

GLOBAL INDOOR HEALTH NETWORK

WORKING TOGETHER FOR HEALTHY INDOOR ENVIRONMENTS
IN OUR HOMES, SCHOOLS AND BUSINESSES



June 27, 2018

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Focus on GIHN's New Paper on "Diagnosis and Treatment"

This edition of the GIHN Newsletter provides excerpts on some of the topics in GIHN's new paper on **Diagnosis and Treatment of Illness Caused by Contaminants in Water-Damaged Buildings**. This new paper discusses the pathophysiology, diagnosis and treatment of this illness, and it also includes information on several related topics.

This paper is 81 pages and includes more than 400 references, so we are only providing excerpts in this newsletter. To read the entire paper and other papers by GIHN, [check out our papers](#) posted on our website.

Diagnosis and Treatment (Overview)

Astute physicians and healers have been aware of the existence of environmental toxins for over a thousand years. The list of substances, both naturally occurring and manmade, which may cause harm to the human organism, is continually growing. For details on many different types of environmental toxins, see our paper on "Indoor Air Contaminants." Our papers are posted on our website.

Curiously, while heart disease, cancers and rare exotic illnesses frequently grab headlines, illness due to environmental sources, though incredibly common, often receive little or no media coverage.

Typically, little education is offered to allopathic physicians in their medical training on this subject. Hence, there is poor understanding of the concept that our environment is capable of slowly poisoning its inhabitants. However, there are thousands of research papers on this topic that describe the significant health effects of indoor air contaminants.

The significant risk of illness caused by contaminants inside water-damaged homes, schools and businesses is summed up in the following statements from the World Health Organization:

Indoor air pollution – such as from dampness and mould, chemicals and other biological agents – is a major cause of morbidity and mortality worldwide.

Indoor dampness is estimated to affect 10-50% of indoor environments in Europe, North America, Australia, India and Japan. In certain settings, such as river valleys and coastal areas, the conditions of dampness are substantially more severe than the national averages for such conditions.

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See *Diagnosis and Treatment (cont'd)* on page 2

Diagnosis and Treatment (Overview) --continued

Continued from page 1...

As we will discuss throughout this paper, the contaminants in water-damaged buildings can include molds, mycotoxins, bacteria, volatile organic compounds (VOCs) and other types of contaminants. Each of these contaminants can cause serious health effects.

Because these contaminants can cause health effects through absorption or inhalation, there is the potential for many different body systems to be affected. Research papers on this topic describe a wide range of symptoms. In a research paper by Dr. Harriet Ammann, she lists the potential system effects in the following categories: vascular, digestive, respiratory, nervous, cutaneous, urinary, reproductive and immune.²⁻³ In regard to mycotoxins, Dr. Amman states:

Mycotoxins are nearly all cytotoxic, disrupting various cellular structures such as membranes and interfering with vital cellular processes such as protein, RNA and DNA synthesis.

In a report by the U.S. Environmental Protection Agency (EPA), they describe the health effects as follows:

Health effects from indoor air pollution cover the range of acute and chronic effects, and include eye, nose, and throat irritation, respiratory effects, neurotoxicity, kidney and liver effects, heart functions, allergic and infectious diseases, developmental effects, mutagenicity, and carcinogenicity.

The extent of this problem is tremendous, with millions of homes, schools and buildings around the world affected by water damage. Here are a few key statistics:

- 10-50% of all indoor environments in Europe, North America, Australia, India and Japan are affected by indoor dampness (World Health Organization--WHO); the report says the numbers are much higher in some areas
- 50% of U.S. schools have indoor air quality problems (U.S. Environmental Protection Agency--EPA)
- 30-50% of all U.S. homes (U.S. Consumer Product Safety Commission--CPSC)



Diagnosis and Treatment (Overview) --continued

- 47% of U.S. homes (Research study supported by the U.S. EPA)
- 45% of U.S. office buildings (U.S. EPA)
- 40% of U.S. homes have health and safety hazards (National Center for Healthy Housing (NCCH). This statistic is based on a report from the U.S. Department of Housing and Urban Development (HUD). The study found that the most common housing problems identified include water leaks, roofing problems, damaged interior walls, and signs of mice.
- 33-50% of all structures (U.S. EPA)
- 30% of buildings have indoor air quality problems (U.S. Occupational Safety and Health Administration--OSHA)
- 20-26% of nursing homes, hospitals and outpatient departments (a report from Finland); percentages also provided for houses, apartment buildings, schools and offices

It is staggering to comprehend the enormous impact on our global society due to medical costs, lost productivity, repairs needed. To see the references for these statistics and to learn more about the statistical and economic impact of this issue, read our paper titled "Global Burden of Indoor Air Contaminants." Our papers are posted on our website.

When you look at the immense scope of the problem, you can understand why we are presenting a comprehensive view of this topic. Please help us share this important information on diagnosis and treatment with government agencies, medical organizations, physicians, patients, school administrators, teachers, news organizations and others around the world.

See *The Name for This Illness* on page 3

The Name for This Illness

Mold illness, mold-related illness and biotoxin-related illness are euphemisms for the same disease. Some of the names for this illness in the U.S. are Mycotoxicosis, Mixed Mold Mycotoxicosis, Indoor Mold Sensitivity and Toxicity, Toxicant Induced Loss of Tolerance (TILT) or Chronic Inflammatory Response Syndrome due to Water Damaged Buildings (CIRS-WDB or CIRS). In Finland, it is called Dampness and Mold Hypersensitivity Syndrome (DMHS).

In our 2012 position statement, rather than favor one group's name over another's, we presented a temporary name for the illness -- Multi-system Exposure Related Illness (MERI, pronounced "meer-ee") -- to refer to the disease as it points to the multi-systemic nature and indoor environmental triggers which include, but are not limited to, toxins, microbial secondary metabolic products, particulates and the microbes themselves.

This illness also recognizes that toxins other than mold or microbial secondary metabolic products may create comparable symptomatology, presumably through the same or similar pathways.

