Humidity Control		Synopsis
Title	Effects of mycotoxins on neuropsychiatric symptoms and immune processes	Molds are ubiquitous in the indoor environment where there is an excess of moisture. Exposure to molds is mostly associated with **allergies and asthma**, though due to the production of mycotoxins, can affect multiple systems in the body such as the **lungs, musculoskeletal system, and the central and peripheral nervous system. Exposure to mycotoxins has also been linked to the development of autism spectrum disorder.**
Author(s)	Clinical Theurapeutics	
AA Location	Physician Form	
Web address	https://www.sciencedirect.com/sci	
Title	A Large Case-series of Successful Treatment of Patients Exposed to Mold and Mycotoxin	An evaluation was done of 100 patients who were chemically sensitive and chronically exposed to mold that still suffered from symptoms even after removing the source of mold. **64% showed respiratory symptoms, 70% showed neurologic dysfuntion, and 100% had abnormal objective autonomic system tests.** 46 patients with neurologic impairment caused by mold exposure exhibitied abnormalities in **short term memory, executive function/judgement, concentration, and hand/eye coordination**. Of the 100 patients evaluated, 85% improved completely with treatment, 14% improved somewhat, and 1% did not improve at all.
Author(s)	Clinical Theurapeutics	
AA Location	Physician Form	
Web address	https://www.sciencedirect.com/sci	
Title	Adverse health effects of indoor molds	A literature review was done to evaluate the adverse human health effects of indoor mold exposure in immunocompetent (healthy) individuals. It was found that exposure to high levels of indoor mold disrupts several organ systems and causes a variety of symptoms. Some of these symptoms include **altered brain blood flow, worsened concentration, attention, balance, and memory.** Not only does it have these neurological symptoms, but also can cause **hemorrhaging disorders, allergies, asthma, wheezing, and rhinosinusitis**. Overall, it affects multiple sytems in the body i**ncluding respiratory, hematological, immunological, and neurological systems.**
Author(s)	Journal of Nutritional and Environmental Medicine	
AA Location	Physician Form	
Web address	https://www.tandfonline.com/doi/	
Title	High ERMI during infancy as a predictor of asthma at 7 years of age	A birth cohort of 136 children were evaluated. It was found that children living in homes with high ERMI values during infancy had twice as great of a risk for developing asthma before the age of 7. Two other risk factors included parental asthma and allergic sensitization of dust mites. Air conditioning was found to reduce the risk of developing asthma.
Author(s)	Annals of Allergy, Asthma & Immunology	
AA Location	1-7	
Web address		

Humidity Control		Synopsis
Title	Dampness and Mold in the Indoor Environment: Implications for asthma	A literature review was done by the Institute of Medicine on associations between damp indoor spaces and asthma or asthma-like symptoms. **It was found that there is a positive association between damp indoor spaces and asthma symptoms, cough, and wheeze.** There has also be suggestive evidence between damp indoor spaces and exposure to mold to the **development of asthma and dyspnea**. Some evidence has shown that remediation of the mold will relieve respiratory symptoms.
Author(s)	Institute of Medicine	
AA Location	Physician Form	
Web address	https://www.sciencedirect.com/sci	
Title	Association between domestic mould and mould components, and asthma and allergy in children: a systematic review	A systematic review from 1980 to 2010 was done over the effects of mold exposure in children. It was found that **when there was visible mold and mold spores, there was an increased risk for allergic respiratory symptoms**. There was also a positive association between **visible mold and asthma, wheeze, and allergic rhinitis.** It is suggested that in cases where there is visible mold growth should be remediated to prevent risk of allergic respiratory health outcomes in children.
Author(s)	European Respiratory Journal	
AA Location	Physician Form	
Web address	https://pubmed.ncbi.nlm.nih.gov/2	
Title	Valuing the economic costs of allergic rhinitis, acute bronchitis, and asthma from exposure to indoor dampness and mold in the US	**35% of cases of allergic rhinitis, acute bronicitis, and asthma is attributed to exposure to indoor dampness and mold.** The economic costs of these cases was determined to be $3.7 billion for allergic rhinitis, $1.9 billion for acute bronchitis, and $15.1 million for asthma morbidity, and $1.7 billion for asthma mortality.
Author(s)	Journal of Environmental and Public Health	
AA Location	Physician Form	
Web address	https://www.hindawi.com/journals	
Title	Indoor mould exposure, asthma and rhinitis: findings from systematic reviews and recent longitudinal studies	There has been sufficient evidence to conclude that exposure to indoor dampness visible mold and mold odor leads to the development and exacerbation of asthma in children. There is not sufficient evidence to determine whether exposure to mold in the workplace in adults leads to the development of asthma, however it is known to worsen already existing asthma. Both of these conclusions have been made by updated analysis made by the Institute of Medicine and the World Health Organization.
Author(s)	European Respiratory Journal	
AA Location	Physician Form	
Web address	https://err.ersjournals.com/conten	

