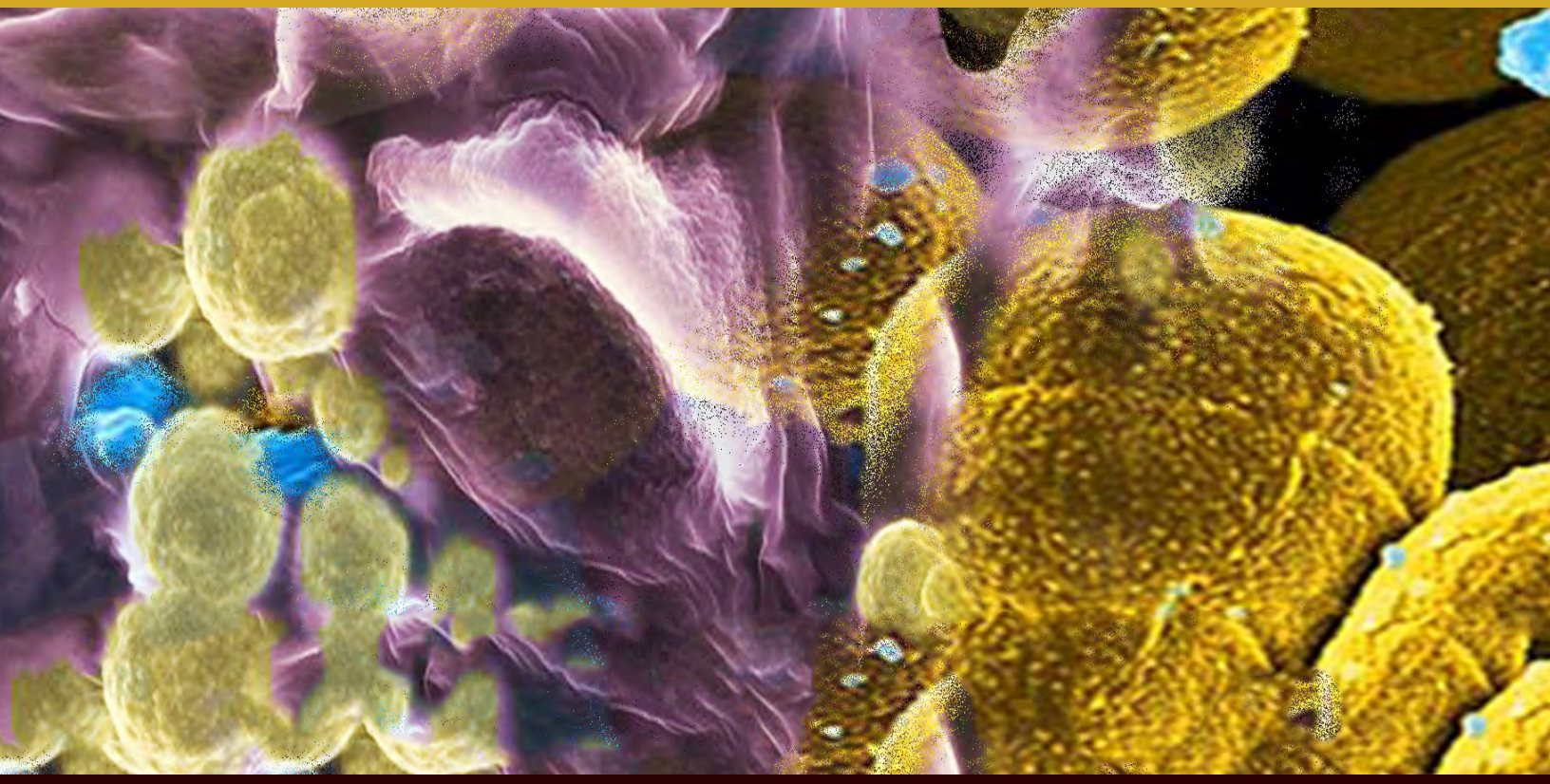
PART 2: WHY MOST ASSESSMENTS FAIL AND PEOPLE STAY SICK

SURVIVING MOLD ILLNESS

Why are so many mold-sensitive patients not getting better?



Gary Rosen, PhD

FIRST EDITION

E-Pub Edition First Printing, 2020.

Published by Kopy Haus Publishing
Ft Lauderdale FL

PREFACE

Within the Surviving Mold and ISEAI communities, focus of both Assessment and Remediation has been on mold-induced illness from Water Damaged Buildings. But when there is obvious water damage, especially where sick people are involved, the leak and resultant damage are generally quickly identified and quickly fixed.

Assessment and Remediation of common water damage problems are not only typically straightforward but also such damage is covered by Home Owners insurance. Therefore easy to hire professionals to properly fix... or is it?

Here we focus on patients not currently living in or perhaps not ever living in obvious water damage homes and yet suffer from what appears to be mold-induced, mold-triggered or mold-aggravated Chronic Inflammatory Response Syndrome (CIRS), as well as from any combination of allergies, asthma, respiratory infections, chronic obstructive pulmonary disease, brain fog, rhinosinusitis, Lyme, dysbiosis, fibromyalgia, autoimmune conditions, chronic fatigue conditions and other triggered Environmental Illnesses.

We note an urgent and growing need to upgrade the quality of education and training for Indoor Environmental Professionals as well as Consumers to include:

i. **The special needs of mold-sensitive occupants with chronic inflammation.**

ii. **Reliable and cost effective Assessment and Remediation procedures for all sources of exposure to hidden mold in not obviously water damaged buildings.**

iii. **Assessment and Remediation procedures for all sources of the many other inflammagens in homes besides mold that include bacteria, viruses, dust mites, micro-particles etc.**

Here we focus on common sense, affordable Assessment/Remediation procedures that not only work the first time but don't involve tearing down all your walls, or selling your house, or throwing out all your possessions.

TABLE OF CONTENTS
Surviving Mold Illness Part 2

INTRODUCTION

Surviving Mold Illness PART 1 RECAP

- In Surviving Mold Illness PART 1 we had focused on pointing out and critiquing problems with Shoemaker's Surviving Mold proprietary **mold remediation** procedures.
- In Shoemaker's Indoor Environmental Professionals Panel of Surviving Mold CONSENSUS STATEMENT (SMCS) they feature/recommend many off-the-wall procedures such as fogging after remediation with a proprietary Glycerin/Borax chemical brew that is actually a serous health hazard.
- No wonder people stay sick. Or even get sicker following such proprietary procedures.
- SMCS has never been Peer Reviewed.
- SMCS has only been reviewed by Surviving Mold Panel Members.

Indoor Environmental Professionals Panel of Surviving Mold CONSENSUS STATEMENT

Medically sound investigation and remediation of water damaged Buildings in cases of CIRS-WDB

Larry Schwartz CIEC, BSME, MBA, Greg Weatherman CMC, Michael Schrantz CIEC, CMI, BPI-BA/EP, Will Spates CIAQP, CIEC, Jeff Charlton, ACIEC, AACIEH, Keith Berndtson MD, Ritchie Shoemaker MD

Internal review performed by The Professionals Panel of www.survivingmold com

Surviving Mold Illness PART 2

According to Surviving Mold: CIRS illness is not an allergy. It is an inflammation within the body caused by an immune system that has gone haywire. The term "mold illness" is a subcategory of biotoxin illness called Chronic Inflammatory Response Syndrome (CIRS). The proper definition of CIRS is:

"An acute and chronic, systemic inflammatory response syndrome acquired following exposure to the interior environment of a **water-damaged building with resident toxigenic organisms, including, but not limited to fungi,** bacteria, actinomycetes and mycobacteria as well as inflammagens such as endotoxins, beta glucans, hemolysins, proteinases, mannans and possibly spirocyclic drimanes; as well as volatile organic compounds.

Key phrases here: Water-Damaged Building. Toxigenic Organisms Not Limited to Fungi.

We call such "Toxigenic Organisms Not Limited to Fungi" MMIs — Moisture-Induced Microbial Inflammagens. (We would include dust mites and their feces to this list.)

- In Surviving Mold Illness PART 2 Why Most **Assessments** Fail and People Stay Sick, we are not focused on finding/assessing this group of irritants/ problems (MOLD/MMIs) in obviously Water-Damaged Buildings.
- That is generally easy to do. Find the moisture/ find the Mold/MMIs. Then fix/ remediate.

In PART 2, the focus is on Assessing homes with no apparent water damage, but the homes are making the client irritated/ill.

- Besides the client, most other people have no ill effects when in these homes. And because of this, in many cases the client is considered to be nuts … making it up.

- In these homes, the measured level of mold spores (mold/ mold toxin exposure) in the indoor air is generally much lower than outdoor mold spore counts (where clients do not get sick.) This serves as confirmation that the client must be nuts. There is nothing there.
- Let us assume that the client is not nuts. Since the levels of mold spores inside the home are generally lower than the outside but clients are getting sick only inside and not outside, we therefore find it is reasonable to conclude, as has Surviving Mold, that it is not only mold spores in the indoor air but always a combination of mold spores and other indoor MMIs that cause or exacerbate CIRS.
- These MMIs are invisible to traditional mold air sampling (spore trap testing).
- And these MMIs are also not in any way detected by Shoemaker's HERTSMI-2 testing.

We ask: If the cause of CIRS in the indoor environment is not limited to fungi/mold, why the Surviving Mold exclusive focus on testing homes with HERTSMI-2 that is limited to testing for mold?

It is our belief, that one of, if not the major reason why so many Chronic Inflammatory Response Syndrome (CIRS) patients are not getting better with proper medical treatment is the over-reliance on Shoemaker's proprietary HERTSMI-2 mold assessment procedure.

HERTSMI-2 is not only of no value in assessing non-mold related MMIs but is also:

- Not especially effective for Initial Mold Assessment — finding hidden mold that is causing a significant amount of exposure to mold toxins that is often if not usually hidden inside the always wet/ always dirty AC and Ducting (HVAC) that is constantly spewing out not only mold but MMIs.
- Not at all effective for Post Remediation Verification — determining remediation success… determining that all sources of significant inflammagen exposure have been eliminated.

In Part 2, we explain why HERTSMI-2 is not an effective assessment tool. And what can be done about it. We explain: Why Most Assessments Fail and People Stay Sick.

www.survivingmold.com

HERTSMI-2 Scoring System Surviving Mold

Dust mites can live on mold and mold spores.

Mold spores being release form the mold body.

Range of toxins, inflammagens, and microbes found in WDBs		
Mycotoxins	Gram-negative bacteria	Hemolysins
bioaerosols	Gram-positive bacteria	Proteinases
Cell fragments	Actinomycetes	Chitinases
cell wall components	Nocardia	Siderophores
Hyphal framents	Mycobacteria	Microbial VOCs
Conidia	Protozoa	Building material VOCs
Beta Glucans	Chalamydia	Coarse particulates
Mannans	Mycoplasma	Fine particulates
Spirocyclic drimanes	Endotoxins	Ultafine particulates
Inorganic xenobiotics	Lipopoysaccharides	Nano-sized particulates

- Shoemaker's table above from SMCS page 4, lists 30 inflammagens in WDB (water damaged buildings) that cause or exacerbate CIRS. Most are microbial in nature.
- We call these Moisture-Induced Microbial Inflammagens (MMIs).
- And we would add dust mites and their feces. Dust mites feed on mold.
- Keep in mind that none of these MMIs are tested by Shoemaker's HERTSMI-2 DNA analysis procedure which is strictly for testing mold in surface dusts. (Does NOT test the air for mold or test for any inflammagens besides mold.)
- (Actually, strictly speaking, HERTSMI-2 does not test for "mold" in surface dusts … only tests for a very small number (5) of different mold species. So it tests for a few types of mold in surface dusts.)
- In what wet area does Mold, Dust Mites and Shoemaker's listed Moisture-Induced Microbial Inflammagens (MMIs) grow/flourish … and can/will always result in significant exposure (breathing them in)?

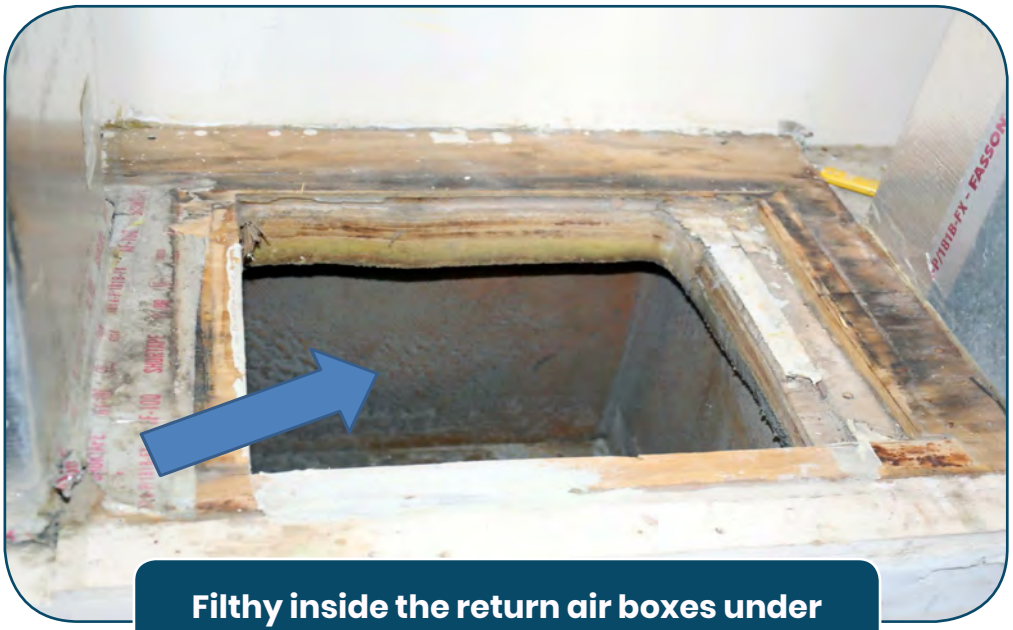
Only inside the always moist and always dirty HVAC System that is releasing these toxins, inflammagens and microbes into the indoor air 24/7.

Let's Look Inside An AC In A Visually Perfectly Clean Home

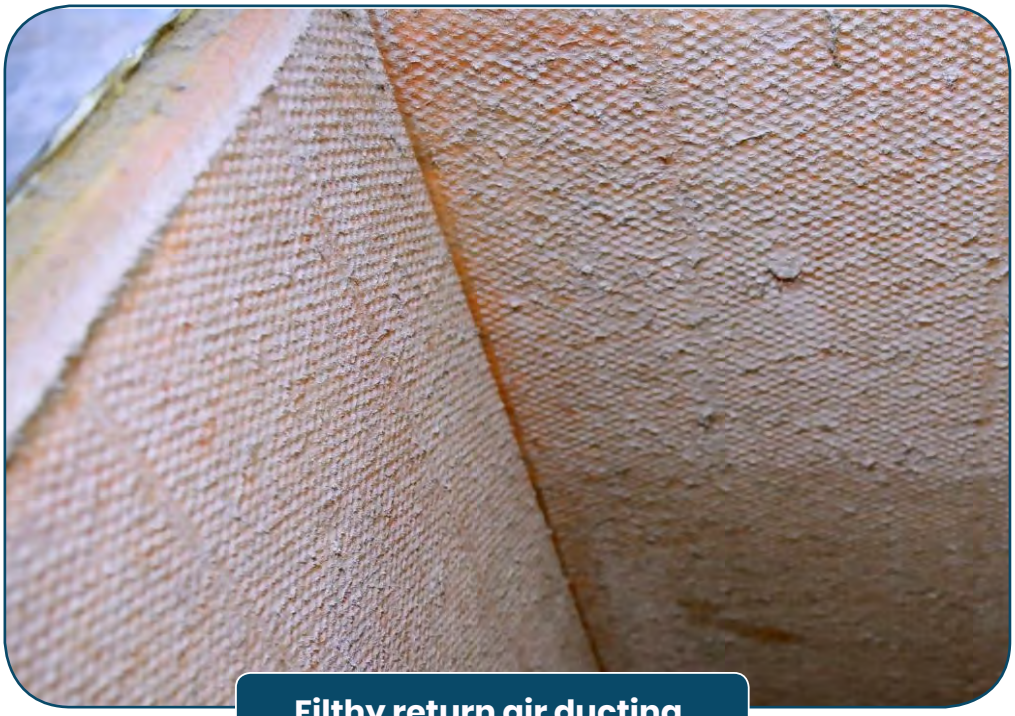
Hard to believe that the AC contractor left a filthy air filter hidden inside machine.