Two new names for this illness were introduced in 2016 and 2017.

In early 2016, Dr. Michael Gray presented a new name for illness caused by exposure to toxins and contaminants in our environment. He refers to this illness as Cumulative Organic Chemical Hyper-Toxicity (COCHT). He explains how toxins can accumulate in our bodies and how genetic deficiencies make it difficult for some people to neutralize, metabolize or eliminate these toxins. Dr. Gray is with the Progressive Healthcare Group6 in Benson, Arizona, and more information about COCHT can be found in his educational videos.

In September 2017, a new nonprofit organization was created by a group of doctors working in this field of medicine. The name of this nonprofit is International Society for Environmentally Acquired Illness (ISEAI). As the name implies, they are referring to this illness as Environmentally Acquired Illness (EAI).

From the ISEAI website:

This illness is currently known by several names including Mycotoxicosis, Mixed Mold Mycotoxicosis, Indoor Mold Sensitivity and Toxicity, Toxicant Induced Loss of Tolerance (TILT), Chronic Inflammatory Response Syndrome due to Water Damaged Buildings (CIRS-WDB or CIRS), Cumulative Organic Chemical Hyper-Toxicity (COCHT) or Environmentally Acquired Illness (EAI). In Finland, it is called Dampness and Mold Hypersensitivity Syndrome (DMHS).

The Name for This Illness (cont'd)

It is no secret that many patients today are sicker and their illnesses are more complex than they were even 20 years ago. Even so, doctors are expected to diagnose and treat patients in less time and with more restrictions. Medical appointments are so brief that patients can present only one or two complaints at a visit. Few doctors have the time or ability to look at a patient's whole health picture. Our chronically ill patients are sick, exhausted, in pain, anxious, not sleeping, digesting or thinking properly. They have been misdiagnosed or told their problems were "in their heads." ISEAI aims to help the medical community to better serve these patients.

For the purpose of this paper, we will not be using a specific name for the illness. We prefer to leave it open until the medical community comes together to select a name that can be accepted and adopted by all involved.

It is important to acknowledge the large number of individuals and families around the world who are being affected by illness caused by exposure to these indoor contaminants in water-damaged buildings. A quick search on the Internet will provide results of countless personal stories from people being harmed by the contaminants in water-damaged buildings (with new stories occurring every day). You can read a small selection of their stories on our website under the heading "Personal Stories."

...continued on page 4

See *The Name for This Illness (cont'd)* on page 4

The Name for This Illness (cont'd)

Continued from page 3...

This illness is not currently being tracked by the medical community, so an accurate count of patients is not available. However, given the multi-system, multi-symptom nature of this illness and the extensive list of health effects, there are likely millions of individuals with this illness throughout the world.

Most physicians will not recognize the illness because they are uninformed about the variable multi-system presentations or have been misinformed about the serious health risks of molds, mycotoxins and other contaminants inside water-damaged buildings.

Typically, one or two systemic problems predominate while several other systems are regularly involved, as evidenced by simultaneous abnormalities among multiple targeted diagnostic tests evaluating multiple organ systems. Patients, who complain of intense fatigue on a daily to almost daily basis, are frequently diagnosed with Chronic Fatigue Syndrome (CFS), Chronic Fatigue Immune Dysfunction Syndrome (CFIDS), or Myalgic Encephalomyelitis (ME) with the diagnosing clinicians often claiming wrongfully that their patient is suffering from a somatoform or “functional” illness.

These physicians have no appreciation that its real cause rests with mitochondrial dysfunctions caused by the direct poisoning of cellular respiration by mycotoxins which interfere with oxidative phosphorylation and cause deficiency states involving multiple enzymes of the electron transport chain pathway, or aerobic metabolism, also known as cellular respiration.

It is a tragic, time-honored habit of many physicians ignorant of the underlying physiologic defects causing the pathology of their patients, to claim that—since the explanation for the problem is not in their heads—the problem must be in their patients’ heads. They psychologize their patients’ problems and then impose inappropriate and often damaging treatments on their patients. These treatments are often court mandated and use mind-numbing and often neurotoxic psychotropic, anti-depressant, anti-psychotic or anxiolytic pharmacologic agents—the scientific basis for which is often absent or marginal, at best.

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The Name for This Illness (cont'd)

Pidgeon-holing the sufferer into a single-system diagnosis requires ignoring or minimizing many other symptoms and systemic clues. Patients are frequently told they are depressed, anxious and need psychiatric medications, while the central environmental history of home and work was never explored. Others are told they are somaticizing (or worse – malingering), that they need to “learn to live with it,” or that it’s “all in their head.”

Another tactic used by the naysayers to deny this illness is to blame it on psycho-social factors. For additional information about the government agencies, insurance companies, medical organizations, defense experts, defense attorneys and others who spread their false claims and refuse to admit the truth about this illness, read our paper titled “Discussion of Naysayers and Deniers.” Our papers are posted on our website.

Although there is not yet one common name for this illness, it is our opinion that a single unifying name would benefit all the various vested communities (treating physicians, researchers and sufferers). Eventually, the medical community will come together and agree upon a name that will be easily remembered and resonate with lay people, media and scientific personnel.

In summary, this illness is a multi-symptom, multi-system disease occurring in many people due usually to long-term exposure to the interior of water-damaged buildings (WDB). While there are differing opinions on the best diagnostic and therapeutic approaches, it is clear from the literature and from practice that this disease exists and significant relief can be obtained by most sufferers with avoidance of further exposure and appropriate treatment.

See *Water-Damaged Buildings* on page 5

Water-Damaged Buildings

Mold and bacteria are ubiquitous, inside and outside of buildings. Adding water provides the missing ingredient needed for the explosive microbial growth, known as amplification, found in water-damaged buildings (WDB).

Water damage inside buildings is mainly caused by natural disasters or human activities (e.g., lack of repair and maintenance in schools and office buildings). The determining factor for fungal growth on building materials is water activity. This is why eliminating the source of water intrusion is the first step in remediation of water-damaged buildings.

