UNDERSTANDING MOLD
Understanding Mold

Table of Contents

Introduction ........................................................................................................................................ Page 3

Chapter 1 What is Mold? .................................................................................................................... Page 5

Chapter 2 What is Mold A Problem? ................................................................................................ Page 10

Chapter 3 Why does Mold Get in My House? ................................................................................ Page 18

Chapter 4 How Can I Prevent Mold From Growing? .................................................................... Page 26

Chapter 5 How do I Get Rid of Mold? ............................................................................................ Page 30
Introduction

WHY WRITE ABOUT MOLD?

You may be thinking that there isn't a lot to discuss when it comes to mold, mildew, and other indoor fungus. But the current knowledge on mold has been changing over the last few years and we are starting to change the way we think about and deal with mold.

Mold is a bigger problem than ever before. New homes with modern materials and ventilation systems have given rise to a greater mold problem. We have been realizing how much mold affects our health. Common ailments like asthma and hay fever that have been around forever are finally being greatly attributed to mold. Other more dangerous toxic molds are causing lethal health problems and great property damage.

But also, how we deal with mold has been changing too. The techniques we've used for generations to clean and remove mold have become outdated. New, safer and more effective methods have been developed and need to be shared. The purpose of this book is to inform and educate so that you can make the best decisions when you experience mold.
WHO DOES MOLD CONCERN?

Mold affects all of us in different ways. The following groups each have their own concerns about mold. How does mold affect you?

Homeowners

If you own a home, you need to be aware of the severe health problems mold can cause for your family. Inhaling mold can cause body aches and pains, sinus infections and congestion, shortness of breath, and eye irritation. Family members with respiratory conditions, such as allergies and asthma, are prone to attacks from mold and young children and the elderly are more susceptible to the harmful effects of mold. Mycotoxins, such as Stachybotrys, can form on mold and cause devastating health consequences like hearing and memory loss, internal bleeding, and immune deficiency. The public is becoming more aware of these dangers as the news is reporting homes that have had to be quarantined, abandoned, or demolished from irrecoverable mold growth and families are feeling the long-term and permanent effects of toxic mold exposure.

Commercial Businesses

Indoor air quality affects more businesses than people realize. A recent study showed that 20%, of public schools in the nation have indoor air quality problems. How can you expect your workers to be productive when the very air they breathe is making them sick? Mold is unsanitary and unhealthy, and fungus infections create long-term health problems — such as difficulty speaking, memory and hearing loss, and deficient immune systems — that you, as the employer, are liable for. Additionally, property damaged by mold must be torn out, removed, and replaced at your expense. Can you afford to be vulnerable?
Who Does Mold Concern?

**Real Estate**

Because mold mostly grows in unseen places, real estate agents are sometimes completely unaware of the extent and potential damage from mold. If you are buying, selling, or renting property, then you want to be aware of the mold situation. Sometimes property is purchased only for the buyer to subsequently find out that the mold is so toxic that it must be quarantined and demolished. Landlords may be financially liable for the long-term health problems of their tenants caused by mold. Mold inspection and remediation is becoming a necessary standard for everyone involved in real estate.

**Insurance Companies**

“Mold is gold." That's the phrase attorneys are beginning to use as mold litigation has risen to cost insurance companies billions over the last few years. Recent verdicts, awarding families and businesses multi-million dollar settlements, have fueled the new focus on mold-based claims. Doctors are identifying the culprit of severe health problems on their patients as mold, and the sufferers are claiming millions. Even when action is taken, it may only exacerbate the problem. If a mold cleanup crew is not adequately trained, they may only succeed in releasing millions of spores and spreading the mold around and making the air more contaminated. You can avoid these devastating losses by conducting mold inspections and using our cost-effective mold remediation process to eliminate mold before it leads to catastrophic losses.
Helpful Hints

Warning!
This section contains especially important information.

Mold Myth
This part talks about a common misconception about mold or mold remediation.

Home Owners
People who own homes should be concerned with this part.

Employers
This part is important to people who own or operate businesses.
WHAT IS MOLD?

Chapter 1

Molds and mildews are microscopic organisms that live on plant and animal matter. Along with mildew, yeast, mushrooms, and rust, mold is a type of Fungi. Mold is the common term for multicellular fungi that grows with weaving multicellular filaments called hyphae. Mold generally refers to a visible colony of fungi growing indoors.

There is no agreed technical distinction between mold and mildew, but mildew often refers to mold growing in and on substances such as fabrics and wood.
MYTH: “FUNGUS IS A PLANT”

Often people confuse certain fungi, such as mushrooms, with plants since they appear and behave similarly. But mold belongs to the kingdom Fungi. Unlike plants, fungi do not have chlorophyll and cannot make their own food by converting sunlight into energy like trees and grass do. This is why mold must consume other organic material as food as an external source of energy.

Also, fungi produced by creating spores that are basically a chunk of the parent fungus cell. Like plants and animals, fungi are eukaryotic – having complex organelles within their cells – but they can be single-celled or multicellular. For example, mold is multicellular but yeast is single-celled.

Mold is everywhere!

Whatever you call them, mold and other fungi are a natural part of the environment. We probably first noticed fungus when a caveman stumbled upon a mushroom growing on the forest floor. But fungi are present virtually everywhere — both inside and outside. Many species of fungi even live in or on the surface of the human body. Get used to it - exposure to molds and other fungi is practically unavoidable unless you live in a sanitized laboratory.

Nature’s Garbagemen

Molds along with mushrooms, yeasts, and other fungi, play a vital role in the Earth's ecology. They are needed to break down dead organic matter such as fallen leaves and dead trees. These nutrients are recycled back into the environment. These little decomposers are nature's recyclers.

