kill bed bugs on mattresses, couches and other locations where insecticide applications are undesirable.

Steaming bed bugs is a slow process that takes patience. The technician must move slowly enough so that the heat concentration is maintained over every inch of surface. The steamer head must also be large to avoid the steam coming out at such velocity that it blows bed bugs and their eggs across the room. Steam cleaning is an effective way of reducing an infestation quickly. However, steam alone will not eliminate an infestation.

Pressurized Carbon Dioxide Snow

Some of the larger pest management companies have been using a new technology where bed bugs are frozen to death by being exposed to pressurized CO₂ snow at -108° F. The technology goes by the trade name Cryonite®. The snow mixture is blown out of a pressurized cylinder through a nozzle that forms vapors to penetrate baseboards, bedding, box springs, the furniture, other cracks and crevices where bed bugs aggregate. The pressurized snow freezes the cells of the bed bug killing them instantly. Similar to steam cleaning, the Cryonite® process requires patience and will not eliminate a bed bug infestation if used alone. Other control methods will still have to be used.

Diatomaceous Earth

Diatomaceous earth (DE) is a desiccant dust made of the silica-based skeletons of microorganisms called diatoms. This dust kills bed bugs by sticking to the outside of their bodies and absorbing the wax layer that keeps them from losing their body moisture. The bed bugs desiccate and die within a couple of days.

DE is very safe to use and has a broad label allowing the product to be applied in many locations where insecticidal dusts cannot (bed frames, carpeting, pet bedding etc.). However, be aware that there is more than one type of diatomaceous earth. There is the 100 percent diatomaceous earth that is an insecticide labeled for crawling insect pests. There is a 100 percent DE that is used as an animal food additive (also works well for killing bed bugs). There are also insecticide formulations of DE that contains pyrethrins. These products will have more restrictive labels regarding where the product can be used. The fourth type of DE is used for swimming pool filters. The swimming pool form of DE has been heat treated so that the diatom skeletons are no longer the same shape. Swimming pool DE is a serious inhalation hazard and should never be put into someone's home. Be sure that if you are purchasing DE yourself, you avoid those products used for swimming pool filters.

Mattress Encasements

Mattress encasements are now a standard part of a quality bed bug management program. A mattress encasement is more than a bed cover. The encasement is intended to seal your mattress so that no bed bugs can infest your mattress, and any bed bugs currently infesting your mattress can never bite through or escape from the encasement. It is extremely important that the mattress encasement be placed on both the mattress and the boxsprings. If you cannot afford to encase both, make sure that the boxsprings is put into the encasement. The boxsprings is a favorite bed bug harborage, and it is very difficult to treat. Encasing the boxsprings makes bed bug treatment much easier and more effective.

It is also important that the mattress encasements you purchase have a zipper that will close completely. Many people neglect to zip the cover all the way up and this is the number one escape route used by bed bugs. Mattress encasements that have a zipper protector (Protect-A Bed or Mattress Safe) will prevent bed bug escape even if the zipper is not entirely closed. Also, **the teeth of the zipper must be tight enough to keep newly hatched bed bugs from escaping through the teeth.** Not all mattress covers are effective at keeping bed bug inside so make sure that the product you purchase describes on the label how it has been tested for containing bed bugs.



Heating Systems

Some of the most effective new technologies for bed bug control have been the development of heating systems that are capable of superheating infested rooms to kill all the bed bugs. There are currently two heating systems being used for bed bug elimination. These are the ThermaPureHeat® and the Temp-Air Heat Remediation System®. The principles behind these two methods are essentially the same. Propane generated heat or electric heaters are used to raise the temperature inside the room to 135° F (this temperature will not damage electronic equipment). The heat is blown into the room for several hours. The temperatures in cracks, crevices, and hard-to-reach places are monitored remotely from numerous sensors placed throughout the room. Once the bed bug thermal death point is reached at all of the sensors (114-115° F), the heating process is continued for 60 minutes (or more) to kill all of the bed bugs and their eggs. The advantages of these heat systems are that the resident does not have to remove or bag their belongings, and most infestations can be cured in a single treatment. The disadvantage of heat treatment is that the technology is still so new that it is difficult to find a pest management company that has purchased the system. The process is also time consuming (taking 6-8 hours from setup to take down), and therefore expensive.