Dampness problems in homes, office buildings, schools and other nonindustrial buildings may develop moisture and dampness problems which can lead to the growth of mold, fungi and bacteria, the release of volatile organic compounds, and the breakdown of building materials.

Construction materials in the form of sheetrock, drywall, wood, etc. offer a great amount of food resources for indoor molds and bacteria.

Molds can obtain nutrients and moisture sufficient for growth from water-affected building materials such as wallboard and insulation materials, as well as carpets, furniture, and clothing. They feed on dead organic matter and, provided with sufficient moisture, can live off of many materials found in homes, such as wood, cellulose in the paper backing on drywall, insulation, wallpaper, glues used to bond carpet to its backing, and everyday dust and dirt.

Buildings become water-damaged when water intrudes via numerous pathways including leaking roofs, inadequate vapor barriers, indoor plumbing leaks, faulty HVAC (heating, ventilation and air conditioning) systems, condensation drainage, and intrusions into basements and crawl spaces through several mechanisms.

Another common source of water damage is caused by delayed or insufficient maintenance of homes, schools or office buildings, improper design of HVAC systems (e.g., insufficient cooling capacity).



Water-Damaged Buildings (cont'd)

Water damage and mold often occur in schools during the summer because the school districts decide to turn off the air conditioning which causes the humidity to rise. The schools think this will save money, but it often leads to significant mold growth and very large expenses for repairs and remediation. It also causes disruption and turmoil for school administrators, teachers, students and families because the start of the school year has to be delayed and/or arrangements have to be made to transfer the students to a different location.

Another important consideration regarding water damage is the relative humidity level inside buildings. Most guidelines recommend that the humidity levels indoors be kept below 50-60%. The U.S. EPA says that indoor humidity should ideally be kept between 30-50%.

Relative humidity also affects spore release for some molds (e.g., Aspergillus and Penicillium), with spore release occurring with lowering humidity after initial growth at high humidity levels. One reviewer concluded that "the worst-case scenario for the development of an indoor mold problem involves a series of water intrusion events that allow large quantities of biomass and mycotoxins to form, then a period of drying that promotes the dispersion of spores and colony fragments, followed by their deposition throughout the building."

As mentioned earlier in this paper, the scope of this problem is tremendous. There is some guidance available on the ways to build mold-resistant homes and there are others working on creating mold-resistant building materials, but much more progress could be made in this area when the government agencies, insurance companies, medical organizations and other naysayers and deniers acknowledge the health effects of contaminants in water-damaged buildings.

See *Pathophysiology* on page 6

Pathophysiology

Illness due to exposure in WDB buildings results from a combination of factors and includes the direct effects of toxins, chronic inflammation and colonization and infection of microbial agents. In an amplified system, there is unchecked expansion of numerous species of molds, bacteria, *Actinomycetes* and *Mycobacteria*, and unfettered production of spores and secondary metabolites such as endotoxins, β -D-glucans, spirocyclic drimanes, trichothecenes, aflatoxin, ochratoxin, satratoxins, galactomannans, hemolysins, fine particulates, etc., as well as Volatile Organic Compounds (VOCs) from the building materials and microbial VOCs (MVOCs) which are released from damp cavities, through sheetrock, into the air the inhabitants breathe.

Persons can be exposed to mold through skin contact, inhalation, or ingestion. Inhalation is usually presumed to be the most important mechanism of exposure to viable (live) or nonviable (dead) fungi, fungal fragments or components, and other dampness-related microbial agents in indoor environments. The majority of fungal spores have aerodynamic diameters of 2–10 μ m, which are in the size range that allow particles to be deposited in the upper and lower respiratory tract. Inhalation exposure to a fungal spore requires that the spore be initially aerosolized at the site of growth. Aerosolization can happen in many ways, ranging from disturbance of contaminated materials by human activity to dispersal of fungi from contaminated surfaces in heating, ventilating, and air-conditioning (HVAC) systems.

Although the naysayers claim that illness occurs only due to ingestion (i.e., eating foods with mycotoxins), inhalation also causes illness and is a greater risk because the toxins enter the blood-brain barrier and can affect multiple organs.

Inhalation exposure gives direct access to the general circulation through the alveoli, without a first pass through the liver for detoxification as the ingestion route does. Inhalation exposure also provides a pathway to the central nervous system along the olfactory and trigeminal nerve axons in the nasal sensory epithelium that bypasses the blood-brain barrier.

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Pathophysiology (cont'd)

Deposition of these small particles occurs throughout the respiratory tract, but especially in the alveoli where transport to the bloodstream largely occurs, resulting in toxin distribution to other systemic target organs.

As mentioned above, there are thousands of published, peer-reviewed research papers on this topic. This paper will highlight some of the primary health effects of contaminants in water-damaged buildings. However, this is not intended to be a complete list of all health effects.

The literature provides ample evidence that exposure to the interior of WDB leads to increases in upper respiratory syndromes, allergies and increased incidence of asthma with further triggering of asthma flares.

There is also significant evidence regarding the neurological effects, even though the government agencies and naysayers continue to deny it. Direct neurotoxicity and immunotoxicity of some mycotoxins have been clearly demonstrated in the literature.

The immunological effects of molds and mycotoxins have been discussed in numerous papers, and the World Health Organization includes it in their 2009 paper on Dampness and Mould. Mycotoxins are nearly all immunotoxic and cytotoxic. Although the immunological effects have been widely discussed in countless research papers, most government agencies still ignore those health effects.

Government agencies and naysayers also claim that molds and mycotoxins in water-damaged buildings affect only immune-compromised (immunocompromised) patients even though many immune-competent (immunocompetent) individuals have also been harmed.

NOTE: See our paper for additional information on pathophysiology of this illness.

See *Diagnosis* on page 7

Diagnosis

Diagnosis of this illness is usually straightforward although a widely used consensus of the exact definition of the disease has not yet been established. There are numerous objective biological indicators found in patients suffering from this illness.