Humidity Control		Synopsis
Title	Exposure and Health Effects of Fungi on humans	Exposure to indoor dampness and mold early in life has been associated with an increased risk to developing asthma. Exposure has also been associated with increased asthma morbidity in adults. Allergic sensitization to fungi has also been associated with severe persistent asthma in adults. Mold and their metabolites are also know to cause Allergic Bronchopulmonary Mycosis, Allergic Fungal Sinusitis, and Hypersensitivity Pneumonitis. Interventions such as moisture control, killing fungi, and removing fungi contaminated materials have all shown to decrease morbidity caused by indoor dampness and mold.
Author(s)	Journal of Allergy and Clinical Immunology	
AA Location	Physician Form	
Web address	https://www.ncbi.nlm.nih.gov/pmc	
Title	Moisture Damage and Asthma: A birth cohort study	Home inspections of children averaged 5 months of age were done to evaluate for mold and moisture damage. The children were again monitored at 6 years of age. High moisture damage and visible mold in the children's rooms and living room were associated with the development of asthma and other respiratory symptoms. Atopic (predisposition to heightened immune responses to common allergens) children were found to be more susceptible to mold and moisture damage in the home.
Author(s)	Pediatrics	
AA Location	Physician Form	
Web address	https://pubmed.ncbi.nlm.nih.gov/2	
Title	Differences in presence of allergens among several types of indoor environments	Dust mite and cat allergens were tested in different types of indoor environments such as home, office, and schools. Findings found dust mite and cat allergens present. Significant levels of endotoxins were present in bedding and pillows, which exacerbates **asthma.**
Author(s)	Annali Dell'Istituto Superiore Di Sanità	
AA Location	6-1	
Web address		
Title	Guidelines on Assessment and Remediation of Fungi in Indoor Environments	A NYC DOH Guideline on fungi remediation that highlights the health issues, environmental assessment, remediation, and hazard communication when dealing with fungi in indoor environment. Health issues included Organic Toxic Dust Syndrome, Hypersensitivity Pneumonitis (**can lead to permanent lung damage**), and allergy-like symptoms such as **runny nose, eye irritation, cough, congestion, asthma.**
Author(s)	NYC Dept Health & Mental Hygiene	
AA Location	6-2	
Web address	www.ci.nyc.ny.us/html/doh/html/e	

Humidity Control		Synopsis
Title	Pediatric Aspergillosis Clinical Presentation	Details symptoms and events caused by invasive and noninvasive aspergillosis in children. Includes **sinusitis, fever, unproductive cough, epistaxis, nasal discharge, sinus pain, sore throat**. Patients w/ preexisting conditions are especially at risk. **Pulmonary disease** occurs in 80-90% of patients w/ invasive aspergillosis.
Author(s)	Vandana Batra, MD	
AA Location	6-3	
Web address	http://emedicine.medscape.com/ar	
Title	Mold Allergy Workup	Summarizes different medical tests for **allergies caused by mold such as allergic rhinitis, allergic asthma, allergic fungal sinusitis, allergic bronchopulmonary aspergillosis extrinsic allergic alveolitis.**
Author(s)	Shih-Wen Huang, MD	
AA Location	6-5	
Web address	http://emedicine.medscape.com/ar	
Title	Some Chronic Rhinosinusitis Patients Have Elevated Populations of Fungi in Their Sinuses	Seven types of fungi were found in high concentrations in the sinuses of some patients that suffer from CRS. It was proven that certain fungi can grow in the sinuses of susceptible people and surgery was required for longtime sufferers of CRS. CRS accounts for 18-22 million doctor visits per year.
Author(s)	The Laryngoscope	
AA Location	6-7	
Web address		
Title	Health effects and illnesses from mold toxins	Summarizes health effects caused by toxic mold exposure such as **fatigue, neurological effects, seizures, cough, headaches, depression and anxiety, severe allergies,** etc. Organic Toxic Dust Syndrome. Overviews different toxins produced by mold that **can affect liver or kidney function, are neurotoxins, and/or carcinogenic, etc**. **Aspergillosis is 2nd most common fungal infection in US.** References study of bone marrow transplant patients that had HEPA filter in room vs no filter. Patients with HEPA filter had no cases of aspergillosis while rooms with no filter reported 14 cases.
Author(s)		
AA Location	6-8	
Web address	http://www.dynamiclist.com/expor	

Humidity Control		Synopsis
Title	Aspergillus Candidus: A Respiratory Hazard Associated with Grain Dust	Concluded that Aspergillus Candidus posed an occupational hazard to grain workers due to immunomodulating properties, causing allergic and immunotoxic diseases. Rabbits exposed to the fungus experienced inflammatory changes such as hemorrhagic and exudative changes in the lungs. Both rabbits and human groups showed a significant reaction to the fungus in the leukocyte migration and precipitation test as compared to the control group that showed no change or a decrease.
Author(s)	Annals of Agricultural and Environmental Medicine	
AA Location	6-9	
Web address		
Title	Isolation and Identification of Aspergillus fumigatus Mycotoxins on Growth medium and Some Building Materials	Gliotoxin was isolated from Aspergillus fumigatus mold samples collected from **building material** and growing medium. Aspergillus fumigatus is an indoor mold. Gliotoxin is a known cytotoxin due to its production of reactive oxygen species, **which damages DNA**. The genotoxic compounds isolated, including gliotoxin, was shown to be damaged to mouse hepatoma cells. This study shows that indoor mold exposure can also lead to mycotoxin exposure.
Author(s)	Applied and Environmental Microbiology	
AA Location	6-10	
Web address		
Title	Microbial Growth Inside Insulated External Walls as an Indoor Biocontamination Source	Actinomycete growth within the building envelope caused increased concentrations in the indoor air. Increased indoor moisture content also increased the concentration measured. However, in a subarctic climate, indoor air biocontamination from the envelope of concrete panels is rare though it should not be ignored. Should be noted this study was done in Finland, a subarctic climate.
Author(s)		
AA Location	6-11	
Web address		