Mold is an incredibly resilient organism and can survive in the most undesirable environments. It needs only some moisture and organic material to live and reproduce. It can find moisture very easily, even from a humid atmosphere. It can eat just about anything that came from a plant or animal — leaves, wood, paper, or dirt. This includes many of the materials our homes are made out of; mold is not a picky eater.

Molds reproduce with tiny spores that are naked to the human eye, but can be inhaled. These sticky or slimy spores float through the air until they land on something edible where they will start new mold colonies.
Living with Fungus

Before recent times, the toxic effects of fungi were limited to ingesting poisonous mushrooms. But now, mold can become a real problem by growing in people's homes, causing property damage and creating numerous health problems. Mold can be inhaled and absorbed through the skin to affect allergic people sensitive to mold.

Additionally, mold degrades and destroys organic materials used in buildings.

In order to combat these problems, we must now become educated on the causes, effects, and prevention of unwanted mold so that we can learn to get along and coexist with the fungus.

Myth: “All Mold is Bad”

Sometimes mold gets a bad rap because of all the problems it causes people. But fungi are also responsible for some terrific things in life. Yeast helps bread to rise and beer to brew. You eat mushrooms too, right? Ever seen a moldy old orange? That kind of mold was used as the basis of the first cholesterol lowering statin drug. Penicillin is a mycotoxin that is even used in antibiotics.

But most importantly, mold is a natural and vital part of the ecosystem. Its job is to decompose organic matter and recycle that energy back into the environment. If it did not perform this necessary task, we would not likely survive!

Fungus is completely natural, we just don’t want mold in our homes (which are not natural). Tigers are natural too, but we probably wouldn’t want them in our homes or offices either.

So let’s give fungus a break. We share the planet with mold. It was on this planet before us and we will probably be around long after we’re gone.
WHY IS MOLD A PROBLEM?

Chapter 2

A little mold may be relatively harmless and easy to ignore. But when it becomes too great, mold can destroy property and damage your health. In extreme cases, rampant mold has caused homeowners to lose their homes and become inflicted with lifelong debilitations.

Why Does Mold Effect Us More Today?

As previously mentioned, new homes and buildings are moldier by design. Conserving energy with air tight structures keeps fresh air out and modern HVAC systems circulate spores throughout a building. Materials are more often made out of organic components like drywall and gypsum wood that mold will eat and grow on. We spend 90% of our time indoors, a lot more than we used to, where we are susceptible to mold. Many of us are living with diseases or use medication that suppresses the immune system.

All of these factors contribute to the new urgency in mold. Mold is being called the "new asbestos" and is a growing concern for everyone.

Figure 1 Indianapolis apartment after a water heater leak in the second story apartment went unnoticed.
Asthma

Approximately 7% of people are afflicted with asthma and mold is blamed for a 300% increase in the asthma rate over the past 20 years. It has been proven to increase the risk of asthma in children by 2.5 times. Exposure to molds is associated with exacerbations of asthma. Mold causes breathing difficulties and can trigger an asthma attack, especially if someone is already allergic.

Infections

Serious mold infections are rare since most people have immune systems that fight off foreign particles. But mold spores are especially dangerous to people who have suppressed immune systems. These people may not have the ability to fight off foreign mold spores and are at great risk of mold infections that can enter the body and colonize human tissue.

Here are a few people who have compromised immune systems. How many live in your home or work in your office?

- Cancer patients receiving chemotherapy
- Organ transplant patients using immunosuppressive drugs
- Other patients using drugs that suppress the immune system
- AIDS patients
- The elderly
- Infants and young children

These people are particularly at risk of acquiring fungal infections, but exposure to high amounts of mold is not healthy for anyone. Mold itself can permanently weaken the immune system. Mold patients have an average of 2% of the killer fighting cells in their system while 5% to 20% is the norm. These victims are predisposed to diseases like cancer for the rest of their lives.
“If we had a mold problem, then everyone should be sick.”

Often people assume that if there is a mold problem, then everyone living or working in the space would be sick and not just some people. Some might go as far as ignoring the sickness of one or two people by assuming it is “just the way they are.” They may go years without ever realizing that the reason for their constant illness was right under their nose.

There are numerous factors that go into the “if” and “how” mold is going to affect someone. People differ significantly in their sensitivity and body reactions to mold. Remember mold is everywhere and we are all exposed to it every day. What amounts to a lot of exposure for one person may not impact another at all. Also, different fungi are associated with different health effects. Even different parts of the same fungus can affect you differently.

All these factors come into play:

- How much time you spend around the mold
- How sensitive you are to mold
- Specific mycotoxins involved
- The dose received at once
- The portal of entry into the body
- Climate conditions
- Current nutritional status and health of the victim
- How different types of mold affect you
- How your body reacts to mold

Mold Symptoms are Unpredictable

It isn't worth trying to figure in all these factors and science is still inconclusive on how much mold is acceptable. But it doesn't matter. Indoor mold is unsanitary and undesirable. If you can see or smell it then it needs to be removed regardless of how it may or may not affect your current health.
Mold in the Workplace

Mycotoxins

Sometimes molds can produce powerful chemical poisons called mycotoxins. Mycotoxins are probably used by mold to fight off other molds and bacteria (penicillin is a mycotoxin we use to kill certain bacteria). Mycotoxins help the mold survive by attacking other competing and predatory organisms, and they are harmful to humans as well.

Mycotoxins are not allergens and will cause a variety of reactions in anyone they come into contact with. These include responses similar to allergies (nose and eye irritation, shortness of breath) but also dizziness, memory loss, headaches, and mood swings. Infections include bird breeder’s disease and Aspergilliosis which is frequently encountered in hospitals and burn wards. Mycotoxins have even been used as agents in biological warfare!

