



Mold in Homes: Causes, Investigations, Fixes

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Our Agenda

- **Concerns**
- **Causes**
- **Investigations**
- **Remediation**
- **New Construction in Minnesota**





The Over Riding Issue

- **Mold is Everywhere in Our Environment.**
- **All people are exposed to microbes**
- **Most of the time there is no problem**
- **Some times there is a problem**



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So Why Focus on Mold?

- **Because we can see it**
- **Because we think we understand it**
- **Because it gets good press**



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Health Effects Associated with Mold

- **Allergy Causing Mold**
- **Hypersensitivity Pneumonitis**
- **Pathogenic Fungi (Infectious Disease)**
- **Toxic Fungi**
- **MVOCs**



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Allergies - Type I Immune Reactions

- **Drippy Nose Stuff**
- **"All Fungi are Allergenic" NAS, 1993**
- **10% - 60% of Atopic Individuals show response on Patch Test**
- **Don't get hung up on genera or species**
- **Mild transitory**
- **Common Genera in "higher" concentrations**



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Hypersensitivity Pneumonitis

- **Farmers' Lung**
- **Lung Inflammation from Inhalation of Antigen**
- **Heavy, repeated, continuous exposures**
- **Flu Like Symptoms**



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Pathogenic Fungi

- **Opportunistic**
- **Infect people who are already immunocompromised**
 - **Bone marrow transplants**
 - **Chemotherapy**
 - **HIV**
- **Can be fatal**



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Toxic Fungi

- **This is what we think we're scared of**
- **It is the unusual situation, not the normal situation**
- **It gets good press**
- **Happens far less often than allergens**



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MVOCs

- **This is where we get the odors**
- **Can cause non-specific illness or complaints**



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Microbial Growth

- **Fungi need**

- **Nutrients**
 - Complex Starches , organic matter
- **Temperature**
 - 40°F - 100°F
- **Moisture**
 - This is the only thing we can really address
 - At least we can try



Fungal Environmental Needs

- **We generally can't control temperature or nutrients**
- **We have to be careful with moisture**
 - **Relative humidity**
 - **Water Loss**
 - **House Occupancy**





Water Damage/Mold Assessments

- **Something Failed (causing a leak), Find it**
- **Visual assessment is the most important**
- **Often needed to determine the extent of damage**
- **Used to develop a scope of work**
- **Used to document the loss for the record**



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Where to Look

- **Exterior of Building**
 - **Landscaping**
 - **Siding under dirt**
 - **Poor Slope**
 - **Poor Drainage**
 - **Condition of roof and structure**



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Where to Look

• Inside Building

- Signs of moisture
- Visible mold
- Insects
- Musty Odors



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Where to Look

• Indoors

- Wall cavities
- Under carpets
- Behind baseboard molding
- In the Air Handler
- In the attic



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Testing Procedures

- **Moisture Testing**
- **Mold Testing**



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Moisture Testing

- **Mike Will Spend More Time with This**
- **Find the moisture, that's where the mold is growing**



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Sampling Methods

- **Air**
- **Source**
- **Different Types of Agar Plates**
 - **May not impact decision**



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Data Analysis

- **No standards available to correlate levels with odds of illness**
- **Based on broad judgment of industrial hygiene and laboratory community**
- **Count (CFUs)**
- **Distribution**



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Count (CFUs)

- **Count**

- **Low, borderline, high, very high**
- **separated by orders of magnitude**
- **Shows active growth or secondary sink**
 - **No data/risk correlation**
 - **No statistical treatment of judgment tables**



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Distribution

- **Typical of outdoors**
- **Not typical of outdoors**
- **Indicator Genus and Species**
 - **Indicate elevated water activity or health risks**



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Surface Units

- **CFU/Gram**

- How much of the dirt and dust pulled up is spores

- **CFU/ft²**

- How many spores per area
- Useful for evaluating cleaning effectiveness

- **Initial Sampling**

- Total Counts
 - 7,682,000 CFU/gram
 - 1,223,000 CFU/ft²

- **“Clearance Sampling”**

- Total Counts
 - 455,000 CFU/gram
 - 911 CFU/ CFU/ft²



Air Units

- **CFU/air volume**

- Compare indoors to outdoors
- Indoors should be lower
- Types of fungi should be the same





Age of Mold

- **Can't Really Tell after about 3 weeks**
- **Look for additional evidence**

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What Kind of Evidence?

- **Rusty metal**
- **Rotted wood**
- **Signs of ongoing water**
- **Signs that there have been problems for a long time**

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Remediation

- **The goal of remediation is to remove water damaged materials without spreading microbial contamination to other parts of the house.**
- **No Remediation will be successful if the source of moisture is not eliminated. Mold will always grow again.**



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A Good Remediator

- **Is skilled**
- **Is qualified**
- **Has a good crew**
- **Works well with clients**
- **Is probably expensive**



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Post Remediation Sampling

- **There are no standards**
- **There are no safe/unsafe levels**
- **There are many ways to do it**
- **Be educated and get different opinions**



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In Summary

- **Water Damage Happens**
- **Moisture testing Can Help find the damage**
- **Visual inspection is the best route**



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In Summary

- **Visible microbial growth is not acceptable in indoor environments**
- **Assessments help determine the extent of damage**



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In Summary

- **The age of mold is hard to tell**
- **Look for other evidence**



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In Summary

- **Find the water source**
 - **Fix it**
- **Find the damaged materials**
 - **Remove them**
 - **Clean and seal them**



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