Humidity Control		Synopsis
Title	Fungal Exposure: Toxicity and Immunology	Summarizes mycotoxins and their effect on human health, inhaling even dead mold spores can be a source of the toxins. Ochratoxin A has genotoxic carcinogenic effects in the liver, kidney, brain, heart, testicles, spleen, and bladder. It also accumulates in the brain and has an effect on NMDA receptors. Aflatoxins can lead to liver necrosis and tumorigenesis. In 16-20% of people fungus exposure causes an eosinophilic inflammatory response. **Mycotoxin production increases by up to 40,000 times when the mold dries, so it is still a health risk even if the mold is dead.** Chronic exposure to **mixed molds** are **central and peripheral nervous system complaints, severe fatigue, shortness of breath and chest tightness, recurrent flu-like illness**, etc. Many autoimmune diseases are associated with mycotoxicosis such as Thyroiditis, Type 1 Diabetes, Lupus, Crohn's Disease, and more. Patients exposed to molds and/or VOCs emitted by buildings experience these symptoms: **decreased balance, dizziness, decreased memory, asthma, slower rxn time, altered mood state scores, and more neurobehavioral dysfunctions as well as irritations in the eyes, nose and throat.** Mycotoxins also disrupt Vitamin B12 and cause a deficiency. 97% of patients with a history of mold exposure, fatigue, and chronic sinusitis have fungal antibodies.
Author(s)		
AA Location	6-12	
Web address		
Title	Indoor Mold, Toxigenic Fungi, and Stachybotrys chartarum: Infectious Disease Perspective	Concludes upon literature research that there cannot yet be made any connection between serious illness caused by Stachybotrys exposure. However, it should be noted that this study was completed in 2003 before any significant and legitimate research into the topic was made, as well as the study being funded by CNA Insurance Corp, a property and casualty insurance company. Also, Stachybotrys is only found in 12.8% of dwellings tested and is not the only mold or mycotoxin known to produce ill effects.
Author(s)	Clinical Microbiology Reviews	
AA Location	6-12	
Web address		

Humidity Control		Synopsis
Title	Facts about Stachybotrys and other molds	Molds themselves are not toxic, but rather the mycotoxins that they may produce. There is sufficient evidence linking respiratory symptoms to mold such as **cough and wheeze (in healthy individuals), eye irritation, nasal stuffiness, skin irritation, asthma in asthma patients, and hypersensitivity pneumonitis in immunocompromised patients.** There is a potential link to early mold exposure to development of **asthma in children.** Molds are common in buildings and homes where moisture is present. **Good prevention is keeping humidity levels below 50% and have adequate ventilation.** Immunocompromised patients or people with chronic lung conditions are at higher risk of fungal infections.
Author(s)	CDC	
AA Location	6-14	
Web address	http://www.cdc.gov/mold/stachy.h	
Title	Mold Exposure in Infancy May Raise Asthma Risk	Studies performed by the University of Cincinnati, EPA, and Children's Medical Center concluded that there might be a **possible link between exposure to mold during infancy and development of asthma by age 7**. Of the nearly 300 infants in the study, 25% developed asthma before age of 7 and the only indoor contaminant that could have lead to the asthma was mold. Three types were associated with the development: A. ochraceous, A. unguis, and Penicillium variable.
Author(s)	News, H.	
AA Location	6-15	
Web address	https://consumer.healthday.com/re	
Title	It's Time to Break the Mold	Aspergillosis cases were monitored at 24 medical centers and **more than half died within three months of a positive culture**. Mold growth situations were evaluated at hospitals, one where wet building materials with visible fungal growth was used. After disposal of the visibly contaminated material, the remaining material still tested positive for high concentrations of several aspergillus species. At the final stage of construction (of the OR and NICU wing), they again tested positive for aspergillus. Only after extensive cleaning and vacuuming with HEPA filters did the concentration decrease significantly. When carpet was removed in another wing, Aspergillus niger levels increased ten-fold during removal. Aspergillus was also found in showerheads of patient rooms.
Author(s)	Mary Jo and Stephen Vesper	
AA Location	6-15	
Web address	https://www.infectioncontroltoday	