The process of establishing a unique constellation of symptoms and lab findings is commonly used in medicine to delineate a diagnosis. The Jones criteria for Rheumatic Fever and the diagnoses of SLE and Kawasaki Syndrome are just three such examples.

Dr. Ritchie Shoemaker, et al, coined the term “CIRS-WDB” in 2008 and proposed a three-tiered case definition. He and his group use history, physical exam findings, and results of Visual Contrast Sensitivity (VCS) testing, MR Spectroscopy, nasal culture and blood tests to look at ten different biomarkers for CIRS-WDB. Healthy persons should have, on average, 5% of these markers positive (0-1 per patient) whereas cases usually manifest at least 5-6 (50-60%) abnormal values.

In May 2018, Dr. Shoemaker and six of his associates released a Consensus Statement regarding the diagnostic process for CIRS. The information expands on previous papers regarding CIRS. Table 1 in the paper lists a percentage of incidence of symptoms that are common in CIRS patients. They grouped those symptoms into 13 clusters.

Other treating physicians use additional testing modalities. Dr. Michael Gray, et al, use the term Mixed Mold Mycotoxicosis and also look for evidence of fungal colonization in nasal passages, sputum and stool, evaluate potential pesticide exposures and measure urine mycotoxins as proof of exposure. His group also looks at Nerve Conduction Velocities, neurobehavioral testing developed by Dr. Kaye Kilburn (found to demonstrate evidence of chemical brain injury in those exposed to environmental toxins including mycotoxins) and Quantitative Electroencephalograms (QEEG) as part of their evaluation.

In addition to much of the testing used by Dr. Gray, Dr. Janette Hope uses detoxigenomic studies which look at various single nucleotide polymorphisms (SNP) and assesses for nutritional deficiencies and food allergies frequently found in those with long-term toxic exposures.

Patients with inflammation have localized swelling, resulting in misplaced fluid in the body. The more extensive the inflammation, the greater is the fluid shift. Dr. Vinitzky has coined this condition “dyshydration.”©

Diagnosis (continued)

Dr. Alan Vinitzky assesses for autonomic nervous system (ANS) dysfunction via the Autonomic Nervous System and Respiration (ANSAR) testing system. He has developed a working model of hypomethylation to account for some of the symptoms of ANS dysregulation as they relate to stress. His treatments initiate recognition and correction of the dehydration patterns that relate to the ADH – Histamine reactions described above.

By definition, all patients with inflammation have localized swelling, resulting in misplaced fluid in the body. The more extensive the inflammation, the greater is the fluid shift. Dr. Vinitzky has coined this condition “dyshydration©.” And, the messenger is still histamine.

The pattern of 24-hour urine for amino acid deficiencies was phosphoethanolamine, hydroxyproline, asparagine and isoleucine. Sometimes glutamine and methionine are also depleted. Dr. Vinitzky’s protocol on balance testing during physical examination is described. The loss of balance with eyes closed reflects mid-brain dysfunction. Autonomic function is separated from visual compensation in maintaining balance.

Significantly, in water-damaged environments of mixed microbes, Gram negative organisms (associated with LPS) often thrive. When inhaled or ingested by affected persons, LPS may then be the trigger for frequently observed food-induced histamine intolerance.

Dr. William Rea has developed a multi-disciplinary approach to diagnosis (which includes intradermal provocation of mycotoxins) in a facility using state of the art construction techniques to create a “less polluted environment for patient evaluation, testing and treatment.”

NOTE: See our paper for additional information on pathophysiology of this illness.

See *Treatment Protocols* on page 8

Treatment Protocols

Treatment protocols also vary and to date there have been no head-to-head trials on the efficacy or superiority of any one regimen. However, each listed practitioner will relate extraordinary results (even up to 90%) of patients who are compliant with the prescribed therapy. The two basic principles of most approaches include 1) toxin avoidance and 2) removal of toxin from the body—usually via sequestering agents.

There have been several influential treating doctors in this field. Two of the early pioneers were Dr. Kaye Kilburn and Dr. Vincent Marinkovich. Their contributions were significant and are briefly described in the following paragraphs.

Dr. Kaye Kilburn investigated asbestosis, byssinosis, mold, mycotoxins and hydrogen sulfide. He conducted one of the most extensive studies into asbestos, helping to expose its danger in an industrial setting. His work with cotton dust helped set the modern standard for respiratory care and testing.

In 1987, Dr. Kilburn founded his own practice, Neuro-Test Inc., to study neurobehavioral and pulmonary impairment as a result of exposure to common chemicals including mold, hydrogen sulfide, diesel, pesticides and insecticides. In regard to patients exposed to molds, mycotoxins and chemicals, Dr. Kilburn demonstrated the benefits of neurocognitive testing as these toxins cross the blood brain barrier.

Toxic encephalopathy is an enormous issue throughout the world. Mycotoxins are one of the myriad classes of natural and synthetic toxins well established in a massive, worldwide peer-reviewed literature as causally related to neuro toxicity. One of the major contributions to the study, understanding and treatment of toxic encephalopathy was Dr. Kilburn's neurologic test battery. He developed these tests on the premise that global neurotoxins affected the brain globally, and that any test that measured the functions of the brain that required a large mass of brain cells to perform, ought to be able to demonstrate the compromising impact of neurological toxins. On that theory, he amassed twenty-six (26) neurologic tests that demonstrated remarkably reproducible results in human subjects. Included among them were measurements of nine (9) neurophysiological and seventeen (17) neurocognitive parameters.

Toxic encephalopathy is an enormous issue throughout the world. Mycotoxins are one of the myriad classes of natural and synthetic toxins well established in a massive, worldwide peer-reviewed literature as causally related to neuro toxicity.