There are hundreds of mycotoxins and a single fungal genus can produce more than 100 different types of toxins that are released into the air as bioaerosols. Many types of mold produce toxins but not all the factors that decide when a mold starts producing mycotoxins are unknown. Among other things, it depends on what the mold is growing on, the temperature, pH level, light, and humidity.

Mycotoxins occur in both living and dead mold spores and may still be present in materials that have been contaminated with mold growth.
Stachybotrys

Stachybotrys, commonly referred to as “black mold” is an especially lethal mold. You’ve probably heard about this toxic mold in the news. A number of dramatic case reports have identified it as a contaminant where unexplained, horrifying symptoms have occurred to the occupants.

Effects of Stachybotrys

Stachybotrys produces mycotoxins that have devastating effects. It’s still unclear what the specific effects of Stachybotrys poisoning are and the range of symptoms are broad. Symptoms from prolonged exposure include chronic fatigue, headaches, fever, bleeding lungs, dizziness, nausea, diarrhea, or vomiting. It has even been linked to depression and lifelong debilitations — hearing loss, difficulty speaking, and memory loss. Stachybotrys has recently been blamed for infant deaths in Cleveland.

What Causes Stachybotrys?

Fortunately, Stachybotrys is not a common mold and only grows on material with high moisture content or reoccurring moisture incursions. It frequently grows on wallpaper, wallboard, ceiling tiles, carpets, insulation, around leaking window frames or water pipes, and especially in air ducts in HVAC systems.

Reports of Stachybotrys related incidents have triggered widely publicized litigation against builders, and insurance companies who did not take action to present water leakage and remediate mold growth. Are you in a position where you would be liable for the toxic effects of Stachybotrys growth?

While many think of Melinda Ballard and her $32 million settlement against her insurance company as the catalyst of the “mold is gold” mantra. The landmark case that skyrocketed mold litigation by 1000 percent in Texas the following year is actually not the largest settlement ever awarded to a mold victim.
Mold Symptoms

Here is a compiled list of symptoms that result from mold, mold spores, and mycotoxins. As you can see, mold is linked to a very broad range of ailments. If you suffer from some of these symptoms, you might suspect mold is the culprit.

- Wheezing
- Shortness of breath
- Nosebleeds
- Skin rashes or irritation
- Dry, hacking cough
- Fevers
- Memory problems
- Irritability
- Loss of balance
- Vomiting
- Feeling disconnected
- Chronic fatigue

- Difficulty breathing
- Nasal and sinus congestion
- Throat irritation
- Red, burning, watery eyes
- Headaches
- Flu-like symptoms
- Mood swings
- Dizziness
- Malaise
- Diarrhea
- Body aches and pains
- Difficulty concentrating
Property Damage

Fungal growth eats away at materials and personal possessions. In nature, mold biodegrades dead organic material and recycles it back into the environment — an important role in the ecosystem. But mold will try to do the same thing to the organic material in your home. Because molds grow by digesting the organic material, they gradually destroy whatever they grow on.

Some hard materials can be cleaned and salvaged, but porous objects can be ruined. Furnishings, such as carpets, sofas, and cabinets are immediately susceptible. Mold can discolor walls, floors, and ceilings. The longer it grows, the more it will destroy. If left unchecked it can even compromise the structural integrity of a building. In extreme cases, mold has made home uninhabitable, forcing them to be demolished. Insurance companies usually only cover a part of the mold damages, sometimes none at all. If this is the case, then it's up to property owners to take steps to take care of the problem as it arises.
Mold is Gold

In Texas there have been nearly 40,000 insurance claims filed over the past five years over problems stemming from mold.

Melinda Ballard was awarded $32 million dollars against Farmer’s Insurance for mishandling a burst pipe claim. The water damage caused black rot mold to cover her house, which then had to be destroyed.

Celebrities like Erin Brockovich, Lota Ferrigno, and Ed McMahan have been in highly publicized mold litigation cases.

"Mold is gold!" That’s the phrase attorney’s have coined in recent years regarding litigation against builders, landlords, and insurance companies. These people are getting sued in multimillion dollar cases by attorneys representing victims suffering symptoms linked to mold. Insurance companies have paid out $1 billion in 2001 and $3 billion in mold related claims in 2002, and the numbers keep growing exponentially.

As you know, doctors have been attributing mold as the culprit behind respiratory diseases with previously unknown sources of sinus infections and asthma. They have pinpointed mold as the cause for tripling the asthma rate for almost all sinus infections and the media has paid attention. Of course, the new research on Stachybotrys, black rot mold, has also propelled mold’s infamy which has been linked to bleeding lungs, memory loss, even death.

The fact is the true health effects of mold are still unclear and depend on a wide variety of factors. What used to be mystery illnesses are now being linked to mold. There is enough research to point to mold as the cause behind just about any health problem people can experience. Sometimes mold is directly responsible, but other times it may just be one of many possible factors. This won’t stop an attorney from using mold as the scapegoat if it is found present on the plaintiff’s living space. Environmental lawyers are holding weekend long seminars on mold litigation.

Insurance companies, home builders, and landlords are facing enormous lawsuits, even criminal charges, for ignoring mold problems. Occupants can sue for health problems and property damages. This presents both a financial risk and a risk to your reputation. Consistently using the best practices in removing mold and preventing moisture incursions can save your company from the risk and hassles associated with defending against mold.
How Does Mold Get In My House?  Chapter 3

It doesn’t take much for mold to creep into our homes and offices. After all, mold only needs a little food and water to thrive.
What does mold eat?