Humidity Control		Synopsis
Title	Stachybotrys Chartarum: The Toxic Indoor Mold	The mycotoxins produced by s. chartarum are known hazards to human health. One mycotoxin it produces is a variety of macrocyclic trichothecenes, which are highly toxic due to their ability to inhibit protein synthesis. Satratoxin is one type of trichothecene that has an LD50 as low as 1mg/kg in mice. Outbreaks of disease in E. Europe among horses and other farm animals were attributed to S. chartarum, where 1mg of pure toxin resulted in death of the horse. The outbreak was from infested hay and feed, and humans that handled it were also affected. **They experienced rash, pain/inflamm. in mucous membranes, cough, fever, headache, fatigue, etc**. **Another outbreak recorded in a flooded NY office building experienced the same symptoms listed above and pulmonary disease.** Concluded that environments contaminated with s. chartarum are unhealthy, especially for children.
Author(s)	Berlin D. Nelson	
AA Location	6-15	
Web address	http://www.apsnet.org/online/feat	
Title	Stachybotrys Chartarum	Individuals exposed to toxins produced by s. chartarum reported **cold and flu-like symptoms, memory loss, muscle aches, fatigue, sore throat, diarrhea, headache, hair loss, dermatitis, malaise, and cancer.** Animals injected with the toxin experienced **necrosis, depression of immune response, and hemorrhaging of target organs**. Trichothecenes are also 40x more toxic when inhaled than orally ingested by animals. There have also been several cases of **pulmonary hemorrhaging** in both animals and humans exposed to s. chartarum, **primarily in children.** Areas with humidity above 55% and high cellulose and low nitrogen content are ideal for toxin production. S. chartarum is incredibly hard to kill and some experts say not even fire will completely rid an infestation. It is recommended that prevention through scheduled maintenance and inspection for water leaks is done.
Author(s)	Susan Lillard	
AA Location	6-15	
Web address	http://www.mold-help.org/content	

Humidity Control		Synopsis
Title	Profiles of Airborne Fungi in Buildings and Outdoor Environments in the US	This study concluded that airborne fungal concentrations were lower in indoor air compared to outdoor levels. Fungi usually enters through outdoor air intakes of heating, vents, AC, doors/windows, and contaminants on building materials. Highest concentrations in both indoor and outdoor were found in the Southwest, Far West, and Southeast. Up to 86% of buildings had a common fungus type detected. The highest concentrations were in buildings with visible growth and the next highest were from buildings that received health complaints. The median indoor lvls were higher where hypersensitivity pneumonitis was reported. The study proved that outdoor air has an impact on IAQ, though outdoors had 6 to 7 times higher fungal concentration. A major limitation to this study was there was no information on building conditions or where samples were collected and no information on whether samples were taken at complaint areas.
Author(s)	Applied and Environmental Microbiology	
AA Location	6-16	
Web address		
Title	Podium Session 122: Biosafety and	Relevant info in document: **Respiratory symptoms were constantly reported by employees of a high rise office building. The building had high relative humidity and multiple water incursions with visible mold growth in multiple areas. Aspergillus flavus, Aspergillus versicolor, Chaetomium, and Stachybotrys chartarum were detected in both air and surface samples.**
Author(s)	Phillip R. Morey, PhD, CIH	
AA Location	6-17	
Web address		

Humidity Control		Synopsis
Title	AIHA Position Statement on Mold and Dampness in the Built Environment	Very brief wetting episodes are usually not a problem if adequate drying occurs. Building dampness has been associated with multiple health risks such as **respiratory symptoms, asthma, hypersensitivity pneumonitis, rhinosinusitis, bronchitis**, etc. Due to the health risks, the National Institute for Occupational Safety and Health, many state govts, and the World Health Organization has deemed intervention of moisture buildup and mold removal necessary. It was found that a high percentage of makeup air was below the standard set by the American Society for Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE). Improper temperature, humidity levels, and other indoor contaminants such as VOCs were also found to be below this standard. The AIHA has also deemed mold remediation necessary regardless of species, and remediation will likely reduce new onset asthma and reduce healthcare costs. Hidden damage should also be a focus of remediation and relocation of occupants with preexisting conditions may be considered appropriate. Sampling data should also be obtained in a format that is comprehensible to physicians and other related professionals.
Author(s)	American Industrial Hygiene Association	
AA Location	6-18	
Web address		
Title	Microorganisms, Mold, and IAQ	**The EPA has rated indoor air pollutants as third out of 30 environmental risks. This leads to expensive litigation, healthcare, and remediation. Bioaerosols are known to exacerbate asthma, which affects 20 million Americans and costs $13 billion per year**. Asthma is also the leading chronic illness in children, while **20% of schools in the US have indoor air problems. Another 30% of buildings in the US and Europe have moisture problems that could lead to microbial growth**. High levels of indoor moisture have been associated with **headaches, congestion, sore throat, cognitive problems, gastrointestinal problems, fever, muscle pain, cough, skin and eye irritation**, and more. Environmental sampling needs improvement due to it not always providing clear connections between poor indoor air quality and relating illnesses. The best defense against mold is **prevention by dehumidification and adequate ventilation.**
Author(s)	American Society for Microbiology	
AA Location	6-19	
Web address	https://apnews.com/article/244cc2	