Heat treatment is one of the few methods that can be used alone for bed bug control. However, some buildings (usually older remodeled buildings) may have construction features that create heat sinks. In cases where construction issues are a concern, it is wise to supplement the heat treatment with a conventional insecticide application in cold spots where bed bugs might find refuge.

The Temp-Air Heat Remediation System® uses electric heaters to generate the heat needed to treat a room or apartment (typically a 4-heater system will treat 900-1100 sq. ft.). The heaters are placed in the infested room and powered by a generator located outside. High velocity fans are used to blow the heated air into all corners of the room. The temperature of the room will increase to between 120-135°F. The sensors are monitored until each has reached 115°F. This temperature is adequate for killing bed bugs but not high enough to damage belongings inside the home.

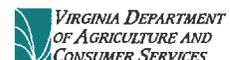
The ThermaPureHeat® system uses a large propane fueled heater to generate the heat needed to treat an infested apartment unit. The propane heater is located outside the building and the heat is funneled into the apartment through insulated duct work. The ducts are extended into various areas of the home creating positive pressure as the propane heat is continuously blasted into the unit. The temperature of the room will increase to 135°F, heating bed bugs harborage to the thermal death point, but not damaging items in the apartment.



Summary

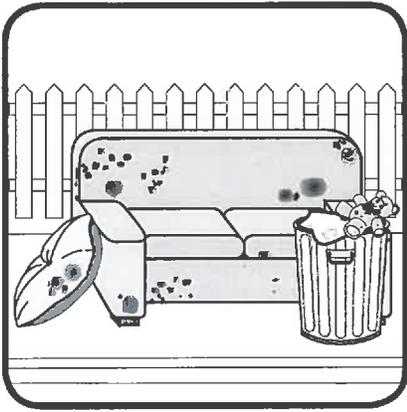
Insecticides alone can rarely eliminate a bed bug infestation. Long-term control requires that non-chemical methods be used in combination with insecticides as part of an integrated bed bug management program.

*Cooper Pest Solutions, Lawrenceville, New Jersey



Get Rid of Mold

After a flood, mold will grow in your house. It can make you sick. You will need to clean your house.



Take things that were wet for 2 or more days outside.

Things that stayed wet for 2 days have mold growing on them even if you can't see it.

Take out stuff made of cloth, unless you can wash them in **hot** water. Also take out stuff that can't be cleaned easily (like leather, paper, wood, and carpet).

Use bleach to clean mold off hard things (like floors, stoves, sinks, certain toys, countertops, flatware, plates, and tools).

Follow these steps:



- Never mix bleach with ammonia or other cleaners.
- Wear rubber boots, rubber gloves, goggles, and N-95 mask.
- Open windows and doors to get fresh air when you use bleach.
- Mix no more than 1 cup of bleach in 1 gallon of water.
- Wash the item with the bleach and water mixture.
- If the surface of the item is rough, scrub the surface with a stiff brush.
- Rinse the item with clean water.
- Dry the item or leave it out to dry.



**A BRIEF GUIDE TO
MOLD,
MOISTURE,
AND
YOUR HOME**

Indoor Air Quality (IAQ)

*EPA 402-K-02-003
(Reprinted 09/2012)*

**This Guide provides
information and guidance
for homeowners and
renters on how to clean
up residential mold
problems and how to
prevent mold growth.**

*U.S. Environmental Protection Agency
Office of Air and Radiation
Indoor Environments Division
1200 Pennsylvania Avenue, N. W.
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Washington, DC 20460
www.epa.gov/iaq*

A BRIEF GUIDE TO MOLD, MOISTURE, AND YOUR HOME

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MOLD BASICS

- The key to mold control is moisture control.
- If mold is a problem in your home, you should clean up the mold promptly *and* fix the water problem.
- It is important to dry water-damaged areas and items within 24-48 hours to prevent mold growth.

Why is mold growing in my home? Molds are part of the natural environment. Outdoors, molds play a part in nature by breaking down dead organic matter such as fallen leaves and dead trees, but indoors, mold growth should be avoided. Molds reproduce by means of tiny spores; the spores are invisible to the naked eye and float through outdoor and indoor air. Mold may begin growing indoors when mold spores land on surfaces that are wet. There are many types of mold, and none of them will grow without water or moisture.



Mold growing outdoors on firewood. Molds come in many colors; both white and black molds are shown here.