Treatment Protocols (cont'd)

Most degenerative neurological illnesses of “unknown cause,” are accelerated by, aggravated by, and with great frequency caused by the proliferation of neurotoxins in our macro and micro environments. Mycotoxins are prominent among them. Ochratoxins, aflatoxins, and trichothecenes, like many other persistent organic pollutants, cause Toxic Encephalopathies, including but not limited to Multiple Sclerosis, mid-brain based, physiologically measureable, movement disorders, including chorea, dystonia, obsessive compulsive disorders, seizure disorders, ADD, ADHD, Autism Spectrum disorders, dementias, Parkinsonian Syndromes, tremors, and chronic mild to severe cognitive decline, and chronic fatigue.

As Dr. Kilburn described in a 2009 paper:

Colonization of nasal sinuses and local extension; tissue destruction and swelling, coupled with systemic toxicity produce extreme fatigue, headache, hearing loss, joint pain, tremors, depression, and direct central nervous system effects with abnormal balance, loss of concentration and of verbal recall, and long-term memory.

Poisoning by inhaling mycotoxins can explain multi-organ symptoms and neurological impairment for balance, reaction time, muscle strength, color discrimination, visual field performance, hearing, and blink reflex latency. Cognitive performance, verbal recall, and long-term memory are impaired, especially the ability to recognize missing items in standard pictures. This pattern is identical to that after exposure to H₂S, chlorine, solvents, and other single toxic chemicals that are small molecules.

See *Treatment Protocols (cont'd)* on page 9

Treatment Protocols (cont'd)

Continued from page 8...

Dr. Vincent Marinkovich specialized in diagnosing and treating mysterious ailments caused by household molds.⁸¹ He was known as Dr. Mold, and he continued his devotion to his patients until he passed away in 2007.

In 1976, Dr. Marinkovich developed the MAST allergy blood test (Multiple Allergen Simultaneous Test) that detected allergens with the use of cellulose fibers in an enzymatic test chamber.

The MAST Immunodiagnostic Test System was developed to provide a comprehensive, simple means for the in vitro measurement of multiple antigens or antibodies. The MAST system greatly simplifies testing for allergen-specific IgE, while retaining specificity and sensitivity.

In a 2004 paper by Dr. Marinkovich, he discussed the effects of mold on the human body and the diagnosis, pathophysiology and therapy/treatment. He also talked about the doctors who refuse to recognize this illness, as follows:

There are other physicians who deny that fungi as encountered in homes or office-type workspaces are capable of causing illness. These physicians generally are not primary caregivers and can dismiss the patient's complaints because of their apparent complexity without a consequence.

They are better designated as theorists who base their negativity on arguments that the lack of sufficient evidence-based proof of a causal relationship of fungal exposure to human disease proves that such a relationship is not possible.

They dismiss all case reports, epidemiological studies and clinical observations of experienced clinicians as worthless.

They seem to lack the vision to accept the challenge of the possibility that injury to multiple organ systems may result from exposure to large amounts of fungal derived materials (such as spores and/or mycotoxins) in a home or office environment.

There are other physicians who deny that fungi as encountered in homes or office-type workspaces are capable of causing illness.

They are wrong and they can do a great deal of harm.

They are guilty of using poor scientific logic because it is close minded. Such thinking has no place in a medical setting where there are sick patients who need help.

Treatment Protocols (cont'd)

They are wrong and they can do a great deal of harm. First in denying the patient's symptoms, and secondly by blocking disability requests from such patients injured by exposure to fungi in their workplaces. They are guilty of using poor scientific logic because it is close minded. Such thinking has no place in a medical setting where there are sick patients who need help.

Dr. Claudia Miller first introduced the theory of TILT (Toxicant Induced Loss of Tolerance) in 1996. Her work with patients with chemical intolerance (also referred to as chemical sensitivity) led to the development of the Quick Environmental Exposure and Sensitivity Inventory (QEESI). The QEESI test is used for screening patients with multiple chemical intolerance.

In 2012, Dr. Miller proposed a new level of "LEED Diamond" for LEED-certified buildings. Although builders can earn extra points for meeting certain requirements for improving indoor air quality (IAQ) under the current LEED categories (silver, gold and platinum), additional requirements relating to IAQ are needed. As Dr. Miller said:

Someday, we will look back at how we constructed and operated our buildings and realize that we should have paid far more attention to IAQ (indoor air quality). At that time, it will be clear what we should have done long ago—designing buildings for the most vulnerable individuals in our population (about 1/3 of the population). Protecting the most susceptible people will protect everyone.

...continued on page 10

See *Treatment Protocols (cont'd)* on page 10

Treatment Protocols (cont'd)

Continued from page 9...

NOTE: See our paper for a detailed discussion of treatment protocols. A few excerpts are provided here.

All of the treating physicians in this field recommend avoiding mold exposure as a key component of their treatment plan. They also use various sequestration methods including cholestyramine, bentonite or zeolite clay and/or activated charcoal. The clay and cholestyramine are mixed together in a liter of water and drunk over the course of the morning/afternoon and then again after dinner. The charcoal is taken as pills or capsules.

Some of these treating physicians use glutathione and targeted nutritional support to promote detoxification, as well as exercise and sauna therapy when indicated.

Beyond toxin avoidance and sequestration, Dr. Ritchie Shoemaker follows a 14-step, pyramidal approach to therapy.

Dr. Mary Ackerley is another treating physician in this field. She is an integrative holistic physician as well as a classically trained board certified psychiatrist. One of the areas she focuses on is the inflammatory effects on the brain. She cites research studies documenting cognitive impairments, decreased executive functioning, depression and suicidal thoughts in patients who have been exposed to contaminants in water-damaged buildings and has seen this in her own patients.

Dr. Michael Gray's treatment protocol is described in great detail in our paper. His treatment protocol includes sequestrants, supplements, glutathione therapies, antifungal therapy (when needed), oxygen therapy and sauna therapy. See our paper for more details regarding Dr. Gray's treatment protocol.

Dr. Janette Hope, in addition to the use of sequestering agents, also prescribes glutathione and antifungals when indicated, treats detoxigenomics findings to specifically address genetic deficits (SNPs) and nutritional testing to assess for adequate presence of vitamin cofactors needed for proper detoxification.