Humidity Control		Synopsis
Title	1 dead, 5 infected by mold that halted hospital surgeries	At Seattle Children's Hospital, **one patient died and five others were infected by aspergillus** that were infested in several operating and equipment storage rooms. The mold reappeared several times over the course of a few years and the cause seemed to be from deficiencies in the air handling and purification systems.
Author(s)	Associated Press News	
AA Location	6-20	
Web address		
Title	OSHA A Brief Guide to Mold in the Workplace	The Occupational Safety and Health Administration in 2013 published a guide on mold health effects, prevention, and remediation. **Moisture buildup has been linked to tightly sealed buildings that have poor ventilation. For prevention of mold, it is recommended to reduce the moisture in the air, repair leaks, and increase ventilation.** Humidity meters to monitor indoor humidity levels can be purchased for under $50, or an alternative is a humidistat, which turns on the HVAC system when humidity levels reach a certain percentage. During remediation, it is recommended to have a filter of at least MERV 8 to prevent spore spreading. **The allergic responses to mold exposure are hay fever-like symptoms like runny nose, sore throat, and red eyes**. Immunocompromised or asthmatic people are more at risk for systemic infection. The report also details mold cleanup procedures for professionals, which includes extensive procedures and personal protective equipment.
Author(s)	OSHA	
AA Location	6-21	
Web address	https://www.osha.gov/dts/shib/shi	
Title	Case Study: Controlling Humidity in Affordable Multi-Family Housing for Health, Comfort, and Property Protection	A complex built in 2015 was designed to be energy efficient. However, the two-stage cooling equipment did not properly account for the humidity brought in by the fresh-air intake. Mold growth was present on the walls in multiple rooms where the temperature was 66 degrees but humidity at 74.4%. An in-wall dehumidifier was installed, which immediately remediated the issue to humidity levels at 50% and the temperature at 75 degrees.
Author(s)		
AA Location		
Web address	https://hvac-blog.acca.org/case-stu	

Humidity Control		Synopsis
Title	Neurologist opines on nerve damage from toxic mold exposure	A man suffered from severe neurological symptoms after a burst water pipe caused water damage which lead to black mold growth in his apartment. He suffered from **memory loss, headaches, and seizures.** An expert witness on neurology claimed that in his experience, he has seen neurological symptoms such as **seizures, headaches, and demyelination, gait abnormality, confusion, ataxia, and nystagmus caused from toxic mold exposure.**
Author(s)	J. O'Neill	
AA Location	6-22	
Web address	https://www.expertinstitute.com/r	
Title	Myxomycete spore: unrecognized aeroallergens?	42% of subjects had positive results for allergic sensitivity to myxomycete spores. A significant portion of the subjects that suffered from seasonal allergic rhinitis (SAR) tested negative on a typical allergy panel, but positive to myxomycete spores. Most subjects also had positive results for more than one myxomycete species. Myxomycete spores are mostly found outdoors and it can be concluded that they account for some "unknown seasonal aeroallergens."
Author(s)	Annals of Allergy, Asthma & Immunology	
AA Location	6-24	
Web address		
Title	NYC Housing Authority to come under judicial oversight over mold in apartments	The NYC Housing Authority has come under judicial oversight due to mold in apartments that had been consistently ignored. Oftentimes the mold infestation was just painted over rather than remediating the problem as well as the cause. The Housing Authority will now face large fines if the problem is not fixed correctly. The Metro Industrial Areas Foundation has also filed with the ADA for housing asthma tenants in mold-infested apartments.
Author(s)	NY Daily News	
AA Location	6-25	
Web address	https://www.nydailynews.com/nev	

Humidity Control		Synopsis
Title	Mold, mice, and zip codes: Inside childhood asthma epidemic	There have been significant links made between asthma rates and poverty. In a study of 5,563 children, 20.7% had asthma. But when you evaluated an impoverished community, that number jumped to 47%. The link can be made to housing infested with cockroaches, mice, and mold. In one case, the NYCHA ignored repairs and when a complaint was made by a family with a child suffering from serious illness due to mold, it took them two years to remedy the problem and source.
Author(s)	NBC News	
AA Location	6-25	
Web address	https://www.nbcnews.com/feature	
Title	US District Court NYCHA	The US District Court stipulation and hearing made it law for the New York City Housing Authority to accommodate tenants with asthma and to remedy mold/dampness in housing within a certain time period as well as fix the cause of the mold infestation properly.
Author(s)		
AA Location	6-26	
Web address		
Title	Fungal colonization of automobile air conditioning systems	29 automobiles in Atlanta, Georgia were analyzed for fungal colonization by taking air and swab samples of the AC unit. 6 different species of fungi were detected in high concentrations. The samples were taken from cars that received complaints for foul odor.
Author(s)	Journal of Industrial Microbiology and Biotechnology	
AA Location	6-27	
Web address		