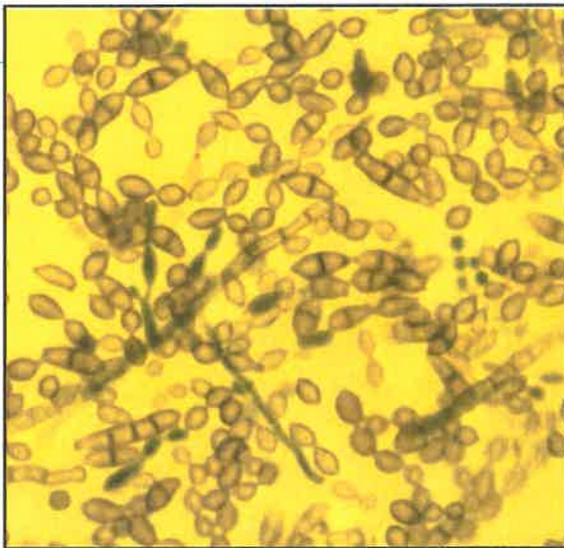
Can mold cause health problems? Molds are usually not a problem indoors, unless mold spores land on a wet or damp spot and begin growing. Molds have the potential to cause health problems. Molds produce allergens (substances that can cause allergic reactions), irritants, and in some cases, potentially toxic substances (mycotoxins).

Inhaling or touching mold or mold spores may cause allergic reactions in sensitive individuals. Allergic responses include hay fever-type symptoms, such as sneezing, runny nose, red eyes, and skin rash (dermatitis). Allergic reactions to mold are common. They can be immediate or delayed. Molds can also cause asthma attacks in people with asthma who are allergic to mold. In addition, mold exposure can irritate the eyes, skin, nose, throat, and lungs of both mold-

allergic and non-allergic people. Symptoms other than the allergic and irritant types are not commonly reported as a result of inhaling mold.

Research on mold and health effects is ongoing. This brochure provides a brief overview; it does not describe all potential health effects related to mold exposure. For more detailed information consult a health professional. You may also wish to consult your state or local health department.

How do I get rid of mold? It is impossible to get rid of all mold and mold spores indoors; some mold spores will be found floating through the air and in house dust. The mold spores will not grow if moisture is not present. Indoor mold growth can and should be prevented or controlled by controlling moisture indoors. If there is mold growth in your home, you must clean up the mold **and** fix the water problem. If you clean up the mold, but don't fix the water problem, then, most likely, the mold problem will come back.



Magnified mold spores.

Molds can gradually destroy the things they grow on. You can prevent damage to your home and furnishings, save money, and avoid potential health problems by controlling moisture and eliminating mold growth.

MOLD

CLEANUP



Leaky window – mold is beginning to rot the wooden frame and windowsill.

If you already have a mold problem – **ACT QUICKLY.** Mold damages what it grows on. The longer it grows, the more damage it can cause.

Who should do the cleanup? Who should do the cleanup depends on a number of factors. One consideration is the size of the mold problem. If the moldy area is less than about 10 square feet (less than roughly a 3 ft. by 3 ft. patch), in most cases, you can handle the job yourself, following the guidelines below. However:

- If there has been a lot of water damage, and/or mold growth covers more than 10 square feet, consult the U.S. Environmental Protection Agency (EPA) guide: *Mold Remediation in Schools and Commercial Buildings*. Although focused on schools and commercial

buildings, this document is applicable to other building types. It is available on the Internet at: www.epa.gov/mold.

- If you choose to hire a contractor (or other professional service provider) to do the cleanup, make sure the contractor has experience cleaning up mold. Check references and ask the contractor to follow the recommendations in EPA's *Mold Remediation in Schools and Commercial Buildings*, the guidelines of the American Conference of Governmental Industrial Hygienists (ACGIH), or other guidelines from professional or government organizations.
- If you suspect that the heating/ventilation/air conditioning (HVAC) system may be contaminated with mold (it is part of an identified moisture problem, for instance, or there is mold near the intake to the system), consult EPA's guide *Should You Have the Air Ducts in Your Home Cleaned?* before taking further action. Do not run the HVAC system if you know or suspect that it is contaminated with mold - it could spread mold throughout the building. Visit www.epa.gov/iaq/pubs to download a copy of the EPA guide.
- If the water and/or mold damage was caused by sewage or other contaminated water, then call in a professional who has experience cleaning and fixing buildings damaged by contaminated water.
- If you have health concerns, consult a health professional before starting cleanup.