Decomposing dead organic matter is an important job for molds in the ecosystem. But many of the materials in our homes, especially new ones, are also composed of dead organic matter. Mold can't tell the difference between dead plants in the wild and organic materials that make up your home. It's not a picky eater. And in the eyes of mold, your home looks like a tasty buffet.

Is My Home Mold Food?

It might be strange to think of your home or workplace as being full of dead plants and animals. But that is essentially what many of the materials and components used in modern homes are. Here is a checklist of some things in your home that mold can use for nutrition.

- Paper faced drywall
- Stucco
- Wood
- Paint
- Upholstery
- Wall board
- Furniture
- Partitions
- Plants
- Leather furniture
- Paper faced gypsum board
- Dirt and dust
- Paper
- Insulation
- Carpet
- Ceiling tiles
- Drapes
- Books
- Oriented Strand Board (OSB)
- Cotton clothes, leather shoes
How can water get into a Building?

Water is really the ticket mold needs to gain entrance to your property. If water can get into your building, then almost certainly mold will too. So the key to presenting mold growth is to control moisture problems.

Indications of a previous or ongoing moisture problem may include discoloration of the ceiling or walls, warping of the floor, or condensation on the walls or windows.

But other than flooding, how can water can get inside? Here is a list of possible sources of water, see if any of them have ever afflicted your home or office.

- Roof leaks
- Damp basement and crawl spaces
- Condensation from poor insulation or ventilation
- Dryer exhausting indoors
- Overflow from sinks or sewers
- HVAC leaky ducts
- Leaky walls
- Basement flooding
- Site grading
- Plumbing leaks, drainage problems
- Steam from bathroom or kitchen
- Sprinkler spray hitting the house
- Broken air conditioners (standing water)
- Leaky or open windows or doors
- Interior vapor barriers
- Leaking hot water heater
- High humidity
How Does Mold Move?

Once mold starts growing in an unoccupied area like your crawl-space or basement, it can then reach other parts of your home. Mold can grow by extending tiny root-like hairs called hyphae. This allows a small patch of mold to expand and cover many square feet of material.

Once mold starts growing it will produce spores. Spores can be slimy so that they can easily stick to other surfaces. Other spores are powdery and can be carried in the air. These spores will float through the air until they latch onto new materials and begin growing colonies of their own.

It takes just one leaky incident for mold to begin taking over.

Once materials become damp or water-damaged, they serve as a breeding ground for molds and mildews. Water sitting for 24 hours is enough time for common molds to take hold. If water continues to completely saturate the area, more lethal mold, such as Stachybotrys or "black mold," can grow.

The Crawlspace Dilemma

Crawlspaces are often a major culprit behind mold growth and bacterial growth. Moisture in crawlspaces can cause mold to damage wood floor joists and beams. Carefully designed and constructed crawlspaces can reduce problems for homeowners and improve indoor air quality.

Humidity

Mold doesn't require a lot of water to start growing (in fact, mold won’t grow under-water). Dampness from condensate is adequate for some types of mold that are known to affect your health. Mold can pull moisture from the atmosphere if the humidity exceeds 80%.
HVAC – MOLD SUPER HIGHWAYS

HVAC — heating, ventilation, and air conditioning — can help fight off mold but they are also one of the biggest causers of mold and poor indoor air quality. Huh?

The amount and quality of the air flowing through a building greatly affects indoor air quality. Ventilation systems help decrease humidity and water condensation. This helps decrease mold.

But at the same time, these very same systems are a major contributor in mold growth. If mold is already in the building, then modern HVAC will recirculate air contaminated with mold spores throughout a building. This distributes mold and disperses spores into the occupants' breathing zone.

Poorly maintained ventilation systems may themselves harbor mold that is hidden from view in air ducts. Ducts with internal lining or duct hoard can become humid and dirty. Fiberglass insulation and condensate water blowing off the cooling coil also provide sources for mold. Occupants of an HVAC building can be afflicted with terrible mold symptoms for months, even years, without ever knowing where their symptoms are coming from.

If you are a modern HVAC home or a climate-controlled office, you can easily create a mold explosion if these systems are not adequately maintained and operating as designed.
Myth: “ONLY OLD HOMES ARE MOLDY”

A musty, mildew smell is often associated with old homes. We commonly think that if a home is moldy, it is probably old. While older homes probably have more leaks and can develop a mold problem over the years, it’s actually true that new homes are moldier than old homes.

Newly designed homes implement more organic material than old homes. Gypsum board and oriented strand board are used more often and mold finds them delicious. New homes use more insulation which can trap moisture behind walls, and more carpeting. Fake stucco is also a tasty treat for mold, especially when wet.

Additionally, tight building structures and poorly monitored HVAC systems found in newer buildings have contributed to mold growth. Airtight structures conserve energy, but prevent fresh air from ventilating into the building. Leaky HVAC produces mold and disperses it throughout a building via ventilation. Recent studies have linked molds to the tripling of the asthma rate over the past 20 years.
How can you check for mold?

Now you know what factors can cause mold. But how do you know if your home, place of work, or rental property has a serious mold problem?

Mold growth on surfaces usually appears as discolored patches — often green, gray, brown or black, but sometimes white and other colors. Sometimes mold takes on a speckled or cottony pattern on walls or furniture. Mold can be slimy or even furry patches that increase in size as they grow.
You may suspect mold if a building smells musty or moldy, but you cannot see the source. Not being able to see the mold may be enough for some people to delude themselves into thinking they do not have mold. But mold usually grows in unseen places. Here it can secretly fester until it takes over the entire building.