All of the treating physicians in this field recommend avoiding mold exposure as a key component of their treatment plan.

Treatment Protocols (cont'd)

Dr. William Rea has treated more than 30,000 patients over the past 40 years. He has developed a comprehensive protocol for treatment and diagnosis.

Dr. Rea's approach is aimed at decreasing the "total body load" of all toxins and toxic chemicals, injections to neutralize mycotoxins, avoidance of foods and chemicals to which patients may have become sensitized, parenteral and oral nutrition (the latter includes spring water in glass bottles, organic foods and a rotary diet), sauna treatments, exercise and massage. Some patients require an autologous lymphocytic factor, developed at Dr. Rea's center, which modulates the patient's own immune system.

Dr. Walter Hayhurst and Dr. Donald Dennis suggest treating fungal infections in the sinuses aggressively and use "The Inflammation Free Diet Plan" and recommend resveratrol.

Dr. Alan Vinitsky teaches that chronic overstimulation of the sympathetic nervous system (SNS) also contributes to "mold toxicity." His therapies also include relaxation/meditation techniques, energy optimization, dietary changes, exercise, nutritional supplements, increasing purified water intake and development of a positive mental attitude to help the body heal itself of toxins and toxic stress as precursors to the inflammatory response.

Dr. Raymond Singer, a Ph.D. neuropsychologist, and Dr. Robert Crago, a Ph.D. psychologist, provide testing and evaluation of patients with neurological damage and brain injuries caused by mold and other toxins.

The number of doctors and other medical professionals who know how to treat this illness is increasing. You can find a list, along with their contact information, on the Paradigm Change [website](#).

See *Mold Avoidance and Testing* on page 11

Mold Avoidance and Testing

As mentioned earlier, toxin avoidance is another important component of treatment for many patients.

Unfortunately, there continue to be limits to most testing modalities, and it is often necessary to evaluate indoor settings using historical information about the building, as well as signs of water damage and moisture excess, combined with judicious use of focused testing. Multiple testing modalities exist and most experts agree a combination of methods provides optimal results.

Prior to doing any tests, a thorough investigation and evaluation should be conducted. See our paper for more details about sampling and testing.

Testing for contaminants in water-damaged buildings is a very complex situation. Although many government agencies say that testing is not necessary, there are some situations where testing may be desired or needed. For example, the U.S. EPA says that you may consider sampling as part of your site evaluation in specific instances, such as:

- Cases where litigation is involved
- The source(s) of the mold contamination is unclear
- Health concerns are a problem

If you do not have extensive experience and/or are in doubt about sampling, consult an experienced professional. This individual can help you decide if sampling for mold is useful and/or needed and will be able to carry out any necessary sampling.

Another factor is the possibility of false-negative test results which are easy to obtain, especially using the common 5-minute spore trap techniques. However, it is nearly impossible to obtain a false-positive test result; therefore, all positive results should be taken seriously. Making sure home and work are mold-free places is critical for everyone.

The U.S. Centers for Disease Control and Prevention (CDC) says: *“Exposure to materials and structures contaminated with mold should be assumed to present a potential health risk regardless of the type of mold. Risk for illness does not necessarily vary with the type of mold or the extent of contamination.”*

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Mold Avoidance and Testing (cont'd)

Schools are a more challenging locale to test as the school district usually must give permission. Often, school districts and employers will not allow testing of their buildings.

Many government agencies state that testing is not necessary or not recommended or that exposure limits have not been set. However, OEHCS has published books that discuss international exposure standards for mold, bacteria and chemicals.

Decisions about testing depend on many independent and inter-dependent factors including whether the parties are involved in litigation and the current health status, sensitivity, and/or genetic susceptibility of each individual. An additional factor that needs to be considered is that testing is not financially viable for all homeowners, due to the extent of the damage and the tremendous financial losses that families incur in these situations. If testing is used or needed, positive results are a guide to treating the occupants of the exposed site, but negative results do not rule out the need to appropriately remediate.

In addition, a lack of moisture detection at the time of investigation may lead to a false sense of security. Mycotoxins are present in dust and can be on the hidden side of a “dry wall” which had previously been wet.

As noted above, a combination of testing modalities provides optimal results. Indoor air quality testing alone is often not sensitive enough to detect all possible contaminants (especially when some are hidden) or the low levels required to cause illness.

Remediation

For spaces found to be “moldy” (i.e., water-damaged, regardless of the findings on testing, when used), remediation by certified personnel is recommended. Improper efforts can spread microbes (such as mold, bacteria and parasites), spores, fragments and toxins throughout the entire structure as water-damaged building materials are removed. As such, in many cases, occupants should be relocated during the remediation process.

Because many factors must be considered when remediating water-damaged homes, schools, offices and other buildings, and because there are several industry guidelines and government publications about remediation, it is not practical to provide a detailed discussion of mold remediation in this paper. However, we will be discussing a few key topics relating to remediation.

It is important to state there are some water damage situations that cannot be resolved or corrected with remediation, and remediation is not always successful.

If remediation is attempted, proper containment procedures and personal protective equipment are critical, because disturbing or handling the contaminants can result in increased aerosolized spores and particles containing mycotoxins which can be dangerous to human health and destructive to property.

During remediation or renovation of water-damaged structures, personal protective equipment (PPE) should be used to protect the occupants and workers.

- Protective clothing that covers the entire body (i.e., a disposable body suit such as TYVEK with mold-impervious, disposable head and foot coverings). All gaps in the clothing, such as those around ankles and wrists, should be sealed.
- An N-95 respirator or better (i.e., a half-face or full-face respirator with N, R or P100 filters)
- Protective gloves (made of natural rubber, neoprene, nitrile, polyurethane or polyvinylchloride). Do not touch mold or moldy items with bare hands.

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Remediation (cont'd)

- Non-vented goggles. Wear goggles that provide complete eye protection. Choose goggles designed to keep out dust and small particles. Safety glasses or goggles that have open vent holes will not protect you against dust and small particles.