Black mold in supply plenum. Outside looks perfect.

Let's Look Inside An AC In A Visually Perfectly Clean Home



Filthy inside the return air boxes under brand new ACs. Outside looks perfect.



Filthy return air ducting.

A professional visual + moisture inspection of the entire home using moisture meters/ infrared cameras as well as an intrusive inspection inside the AC, ducting, and AC closet is the only way to find sources of significant (illness promoting) exposure to not only mold but also other MMIs that are always found in dirty HVAC systems.

Do not think you can simply take a few HERTSMI-2 dust samples and make any useful determination about sources of illness.

And we will so prove.

Beyond Mold Related Symptoms So Better Fix The Mold Problems RIGHT

Many other conditions may not be caused by Mold Toxins but can be exacerbated by them:

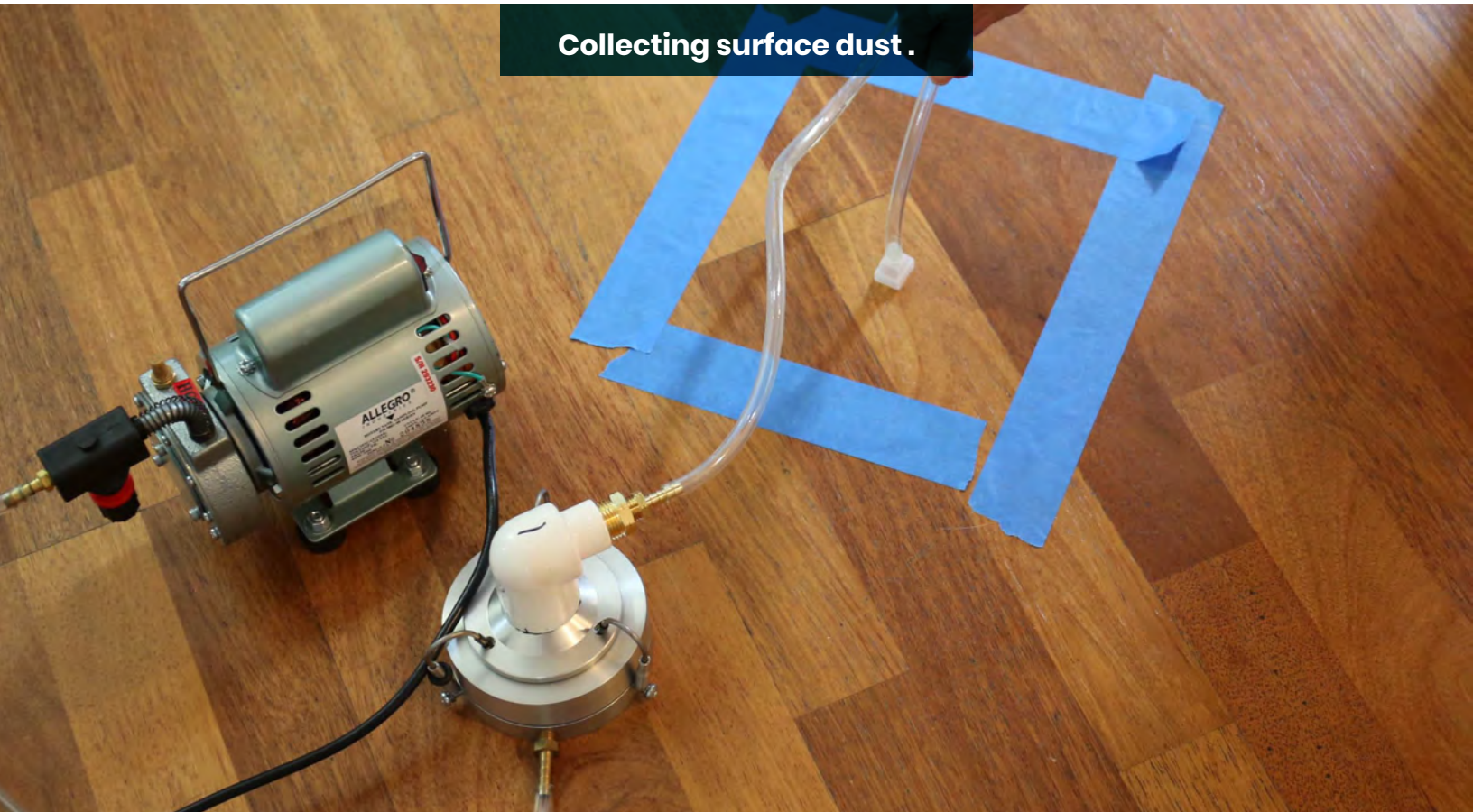
- Lyme Disease
- Babesia and other co-infections
- Multiple Chemical Sensitivity (MCS)
- Irritable Bowel Syndrome (IBS)
- Mast Cell Activation Syndrome (MCAS)
- Small Intestinal Bacterial Overgrowth (SIBO)
- Pediatric Acute-onset Neuropsychiatric Syndrome (PANS)
- Pediatric Autoimmune Neuropsychiatric Disorder Associated with Streptococcal Infections (PANDAS)
- Amyotrophic Lateral Sclerosis (ALS)
- Alzheimer's Disease (AD)

And many other conditions have been speculated to be caused or exacerbated by Mold Toxins including:

1. Childhood ADHD
2. Obesity and many others ....

Yes, Dr. Ritchie Shoemaker ...

1. Yes, Shoemaker essentially invented modern treatment of mold related illness.
2. But he has no formal training nor practical experience in mold assessment, mold remediation, building construction or HVAC Systems.
3. So keep an open mind ...
4. **If you have mold toxin related symptoms and you are going broke on mold assessment and remediation that don't appear to work .... you owe it to yourself to read this series.**



Collecting surface dust .

FREE Consulting A $75 Value For Only The Cost of This E-Book

- With the purchase of this E-Book you get 15 minutes of FREE telephone consulting to:
  - Answer questions about the material in this Book.
  - Provide second opinion on remediation plans and lab results interpretation.
  - Explain how to perform your own testing.
  - Perform virtual inspections to assess property for microbial contamination and answer general questions about all parts of the investigation and remediation process.

FREE Consulting

- **For SE Florida / Europe:**
  - Contact Linda Rosen (linda@mold-free.org) to set up telephone consulting with Dr. Rosen, book author.
- **For the rest of the US and other international:**
  - Contact Scott Armour at www.armourappliedscience.com

DNA TESTING OVERVIEW

ERMI vs HERTSMI-2

- EPA's ERMI tests, using DNA methodology, for 26 species of the most commonly found water damage indicator molds. On the other hand:
  - Shoemaker's proprietary HERTSMI-2 tests for only 5 mold species and therefore cannot detect the vast majority of water damage indicator molds.
  - And surprisingly, Shoemaker's proprietary HERTSMI-2 does not test for the most common water damage indicator mold Penicillium.

EPA
United States
Environmental Protection
Agency

Mold DNA Dust Testing Not a Measure of EXPOSURE

- Most people that are sick from Environmental Illness (mold or otherwise) are not living in obviously water damaged and moldy homes.
- When there is an obvious problem, people fix the problem.
- Mold/MMI problems are often hidden. Shoemaker's proprietary HERTSMI-2 testing for mold in isolated pockets of surface dust (as they recommend) will not identify any sources of current significant mold exposure problems.
- It only tests for mold in settled dust. Not for airborne mold such as mold and mold fragments released by the HVAC system that always causes **significant exposure.**

Mold DNA Dust Testing Not a Measure of SIGNIFICANT EXPOSURE

- We emphasize the term "significant exposure."
- We need to know the source of significant mold exposure for the purpose of remediation. There is always some mold inside of walls or attics. Even large amounts of mold behind walls or ceilings generally does not represent significant exposure so long as the leak/moisture source is fixed and the mold is no longer active.
- But even small amounts of mold inside the always moist interior of the AC and/or ducting (especially in combination with other MMIs always found there) can represent overwhelming exposure for a mold sensitive person.
- For a mold assessment we are interested in:

  a.) Determining if there is significant mold exposure (mold in the air) and

  b.) If so, where its source is located so we can remediate it.

- **Shoemaker's HERTSMI-2 dust testing is of NO VALUE for either.**

- It is mold in the air that represents significant exposure and not mold in surface dust.
- Again, most mold exposure problems from homes that do not have current obvious mold and water damage problems are from contaminated HVAC systems.
- **Shoemaker's HERTSMI-2 testing for mold in surface dust is of no value in finding the #1 cause of significant mold exposure which is contaminated HVAC Systems.**

Contaminated AC coils

If Mold In Dust. Then Clean Dust.

- Testing (using Shoemaker's HERTSMI-2) for mold in isolated pockets of dust throughout the home allows you to conclude only one thing ...that there is mold in old surface dust.
- Which there always is, since dust is partially composed of mold and mold fragments.
- **If mold is in dust, then clean dust. Eliminate mold exposure from dust. No professional mold remediation needed.**

Dust Testing Massively Over-Estimates Exposure

- Dust testing for mold over-estimates mold exposure by approximately 100x according to research featured by the US Department of Housing and Urban Development*.
- Testing dust for mold and then equating that to exposure (causing Mold-Induced CIRS) is a proven Red Herring.

*http://healthyhousingsolutions.com/wp-content/uploads/2014/12/ HUD_Mold_Paper_Final_11-20-12.pdf

Shoemaker/SMCS dust testing does not focus on determining and fixing the actual source of significant Mold exposure or other Moisture-Induced Microbial Inflammagen (MMI) exposure (bacteria, viruses, dust mites, mold fragments etc.) in clean/ not water damaged homes, which again is always (or almost always) the HVAC System.

As a result, it finds Red Herrings. Mold in isolated pockets of 10 to 20 year old dust.

- Shoemaker HERTSMI-2 finds Red Herrings ... mold in pockets of isolated dust.
- As result ... start ripping out walls, cabinets, throwing out books ... doing everything that is guaranteed to not eliminate or even reduce significant Mold/MMI **exposure**.
- Doing everything that costs a lot of money.
- Absolutely no wonder so many CIRS patients are not getting better, **and going broke**.

No Wonder ...

- No wonder people being treated for CIRS that follow Shoemaker's Proprietary Assessment and Remediation procedures are

Shoemaker's HERTSMI-2
A Failed Assessment Procedure

- In Surviving Mold Illness Part 2, we explain in detail why the Shoemaker HERTSMI-2 is a failed procedure in terms of:

  a. HERTSMI-2 for initial assessments, fails at finding significant mold toxin exposure problems (always airborne) so they can be remediated.

  b. Shoemaker's HERTSMI-2 testing for mold in surface dust is of no value in finding the #1 cause of significant mold and/or MMI exposure which is contaminated (always wet) HVAC Systems.

  c. HERTSMI-2 for post remediation assessments, has no value for proving if remediation work has been effective or not at eliminating mold toxin exposure.

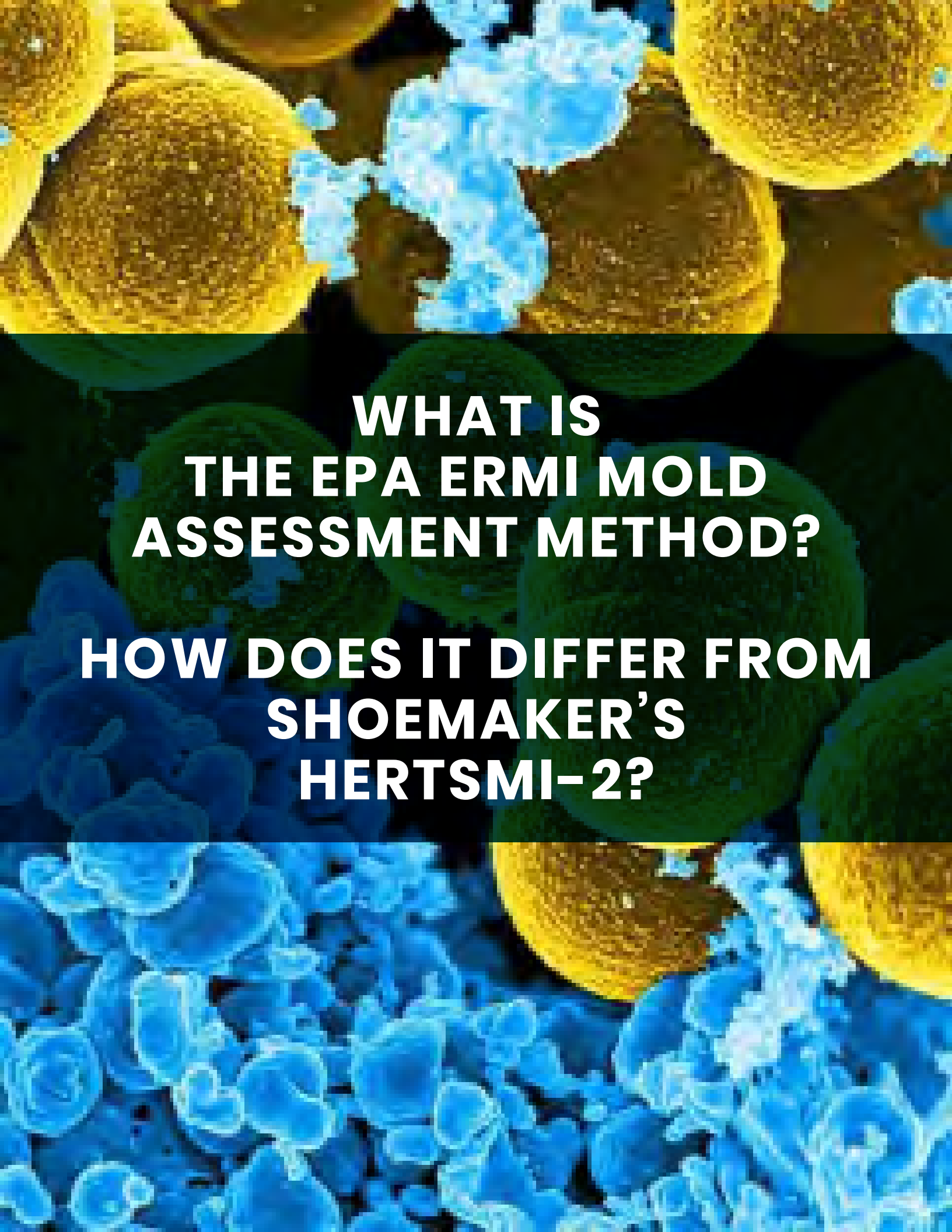
Surviving Mold Illness PART 3

- In Surviving Mold Illness Part 3 coming up next, we will review 3 case studies that prove beyond a shadow of a doubt (you be the judge) the following:

  a. Experimental proof that significant exposure from hidden mold in dirty AC/ducting is not detected by Shoemaker's HERTSMI-2 surface dust testing.

  b. The importance of a super clean HVAC system to those irritated not only by Mold Toxins but also other Moisture-Induced Microbial Inflammagens (MMIs) such as bacteria, mold fragments, glucans, viruses, dust mites etc.