Humidity Control		Synopsis
Title	Air and Dust borne Mycoflora in Houses Free of Water Damage and Fungal Growth	Samples and analysis of mycoflora were obtained from homes that did **not** have a known water damage or mold problem in order to establish a baseline reference for buildings with such infestations. It was found that in both winter and summer months that air and dust samples did not differ from outside air. The fungi that was mostly present was leaf and soil fungi while water indicator fungi were not found. This implies that if samples have >20% of leaf/soil fungi, they are unlikely to be from buildings free of moisture or water damage.
Author(s)	Applied and Environmental Microbiology	
AA Location	6-28	
Web address		
Title	Infant Origins of Childhood Asthma associated with specific molds	Dust samples from 289 homes were collected from families that had an infant at 8 months of age. 24% of the infants were diagnosed with asthma by age 7, and **there was a statistically significant correlation between the asthmatic children and high ERMI values sampled.**
Author(s)	Journal of Allergy and Clinical Immunology	
AA Location	6-29	
Web address		
Title	Hydrophilic Fungi and Ergosterol Associated w/ Respiratory Illness in a Water-Damaged Building	In an office building with a history of water damage, respiratory symptoms were documented and evaluated. **A direct linear relationship was discovered between respiratory illnesses and the levels of hydrophilic fungi. Asthma was the most strongly associated respiratory illness and adult-onset asthma increased 7.5 times after occupying the water-damaged building.**
Author(s)	Env. Health Perspectives	
AA Location	6-30	
Web address		
Title	US Toxic Mold Safety and Protection Act	Details the United States Safety and Protection Act, an act proposed by U.S. Congressman John Conyers Jr. The goal of the act was to establish general guidelines for preventing and removing mold as well as tax credits and grants for mold removal and inspection/remediation. A key point in the bill was to modify building codes to prevent mold hazards in the future.
Author(s)		
AA Location	7-1	
Web address		

Humidity Control		Synopsis
Title	AIHA Facts About Mold	Mold becomes a problem in homes where there is water damage or prolonged exposure to humidity or dampness. The key to preventing mold growth is controlling the excessive moisture and condensation **by use of a dehumidifier, temperature control, and better ventilation**. Mold contains toxins and low concentrations of these toxins have shown inflammation in animal test subjects. They are also known to exacerbate asthma. Symptoms of mold exposure can be **allergic reactions and flu-like symptoms and skin rash**. Eliminating the mold problem typically shows symptom improvement. People most at risk for developing adverse health effect from mold exposure **are children, elderly, pregnant women, and people with respiratory conditions and weakened immune symptoms.**
Author(s)	American Industrial Hygiene Association	
AA Location	7-2	
Web address		
Title	Auerobasidium	Multiple studies have shown that there is a strong association with mold exposure and allergic rhinitis and asthma in children. In one study, a birth cohort consisting of 405 children were evaluated for their possible development of allergic rhinitis. This development was found to coincide with high levels of Aspergillus found in the homes. **Mold can be prevented by stopping it from entering the home by the use of allergy-grade filters, controlling indoor moisture levels, fixing leaks, providing adequate ventilation, and using HEPA filters on vacuums.**
Author(s)	Env. Health Perspectives	
AA Location	7-3	
Web address		
Title	Mycotoxin List	Mycotoxins are the secondary metabolites produced by some molds. They are nearly all cytotoxic. Whether a mold produces a certain mycotoxin depends on both its species and environment. Mycotoxins are known to negatively affect the following systems: **vascular (hemorrhaging), digestive (nausea and vomiting), respiratory system, nervous system (depression, headache, etc.), cutaneous system (skin rash), reproductive system (infertility or irregular cycles) and immune system (suppression).**
Author(s)		
AA Location	7-4	
Web address	www.micotoxins.com.br	

Humidity Control		Synopsis
Title	Quantitative PCR analysis of molds in the dust from homes of asthmatic children in North Carolina	Vacuum bag dust from the homes of 19 asthmatic children were analyzed for mold and compared to the vacuum bag dust from 176 healthy homes. It was found that the mold content was significantly higher in the homes of the asthmatic children.
Author(s)	Journal of Environmental Monitoring	
AA Location	7-5	
Web address		
Title	Industry Concerns	The Insurance Industry was estimated to have spent over $30 billion in claims due to moisture issues in 2008. An estimated $60 billion worth of buildings go without insurance due to mold/moisture issues. Mortgage Bankers Association suggests that an annual moisture inspection would minimize financial impact through prevention. In 1999, the Mayo Clinic reported that 98 % of the 40 million Americans that suffer from chronic sinus infections IS caused by mold.
Author(s)		
AA Location	7-7	
Web address	www.evsp.com/industryfacts.php	
Title	About Mold and Moisture	People with mold allergies may experience **watery eyes, runny/stuffy nose, itching, headaches, and difficulty breathing.** Exposure to mold can also **trigger asthma attacks**. The mycotoxins produced by some molds can also pose a serious health risk to people with compromised immune systems.
Author(s)	HUD	
AA Location	7-8	
Web address	https://www.hud.gov/program_off	
Title	Preventing Common Springtime Allergies	Moisture and warmth increase prevalence of both dust mites and mold, two common allergens. Relative humidity in the home should be kept under 50%. The proper use of a dehumidifier can help your home achieve these levels. When kept below 50% humidity, dust mites die within 5-11 days. National Allergy also recommends adding additional filters to assist the furnace filter during allergy season.
Author(s)	National Allergy Newsletter	
AA Location	7-9	
Web address	www.nationalallergy.com/	