- The back side of dry wall, wallpaper, or paneling
- The top side of ceiling tiles in roof materials
- Underside of carpets and pads or floorboards
- Around leaky or condensing pipes
- Behind furniture where condensation forms
- Inside duct work where insulation is insufficient
- Inside crawlspaces

If you know there has been water damage in a building, you should be concerned with mold. Also, if building occupants are reporting health problems then it’s definitely time for a thorough inspection. But you should not wait until it gets this bad. Even without noticeable symptoms, mold is unsanitary and undesirable.

Lastly, to determine if you have mold, just follow your nose! Mold has an earthy, musty odor that you should be able to identify. If you’re not sure; try stepping outside for a few minutes and comparing the smell outdoors. Is there a noticeable difference? If so, then you likely have a mold problem.
How can I prevent mold from growing?

Chapter 4

The best way to deal with mold is to prevent it from ever occurring in the first place. Mold is a problem that requires a proactive solution and prudent avoidance is the best approach.

The incentive to worry about mold and fix the problem does not often occur after it is already too late. Renters and commercial businesses are liable for the health problems of their tenants and employees as a result of moldy properties. Insurance companies are being forced to award millions to people who are suffering from mold attacks. Considering the potential losses that mold can cause, it makes sense to act proactively and prevent these devastating situations from occurring.
How to prevent mold?

Since houses and buildings, especially new ones, are built from wood products and paper faced drywall there is always mold food. We can't get rid of mold food, so controlling water is key to mold prevention. If you can control water, you can control mold.

Not all homes are built to minimize water problems. But there are some precautions you can follow to keep your home dry.

**Simple precautions**

- Always use bathroom and stove vents
- Cover pots while cooking
- Promptly wipe down damp surfaces
- Open closet and cabinet doors
- Move furniture away from walls
- Use portable fans to increase circulation
- Do not over-water indoor plants
- Seal leaks when they first appear
- Use sub pumps in basements
- Use dehumidifiers to keep air dry
- Keep rain gutters and drains in working order
Controlling Humidity

Even if you can manage to keep your building free of flooding, leaks, and spillage, mold can still derive water from the atmosphere itself! If the relative humidity is beyond 80%, the mold can absorb moisture in the air. This is a major concern for homes in humid climates like southern states such as Texas and Florida.

In order to prevent mold growth, the relative humidity indoors should be below 60 percent and ideally between 30 and 50 percent. You can decrease the humidity by using ventilation, air conditioners, and dehumidifiers. But be careful — because these can also become mold reservoirs themselves if poorly maintained.

Eliminating excess water

Without water, mold can’t get started at all. But when water is left to sit for even 24 hours, common molds can take hold. Beyond that, areas can become completely saturated and lethal molds like Stachybotrys can grow.

For this reason, you need to take steps to eliminate water as quickly as possible after an incident.

- Stop the source of the leak or flooding
- Remove excess water with mops or a wet vacuum.
- Move rugs and pull up areas of wet carpet if necessary
- Move wet items to a dry, well-ventilated area or outside.
- It may be necessary to open wall cavities, remove baseboards or pry open paneling.
After mold begins

If your building has suffered a leak and you already suspect that mold may be forming, you need to be careful to keep the problem from getting worse. You don't want the mold migrating throughout the building and forming new colonies on edible surfaces.

Do not turn up the heat.

High temperatures increase the rate of mold growth.

Do not ventilate by using fans or HVAC

This will only cause the mold to spread.
How Do I Get Rid of Mold?  Chapter 5

The way we deal with mold is changing. Practices for dealing with toxic mold, like cleaning infested areas with bleach and fogging with toxic chemical fungicides, were recommended by the EPA only a few years ago. Now many are known to be ineffective, or even counter-productive, and are as potentially harmful to your health as the mold itself.
Fix the source

The single most important thing you need to know about mold remediation is that you must fix the moisture problem that led to mold in the first place! If you don't, then the mold will just come back and any mold cleaning you do will be futile. Either you, or a remediation contractor, need to figure out how water got into your building and determine how to keep it from happening again. Any remediation contractor that does not show concern with the moisture situation is either inexperienced or hoping he can continuously make money off you through repeated service.

There are a few interesting techniques modern mold remediators may use to find the source of water:

Visual inspection — checking walls, floors, ceilings, plumbing and drainage systems, HVAC systems, and other building elements for signs of water leakage.

Electronic methods — These locate areas of water damage without having to open walls or cavities. (E.g. Infrared thermography, moisture meters)
Should it stay or should it go?

Whether or not certain mold-infected objects can be salvaged or must be discarded depends on the type of material and the remediation method used.

Hard, flat surfaces

These can usually be cleaned by the residents or custodial staff. (counter tops, bathtubs, glass, plastics, metals).

Fibrous material

It is very difficult to clean and remove mold from absorbent fabrics. These almost always need to be thrown away, but exceptions can be made with a thorough remediation method. (E.g. carpets, furniture, insulation).

Porous items

Although they may be made to "look clean," these items are often difficult to clean because mold roots deep in the pores where bleaches and disinfectants cannot reach. (E.g. paper, wallboard, wood). When discarding items, bag and seal them. If properly enclosed, they may be disposed with household trash.
To sample or not to sample?

If you suspect that you have mold, it may not be evident by visual inspection. You may decide to have the mold sampled by an assessor to determine the amount, species, and toxicity of the mold. The assessor may use two types of sampling.

**Source sampling**

Sampling wood, carpets, wallboards, wallpaper adhesives, and other materials where mold may be growing using swabs, wipes, or adhesives tapes.

**Air sampling**

Sampling of air passed through a filter, impacted on growth media plates, or greased microscopic slides.