Dust mite



WHAT IS THE EPA ERMI MOLD ASSESSMENT METHOD?

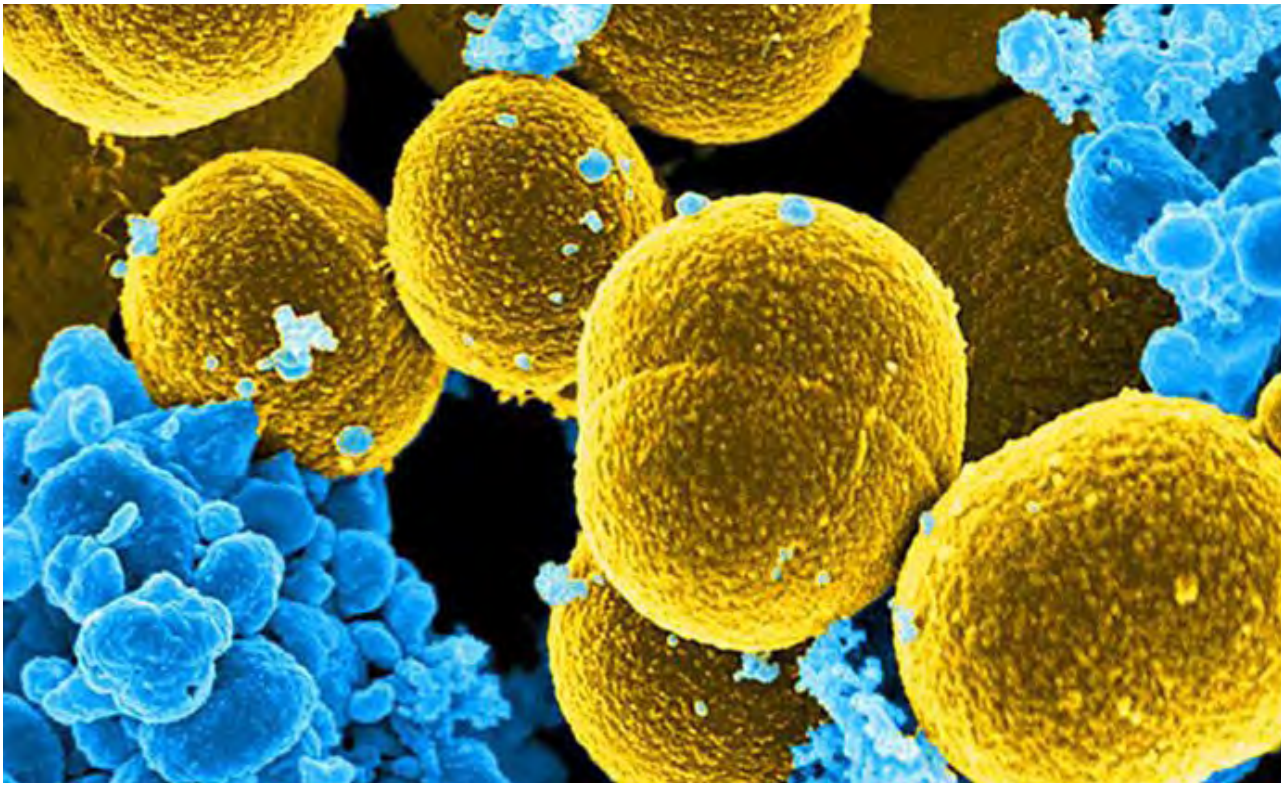
HOW DOES IT DIFFER FROM SHOEMAKER'S HERTSMI-2?

HERTSMI-2 Uses the Same EPA-Developed DNA Analysis Method as ERMI

- While HERTSMI-2 uses the same EPA-developed mold DNA analysis method [PCR] as does the industry standard EPA's ERMI...
- HERTSMI-2 is not in any other way similar to ERMI.
- Shoemaker's HERTSMI-2 is promoted as a cost-reduced, improved, simplified version of ERMI, optimized as the best predictor of CIRS.
- And we will prove otherwise.
- But before comparing Shoemaker's HERTSMI-2 to EPA's ERMI we need to ask: What is ERMI?
- EPA scientists developed the DNA-based Environmental Relative Moldiness Index (ERMI) as an improved method for the assessment of indoor mold over traditional, non-DNA procedures such as spore traps or surface swabs analyzed by direct microscopic examination (DME).
- And it certainly is. DNA-based mold analysis has many benefits versus microscopic analysis.
- Though by no means has it replaced, or will it ever replace, the much lower cost traditional DME based methods.

EPA's ERMI Test Panel Defined

- The EPA's ERMI consists of testing for 36 molds, broken down into two groups:
  - **Group 1:** 26 species of molds that represent the species most associated with water damaged and/or elevated indoor humidity environments,
  - **Group 2:** 10 species that are considered common molds in homes that come from the outside air. These are neither water-damage indicators nor the result of elevated indoor humidity.
- The ratio of Group 1 to Group 2 can be used to classify an indoor environment as having elevated levels of water damage indictors or not.
- Elevated levels of Group 1 (water damage indicator molds) vs Group 2 molds means that there (likely) is/has been previous water damage in the home.
- When Group 1 is not elevated vs Group 2, there is no indication of elevated water damage molds in the test samples.



EPA's ERMI Tests
Surface Dust and/or AIR

- EPA's ERMI was designed for, and is applied to, testing both:
  - Indoor air, in which case the air sampling is a measure of current exposure as it is only mold in the air, mold that is being breathed, that results in actual mold exposure. And ...
  - Indoor surface dust that represents what is termed a "history of water damage", and not current exposure.
- Dust for the original EPA ERMI national study was collected by vacuuming a carpeted area three feet by six feet in the living room and bedroom for 5 minutes with a dust sampler-fitted vacuum. See pictures below of dust sampling vacuum attachments. Sampling is easy to do!

- ERMI: both the collection locations and the size of collection areas are defined/standardized.
- Defining/standardizing collection procedures allows comparison between homes of what is considered a "history of water damage". The higher the ERMI value the more likely a water damaged home.

Heavy duty air sampling pump for ERMI air testing.

- The EPA's ERMI air sampling procedure is also easy.
- ERMI air samples can be taken over many hours versus a few minutes for traditional air sampling (spore traps).
- Otherwise sampling is no different from the traditional spore trap air sampling procedure.
- Attach appropriate cartridge to pump. Turn on pump. Take air sample. Turn off pump. Remove cartridge and send to lab.

ERMI Air Collection Cartridge

ERMI Air Sampling
The Importance of Mold Fragments

- **What About Mold Fragments?*** A huge benefit/ improvement with taking ERMI samples over traditional mold sampling is that ERMI DNA-based sampling measures spores plus mold fragments.
- Traditional air and dust sampling measures only spores.
- Mold fragments while they are invisible to traditional spore trap and surface swab sample analysis are a major or perhaps even the major health concern, more so than spores.
- Research has shown that mold fragments are not only more numerous than mold spores, but also more illness-promoting than spores, therefore …
- Traditional sampling will always completely miss what is often the major cause of mold-induced CIRS… mold fragments.
- ERMI DNA analysis does not.

***Gorny et al.** https://www.ncbi.nlm.nih.gov/pmc/articles/PMC126767/

ERMI Air Sampling Collection vs ERMI Dust Sampling

ERMI surface dust sample limitations:

- Shows only a history of earlier water damage;
- Not current exposure; and
- Is not useful at pinpointing the location of current or earlier mold/water damage problems for the purpose of remediation.
- If there is mold in surface dust, you know where the mold is. It is in the dust. Remove/clean the dust and there will be no mold in the dust.

ERMI air sampling has no such limitations:

- ERMI air sampling is a direct measure of the extent of current exposure (mold and mold fragments in the air). Dust sampling is not.
- ERMI air sampling is useful in finding the source of exposure (mold in the air) for the purpose of developing a remediation plan for removal. Dust sampling is not.
- **For these reasons, ERMI air sampling, not dust sampling, is always the preferred sampling method.**

ERMI = Peer Reviewed
ERMI = Scientific Method

ERMI Summary:

- A Peer-Reviewed mold testing procedure.
- Developed by EPA scientists and widely accepted.
- Procedures published in numerous scientific journals.
- Standardized collection and analysis method.
- Extensively and independently tested by the U.S. Housing and Urban Development on a nationwide basis.
- Developed for both surface dust and air sampling.

Shoemaker's HERTSMI-2 On The Other Hand

HERTSMI-2 Summary:

- Not Peer-Reviewed.
- Proprietary and not widely accepted by the professional community.
- Not published in any scientific journals.
- Has no standardized collection method.
- Developed only for surface dust. Not used for air sampling.
- Other than using the same lab procedure (PCR) for analyzing samples, Shoemaker's proprietary HERTSM-2 is not in any way similar to the EPA's ERMI.

HERTSMI-2 = PROPRIETARY. NOT PEER REVIEWED.

Not Peer Reviewed

Indoor Environmental Professionals Panel of Surviving Mold
CONSENSUS STATEMENT

Medically sound investigation and remediation of water-damaged Buildings in cases of CIRS-WDB

Larry Schwartz CIEC, BSME, MBA, Greg Weatherman CMC, Michael Schrantz CIEC, CMI, BPI-BA/EP, Will Spates CIAQP, CIEC, Jeff Charlton, ACIEC, AACIEH, Keith Berndtson MD, Ritchie Shoemaker MD
Internal review performed by The Professionals Panel of www.survivingmold.com

- Shoemaker's Surviving Mold Consensus Statement (SMCS) says: "Internal Peer Review". There is no such thing. This is doublespeak for NO Peer Review.
- Peer Review is the required quality control standard in the industry.
- Peer review involves subjecting the author's work (theory, procedures, experiments, etc.) to the scrutiny of other independent experts in the same field to check its validity, methods, and whether the author's results can be reproduced.
- If a theory/procedure such as SMCS/Shoemaker's HERTSMI-2 has not been Peer-Reviewed by an independent panel of experts...

It Is NOT SCIENCE.

Competing Interests

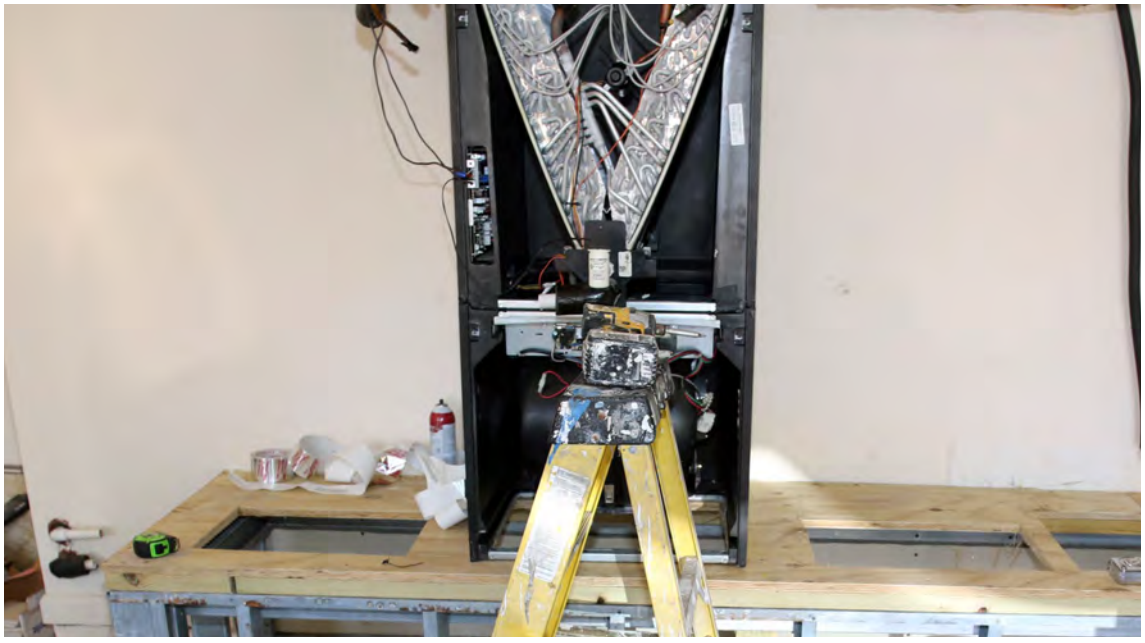
- A cornerstone of Peer Review is independence.
- Which means no Competing Interests.
- What is a competing interest?
- A competing interest is anything that could reasonably be perceived as potentially interfering with the full and objective peer review.
- SMCS was written and reviewed only by members of Surviving Mold that receive leads from Surviving Mold. That is the definition of competing interests.

SMCS IS BASED ON COMPETTING INTERESTS: NOT SCIENCE.

SMCS: Not Science

- No Peer Review.
- Reviewers were not independent.
- Reviewers had/have competing interests (receive leads from Surviving Mold.)
- SMCS/Shoemaker's HERTSMI-2 is ....

NOT SCIENCE.



Rebuilding AC return air box

WHAT DOES HERTSMI-2 MEASURE? DOES NOT MEASURE EXPOSURE.

HERTSMI-2 Best Predictor of CIRS? NO.

"ERMI and HERTSMI-2 dust sampling currently offer the best predictive value for CIRS certified physicians in cases of CIRS-WDB. (SMCS page 8.)"

- HERTSMI-2 is a proprietary DNA-based mold sampling procedure developed by Dr. Ritchie Shoemaker, claimed to be, along with the ERMI, the "best" predictor of CIRS according to Surviving Mold.
- As mentioned, Shoemaker's HERTSMI-2 uses the same DNA analysis method [PCR] as the EPA's ERMI for analyzing samples.
- But otherwise HERTSMI-2 is not in any way similar to ERMI.
- So right off, if ERMI and HERTSMI-2 are so very different from one another, how could they both be the best predictor of mold-induced CIRS as claimed in page 8 of SMCS?
- Hint. HERTSMI-2 is not… as we will prove.

HERTSMI-2 Limited To Surface Dust Sampling. Whereas ERMI is Not

Three major ways HERTSMI-2 technology and procedures differ from ERMI:

1. HERTSMI-2 uses a very small proprietary mold panel (only 5 molds tested for versus 36 with ERMI).
2. HERTSMI-2 is limited to surface dust sampling (not applicable to air sampling).
3. HERTSMI-2 surface dust sampling uses a radically different sample collection method than does ERMI. As a result one cannot in any useful way compare results from one home to another.

HERTSMI-2 does not test for the same set of mold species as ERMI.

- The HERTSMI-2 proprietary mold panel has not been validated in an independent nationwide study as with ERMI.
- HERTSMI-2's limited mold spore panel will be shown to be inadequate for reliably measuring actual mold exposure.

Unlike the EPA's ERMI, the proprietary HERTSMI-2 is limited to surface dust sampling only.

- Not defined for air sampling.
- HERTSMI-2 dust sampling measures only a history of water damage.
- It is not applicable to air sampling that measures actual current exposure, and helps pinpoint hidden sources of mold exposure.