Humidity Control		Synopsis
Title	Mold Allergens in Respiratory Allergy: From Structure to Therapy	The paper highlights the widespread experience of fungal allergies. **They cause respiratory and skin symptoms and is associated with allergic rhinitis and asthma.** The study focuses on the immune response of people allergic to molds and that allergies are often overlooked because they coincide with other allergies. Proper allergy testing of molds needs to be introduced. Immunotherapy for mold allergy is still under research though the quality of mold extracts is limiting.
Author(s)	Allergy, Asthma & Immunology Research	
AA Location	7-10	
Web address		
Title	Fungal Allergy in asthma-state of the art and research needs	The poor control of asthma and sensitivity to fungi and fungal infection are correlated. Greater than 65 million people have severe asthma as well as fungal sensitivity. An estimated 4.8 million people have allergic **bronchopulmonary aspergillosis, which is a serious health condition that can cause permanent lung damage**.
Author(s)	Clinical and Translational Allergy	
AA Location	7-11	
Web address		
Title	Scopulariospsis, a poorly known opportunistic fungus: spectrum species in clinical samples and in vitro responses to antifungal drugs	Scopulariopsis is a common fungus known for its resistance to antifungal agents. It has mainly caused superficial tissue infections, though in more severe cases it has been involved in deep tissue infections like **pneumonia, endophthalmitis, subcutaneous and brain abscesses, invasive sinusitis, peritonitis, and endocarditis.**
Author(s)	Journal of Clinical Microbiology	
AA Location	7-12	
Web address		
Title	Unhealthy Carpets	Contains a list of molds found in unhealthy carpets and whether toxins are produced. Nearly all molds were found in the unhealthy carpet, while several species of Aspergillus were present w/ toxin produced, as well as Auerobasidium pullulans, Stachybotrys, and Trichoderma.
Author(s)		
AA Location	7-12	
Web address		

Humidity Control		Synopsis
Title	Importance of aspergillus spp. isolation in acute exacerbations of severe copd: Prevalence, factors and follow-up: The fungi-copd study	Of 240 patients evaluated who had visited the ER for acute exacerbations of COPD (AECOPD), 16.6% had Aspergillus spp isolation and 14.4% did after a one year follow-up. It was found that patients who had previously received antibiotics and/or corticosteroids promoted the isolation of Aspergillus spp, suggesting a strong relationship between the two. Studies suggest that Aspergillus spp detection does not worsen clinical conditions, though there was a high prevalence of Aspergillus spp isolation in the AECOPD (requiring hospitalization) patients.
Author(s)	Respiratory Research	
AA Location	7-43	
Web address		
Title	Development of Aspergillosis in a cohort of non-neutropenic, non-transplant patients colonized by Aspergillus spp	67 patients colonized with Aspergillus spp were evaluated, and 17.9% of them developed aspergillosis. This high percentage of disease progression indicates that colonization is a risk factor and should be considered, especially in patients with COPD.
Author(s)	BMC Infectious Diseases	
AA Location	7-44	
Web address		
Title	Mold Toxin Reduction of Vitamin B12 and Neurological Function	**Researchers have reported that those chronically exposed to indoor mold have also had vitamin B12 deficiencies**. B12 deficiency hinders the body's ability to make blood and accelerates blood cell destruction. This can damage the nervous system and cause symptoms like **fatigue, burning of tongue, lost appetite, weakness, gastrointestinal problems, emotional and psychological problems, and numbness.**
Author(s)	The Scientific World Journal	
AA Location	8-R	
Web address	http://www.anapsid.org/cnd/diffdx	

Humidity Control		Synopsis
Title	Human Health Effects of Airborne Mycotoxin Exposure in Fungi-contaminated indoor environments	Mold contamination has been a problem in buildings for a number of years and has been so extreme in some cases that the cost of remediation equaled the cost of construction of the contaminated building. In one case, burning was the only plausible solution due to the extent of the contamination. Mold exposure poses adverse health effects for humans due to the mycotoxins that they are capable of producing. Exposures to mycotoxins can include symptoms like **pulmonary hemorrhage, dermatitis, cold/flu-like symptoms, fatigue, diarrhea, headaches, and sore throat.** However, these are just the acute effects. Chronic effects include **carcinogenicity, mutagenicity, teratogenicity, and central nervous system and immune system damage**. One mold induced condition is Organic Toxic Dust Syndrome, which is caused by the inhalation of dust contaminated with a mixture of endotoxins, mycotoxins, glucans, and antigens, all of which have adverse health effects. Mold can be controlled and prevented in the home by **maintaining the indoor humidity level between 30-50%** and regular HVAC maintenance and fast repair of water leaks.
Author(s)	American Society of Safety Engineers	
AA Location	8-W	
Web address		
Title	Prevention is the best medicine: new asthma reduction model for moldy homes	A study of 1,100 homes was done to establish the Environmental Relative Moldiness Index (ERMI), which is typically in ranges from -10 to 20 or higher. The higher the ERMI value, the higher the mold content in the home. A Cleveland study was done to evaluate the effect of remediation of moldy homes with asthmatic children. The average ERMI value of these homes was 10 on the scale. The average cost of remediation was $3,000. **A significant reduction in maximum symptom days and a ten-fold reduction in ER visits/hospitalizations was observed in the 10 months following remediation. The ERMI values in the home were also significantly reduced.**
Author(s)	AARC Times	
AA Location		
Web address		