The processes involved in accomplishing effective mold remediation are dependent upon multiple factors as each water damage situation presents its own unique set of circumstances and challenges. For example, because some water-damaged structures may produce a false negative test result based on sampling, remediation procedures should still be implemented.

It is important to note that remediation plans should not be prepared by the person or company who will be doing the remediation work. There needs to be a separation of duties in order to ensure proper procedures and industry guidelines are outlined in the remediation plan and to avoid any conflict of interest.

Mycotoxins routinely travel with spores (alive or dead) and, even more concerning, travel with very small, even submicron-sized particles capable of penetrating deep into the lungs. At this level, they are subjected to the effects of pulmonary surfactants which allow otherwise insoluble toxins to be absorbed into the bloodstream. And, as mentioned earlier in this paper, mycotoxins can cross the blood-brain barrier.

The 2013 report from the U.S. National Institute of Occupational Safety and Health (NIOSH) provides good general advice: “Building owners and employers should always respond when occupant health concerns are reported.”

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Remediation (cont'd)

The 2013 NIOSH report also says:

Renovation (and remediation) projects can create the release of airborne dusts, microbiological contaminants, gasses, and odors from both inside and outside of a building. Therefore, careful planning is essential to prevent exposures to building occupants. Key factors to consider include scheduling projects during times of low or non-occupancy, isolating work areas from occupied areas using temporary barriers, negative pressurization to prevent migration of air contaminants into occupied areas, and HEPA filtration.

Inappropriate remediation (e.g., painting over water-damaged materials, adding air-fresheners in areas to mask musty odors, and applying disinfectants or biocides to damp or moldy surfaces) can cause further problems with building degradation and symptoms in occupants.

In the 2012 study by Peitzsch et al, researchers tested ten commonly used agents purporting to be capable of neutralizing mycotoxins and/or suppressing mold growth; not one of them completely removed all mold and toxins.

Building owners, homeowners and others responsible for the proper maintenance of structures are encouraged to contact experienced, knowledgeable and certified professionals for appropriate guidance.

Serious disinformation has been popularized and reflected in the guidelines given healthcare workers and the public encouraging the use of bleach (sodium hypochlorite) and other chlorinated products for cleaning the mold from damp indoor spaces. Bleach should NOT be used. (See our paper for details.)

In regard to remediation of HVAC systems and ducts, the NADCA says source removal is the best method for cleaning HVAC systems. For best results, the entire HVAC system should be cleaned, including coils, blowers, and other components of the system.

In regard to whether biocides should be used inside air ducts, the NADCA does not recommend the use of chemicals within ductwork unless there is a specific need. They state:

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Remediation (cont'd)

Air duct cleaning service providers may tell you that they need to apply a chemical biocide to the inside of your ducts to kill bacteria (germs) and fungi (mold), and prevent future biological growth. Some duct cleaning service providers may propose to introduce ozone to kill biological contaminants. Ozone is a highly reactive gas that is regulated in the outside air as a lung irritant. However, there remains considerable controversy over the necessity and wisdom of introducing chemical biocides or ozone into the duct work.

What about the claims of some service providers that they need to use chemicals to “sanitize” the ductwork? According to the NADCA, using biocides to sanitize ductwork is illegal. They state:

The EPA has not registered any products for sanitizing or disinfecting ductwork. Further, no fungicides are registered for use in ductwork. It is a violation of federal law to use a product in a manner inconsistent with its labeling. For antimicrobials, this law is the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). Therefore, any claims of sanitizing or disinfecting ductwork would require the use of a product in a manner inconsistent with its labeling, which is a violation of FIFRA. Violations of FIFRA can result in fines and criminal penalties from the EPA.

The U.S. EPA says:

Biocides are toxic to humans. Do not use fungicides developed for use outdoors for mold remediation or for any other indoor situation

If someone tells you they have a product that can kill mold or “cure” a mold problem in your home, ask for their peer-reviewed, published research paper that validates the safety and efficacy of their product. To date, none of them have been able to provide such proof.

See *Cross Contamination* on page 14

Cross Contamination

Cross contamination is an important concept because people who have been exposed to toxic mold can cross-contaminate their homes. This can occur if you take contaminated personal items from one house to another or if you carry the contaminants on your hair and body from contaminated buildings. A key issue that is often overlooked in these situations is the nano particulates. These contain 1, 3-Beta-D-glucans, fungal antigens and mycotoxins. They can usually be found during tests of the HVAC system and the ventilation ducts.

In the case of exposures to mycotoxins including ochratoxin, it is imperative to address issues of cross contamination of items exposed to water-damaged/mold-contaminated environment. Mycotoxins are very difficult to destroy and travel readily on fine, often submicron-sized particles making simple spore testing inadequate for determining the presence of mycotoxins. Thus, a thorough approach is needed to address contamination of items exposed to water-damaged environments to avoid continued exposure to mycotoxins including ochratoxin through these items even if the building is no longer a source of exposure.

Due to the size and weight of fungi particulates, air currents and vibrations, these contaminants are spread quite easily throughout the structure. In addition to attaching itself to clothing, hair and skin (from normal daily activities), the fungal matter can be transported onto every surface. This includes furniture, electronics, clothing and other household material possessions. Computers especially get contaminated as their cooling fans pull in the spores and toxins. Vacuuming without a HEPA filter also spreads the contaminants, because the spores are spread through the air.

Another source of cross contamination occurs when mold remediation is done incorrectly. Quite often, industry guidelines for mold remediation are not followed. In addition, some companies claim to be mold remediators, but they do not have the training or certifications in this field. And, they are typically not knowledgeable about and do not follow industry guidelines for remediation. As a result, they will spread the contamination by blowing the contaminants throughout the structure and the HVAC system.



Cross Contamination (cont'd)

There are significant health risks at play when patients and their personal effects are subjected to contamination in damp, rotting, moldy—whether visible to the eye or hidden in the wall cavities—conditions indoors.