The proprietary HERTSMI-2 dust sample collection method results in BAD DATA

- As a result, when a mold assessment relies on BAD data due to relying on HERTSMI-2 to assess mold exposure…
- Medical practitioners are provided bad data.
- How can medical practitioners properly treat CIRS if they have no idea if they are treating mold-induced CIRS or not? They can't.
- Mold in surface dust: So what!
- When one does a mold inspection in a home of someone with CIRS who is sensitive to/irritated by mold, what exactly are we interested in determining?
- Not simply analyzing mold in (old/isolated) pockets of surface dust.
- And if there is a high level of surface dust with lots of illness promoting mold in the dust … **why not simply clean the dust?**

Breathing Mold (Airborne Mold) Represents Exposure

- Always keep in mind that it is breathing mold (airborne mold & fragments) that represents actual exposure.
- Mold in (old/isolated) pockets of surface dust does not represent current, significant, actual exposure/cause of irritation.
- And if mold in surface dust is a concern … again, clean the floors or discard old carpet and replace with hard flooring.
- When we are concerned that someone's home may be irritating, we need to determine:
    - **The extent of (or lack of) current actual significant mold exposure (airborne mold/mold fragments) not only what's in isolated pockets of surface dust.**
    - **The origin/source, extent and location of such exposure for the purpose of developing a remediation plan to eliminate any and all sources of significant exposure.**
    - **And often as important as finding sources of mold exposure, mold assessment/testing needs to be able to rule out areas that may be considered for remediation but are not significant sources of exposure.**
    - **Why? Because even though some areas may have, or appear to have, some earlier water damage …**
    - **If they do not release significant numbers of mold spores/fragments into the indoor air, and therefore do not represent actual significant exposure… why fix?**
    - **Why fix (pay to fix) something that does not need fixing? Is not causing CIRS symptoms?**
    - **Why chase a red herring by developing remediation plans based on HERTSMI-2 testing of what is perhaps 10-20 year old mold in surface dust? Makes no sense.**

HERTSMI-2 CAN BE DERIVED FROM ERMI

Shoemaker's HERTSMI-2 5-Mold Test Panel

- The HERTSMI-2, 5-mold panel, is a simplification of the EPA's ERMI.
- 5 mold species selected from the 36 in ERMI.
- Shoemaker's HERTSMI-2 panel:
  - *Aspergillus penicilloides*
  - *Aspergillus versicolor*
  - *Chaetomium globosum*
  - *Stachybotrys chartarum*
  - *Wallemia sebi*
- No doubt high levels of any these 5 particularly nasty molds in house dust will be associated with illness when someone sensitive to mold is involved.
- Yes, high levels in a home can predict/cause CIRS.
- But as claimed by SMCS, is this set of 5 mold species the best predictor of CIRS, so that one limits mold assessment to testing using only one method (HERTSMI-2) rather than multiple testing methods, or using the more extensive/more complete ERMI?

Limitations of 5-Mold Test Panel

- Wouldn't you expect, or at least be concerned that there be potential issues/limitations when you test for only 5 mold species versus 36 in the EPA's ERMI?
- Seems like there must be. You are getting only 5/36, 14% of the information.
- Here's one issue...
  - According to a major published study*, the most common water damage indicator molds are from the mold genus/group Penicillium. No Penicillium molds are included with the 5 molds in HERTSMI-2.
  - EPA's ERMI tests for the most popular water damage indicators (Penicillium) but Shoemaker's HERTSMI-2 does not.
- **This means that ERMI can find/rule out mold contamination from the most common water damage molds whereas Shoemaker's HERTSMI-2 cannot.**

***https://aem.asm.org/content/77/12/4180**

Smaller / Simpler Not Necessarily Better

- If the mold in the home is not one of the 5 in the Shoemaker's HERTSMI-2 panel but is in the 36 mold ERMI panel, Shoemaker's HERTSMI-2 will not detect it, but the EPA's ERMI will.
- Can we agree that the smaller/simpler Shoemaker's HERTSMI-2 with only 5 molds versus 36 molds is not necessarily always better/best?

Here's Another Issue With The 5-Mold Panel

- Another issue/limitation of the 5-Mold HERTSMI-2 panel:
  - Two molds in Shoemaker's HERTSMI-2 panel, Chaetomium globosum & Stachybotrys chartarum, produce very heavy/ large spores.
  - The other 3 molds, Aspergillus penicilloides, Aspergillus versicolor, Wallemia sebi, on the other hand, produce smaller, lighter, more aerodynamic spores.
- The heavy, less aerodynamic Chaetomium globosum & Stachybotrys chartarum spores quickly settle out from the indoor air.
- They are much less frequently found in the air than other much lighter mold spores.
- For HERTSMI-2, 2 out of 5 (40%) of the spores are heavy spores not typically found in the air.
- For ERMI it is 2/36 (6%) are heavy.
- For HERTSMI-2, heavy spores that quickly settle out are over-represented compared to ERMI.
- **Sampling settled dust using Shoemaker's HERTSMI-2 5-mold panel with its over weighting of heavy spores is designed to over estimate exposure. Yes. We have a problem with that.**
- **It is a scare tactic.**

Shoemaker's HERTSMI-2 Heavy Spores Over-Represented

- A home's air filtration system (assuming a decent quality air filter) will much more effectively remove lighter weight/more aerodynamic mold spores from the home than less aerodynamic (large/heavy spores) that settle quickly from the air and are mostly found in surface dust.
- Therefore, the AC system will constantly be removing (controlling) the numbers of the lighter/more aerodynamic molds that may be kicked up from dust by activity and/or air flows from fans/or cooling/heating systems.
- A home's air filtration system will in effect concentrate the number of heavy spores in surface dust.
- **Therefore, measuring mold in surface dust with Shoemaker's HERTSMI-2 with its panel composed of a high percentage of heavy spores, as designed, will significantly overestimate mold in the air compared to the EPA's ERMI.**
- **Only mold in the air represents actual significant exposure.**

Best Water Damage Indicators?

So why reduce/simplify the number of molds tested by using Shoemaker's HERTSMI-2 vs EPA's ERMI?

- HERTSMI-2 does not include the most common mold (Penicillium) found in water damaged homes.
- HERTSMI-2 dust sampling, by design, overestimates exposure vs ERMI, due to over-representation of fast settling heavy mold spores (that are 40% of the 5-mold panel.)

Smaller / Simpler Not Necessarily Better

- Why save $150 (about ½ the cost of ERMI) for a panel that tests only 14% of the molds in ERMI?
- Keep in mind that over 99.9% of the mold assessors in the US and throughout the world do not rely on Shoemaker's HERTSMI-2 testing pockets of (old, isolated, never cleaned) surface dust for a mold assessment.
- Is everyone on the planet, except a handful of the Surviving Mold approved Assessors, wrong? Maybe so. But keep an open mind.

HERTSMI-2 IS NOT QUANTITATIVE

HERTSMI-2 Is a Subset of ERMI. HERTSMI-2 Value Can Be Derived

- The HERTSMI-2 5 mold panel is a subset of ERMI.
- If one takes an ERMI, the HERTSMI-2 value can be derived from the ERMI.
- This way you get both values (for the price of 1).
- But what do you get?
- The labs EnviroBiomics or Mycometrics will extract the HERTSMI-2 value from the ERMI data for you.
- When the ERMI tells you one thing and the HERTSMI-2 tells you another, what does that mean?
- See example below of an actual test result with conflicting conclusions between ERMI and HERTSMI-2

ERMI = Q4 High Moldiness Index. Problem When Tested With ERMI.

Environmental Relative Moldiness Index (ERMI)	8.9

Interpretation	Q4

ERMI scoring was developed by the US government for environmental mold safety (mold related asthma) and the score table is a general recommendation.

For the patient with CIRS condition, in general, an ERMI score of 2 or less is considered safe. For more information please consult with your doctor for the best advice on how to interpret the results.

The ERMI interpretation is made for score of 8.9 with reference to the following table:

Level	ERMI Values	Interpretation	Comment
Q1	Less than -4	Low Relative moldiness index	Furthur investigation is not needed to determine the source of the mold.
Q2	-4 to < 0	Low- Medium Relative	Furthur investigation may be needed to determine the sources of the mold if occupants have been reactive, senitized
Q3	0 to <5	Medium - High Relative	
Q4	5 to < 20	High Relative Moldiness Index	Source and cause of mold should be determined and remediaton is undertaken reducing the ERMI to level below Q2.
Q5	> 20	Very High Relative	

HERTSMI-2 = Below 10. No Problems Found With HERTSMI-2

Species	Spore E./ mg	Weighting
Aspergillus penicillicides	86	4
Aspergllus versicolor	24	4
Chaetomium globosum	2	0
Stachybotny chartarum	4	0
Wallemia sebi	31	0
HERTSMI -2 Score =		8

The HERTSMI -2 interpretation of the score of 8 is made with reference to the following table:

HERTSMI-2 No Indication of Problem Below 10	
If 10 or below	In only 1.7% of cases, re-occupancy of building following mold remediation has led to relapse of CIRS-WDB symptoms
If between 11 to 15	Borderline. Further remediation and re-assesment is indicated
If greater than 15	Re-occupancy is ill-advised until further remediation and re assesment are conclusive.

HERTSMI-2 vs. ERMI

- For the actual sample results reproduced on the previous pages...
- ERMI with its set of 36 molds **concludes there is a problem.**
- HERTSMI-2 with its set of 5 molds **concludes** that there is **no problem.**
- They both cannot be right. Is the HERTSMI-2 that eliminates 31 molds from the ERMI panel correct and ERMI wrong? Impossible!
- Shoemaker's HERTSMI-2 is promoted as a cost-reduced, improved, simplified version of ERMI, optimized as the best predictor of CIRS. But ...

HERTSMI-2 due to its limited (5 molds vs 36 molds of ERMI) completely fails as a reliable predictor of CIRS as this data set shows.

Electric air sampling pump

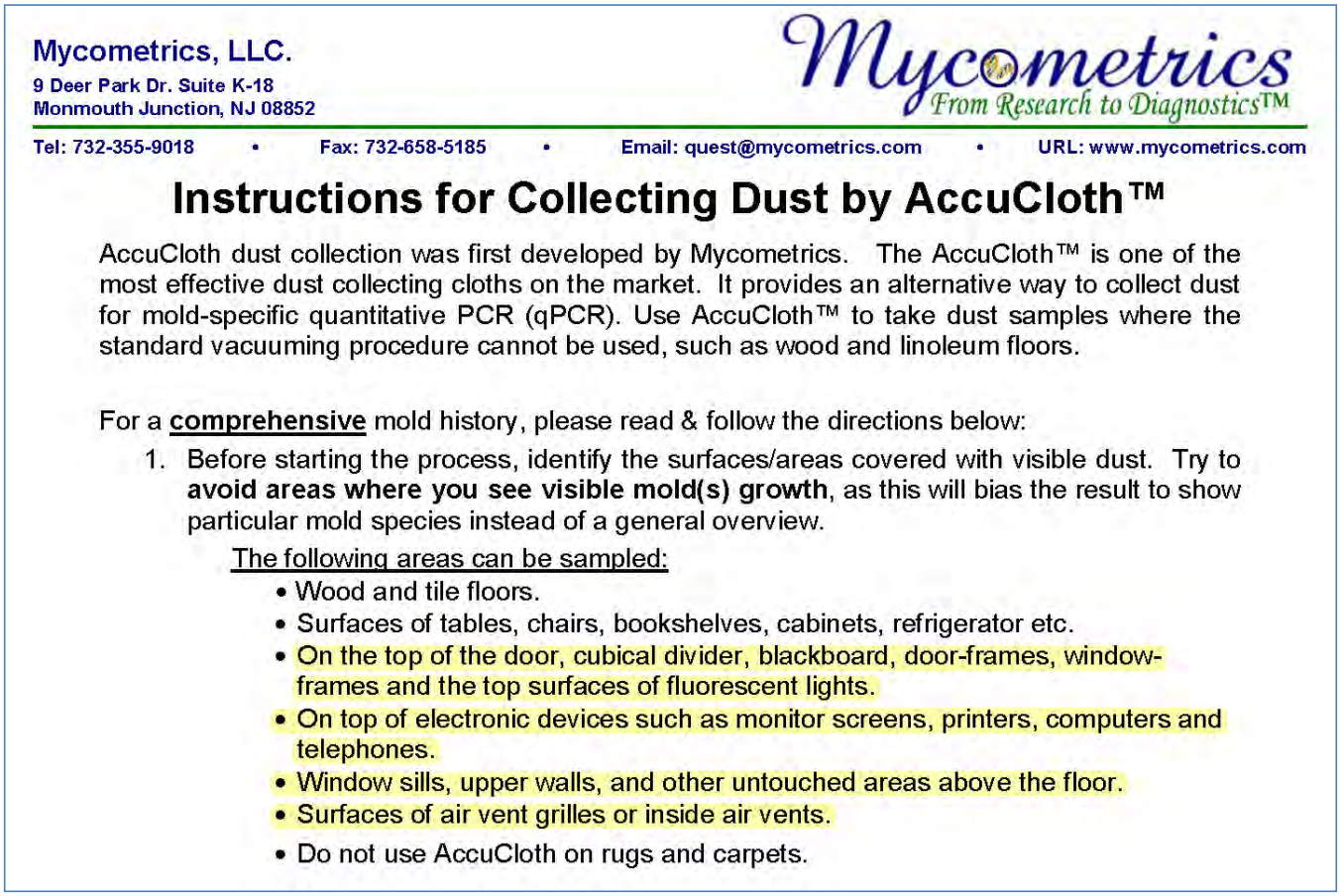
HERTSMI-2 IS LIMITED TO SURFACE SAMPLING

Surface sampling for dust

Location & Extent of Collection Areas

- For the EPA's ERMI, the size of the collection area is defined/standardized (total of 18 sq ft of floor) and includes only representative living areas (living room and bedroom) that would be regularly cleaned.
- For Shoemaker's HERTSMI-2, the collection area (size or location) is not defined/standardized.
- For HERTSMI-2, unlike with ERMI, samples are not limited to areas that are representative of actual (often cleaned) living space.
- For HERTSMI-2 , you take dust samples of old mold/dust, from small isolated areas … the tops of refrigerators, tops of doors … areas that are not routinely cleaned and certainly not considered to be living spaces.
- See Mycometrics instructions that follow.

HERTSMI-2 Collection Method is Not Quantitative.



Mycometrics, LLC.
9 Deer Park Dr. Suite K-18
Monmouth Junction, NJ 08852

Mycometrics
From Research to Diagnostics™

Tel: 732-355-9018 • Fax: 732-658-5185 • Email: quest@mycometrics.com • URL: www.mycometrics.com

Instructions for Collecting Dust by AccuCloth™

AccuCloth dust collection was first developed by Mycometrics. The AccuCloth™ is one of the most effective dust collecting cloths on the market. It provides an alternative way to collect dust for mold-specific quantitative PCR (qPCR). Use AccuCloth™ to take dust samples where the standard vacuuming procedure cannot be used, such as wood and linoleum floors.

For a **comprehensive** mold history, please read & follow the directions below:

1. Before starting the process, identify the surfaces/areas covered with visible dust. Try to **avoid areas where you see visible mold(s) growth**, as this will bias the result to show particular mold species instead of a general overview.

   The following areas can be sampled:

   - Wood and tile floors.
   - Surfaces of tables, chairs, bookshelves, cabinets, refrigerator etc.
   - On the top of the door, cubical divider, blackboard, door-frames, window-frames and the top surfaces of fluorescent lights.
   - On top of electronic devices such as monitor screens, printers, computers and telephones.
   - Window sills, upper walls, and other untouched areas above the floor.
   - Surfaces of air vent grilles or inside air vents.
   - Do not use AccuCloth on rugs and carpets.

HERTSMI-2 Collection Method is Not Quantitive.

2. **Please wear clean gloves** before handling the wiping cloths. Take an AccuCloth out of its plastic bag and rub it on the selected surface(s) to be tested. For multiple surface areas, hold the cloth and rub the first area. The dust should be visible on the cloth. Move to next selected area and rub the dusty surface onto the next clean area of the cloth, and so on. ***Combining basement, garage, or crawl space dusts with upstairs living space samples are strongly discouraged.*** Please collect enough dust samples so that we can see it and retrieve the dust from it (ie. Dark spots covering at least 50% of the cloth).