The sampling is then taken to a lab and the results should identify levels and the dominant species of mold present in your indoor environment.
It's currently debatable whether or not its worth the time and cost to sample mold before deciding what course of action to take. If a sampling suggests there is no serious need for remediation, then you can save money. But if the sampling suggests you need remediation, then you will have to pay the costs of both the sampling and the remediation. So it’s a gamble. Sampling itself can be expensive so take into account the estimated costs for sampling and remediation, as well as the proposed method of remediation, before making a decision.

There are many that argue that there is no need to test or sample mold. If you see it or smell it, you have it. Even if it's not a toxic mold, it's still unsanitary and a threat to your property. And you don’t need to know what species mold is in order to deal with it.

**When do you call in a specialists?**

Determining whether or not to call the men in moon suits depends on the seriousness of the problem. Bathroom molds and mildews are common and are nothing that a little elbow grease won't take care of. But if the problem is larger then often attempts to clean the mold yourself can be ineffective or make the problem worse. If the mold takes up an area greater than 10 square feet, is making people sick, or has a significant odor — then it's probably time to call a remediation company who can effectively deal with the problem.

With the knowledge you've gained from this book, you should be informed enough to select the right contractor.
Things to ask your Mold Remediator

- Does the specialists identify the source of moisture that led to mold in the first place?
- Does the specialist take steps to correct the original moisture problem?
- Does the specialist first determine the extent of mold before taking action?
- Does the specialist put together a plan for remediation that makes sense for your building and your mold circumstances?
- Does the plan include necessary barriers that prevent spreading the mold to other uncontaminated areas during cleaning?
- Does the specialist provide you with a cost estimate for their services?
- Does the specialist hold “Mold Remediation” Certifications from the Professional Mold Institute? These folks have been specially trained.
- IMPORTANT: Will they include clearance testing to prove their work?

Additionally, you should find out what remediation method the contractor will use to remove the mold. Biocides, fungicides, mold paint, enzyme-based formula? Consider what you've learned about each of these methods in this book.

How cleaning by hand can make it worse!

A lot of the time, people make the problem worse by cleaning mold by hand. When you disturb mold it can release spore counts in the air 10 to 1000 times higher than normal. You may end up just spreading mold throughout your building. Unless you really know what you're doing, cleaning procedures may exacerbate the problem.
How to protect yourself while doing cleanup.

Cleaning up mold by hand can be hazardous to your health. You will be exposed not only to mold, which can increase its spore count 10 to 1000 times when disturbed, but strong detergents and disinfectants. Even when undertaking small remediation projects make sure you take safety precautions by using a fitted respirator with N95 filter protection, gloves, and eye protection and keep the area well ventilated.

Bleach as a cleaner

If you have a mold problem, you may be tempted to use ordinary, household bleach as a disinfectant. This was once a common practice, and may still be acceptable to clean minor mold growth on only hard, flat surfaces like kitchen and bathroom countertops, tubs, and shower glass. But most of the things we have are porous like wood, paneling, ceiling tiles, drywall, paper backing of insulation, and carpeting. When it comes to most surfaces, you'll find that bleach is actually a harmful and ineffective disinfectant for major mold removal.

Do not mix bleach with ammonia!

If you insist on using bleach to clean mold, make sure you never, ever combine it with other products and disinfectants that contain ammonia! This can create especially toxic fumes that a mask won't protect you from. Also, keep it away from acetic acid and phosphoric acid. If you're going to mix bleach then read those labels!
How does Bleach damage property?

Property damage from using bleach is not a major concern, but it does exist. Bleach attacks floor coatings making them susceptible to dirt and grime. It damages fibers, like on carpets and furniture, and other porous materials. Metal and other hard surfaces can be corroded and discolored. Make sure you're aware of the effect bleach will have on something before you apply it.

Why bleach is not very effective

People who use bleach may see the illusion that they have fixed the problem. Don't forget, bleach bleaches things — it makes them transparent. This can hide dirt and mold and make you think you've cleaned something when it is still there.

Chlorine bleach is an effective killer of bacteria and viruses, but it doesn't kill and remove mold so well. Because of its ionic structure, chlorine constantly escapes through the plastic walls of its container. How long has that jug of bleach been sitting in your closet or under your sink? Bleach loses 50% of its killing power in the first 90 days of a never opened container.

MYTH:

“Bleach Kills all mold and keeps it from coming back”

Bleach is still commonly thought to be a reliable mold killer. If you have a mold problem, there is probably at least one person who will advise you to use bleach. But in addition to the harmful effects on your health, bleach is simply not as effective in killing mold as people once thought. In some cases, it can even make the problem worse!
How is bleach harmful to you?

If you use disinfectants like bleach, you need to wear gloves, masks, and eye protection. A mask respirator will protect you from mold particles but not from the fumes that attack the mucus membranes. Make sure there is enough fresh air available or you could have eye, nose, or throat irritation.

Why do people use bleach?

So if bleach is so bad, then why is it so often recommended? This is because it was once an acceptable practice. It was once the only product people knew for killing mold. Even the EPA once recommended bleach as a deterrent to mold. You can still probably find bleach recommendations on some websites. After all, when bleach is first used it does at least appear to be working – until all that mold grows back stronger than ever.

But public awareness is gradually changing. The EPA now says: “The use of a chemical biocide that kills organisms such as mold (chlorine bleach for example) is not recommended as a routine practice during mold remediation.” (Guide to Mold, Moisture and Your Home, pg. 15 EPA Publication 402-K-02-003)

OSHA’s Mold Remediation/Clean Up Methods guidelines also denounce chlorine bleach as a tool in mold remediation.

It may have been good for our grandmothers, but it’s time to let go of outdated mold remediation practices.