MOLD **CLEANUP** GUIDELINES

BATHROOM TIP

Places that are often or always damp can be hard to maintain completely free of mold. If there's some mold in the shower or elsewhere in the bathroom that seems to reappear, increasing the ventilation (running a fan or opening a window) and cleaning more frequently will usually prevent mold from recurring, or at least keep the mold to a minimum.



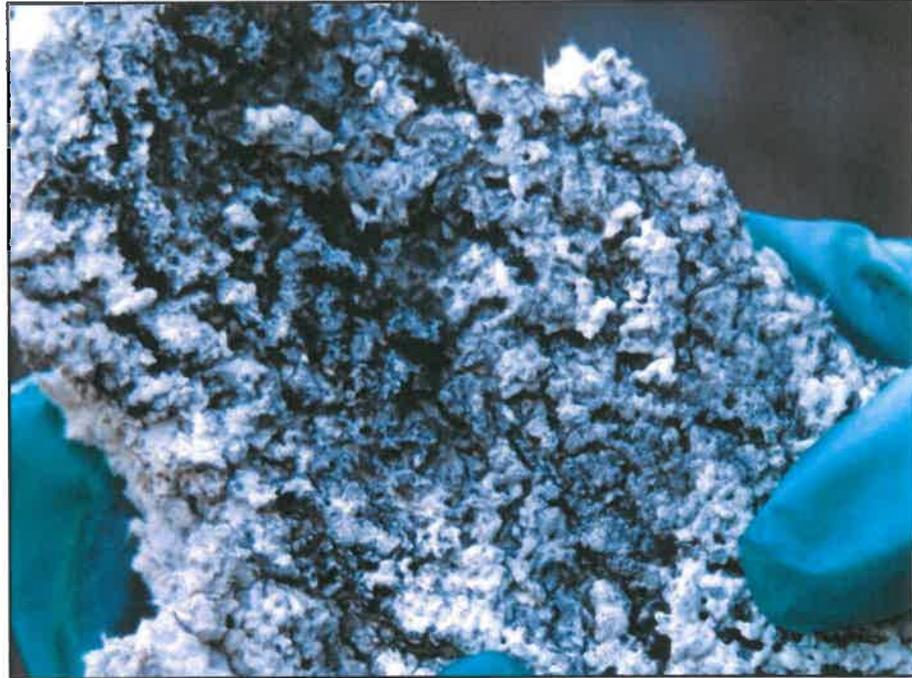
Tips and techniques The tips and techniques presented in this section will help you clean up your mold problem. Professional cleaners or remediators may use methods not covered in this publication. Please note that mold may cause staining and cosmetic damage. It may not be possible to clean an item so that its original appearance is restored.

- Fix plumbing leaks and other water problems as soon as possible. Dry all items completely.
- Scrub mold off hard surfaces with detergent and water, and dry completely.

Mold growing on the underside of a plastic lawnchair in an area where rainwater drips through and deposits organic material.



Mold growing on a piece of ceiling tile.



- Absorbent or porous materials, such as ceiling tiles and carpet, may have to be thrown away if they become moldy. Mold can grow on or fill in the empty spaces and crevices of porous materials, so the mold may be difficult or impossible to remove completely.
- Avoid exposing yourself or others to mold (see discussions: **What to Wear When Cleaning Moldy Areas** and **Hidden Mold**.)
- Do not paint or caulk moldy surfaces. Clean up the mold and dry the surfaces before painting. Paint applied over moldy surfaces is likely to peel.
- If you are unsure about how to clean an item, or if the item is expensive or of sentimental value, you may wish to consult a specialist. Specialists in furniture repair, restoration, painting, art restoration and conservation, carpet and rug cleaning, water damage, and fire or water restoration are commonly listed in phone books. Be sure to ask for and check references. Look for specialists who are affiliated with professional organizations.

WHAT TO WEAR WHEN

CLEANING MOLDY AREAS



Mold growing on a suitcase stored in a humid basement.

It is important
to take
precautions to
**LIMIT
YOUR
EXPOSURE**
to mold and
mold spores.