- For HERTSMI-2 (unlike with ERMI) you take as many wipes of the collection cloth in as many (old/isolated) never cleaned, pockets of surface dust as you like until dark colored dust spots cover at least 50% of the cloth.
- HERTSMI-2's collection method is not quantitative.

ERMI: Standard Collection Area Compared to National Database

- ERMI's standard collection procedure allows you to compare the amount and types of mold found in your home's frequently cleaned living areas (Living Room + Bedroom) with other homes in a national database.
- Unlike with ERMI, there is no way to compare Shoemaker's HERTSMI-2 readings from one home to another because HERTSMI-2 has no standard collection methodology.
- **As a result of the massively flawed, proprietary, collection method:**
  - **Measuring mold in surface dust with Shoemaker's HERTSMI-2, with its collection method that allows you to collect as must dust as you like and not from living areas that are frequently cleaned as with ERMI.... overestimates mold exposure.**
  - **It is a scare tactic.**

HERTSMI-2's Flawed Collection Method. Not Recommended.

- HERTSMI-2 testing is not/never recommended.
- If you want to do DNA-based surface dust testing, use ERMI. (Again, we feel that if there is dust, clean. And then there will be no mold in dust. Testing for mold in dust is of no value.)
- We find, if you are interested in measuring current actual significant mold exposure, do ERMI air sampling rather than surface dust sampling.
- See Appendix A for further explanation by Scott Armour as to why Shoemaker's HERTSMI-2 is not quantitative... a Red Herring:
    - **Why collecting surface mold samples in any number of isolated pockets of dust (in areas not cleaned) that represent less than 0.1% of the living space is not a measure of exposure.**
    - **Why HERTSMI-2 will lead to wrong conclusions and potentially wrong diagnosis/treatments.**

Section Conclusions

- DNA mold testing can be used to test, as we have been discussing:
    - Pockets of **Surface dust** for what is termed a history of water damage (or is this a history of how well a home is cleaned?)
- But DNA mold testing can also be used to test:
    - The indoor **Air** for actual current mold exposure (exposure is from breathing mold and mold fragments.)
- While the EPA's ERMI can be used for both air sampling and surface dust sampling...
- Shoemaker's HERTSMI-2 is defined for testing only surface dust for mold.
- Not defined for air sampling.
- Not defined/used for directly measuring actual current exposure by sampling the air being breathed for mold spores/mold fragments.
- Shoemaker's HERTSMI-2, by having only one method of testing — testing pockets of surface dust for (5 species of) mold — simplifies the collection procedure.

- Yes, for dust testing the homeowner can take their own surface samples and does not need an air sampling pump. Just order a dust collection cloth or use swabs.
- **But why limit (simplify) testing to only testing surface dust when what you really want to know is if there is actual current exposure that can only be determined by sampling the air being breathed?**
- **Makes no sense. Simple is not always better.**
- **In this case, simpler also means not comprehensive, cutting corners, less reliable, imperfect, limiting, incomplete, partial.**
- **All good descriptions of Shoemaker's HERTMSI-2.**

Swabs for collecting dust

HERTSMI-2 & ERMI BOTH HAVE LIMITATIONS

Anderson sampler for viable testing

ERMI & HERTSMI-2 Both Overestimate Irritation

- Mold spores have a limited life span.
- Only viable/live mold spores can germinate/start to grow when they land on wet surfaces such as wet drywall or wet sinus tissue.
- Dead spores do not.
- New/viable/live spores are more irritating than old dead spores because when the live spores try to germinate (start to grow) in the sinuses, they release enzymes to dissolve the sinus membranes. Yes that results in a massive allergy-like response compared to breathing dead spores.
- DNA tests only for total (dead+viable) spores and cannot distinguish old/ dead from new/ viable.

Device for collecting live spores

- DNA testing, as it cannot distinguish the more irritating viable spores from the less irritating dead spores will … therefore always overestimate irritation.
- There should be more to a mold assessment than taking a few DNA samples (either ERMI or HERTSMI-2) that cannot distinguish new from old spores, and as a result overestimates irritation.
- **Viable/culture testing that measures viable spores, can and should be used to augment DNA testing as needed to help identify if there is current/new mold growth, or if the source of the mold spores is old or mostly old.**

SHOEMAKER'S HERTSMI-2 VS. SPORE TRAPS

Shoemaker's HERTSMI-2 vs Spore Traps

- In SMCS, they conclude that HERTSMI-2 is the best predictor of CIRS based on a comparison to Spore Traps.
- Of course that does not make it the best predictor of CIRS, but (perhaps) only a better predictor than Spore Traps.
- But in any event, can one test method be considered better than the other when HERTSMI-2 and Spore Traps measure very different things?
- HERTSMI-2 measures only 5 mold species in old/isolated pockets of (not recently cleaned) surface dust.
- HERTSMI-2 is said to provide a measure of the history of water damage.
- Spore traps test the indoor air for all genus/species of mold spores, and traps are not limited to 5 species of mold as with HERTSMI-2.

Spore traps provide a low cost measure of all (not only 5) species of mold. And spore traps provide a low cost measure of current exposure (mold in the air) and not only mold in surface dust.

Spore trap collection cassette

Shoemaker's HERTSMI-2 VS Spore Traps

- Lab fees for spore trap air sampling are less than 20% of HERTSMI-2.
- Therefore, one can afford to take spore trap samples throughout the entire home.
- Taking low cost spore trap samples in multiple areas throughout the home can help determine cause/origin, extent and location of the source(s) of exposure.
- HERTSMI-2 sampling of one or two isolated pockets of surface dust in a home will not.
- Why limit (simplify) testing to only a few dust samples when such testing will not provide the information needed to measure/determine ...
    - Actual current exposure that can only be determined by sampling the air being breathed.
    - The location of exposure for the purpose of remediation.
- **Simplifying/limiting is not always better.**

Sampling pump for spore trap sampling.

SHOEMAKER'S HERTSMI-2 VS ERMI

HERTSMI-2 IS NOT DESIGNED TO FIND REAL-WORLD COMMON SOURCES OF MOLD EXPOSURE.

HERTSMI-2 For Identifying Water Demaged Homes

- HERTSMI-2 was designed by Shoemaker as a low cost DNA-based mold assessment method for identifying Water Damaged Homes/Buildings (WDBs) in order to predict CIRS-WDB.
- How many CIRS patients that are not getting better with medical treatment are living in actual water damage homes?
- Few to none.
- If there is obvious water damage in a home, medical treatment is a waste of money. Treatment does not work if one is constantly re-exposed.
- When there has been water damage, you find the location and extent of the moisture, find the mold and fix/ remediate the problem.
- Such water damage problems are typically covered by Home Owners insurance.
- So the $$ is there to fix.

HERTSMI-2 For Identifying Water Damaged Homes. Not Humidity

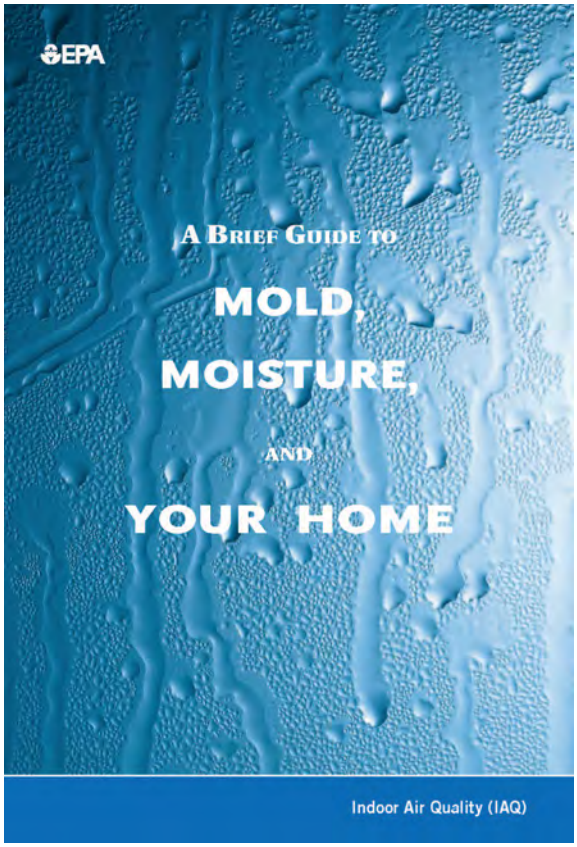
- But molds grow very well in homes that have not been water damaged (not WDBs), but have elevated humidity as the cause of mold growth.
- HERTSMI-2 was designed (the 5 mold species were selected) for identifying water damage homes and resulting mold problems from water damage.
- HERTSMI-2 was not designed and does not do a good job in identifying mold problems as a result of humidity.
- The 5-mold species of HERTSMI-2 selected to find water damage are (of course) species that flourish in water damaged homes (grow on wet drywall, wet cabinets, etc.)
- These 5 are not in any way mold species that grow only from elevated humidity.

Temperature and humidity measuring

- Because CIRS patients are generally not living in water damage homes (and shame on them if they are)...
  - **The major concern/cause of mold-induced CIRS, and why CIRS patients are not getting better is ....**
  - **Mold growth from humidity problems: Hard to find cause/origin, extent and location. Very often hard to fix.**
- **<u>And never found with HERTSMI-2 testing.</u>**
- Often mold growth from humidity problems is throughout the home and not in an isolated water damage area.
- And Home Owner's insurance does not cover remediating mold growth from elevated humidity unless the result of a sudden event such as broken pipe that triggers coverage.
- No money to fix.

Focus On Always Moist/Humid AC Systems

- And where is there always elevated moisture /humidity in a home that is not water damaged?
- The HVAC System.
- Always moist. Always plenty of food for mold (wet dust, dander, skin cells in the AC/ducting).
- And a contaminated HVAC System is not a roof leak, broken pipe, etc.
- Decontamination/remediation of the HVAC System is not covered by Insurance.
- Rarely identified. Usually overlooked. Generally the cause of mold toxin exposure in homes. Not detected by HERTSMI-2.

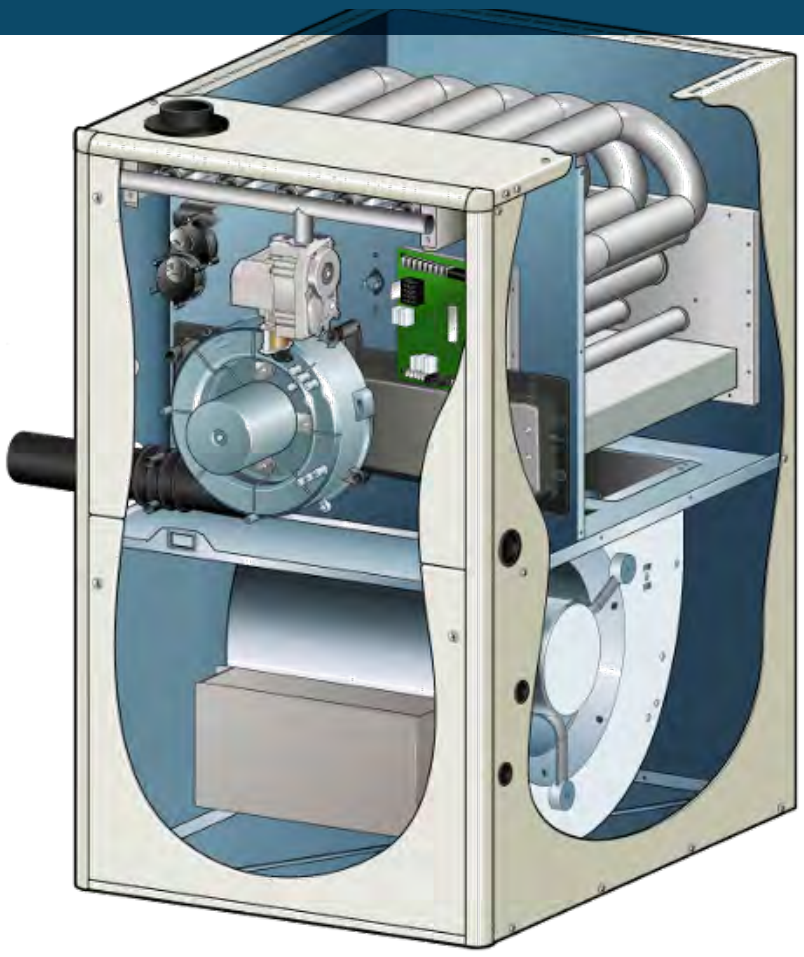


EPA recommends to always check AC/ducting.

Section Summary
Need to Focus on The HVAC System

- **Surviving Mold's proprietary HERTSMI-2 with its focus on finding water damage molds and not molds that result from humidity, misses the actual cause of most sick homes, which is humidity/moisture problems, generally as a result of....**
- **Construction defects or poor maintenance of the HVAC System (AC, plenums, supply and return ducting and AC closets).**

VISUALLY ASSESSING THE HVAC SYSTEM



Mold/MMI Assessment.
Focus On Visual Inspection. Always Check the AC.

- Because mold growth requires moisture …
- Find the moisture to find the mold is the procedure that qualified professional mold assessors use to determine where there is mold growth for the purpose of remediating mold.
- The moisture assessment is performed with the aid of moisture meters and thermal imaging cameras.
- And can usually be performed without or only with limited sampling/testing.

What area in the home is always moist, and always supports a wide range of microbial growth, mold, as well as other **Moisture-Induced Microbial Inflammagens (MMIs) …**

- Such as harmful bacteria, viruses, and mites (none detected with HERTSMI-2, of course) …
- Even when there are no active leaks … even if not a Water Damage Building (WDB)?
- **ONLY the HVAC System.**

HVAC System MUST Be Perfect

- For clients with CIRS one must determine, with 100% certainly, that there is no significant current Mold/MMI exposure.
- Given that, in our experience, at least 95% of the time there is significant current Mold/MMI exposure coming from the HVAC system when running…
- For anyone with CIRS the HVAC System must be perfect.
- Not spewing contaminants/inflammagens into the air.
- So, whatever it takes. If it is not easy, so what?
- Not easy unless you can find the right Team to do the inspection and cleaning/remediation.
- Keep in mind that cleaning the HVAC system, including hard to access areas of the ducting, is far cheaper than ripping out walls, floors, and kitchen cabinets.
- A lot of bang for the buck.

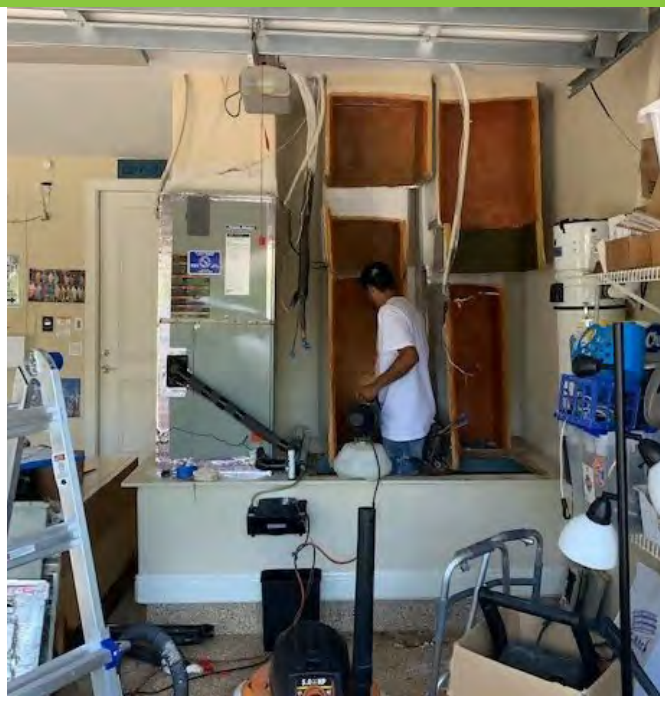
A Dirty HAVC System Emits Toxic Mold Fragments

- Mold, either dead or alive, inside the HVAC system breaks down to highly toxic mold fragments as a result of the high air flow and turbulence within the AC, AC closet and ducting.
- Research has shown that:
  - **There can be up to 500 mold fragments for each mold spore. And …**
  - **Mold fragments are more inflammatory (more toxic) than spores.**
- Therefore, only a small amount of mold/fragments released by the HVAC system always represents major current exposure to a sensitive individual because the mold/fragments are released into the home's air (breathing space.)
- While even a lot of mold, inside of sealed walls/attics represents negligible exposure especially when a good quality AC air filter is used that will clean up such releases.