The combination of an infectious threat (the spores) and poisons riding into the occupants' lungs on the surface of respirable particulates coated with a variety of some of the most toxic substances (mycotoxins) known to humankind represents one of the most serious threats to our public's health and to the health of the individual occupants.

When patients find themselves ill after spending time in highly toxic, damp indoor environments, restoring their health depends on their removal from conditions of continued exposure—in addition to the implementation of appropriate treatment protocols.

They should be evacuated from the contaminated space and separated from their personal effects including, but not limited to, clothing, bedding, furniture, books and papers.

In regard to computers, televisions and other electronic devices, most have fans and/or electrostatic and magnetic fields that attract toxic respirable particulates and spores. All of these items are vectors for cross contaminating other indoor environments into which they are brought.

Causation

Causation is the final issue to address. Differing levels of proof are required for different audiences, and laws vary from state to state. For example, the Michigan Court of Appeals including the following wording in their opinion:

Plaintiffs do not have to present an expert witness to prove they had suffered physical ailments as a result of exposure to mold. According to the court, it was enough that mold was present and that the plaintiffs had physical ailments that could be attributed to mold exposure. The court left it to the defendant to disprove that the mold exposure did not cause the alleged illnesses.

Large, Institutional Review Board (IRB) approved, controlled, prospective, double-blinded and reproducible trials are considered the gold standard. Yet, it is very unlikely that an IRB will ever approve a prospective study that intentionally exposes humans to aflatoxin, endotoxin, digestive enzymes, polysaccharides, lipopolysaccharides (LPS) or any of the other biological toxins found in WDB to further prove that they cause illness in exposed humans. Regardless, sufficient data are already present in the published literature.

There are numerous studies and research reports regarding the health effects of ingested mycotoxins on animals and humans. In addition, there have also been studies regarding the inhalational effects of mycotoxins on mice, rats, guinea pigs and swine (pigs). However, the naysayers refuse to acknowledge those studies.

Because some of these toxins are believed to have been used in the past for biological warfare (and could be used in the future), most of the military studies on these toxins are not available to the public. However, guidance on chemical warfare and the medical management of biological casualties (including trichothecene mycotoxins) is available in books published by the U.S. military.

The U.S. military published the first edition of their handbook "Medical Management of Biological Casualties" in 1993. The seventh edition was published in 2011.

The lethality of T-2 toxin by aerosol exposure can be 10- to 50-fold greater than when injected parenterally. With larger doses in humans, aerosolized trichothecenes may produce death within minutes to hours.

Causation (cont'd)

The book specifically states that "T-2 mycotoxins are trichothecene compounds produced by a variety of filamentous fungi. They are low-molecular-weight compounds that are resistant to heat and UV light." (Remember this when a service provider tells you to install UV lights in your HVAC unit.)

Another book by the U.S. Army titled "Medical Aspects of Chemical and Biological Warfare" discusses the history of chemical and biological warfare and describes several examples.

In Table 34-3 of this book, they show the results of exposure to T-2 toxins based on several different routes of exposure (i.e., intravenous, intraperitoneal, subcutaneous, intramuscular, intragastric, intranasal, intratracheal, inhalational, intracerebral and dermal). They summarize the results as follows:

Depending on the species of experimental animal tested and the exposure procedure, the lethality of T-2 toxin by aerosol exposure can be 10- to 50-fold greater than when injected parenterally. With larger doses in humans, aerosolized trichothecenes may produce death within minutes to hours.

This shows that airborne particulates are the most problematic form of exposure. Once again, this information refutes the naysayers' false claims that mycotoxins are only harmful if ingested (eaten).

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Causation (cont'd)

The following excerpts are from a 3-year study funded by the U.S. Army and a select few inhalation studies that are publicly available.

- A 3-year research study (1982-1985) funded by the U.S. Army on the inhalation effects of mycotoxins on swine and rats.

There were several serious health effects including cardiovascular shock; leukocytosis; myocardial, brain, renal, splenic and pancreatic blood flow decreased; heart and pancreatic lesions; subendocardial hemorrhages; pancreatic edema; microscopic and ultrastructural changes in the heart included myofiber degeneration, vacuolization, necrosis and mineralization with formation of hypercontraction bands, pancreatic changes consisting of acinar degeneration and necrosis which progressed to a diffuse suppurative necrotizing pancreatitis; lesions throughout the heart, mitochondrial swelling, etc.

- A 1987 research study on mice concluded that “inhalation of T-2 mycotoxin is at least 10 times more toxic than systemic administration and at least 20 times more toxic than dermal administration.
- A 2012 study found cardiovascular effects of inhaled T-2 toxin on rats.

The study demonstrated that T-2 toxin caused marked arrhythmias, such as second-degree atrioventricular (AV) block, sinus bradycardia, supraventricular extrasystole, and ventricular extrasystole, which were accompanied by a significant increase in heart rate and a significant decrease in total power and low- and high-frequency power of heart rate variability.

- A 2016 report by Dr. Harriett Ammann.

Inhalation exposure gives direct access to the general circulation through the alveoli, without a first pass through the liver for detoxification as the ingestion route does.

**The tide is turning.
Knowledge and
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Causation (cont'd)

Inhalation exposure also provides a pathway to the central nervous system along the olfactory and trigeminal nerve axons in the nasal sensory epithelium that bypasses the blood–brain barrier.

See our paper for additional information about causation including the criteria outlined in the 2008 U.S. GAO 2008 report, re-exposure studies, and examples of causation during litigation.

Conclusion

In summary, illness caused by exposure to contaminants in water-damaged buildings is a multi-symptom, multi-system disease. While a massive acute exposure can lead to this illness, the most common mechanism is chronic exposure to low level toxin leading to an inflammatory response in the body.

Unfortunately, most physicians will not recognize the illness because they are uninformed about the variable multi-system presentations or have been misinformed about the serious health risks of molds, mycotoxins and other contaminants inside water-damaged buildings.

The tide is turning. Knowledge and awareness of this illness is spreading, and the diagnosis and treatment protocols are being shared around the world.

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