- **Avoid breathing in mold or mold spores.** In order to limit your exposure to airborne mold, you may want to wear an N-95 respirator, available at many hardware stores and from companies that advertise on the Internet. (They cost about \$12 to \$25.) Some N-95 respirators resemble a paper dust mask with a nozzle on the front, others are made primarily of plastic or rubber and have removable cartridges that trap most of the mold spores from entering. In order to be effective, the respirator or mask must fit properly, so carefully follow the instructions supplied with the respirator. Please note that the Occupational Safety and Health Administration (OSHA) requires that respirators fit properly (fit testing) when used in an occupational setting; consult OSHA for more information (800-321-OSHA or osha.gov/).

■ **Wear gloves.** Long gloves that extend to the middle of the forearm are recommended. When working with water and a mild detergent, ordinary household rubber gloves may be used. If you are using a disinfectant, a biocide such as chlorine bleach, or a strong cleaning solution, you should select gloves made from natural rubber, neoprene, nitrile, polyurethane, or PVC (see **Cleanup and Biocides**). Avoid touching mold or moldy items with your bare hands.

■ **Wear goggles.** Goggles that do not have ventilation holes are recommended. Avoid getting mold or mold spores in your eyes.



Cleaning while wearing N-95 respirator, gloves, and goggles.

How do I know when the remediation or cleanup is finished?

You must have completely fixed the water or moisture problem before the cleanup or remediation can be considered finished.

- You should have completed mold removal. Visible mold and moldy odors should not be present. Please note that mold may cause staining and cosmetic damage.
- You should have revisited the site(s) shortly after cleanup and it should show no signs of water damage or mold growth.
- People should have been able to occupy or re-occupy the area without health complaints or physical symptoms.
- Ultimately, this is a judgment call; there is no easy answer.

MOISTURE AND MOLD **PREVENTION** AND CONTROL TIPS

MOISTURE Control is the Key to **Mold Control**



*Mold growing
on the surface
of a unit
ventilator.*

- When water leaks or spills occur indoors - **ACT QUICKLY.** If wet or damp materials or areas are dried 24-48 hours after a leak or spill happens, in most cases mold will not grow.

- Clean and repair roof gutters regularly.
- Make sure the ground slopes away from the building foundation, so that water does not enter or collect around the foundation.
- Keep air conditioning drip pans clean and the drain lines unobstructed and flowing properly.



Condensation on the inside of a window-pane.

- Keep indoor humidity low. If possible, keep indoor humidity below 60 percent (ideally between 30 and 50 percent) relative humidity. Relative humidity can be measured with a moisture or humidity meter, a small, inexpensive (\$10-\$50) instrument available at many hardware stores.

- If you see condensation or moisture collecting on windows, walls or pipes - ACT QUICKLY to dry the wet surface and reduce the moisture/water source. Condensation can be a sign of high humidity.

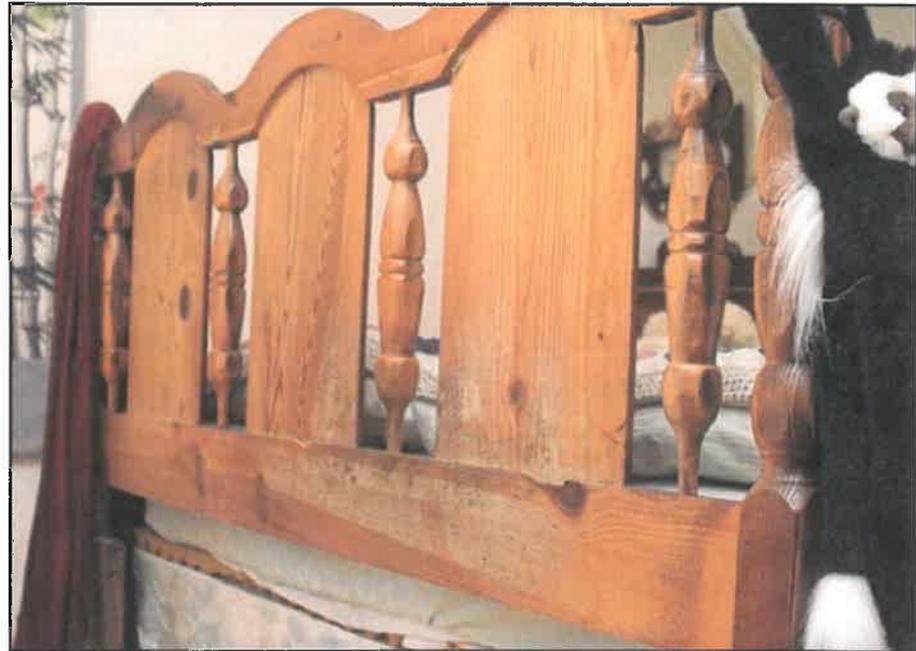
Actions that will help to reduce humidity:

- 💧 Vent appliances that produce moisture, such as clothes dryers, stoves, and kerosene heaters to the outside where possible. (Combustion appliances such as stoves and kerosene heaters produce water vapor and will increase the humidity unless vented to the outside.)
- 💧 Use air conditioners and/or de-humidifiers when needed.
- 💧 Run the bathroom fan or open the window when showering. Use exhaust fans or open windows whenever cooking, running the dishwasher or dishwashing, etc.

Actions that will help prevent condensation:

- ◆ Reduce the humidity (see preceding page).
- ◆ Increase ventilation or air movement by opening doors and/or windows, when practical. Use fans as needed.
- ◆ Cover cold surfaces, such as cold water pipes, with insulation.
- ◆ Increase air temperature.

Mold growing on a wooden headboard in a room with high humidity.



Renters: Report all plumbing leaks and moisture problems immediately to your building owner, manager, or superintendent. In cases where persistent water problems are not addressed, you may want to contact local, state, or federal health or housing authorities.



Rust is an indicator that condensation occurs on this drainpipe. The pipe should be insulated to prevent condensation.

Testing or sampling for mold

Is sampling for mold needed? **In most cases, if visible mold growth is present, sampling is unnecessary.** Since no EPA or other federal limits have been set for mold or mold spores, sampling cannot be used to check a building's compliance with federal mold standards.

Surface sampling may be useful to determine if an area has been

adequately cleaned or remediated. Sampling for mold should be conducted by professionals who have specific experience in designing mold sampling protocols, sampling methods, and interpreting results. Sample analysis should follow analytical methods recommended by the American Industrial Hygiene Association (AIHA), the American Conference of Governmental Industrial Hygienists (ACGIH), or other professional organizations.

HIDDEN MOLD



Mold growing on the back side of wallpaper.

Suspicion of hidden mold You may suspect hidden mold if a building smells moldy, but you cannot see the source, or if you know there has been water damage and residents are reporting health problems. Mold may be hidden in places such as the back side of dry wall, wallpaper, or paneling, the top side of ceiling tiles, the underside of carpets and pads, etc. Other possible locations of hidden mold include areas inside walls around pipes (with leaking or condensing pipes), the surface of walls behind furniture (where condensation forms), inside ductwork, and in roof materials above ceiling tiles (due to roof leaks or insufficient insulation).

Investigating hidden mold problems Investigating hidden mold problems may be difficult and will require caution when the investigation involves disturbing potential sites of mold growth. For example, removal of wallpaper can lead to a massive release of spores if there is mold growing on the underside of the paper. If you believe that you may have a hidden mold problem, consider hiring an experienced professional.

Cleanup and Biocides Biocides are substances that can destroy living organisms. The use of a chemical or biocide that kills organisms such as mold (chlorine bleach, for example) is not recommended as a routine practice during mold cleanup. There may be instances, however, when professional judgment may indicate its use (for example, when immune-compromised individuals are present). In most cases, it is not possible or desirable to sterilize an area; a background level of mold spores will remain - these spores will not grow if the moisture problem has been resolved. If you choose to use disinfectants or biocides, always ventilate the area and exhaust the air to the outdoors. Never mix chlorine bleach solution with other cleaning solutions or detergents that contain ammonia because toxic fumes could be produced.

Please note: Dead mold may still cause allergic reactions in some people, so it is not enough to simply kill the mold, it must also be removed.

Water stain on a basement wall — locate and fix the source of the water promptly.



ADDITIONAL **RESOURCES**

For more information on mold related issues including mold cleanup and moisture control/condensation/humidity issues, visit:

www.epa.gov/mold



Mold growing on fallen leaves.

This document is available on the Environmental Protection Agency, Indoor Environments Division website at: www.epa.gov/mold