Any amount of Mold/MMI contamination in the AC/ducting always results in major/significant current exposure for the mold sensitive.

Properly Inspecting or Cleaning HVAC System Requires Disassembly

Cleaning & Sealing HVAC System Components Requires Disassembly



Proper Inspection & Cleaning HVAC Components Requires Disassembly

Cleaning Ducting Properly and Thoroughly. Not Easy!

Ducting cannot be properly cleaned (to "as new") by duct cleaners that charge per register. They are not cleaning the ducting, but only cleaning visible components and then often spraying/ fogging with illness promoting chemicals/deodorizers.

Section Conclusion: Mold In Settled Dust Not The Problem

- Why all the fuss about testing for mold in (old) pockets of settled dust? No idea. Makes no sense.
- Mold in (small/old/isolated) pockets of surface dust generally results in insignificant current exposure unless there is massive clutter and poor housekeeping.
- And then to fix … clean the dust.
- Failure to clean surface dust is NEVER a mold remediation problem.
- On the other hand, there is always at least some amount of significant Mold/ Mold Fragments/MMIs growing on wet dust/dirt inside the HVAC system.
- These inflammagens are always being released from the HVAC system unless brand new or recently completely and properly refurbished.

Section Conclusion : CIRS Patients. HVAC System Must Be "As New"

- As HERTSMI-2 tests only for Mold…
- Many other Moisture-Induced Microbial Inflammagens (MMIs) are always growing and always being released by the AC but are completely invisible to HERTSMI-2 testing.
- But when you visually inspect that the interior of HVAC System is clean of all accumulated dirt/dust, you have in effect tested for the absence of not only Mold but also the absence of all other MMIs.
- **If you have CIRS, take no chances.**
- **Restore the entire HVAC System to "as new" and put a high quality Merv 13 or better air filter on the intake to make sure it stays that way.**
- Next we take a look at what Shoemaker's SMCS says and does not say about testing and cleaning/ remediating the HVAC System.

SMCS ON HVAC ASSESSMENT/CLEANING

Per SMCS: On HVAC Page 7

Phase 1. Inspect and investigate to detect water intrusions, leaks, and/or condensation problems also investigate the HVAC system for potential **cross contamination issues.**

- SMCS's assumption here is that, if there is any mold contamination in the HVAC system, it was caused by **cross-contamination** from another mold source.
- But what about mold problems (and other MMIs) that originate in the HVAC system and not from cross-contamination?
- Such problems in the HVAC system are on the other side of [past] the air filter, and so would always be of major concern to CIRS patients.
- And what is the SMCS procedure for investigating the HVAC for any such contamination?
- Is that by sampling small pockets of (old/isolated) surface dust that represents only a history of earlier water damage problems?
- They do not say. They certainly do not recommend air sampling which is the only suitable method for testing mold in the air from the AC.

Per SMCS: Replace All Ducting (Page 15)

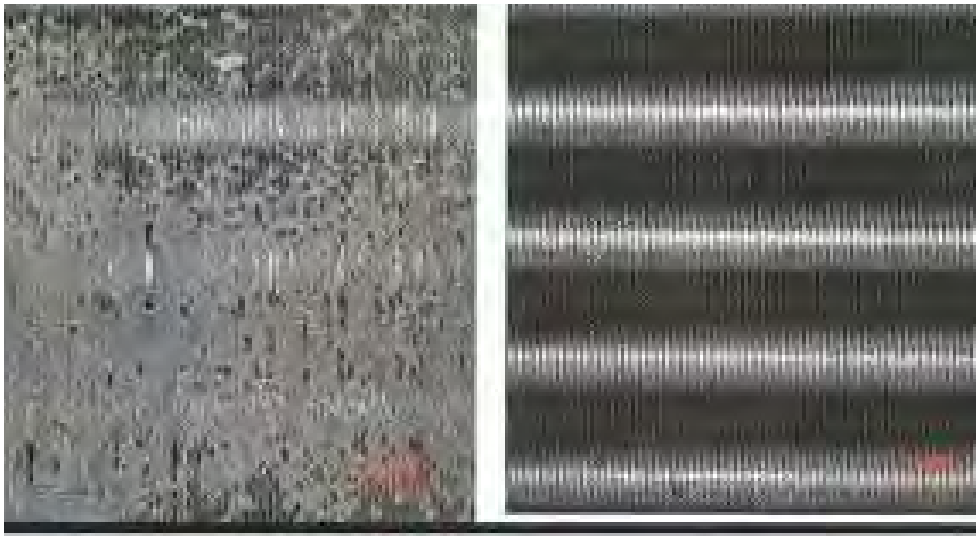
Replace inexpensive flexible ducting or fiberboard junction boxes rather than attempt to clean. Flexible ducting may have folds or wrinkled plastic that makes cleaning **impossible.**

- SMCS says: Replace flex duct or rigid ducting. Do not clean. Duct cleaning is **"impossible"**. That is the word they use.
- They recommend replacing all ducting.
- How was this determined? How were Mold/MMI problems with the HVAC system assessed?
- If the ducting is new, do we replace or clean?

Per SMCS: Duct Cleaning Does Not Work (P. 15)

Duct cleaning according to the National Air Duct Cleaner's Association (NADCA) will **fail to remove particles** measuring 0.5 micrometers and smaller due to a lack of air velocity using the recommendation of their 2013 standard.

- Here SMCS says: National Air Duct Cleaner's Association (NADCA) duct cleaning procedures do not work for small particles.



Dirty Coils **Clean Coils**

Per SMCS: Next Paragraph Replace Ducting Where Accessible

We recommend that flex ducting be **replaced where accessible** since the dust in the plastic wrinkles cannot be cleaned satisfactorily.

- Next paragraph. SMCS recommends that flex ducting be **replaced where accessible** because it cannot be cleaned. But if the ducting is not accessible for cleaning, how would it be accessible for replacement? Not sure SMCS has thought this through.
- Where is the data to support any of this?
- And if it not accessible … why not open ceilings or soffits to thoroughly clean?

Per SMCS: Then Duct Cleaning Is Recommended (Page 23)

HVAC **ducting should be cleaned** according to the National Air Duct Cleaners Association (NADCA) 2013 standard.

- Then on page 23, SMCS contradicts their previous statement on page 15 that NADCA duct cleaning procedures do not work.
- But here they say ducting **should** be cleaned per NADCA standard. Go figure!

Section Conclusions: Assessing HVAC System Is Key

- Since mold spores/fragments hidden in sealed walls or ceilings are contained/ not released and do not typically result in any significant current exposure …
- If there is no visible mold and/or active leaks…
- The only significant source of irritation/ inflammagens is almost always hidden in and coming out of the AC, ducting, or AC closet.
- **A small amount of Mold/MMIs in the AC, ducting or AC closet can result in extensive current exposure.**
- SMCS HERTSMI-2 mold assessment technique is based on testing for historical mold in (old/isolated) pockets of surface dust.
- Not testing the air that would represent current exposure.

- **SMCS HERTSMI-2 assessment protocol is of no value in finding (or fixing) airborne Mold/MMI-related problems coming from the HVAC system, which are always the majority of the Mold/MMI problems in non-obviously water damaged homes.**

Section Conclusions: Yes. Perhaps Hard To Inspect

- No doubt HVAC system, hard to Inspect/Clean.
- But is that a good reason for people to stay sick?
- But is that a good reason to go bankrupt following SMCS procedures that result in tearing apart the walls, ceiling, and floors because there is mold in (old/isolated) pockets of house dust?
- Shoemaker/SMCS: No emphasis on finding and fixing mold contaminated HVAC systems, which are the most common cause of CIRS based on our experience.
- Why? Because a Mold/MMI contaminated HVAC system is not something that can be detected by HERTSMI-2 testing for surface dust on the tops of cabinets or door casings? Rather than note this limitation, what they have done is simply deny that people can get sick from Mold/MMI contaminated HVAC systems and continue to focus on HERTSMI-2 dust testing.
- **If you have CIRS … look for other assessment and remediation options beyond SMCS!**

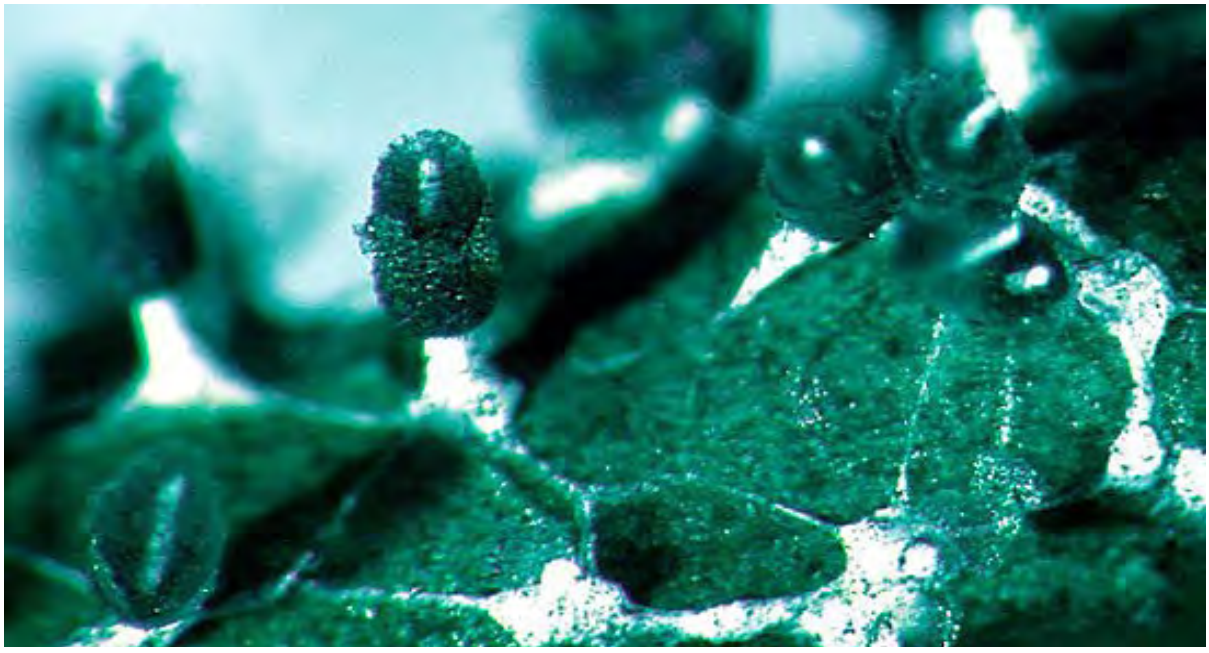
THE IMPORTANCE OF HIGH QUALITY AIR FILTRATION

Mold In Walls/Floor Dusts. No Big Deal. Clean.

- If small amounts of Mold/MMIs are released from properly sealed contaminated walls or aerosolized from a limited amount of (small pockets of) settled dust in an otherwise clean home…
- A high-quality air filter (MERV 13 or better) is all it takes to clean the air and eliminate, significant exposure from such (relatively small) releases…
- As long as the AC and ducting are clean!

Make Your House Self-Healing Use MERV 13 or Better Air Filters

- Filters less than MERV 13/APR2200 will not remove the sub-micron mold fragments that the latest research shows are the major cause of mold-related irritation/illness (CIRS).
- See chart on next page.



% Efficiency of MERV Rated Filters

Use Min MERV 13 for Mold Fragments

MERV Rating	0.3- 1.0 Milcrons	1.0 = 3.0 Milcrons	3.0 -10.0 Milcrons
MERV-1	-	-	<20%
MERV-2	-	-	<20%
MERV-3	-	-	<20%
MERV-4	-	-	<20%
MERV-5	-	-	20% - 34%
MERV-6	-	-	35% - 49%
MERV-7	-	-	50% - 69%
MERV-8	-	-	70% - 85%
MERV-9	-	<50%	>85%
MERV-10	-	50% - 64%	>85%
MERV-11	-	65% - 79%	>85%
MERV-12	-	80% - 89%	>85%
MERV-13	<75%	>90%	>85%
MERV-14	75% - 84%	>90%	>85%
MERV-15	85% - 94%	>90%	>85%

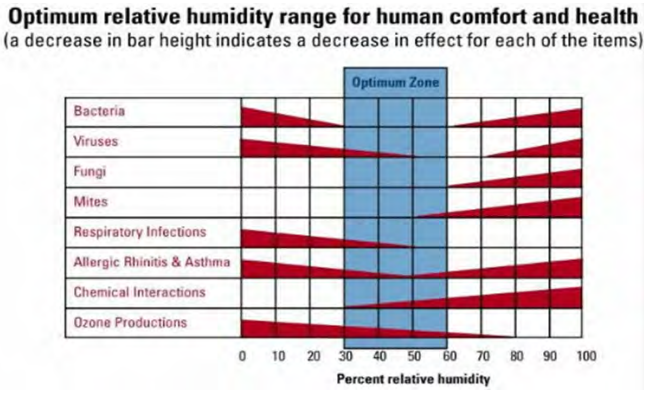
Filters less than MERV 13/APR2200 will not remove highly toxic sub-micron mold fragments.

- In our home we use MERV 13/APR 2200 filters in our air handlers and leave the AC FAN=ON 24/7.
- Yes, constantly running the AC fan has the potential to increase indoor humidity which is BAD.
- But indoor humidity can be controlled.
- So if you are mold sensitive, why not control the indoor humidity and clean the air with at least MERV 13/ APR 2200 rated air filters 24/7?
- Ask your AC contractor how to do that.
- In our home we use two-stage ACs that are designed to control humidity, and they are paired with a thermostat that includes an integrated humidistat to monitor and control humidity.
  - It works well. Controls the humidity.
  - Large whole house dehumidifiers also work well.

- Allows us to run AC FANs 24/7 so we can filter the air 24/7 with MERV 13/APR 2200 air filters without having elevated humidity.

Controlling Humidity Protects Against Infections/ Exposures

- In our home we don't want mold, mites, bacteria, viruses, allergens … none of these in our indoor air.
- We therefore keep the humidity between 50- 55%* and also we keep the ACs and ducting clean.
- We use MERV 13/APR2200 air filters. Leave the AC FAN=ON 24/7 to clean the air 24/7 and to keep the AC and ducting clean and microbial-growth free.



* Comment from reviewer Scott Armour: If the humidity occasionally goes to 65% or even 75% for short periods of time… not to worry. It is prolonged elevated humidity that is the problem.