How bleach makes it worse

That same ionic structure also impedes bleach from penetrating into the pores of materials such as drywall or wood, so it has a hard time killing mold at its roots where it counts most.

But what does penetrate those pores? The water that makes up 99% of bleach. So by bleaching the mold you are sometimes just helping it grow! You can get rid of the visible surface mold, but the roots will cause more concentrated mold to grow back even faster. Also, chlorine bleach will evaporate faster than the water that dilutes it. So if you don’t dry the area well enough, you could just restart the contamination process.
Ozone Generators and Ozone Air Purifiers

In the past, air cleaners that produce ozone were promoted to remove indoor mold and associated odors. If you’re considering using an ozone generating air cleaner to fight your mold problem and control indoor air pollution, you need to be aware of the currently recognized problems with this method.

“Good up high – bad nearby” – that’s how the EPA helps us distinguish between useful and harmful ozone. Ozone in the stratosphere helps filter out UV rays from the sun. But ozone in the atmosphere we breathe is hazardous to your health.

Man-made ozone is produced in our atmosphere by the interaction of sunlight and certain pollutions, like automobile and chemical plant emissions. Ozone is known to harm lung functions and irritate the respiratory system. This is especially dangerous to those who already have asthma or other chronic respiratory diseases. Ozone generators have been shown to produce indoor levels above the safe limit. "The California Department of Health Services strongly recommends that people do not use an ozone air cleaner in any occupied spaces and the EPA specifically discourages the use of ozone for mold remediation.

Additionally, ozone can damage materials in your home. Rubber materials become brittle so think about wire coatings, plastic components of appliances, electronics of all types, extension cords, and HVAC controls. Also, ozone damages dyes in fabrics and pigments in artwork.

Worst of all, ozone simply has not been shown to be effective in controlling mold and other microbial contaminations — even if you use a dangerous amount of it. Ozone must come into direct contact with something to kill it, so it can't kill mold inside walls, beneath carpets, and other cavities where it matters most. Ozone concentration would have to be five to ten times higher than public health standards allow before it could decontaminate to completely kill mold and other air pollutants. If you insist on using ozone, just remember why you’re trying to get rid of the mold in the first place — you want to improve indoor air quality, not make it worse!

Don’t be fooled by ozone generator vendors. No government agency has approved these devices for use in occupied space. They are neither completely safe nor completely effective in their purpose.
Myth:  
“Only Living Mold can Make Me Sick”

Allergic responses can come from exposure to dead as well as to living mold spores. Biocides like bleach do not remove allergens or metabolites that can lead to allergies and adverse reactions in sensitive individuals. Therefore, killing mold with bleach and fungicides may not prevent the symptoms associated with mold. Make sure mold is killed and removed from the area.

Fungicides – Advantages and Disadvantages

There are many products available from mold remediation companies that fight mold. These products utilize a variety of chemicals that act as disinfectants that are more capable than store-bought chlorine bleach against mold. These products are considered “fungicides” because they are designed specifically to target mold.

Fungicides are more effective than bleaches and common disinfectants that aren't intended to clean up mold. But they aren't perfect. Even if a fungicide says it is 99.999% effective, mold colonies may produce a density of 1 million spores per square inch. This leaves 10 remaining spores per inch of infected material. This is more than enough for the mold to regrow, especially there is still a moisture problem. Some fungicides leave behind a microbial coating which helps prevent future mold growth.

Keep in mind that fungicides are chemicals. Some are registered by the EPA as “non-toxic” and some are not. Either way, you need to take necessary precautions to protect yourself from exposure because even if a product has nontoxic ingredients it can still be harmful to your health. Those that say they are made with "nontoxic ingredients" instruct you to avoid breathing the fumes, contact with skin or eyes, and often provide antidotes for accidental ingestion.
A New Solution – MTR94™

A new product you might not have heard of yet in the fight against mold is called MTR94™. MTR94™ isn't a disinfectant at all, but a naturally occurring enzyme formula which breaks down and digests mold. This hungry little enzyme does all the work for you and doesn't use any harmful chemicals or toxins to do its job. It is an environmentally-friendly, green solution, to mold remediation.

Unlike biocides and disinfectants, MTR94™ does not leave any residuals behind. Only a fresh, citrus scent is all that remains. The process only takes 24 hours and does not require property destruction, chemicals, or cleaning.

Where did MTR94™ come from?

The enzyme treatment was discovered by a Lab while doing oil tanker cleanups. A second lab and manufacturer developed a version of the product used to clean and treat surgical equipment and surgery rooms in a hospital. It is still a very new product that the public is just now becoming aware of.

How is MTR94™ used?

It takes a day to clean a building with a MTR94™ spraying, cleaning, then fog is released to get into those hard-to-reach places. MTR94™ is fogged throughout the property in areas including the attic, crawlspace, basement, living areas, and HVAC systems. The product is even atomized into walls and other hard to reach spaces where mold can grow in the final steps of the cleaning process.

The MTR94™ seeks out and attacks mold by breaking down and digesting the mold. And the MTR94™ survives as long as there is mold to eat. So as long as there is any mold, there is MTR94™ eating it. If there is no mold, there will no longer be any MTR94™. Once all the mold is consumed, the MTR94™ enzyme breaks down and dies as well, leaving behind a fresh clean aroma.
Myth: “MTR94™ is a Chemical Fungicide”

MTR94™ cleans mold as a spray or a fog, just like many chemical fungicides. For this reason, the unknowing observer might see them as same thing. But it is important to understand that they are fundamentally different.

Fungicides are chemicals. MTR94™ is organic. Fungicides are manmade. MTR94™ is natural. Think about it – mold is a natural problem, so shouldn’t it require a natural solution?
Will MTR94™ damage my property?