Mold Outside Comes In And Colonizes AC Systems

- There is lots of mold in the outside air. It comes in when you open doors.
- It will grow in wet AC systems.
- A high quality MERV 13 air filter will protect the ducting from mold contamination.
- Stops mold from colonizing your AC.
- See Table typical Outdoor mold levels (Florida) next page,

Fungi Identified	Typical Outdoor Mold Florida Month: Februray (n=1980)					
	very low	low	med	high	very high	freq %
Acremonium	7	8	12	18	25	2
Alternaria	7	7	12	24	35	14
Aspergillus (total)	7	7	14	35	60	30
Aspergillus niger	5	7	12	24	35	13
Asper sydowii	6	7	12	32	51	2
Aspergillus ustus	-	-	-	-	-	<1
Aspergillus versicolor	7	7	12	25	58	8
Aureobasidium	7	7	12	24	35	14
Basidiomycetestt++	8	14	59	160	370	8
Chaetomium	7	7	12	20	35	2
Cladosporium	12	24	120	440	860	80
Curvularia	-	-	-	-	-	<1
Epicoccum	7	7	13	28	48	12
Fungi w/o identifying traits (total)**	7	12	21	47	71	62
Arthrospore-former	12	20	52	130	250	4
Non-sporulating fungi	7	12	21	36	67	60
Nigrospora	-	-	-	-	-	<1
Paecilomyces	4	7	12	22	35	5
Penicillium	10	12	35	100	180	67
Rhizopus	5	7	11	12	18	3
Stachybotrys chartarum	-	-	-	-	-	<1
Torula	-	-	-	-	-	<1
Ulocladium	7	7	12	18	24	3
Yeasts	7	12	23	47	79	38
§TOTAL CFU/m3						

Always lots of mold outdoor

Keep It Clean. Including HVAC System. Keep It Dry.

- A healthy house is self-healing when the AC and ducting are completely clean and you use:
    - Min MERV 13/APR 2200 air filters with the FAN=ON 24/7 and keeping the humidity low.
- Mold blown in from the outside or coming from the inside of walls, or ceilings through tiny openings will be kept under control.
- Self-healing homes are the key to health. No need to throw out all your books or move to another home.

SMCS On Selection of Air Filters

At the end of a small particle remediation, remove the furnace filter on a forced air system, replacing it with a new one after duct cleaning has been performed following the guidelines of National Association of Duct Cleaners. The filter should be at least a rating of MERV 6 to MERV 8

- SMCS, page 11: They recommend using air filters rated MERV 6 or 8.
- But those poor quality air filters will not remove the vast majority of mold spores.
- Will not remove any of the small Pen/Asp spores.
- And will not remove mold fragments.
- Why recommend cheap air filters that do not work?
- Could it be because members of the SMCS committee sell Air Purifiers which would be of no value at all if the AC/ducting is clean and MERV 13 or better air filters are used? Yes!

Note Of Concern. About Using MERV 13 Air Filters

- MERV 13 air filters are tight and can possibly reduce AC air flow in some situations, especially when dirty.
- Change the air filters frequently.

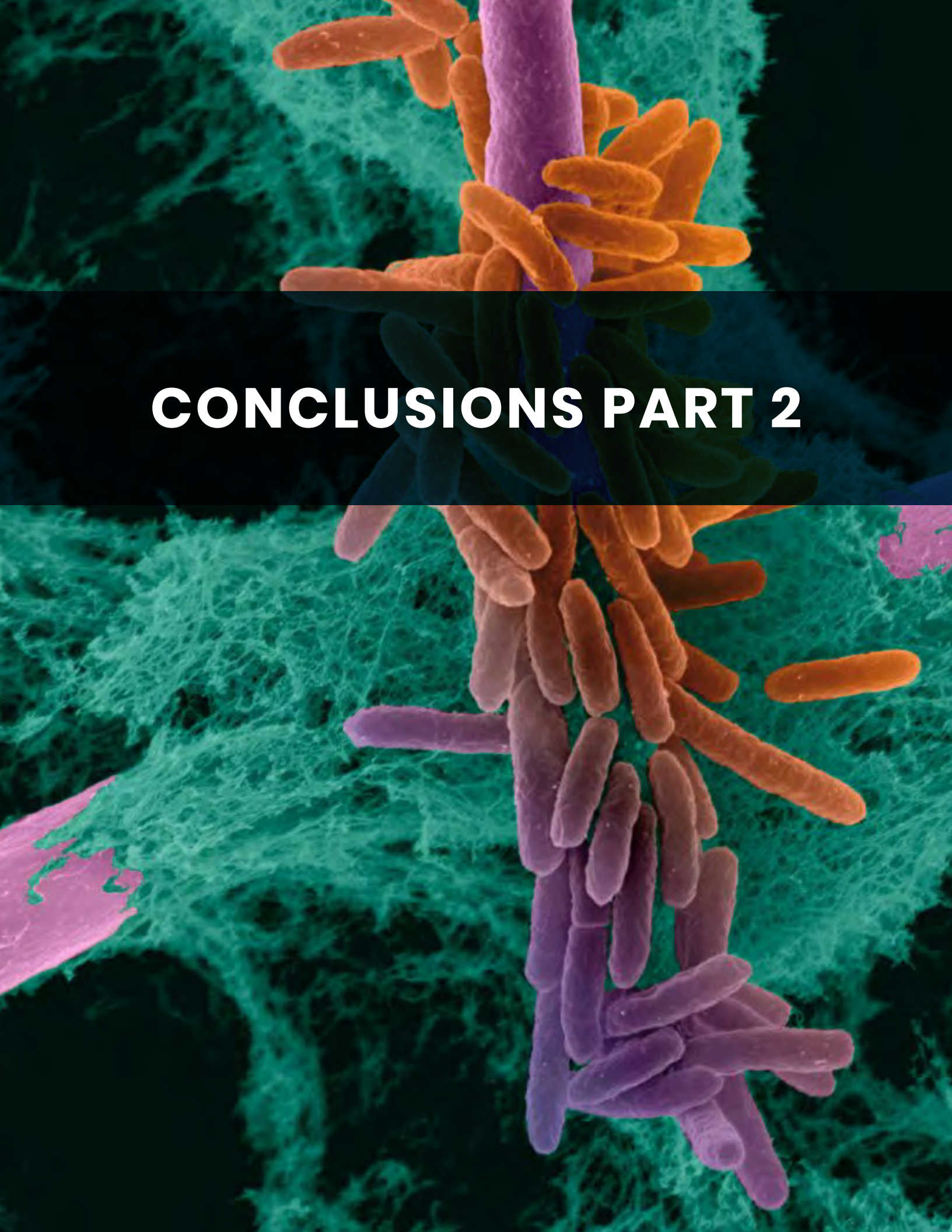
- Some brands of better quality air filters (Accumulair and 3M brands and possibly others) have many more pleats in MERV 13 filters than MERV 11 or lower filters.
- These additional pleats increase the surface area and improves air flow and we recommend these better quality MERV 13/APR2200 air filters.

MERV 13 Air Filters With Extensive Pleating

Accumulair Brand MERV 13. 2x the surface area of MERV 11

Accumulair Brand MERV 11. ½ the surface area of MERV 13

* Comment from reviewer Scott Armour: He will use nothing less than MERV 14. However the price goes way up when you go above MERV 13. We don't use them.



CONCLUSIONS PART 2

Shoemaker's HERTSMI-2. A Failed Assessment Procedure

- Shoemaker's proprietary HERTSMI-2 procedure for initial assessments, completely fails at finding significant mold toxin exposure (always airborne) problems so they can be remediated.
- Shoemaker's HERTSMI-2 testing for mold in surface dust is of no value in finding the #1 cause of significant mold and/or MMI exposure which is contaminated (always wet) HVAC Systems.
- HERTSMI-2 for post remediation assessments, since it only tests for mold spores in dust, has no value for proving if remediation work has been effective for eliminating mold toxin (airborne) exposure.

ERMI vs HERTSMI-2

- EPA's ERMI tests 36 species of the most commonly found water damage indicator molds.
- Shoemaker's HERTSMI-2 tests for only 5 mold species and therefore does not detect the vast majority of water damage indicator molds including Penicillium … the most common.
- Simple/simplified is not always the best.
- Penny wise and pound foolish comes to mind.
- Shoemaker's HERTSMI-2 testing for mold in isolated pockets of dust throughout the home allows you to conclude only one thing …that there is mold in old surface dust.
- Which there always is, since dust is partially composed of mold and mold fragments.
- If mold is in dust, then clean dust. Eliminate mold in dust. No professional mold remediation needed. Swiffers work great.

Dust Testing Massively Over-Estimates Exposure

- Dust testing for mold over-estimates mold exposure by approximately 100x according to research featured by the US Department of Housing and Urban Development*.
- Testing dust for mold and then equating that to exposure (causing CIRS) is a Red Herring and Scare Tactic.

*http://healthyhousingsolutions.com/wp-content/ uploads/2014/12/ HUD_Mold_Paper_Final_11-20-12.pdf

Shoemaker/SMCS Finds Red Herrings

- As result … start ripping out walls, cabinets, throwing out books … doing everything that is guaranteed to not eliminate or even reduce the major cause of Mold/MMI **exposure which is dirty/contaminated HVAC systems.**
- Doing everything that costs a lot of money.
- Absolutely no wonder so many CIRS patients are not getting **better and going broke.**

A PROFESSIONAL VISUAL + MOISTURE INSPECTION OF THE ENTIRE HOME USING MOISTURE METERS/ INFRARED CAMERAS AS WELL AS AN INTRUSIVE INSPECTION INSIDE THE AC, DUCTING, AND AC CLOSET IS THE ONLY WAY TO FIND SOURCES OF SIGNIFICANT (ILLNESS PROMOTING) EXPOSURE TO NOT ONLY MOLD BUT ALSO OTHER MMIS THAT ARE ALWAYS FOUND IN ALMOST ALL, EXCEPT BRAND NEW HVAC SYSTEMS.

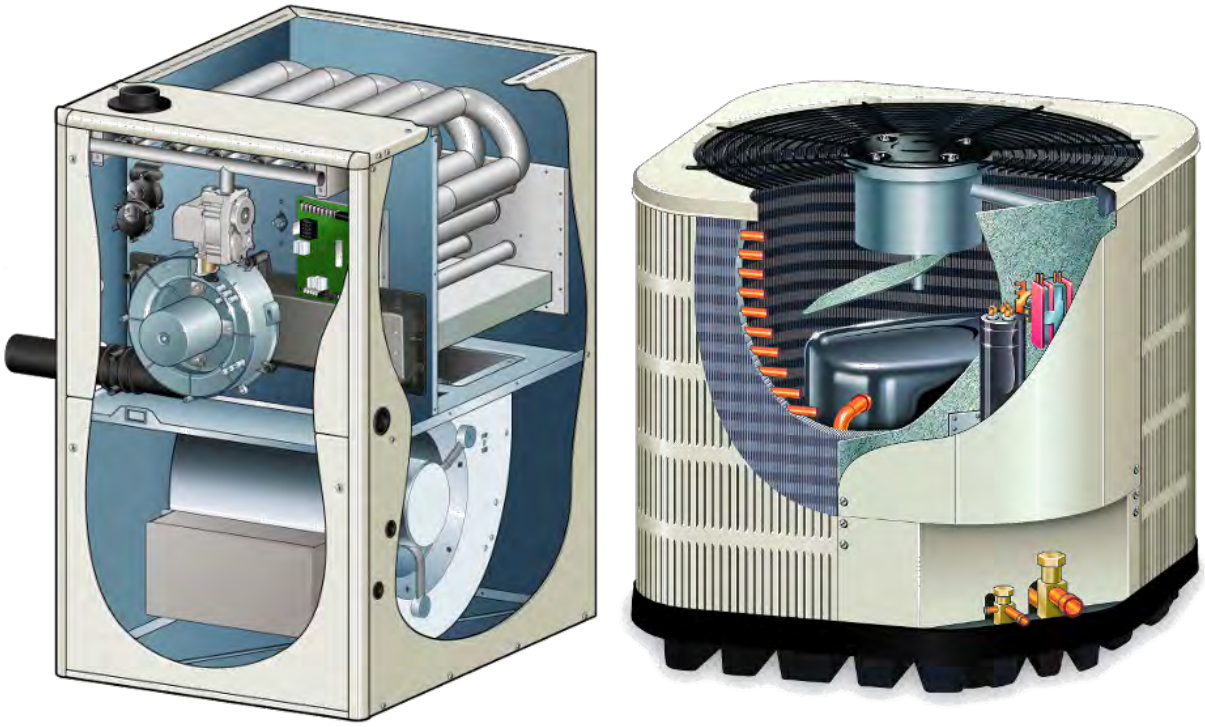
DO NOT THINK YOU CAN SIMPLY TAKE A FEW HERTMSI-2 DUST SAMPLES AND MAKE ANY USEFUL DETERMINATION ABOUT EITHER SOURCES OF MOLD-RELATED ILLNESS OR TO CONFIRM REMEDIATION SUCCESS.

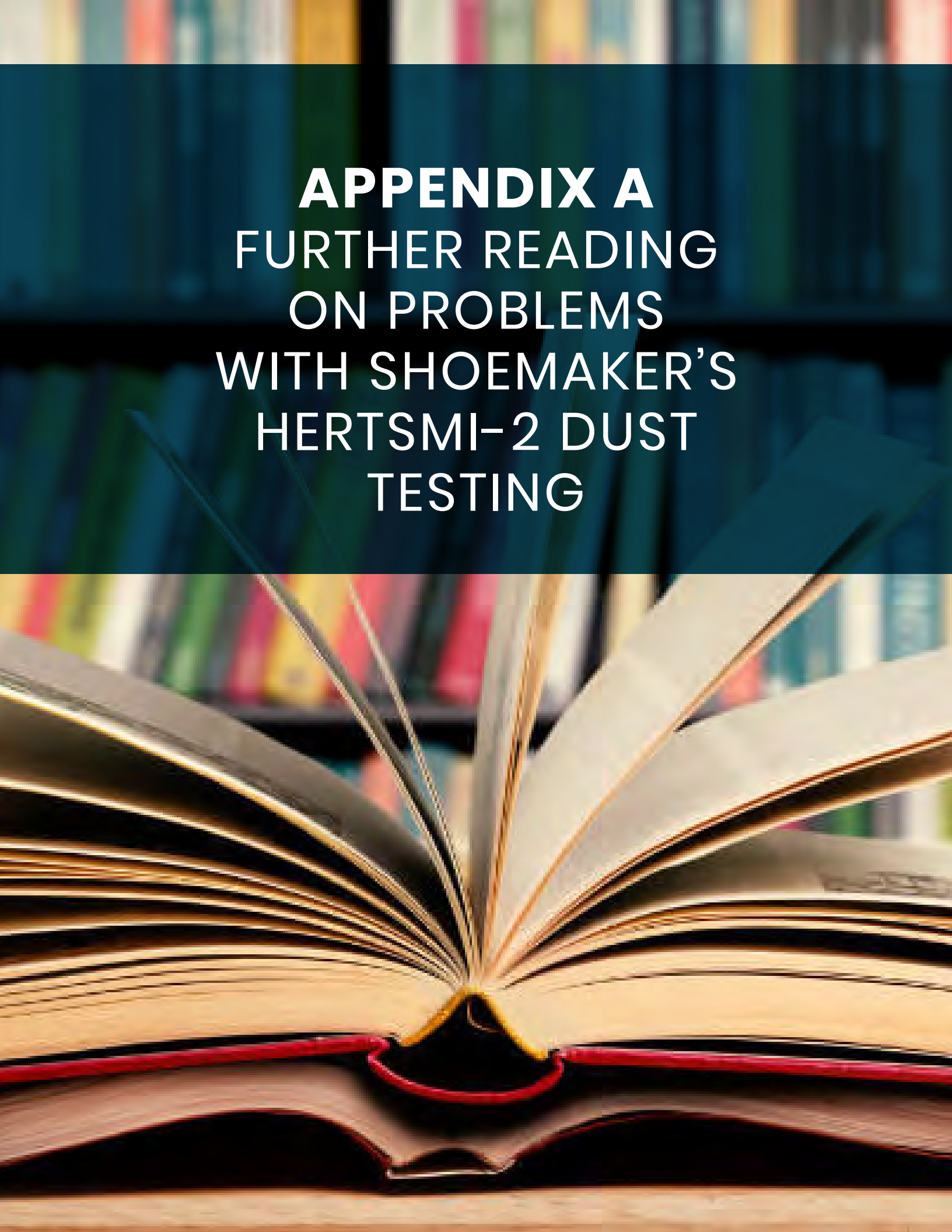
Relying on Shoemaker's HERTSMI-2. No Wonder ...