There is a common concern - if MTR94™ eats mold, what other objects is it going to eat as well? The answer - not much.

Although specifically designed to target mold, the MTR94™ enzyme can eat bacteria, viruses and dust mites. Flat surfaces and furniture are covered with plastic sheeting to keep excess fog disbursements off furniture.

A few objects that require bacteria, such as oil paintings, leather furniture, and certain plants, should be removed, or safely concealed. It won't degrade, damage, or ruin anything else it comes into contact with.

The fact is MTR94™ saves more of your property than any other remediation method.

MTR94™ is so thorough in removing mold, even from porous materials and fabrics, that it saves more compromised material than any other remediation method available. A lot of mold-infected property that would ordinarily have to be thrown away can now be salvaged.

Since MTR94™ is in the form of a fog that seeks out and destroys mold, it eliminates the need for a lot of the manual deconstruction and reconstruction required to reach the hidden mold when using biocides and chemicals. There is no need to rip out walls and tear up carpet to access the mold for removal. Why do all this work when the enzyme will do it for you?
What does MTR94® leave behind?

Once the MTR94® biodegrades the mold, upon dying, it leaves behind an invisible, organic-based "barrier" on a surface area. This microbial coating helps to retard future mold growth. If the area experiences reoccurring moisture exposures, the coating may need to be reapplied after a year. Be sure to ask your remediation providers if their plan includes annual maintenance and evaluation for moisture intrusion. Also, paint adheres to the barrier so you won't have any difficulty if you choose to repaint later.

Workflow Interruption

So you run a company in an office building and you’ve been convinced that you need to get rid of the mold. You're ready to pay the cost of remediation, but before you do you should consider the lost revenue that will result from the interruption in your workflow. Ask yourself these questions:

- For how long must the office building be evacuated for remediation?
- How much money will the company lose by the interrupted workflow?
- What deconstruction must take place during remediation?
- How long will it take to reconstruct?
- How long will residual chemicals from fungicides affect your employees?

Actually, since MTR94® isn’t hazardous to humans or pets, you don’t even have to vacate the office at all. It is safe for employees to be present during the treatment, but it might not be convenient.

Going with a remediation company that uses MTR94® is probably a good idea for office managers who must consider these questions. Remediation can be complete within 24 hours, deconstruction is minimal, and there aren’t any residual chemicals because MTR94® is not a chemical.
Is MTR94® safe?

Releasing a foreign enzyme into occupied space may sound risky, but MTR94® wasn't introduced as a product until it was approved with rigorous safety testing. It took years of testing before MTR94® was allowed on the market.

MTR94® is breathable, even edible! It isn't hazardous to the environment, flammable, or dangerous in any other way. Since MTR94® poses no threat to humans or pets; you do not even need to leave the room when it is applied. The only reason to use protective gear at all is because of the mold that you are dealing with.

Who is using MTR94®

The environmentally friendly enzymes are gaining favor from the government and scientific community. The Department of Housing and Urban Development is recommending enzyme treatment as the only method for mold remediation.

The client list is growing. It has already been used to help Habitat for Humanity, County Disaster Relief Agencies, commercial owners, insurance companies, schools, property managers, hospitals, child day care centers, condo associations, homeowners, etc.

When a volatile organic compound test was performed on MTR94® and it was found to be safe for humans and pets.

MTR94® passed Environmental toxicology tests.

The enzymes used in MTR94® have been approved by the FDA and appear on the GRAS (Generally Regarded as Safe) list.

MTR94® is 100% natural, 100% organic, and non-toxic.
Why I haven’t of heard MTR94® before?

You’re probably asking yourself, if MTR94® is so great then why haven’t I heard of it before?

MTR94® was developed in 2008 and is still a very new product. It is one of only few worldwide enzyme manufacturers. They discovered the enzyme would work to digest or bio-degrade mold after years of selling the product in the medical industry to clean surgical tools and operating rooms. It was only two years ago that it was approved for commercial use with mold. The manufacturer has limited the use of the product to a select few companies with certified staff. For this reason, MTR94™ remains rather exclusive.

The fact is, when a new method is introduced to the public it takes some time for people to kick the old methods that they are used to and embrace the new one. People like to stick with what is familiar to them even if it is obsolete. New things are scary, and people are especially wary of new things that just sound too good to be true — even when they are. It takes time and education to gradually change public awareness. But just by reading this you’re helping solve the problem by educating yourself.

Interesting...Buy Moldy Buildings for Profit!

There are a handful of people who are making a killing in real estate because they know the secret of MTR94®. They find properties for sale that have been covered in mold.

Because most people think it would be too expensive or impossible to remove the mold, they are buying up these properties for dirt cheap. Then, they hire a mold remediation company that utilizes MTR94® to effectively eliminate the mold. They can resell these properties for a huge profit. Sounds like easy money.

Of course, those in the know would like to keep this a secret. But we've just spilled the beans.
So what is the best way to get rid of mold? Obviously, we love the MTR94® enzyme solution. Bleach and ozone are not effective mold killers and are hazardous to your health. Fungicides are usually better, but they aren't as effective or safe for you or the environment as MTR94®.

MTR94® is simply cheaper, faster, safer, and more effective than traditional methods. Frankly, it makes all other methods of remediation obsolete.
Thank you for reading this book, “Understanding Mold.” Dispelling misconceptions and introducing new technologies involves educating people and gradually changing the public awareness. By reading this book, you have helped out in this cause by choosing to become informed yourself. You've made a difference, and now you have the knowledge to properly make decisions on how to live with mold in your life.

Featuring NON-Destructive Remediation!

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