No wonder people being treated for CIRS that follow the Shoemaker Assessment and Remediation procedures are NOT GETTING BETTER WITH TREATMENT.

Surviving Mold ILLNESS Part 3 Coming Up

- In Part 3, we review 3 case studies that prove without a shadow of a doubt (you be the judge) the following:
  - Experimental data show that exposure from hidden mold in AC/ducting is not detected by DNA surface dust testing.
  - The importance of a clean HVAC system to those irritated not only by Mold but also other Moisture-Induced Microbial Inflammagens (MMIs).





APPENDIX A
FURTHER READING ON PROBLEMS WITH SHOEMAKER'S HERTSMI-2 DUST TESTING

Scott Armour on Shoemaker's HERTSMI-2 vs ERMI

- **HERTSMI: What It Is & Is NOT (Written Jan, 2019)**
- **What it is Not:**
- It is not a valid method for assessing current occupant exposure, risk of exposure, actual health impact, or risk of health impact.
- It is not a valid method for assessing degree of contamination.

Scott Armour on HERTSMI-2 Armour Applied Science

- This is obviously contrary to what is claimed by the promotional material from Surviving Mold and Shoemaker, and from those few who rely on the method who sell the method.
- Unfortunately, in the last two or three years, many clinicians who treat environmentally acquired illness (such as mold "toxicosis") have been recommending HERTSMI to their patients.

Scott Armour on HERTSMI-2 Armour Applied Science

- **What it is:**
- The first thing to realize is that Shoemaker's HERTSMI-2 is merely a mathematical construct, a simple calculation.
- HERTSMI-2 is based on (other people's) historical data used by the EPA to develop the sampling and analysis method called ERMI. From those results Shoemaker created HERTSMI-2.
- No actual experimentation was performed.
- No other researcher has replicated these studies.

Scott Armour on EPA Developed ERMI

- ERMI is a method created by EPA researchers back around 2006;
- The EPA released a very clear statement warning people that ERMI was a research tool at best; they warned that it was NOT a tool for either building or health assessment.

Scott Armour on HERTSMI-2 Collection Procedures

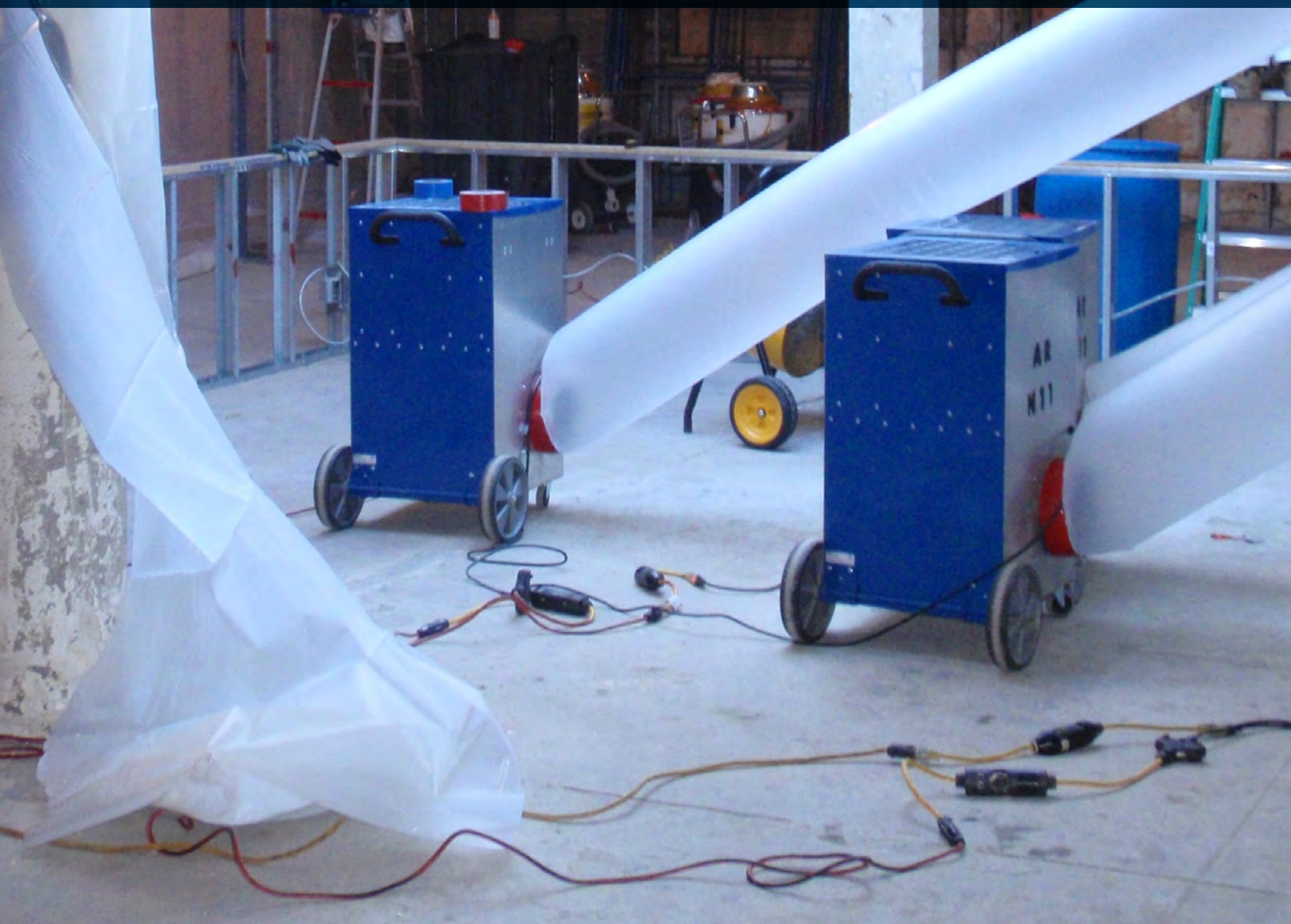
- If the methods of ERMI sample collection procedures are compared with the "new" wipe collection directions used for HERTSMI-2, there is an assumption that the change does not matter.
- Indeed, it matters greatly — because the new "wipe" method used for Shoemaker's HERTSMI-2 has not ever been researched and proven valid.

Scott Armour on ERMI vs HERTSMI-2

- There is no basis nor is there any commonality for the location of these wipes-each person takes "wherever they think" will give them an idea of what is in the building.
- This is NOT a rigorous trustworthy method.
- This can not be used for assessment because it does not take into account what is known as loading.
- Loading is the actual amount of contaminant on a surface, per square area.

APPENDIX B

SURVIVING MOLD CONSENSUS STATEMENT EXTRACTS SHOWING CONTRADICTIONS ABOUT DUCT CLEANING.



Indoor Environmental Professionals Panel of Surviving Mold CONSENSUS STATEMENT

Medically sound investigation and remediation of water-damaged Buildings in cases of CIRS-WDB

Larry Schwartz CIEC, BSME, MBA, Greg Weatherman CMC, Michael Schrantz CIEC, CMI, BPI-BA/EP, Will Spates CIAQP, CIEC, Jeff Charlton, ACIEC, AACIEH, Keith Berndtson MD, Ritchie Shoemaker MD

Internal review performed by The Professionals Panel of www.survivingmold.com

ABSTRACT

This consensus statement on the prevention, assessment, and remediation of water damaged buildings and the maintenance of indoor environmental quality follows a companion medical consensus statement written by physician colleagues ("SM Certified Physicians") of the Professionals Panel of www.survivingmold.com. The prior consensus focuses on medical issues found in patients who have a chronic inflammatory illness syndrome acquired following exposure to the interior environment of water-damaged buildings (CIRS-WDB). In cases of CIRS-WDB, we recommend methods for (i) finding causes of and preventing water damage to built environments; (ii) investigating and remediating WDBs when occupants suffer from CIRS-WDB; (iii) maintaining indoor environmental quality (IEQ) over the long-term; and (iv) determining that a damp indoor environment has been remediated and treated successfully such that occupants with CIRS-WDB may safely re-occupy the remediated space.

INTRODUCTION

We discuss qualitative and quantitative information on environmental variables that impact both the medical treatment of CIRS-WDB as well as the long-term maintenance of IEQ. We also address the various microbial sources of damp building contaminants able to initiate the persistent innate immune system inflammatory response seen in cases of CIRS-WDB. We conclude that there is compelling evidence to (i) support additional steps in the investigation and remediation of WDBs; and (ii) support the maintenance of IEQ to meet the special needs of persons with CIRS-WDB. If remediation is adequate to protect the "eggshell patients," then those same remediation techniques will also be sufficient to protect less affected people. Use of the reverse of this approach – protecting less affected patients without protecting the most affected, is no longer tenable.

damaged building, treatments to remove all types of contaminants may be required to make indoor spaces safe for persons with CIRS-WDB.

How Medically Sound Remediation Differs from Traditional Remediation

1. Use of DNA analysis of systematically collected dust samples to obtain mold speciation data that confirms presence of specific non-toxigenic and toxigenic fungi (ERMI and HERTSMI-2 testing).
2. Greater reliance on small particle cleaning.
3. Systematic calculation of a WDBs propensity for growth and control of mold and bacteria.[43]
4. Assessment of organization within the living space. Extraneous possessions (clutter) can dramatically increase the exposed surface area in a living, work, or school space that has suffered water damage. All surfaces collect and hold dust containing toxins, antigens, inflammagens, and other micro, ultrafine, and nanoparticulate contaminants. We arbitrarily and qualitatively describe clutter on a scale of none, little, moderate and heavy (hoarding).
5. The contractor must not deviate from the IEP's plan unless authorized by the IEP. Medically sound remediation does not allow some of the common current practices; for example, such as fogging disinfectants and HEPA vacuuming surfaces followed by wiping and HEPA vacuuming a second time, known as a "HEPA Sandwich."

The Three Phases of Work Flow to Make a Building Safe

There are three major phases of planning and execution required to make a built environment safe for occupation

Phase 1. Inspect and investigate to detect water intrusions, leaks, and/or condensation problems. Also investigate the HVAC system for potential cross contamination issues. A plan for correcting problems and preventing recurrences follows, including a plan for remediation of water damaged structures. In cases of CIRS-WDB, detection, correction, and prevention should begin with an interview of the occupant(s) that includes a symptom-based assessment of risk for CIRS-WDB, followed by specific methods for inspecting and investigating the home, depending on the presence or index of suspicion for CIRS-WDB in one or more occupants.

Phase 2. Perform the planned corrections required to achieve moisture control and remediate water damaged building materials. In cases where occupants suffer from CIRS-WDB or other medical conditions affected by WDB attempt to save these materials. In those cases, consultants will warn those customers that

attempts to save possessions must be balanced against the real risk of preventing an adequate remediation.

Killing or suppressing mold growth will not address the adverse health effects caused by other microbial components such as endotoxins, exotoxins, beta glucans and mannans, among others. It is folly to advocate use of antimicrobial compounds as the "remedial solution" when the inflammagens, toxins and antigens are still present even if the mold itself is "dead." Removing all toxigens and inflammagens, not simply focusing on killing what is or isn't alive, is the only route to successful remediation.

Cleaning agents that don't leave residues are better than cleaning agents that leave residues and particles. Using products with strong odors or fragrances may offend the chemically sensitive while masking hidden problems that are part of the problem. Some people may not know they are chemically sensitive until they have been exposed to the products used by a contractor. It is better to assume chemical sensitivity to avoid costly surprises.

Replace inexpensive flexible ducting or fiberboard junction boxes rather than attempt to clean. Flexible ducting may have folds or wrinkled plastic that makes cleaning impossible. Fiberboard can be damaged by abrasive cleaning methods. Fiberboard should never be used in close proximity to the cooling coils, since the moisture will lead to microbial growth on and in the porous material.

Duct cleaning according to the National Air Duct Cleaner's Association (NADCA) will fail to remove particles measuring 0.5 micrometers and smaller due to a lack of air velocity using the recommendation of their 2013 standard. This problem is also due to Bernoulli's Principle (described earlier). IEP can address a correction by pumping HEPA filtered air in the end of each duct run simultaneously after the surface cleaning has been performed and the ducting is under a negative air pressure differential.

Air Cleaning by Fogging/Misting

After a remediation and/or small particle remediation, there will be contaminants in the air that are smaller and lighter than what HEPA filters can control which will not settle quickly due to their light weight. Fogging (droplets below 50 micrometers or misting over 50 micrometers) to clean the air (US Patent #9,149,754) will address the suspect areas that are not adequately addressed by HEPA filtration. This method can also address the area immediately outside containment for a smaller remediation job when the whole structure is not cleaned.

As a means of validation of this limitation, one method is to sample the air flow from the farthest location from the HEPA air scrubber using an anemometer. If the

airflow is less than 60 feet per minute (fpm), laminar flow is not present. Without laminar flow, there will be (1) reduced capture rate; and (2) ineffective filtration of airborne particles. Another method is to use a smoke pencil to confirm the distance at which smoke no longer goes into the HEPA filter.

The use of HEPA air scrubbers is only part of the larger remediation and environmental-cleaning efforts recommended in this consensus.

Operating HEPA air scrubbers inside of the contained area would help remove some of the particles of greatest health concern. Adding lay-flat hose to the exhaust end of the HEPA air scrubber will help increase air movement inside of the containment, thereby increasing the removal of total airborne particulates (via the HEPA air filter). Lay-flat can be run around the inside perimeter of the containment. This panel recommends sealing the end of the lay-flat as well as adding small slits (~4-8") to the slides of the lay-flat. The number and location of the slits depend on the layout of the containment and size of the HEPA air scrubber. The remediation company must be familiar with the use and operation of lay-flat.

Another method to help increase air movement inside of the containment is to add air movers in areas where "dead (air) spots" are suspected to exist.

HVAC duct cleaning

HVAC ducting should be cleaned according to the National Air Duct Cleaners Association (NADCA) 2013 standard. Please note we recommend one modification. We recommend a HEPA filtered supply of clean air be added to the end of each duct line as cleaning occurs to push the particles to the HEPA filtered device creating negative air pressure differentials at the fan coil unit; without pulling contamination across the coil assembly. There is no need for use of antimicrobials.

We recommend that flex ducting be replaced where accessible since the dust in the plastic wrinkles cannot be cleaned satisfactorily. This deviation from the IICRC S520 3rd Edition is based on having a lack of laminar airflow with enough velocity (60 feet per minute or greater) to control or suspend particles that float with Brownian motion equal to or less than 0.5 microns in diameter.

HEPA vacuums

HEPA vacuums are known to perform poorly with small electrically charged particles; HEPA must not be used to clean surfaces after wiping. Surfaces should only be vacuumed if they have visible dust that can't otherwise be moved with compressed air outdoors (example: furniture) or in a containment area within the capture zone of a HEPA air scrubber vented to the exterior.