Humidity Control		Synopsis
Title	Biological Pollutants' Impact on Indoor Air Quality	Biological pollutants negatively affect the indoor air quality and include bacteria, viruses, animal dander, house dust, mites, cockroaches, mold, and pollen. **Keeping a relative humidity of 30-50% is recommended** to keep these pollutants at bay. House dust mites are a particular strong allergen and grows in damp, warm spaces. Some health effects from these biological contaminants include **hypersensitivity pneumonitis, allergic rhinitis, asthma**, and symptoms such as **sneezing, watery eyes, cough, dizziness, shortness of breath, fatigue, fever, and digestive problems.** Along with keeping humidity between 30-50%, it is also recommended to **install exhaust fans** in the kitchen and dryer that vent outdoors, **ventilate attic and crawl spaces**, **clean and dry water damage quickly**, and good housekeeping. Some **long term health effects of bad indoor air quality include respiratory diseases, heart disease, and cancer.**
Author(s)	EPA	
AA Location	9-24	
Web address		
Title	Why is relative humidity important?	Mold and biological contaminants thrive in conditions where relative humidity is higher than 80%. Attic and crawl spaces are at particular risk because they are naturally cool and damp from moisture coming from the ground. This is why it is important to have adequate ventilation in these spaces, dehumidification, and no exposed soil in crawl spaces.
Author(s)	Healthy Indoors	
AA Location	9-26	
Web address		
Title	How to avoid allergy and asthma triggers	Some of the most common allergen triggers are dust mites, pollen, pet dander, mold, and cockroaches. Dust mites can live nearly everywhere but thrive in beds, upholstered furniture, and carpet. **20 million Americans are allergic to dust mites**. They thrive in high humidity environments and the **best way to avoid/ rid of them is to keep relative humidity below 45%, mite proof casing on beds, pillows, and comforters, and removing or treating carpet regularly. To avoid pollen in the home, changing the furnace filter and using an air purifier can help. To avoid mold in the home, it is important to watch out for moisture buildup, repair leaks promptly, and keep relative humidity below 45%.**
Author(s)	Nat'l Allergy Newsletter	
AA Location	9-25	
Web address		

Humidity Control		Synopsis
Title	In-office air quality contamination: What you don't know will harm you	The US Department of Labor database, Occupational Informational Network, determined that dentistry is the most unhealthy job in America out of 974 occupations. This is due to the exposure to contaminants, both biological and man-made, that a dentist comes into contact with everyday. This is from the cleaning and dentistry products they use as well as the biological contaminants each patient brings in. It is recommended to have a proper filtration and ventilation system capable of removing dust, VOCs, mold, bacteria, and germs and viruses (killed by UV light).
Author(s)	Oral Health Group	
AA Location	9-26	
Web address	https://www.oralhealthgroup.com/	
Title	Indoor Mold: Better Coordination of research on health effects	As of 2008, it has been confirmed that exposure to indoor mold poses certain adverse health effects such a**s worsening pre-existing asthma**, though it has been stated by GAO (U.S. Government Accountability Office) that there is not sufficient evidence to link it to development of asthma, cancer, and acute pulmonary hemorrhage. GAO recognizes the current gaps in scientific understanding of the health effects of mold and that more needs to be studied. However, enough is known about the potential health risks that federal agencies have directed how to minimize and mitigate exposure.
Author(s)	Government Accountability Center	
AA Location	1-1	
Web address		
Title	Amid suits over mold, experts wear two hats	After recently moving into a New York apartment, a couple complained of **headaches, rashes, respiratory infections, and fatigue** that they attributed to mold. However, in the legal battle it was determined their claims were not backed up by scientific evidence due to an American College of Occupational and Environmental Medicine paper on mycotoxins. It was later discovered that the people who wrote the paper were paid experts in defense in mold litigation, revealing their bias in writing the paper.
Author(s)	Wall Street Journal	
AA Location	1-2	
Web address	https://www.wsj.com/articles/SB11	
Title	Mold in the Home: Mold and Removal Information	An article written by the National Association of Realtors that discusses mold in the home and the possible (though stated as not yet proven) adverse health effects mold exposure causes. These symptoms include **asthma attacks, memory loss, neurological problems, and death**. It summarizes a variety of court cases involving mold exposure in apartment homes or rentals or newly purchased homes. The Texas Department of Health developed guidelines to address indoor air quality in 2001, though compliance is voluntary.
Author(s)	National Association of Realtors	
AA Location	1-3	
Web address		

Humidity Control		Synopsis
Title	Institute of Medicine Report on Damp Indoor Spaces and Health	The American College of Medical Toxicology provides a position statement on the adverse health effects of mold exposure. It is accepted that d**amp indoor spaces present health risks to humans such as the allergic reactions to fungi, dust mites, bacteria, cockroaches, and more**. However, exposure to mycotoxins needs more study to eliminate the common misconceptions. Despite this, **Organic Dust Toxic Syndrome is associated with the inhalation of a large amount of endotoxins and mycotoxins and causes fever, malaise, headache, dyspnea, chest tightness, and cough.**
Author(s)	American College of Medical Toxicology	
AA Location	1-4	
Web address		
Title	Request for Transparency & Oversight of Federal Funds Used to Educate US Pediatricians	Contains a list of 70 issue-educated and concerned physicians, scientists, and citizens requesting the transparency and federal funds to educate and **address children's illnesses caused by damp indoor environments and water damage buildings.**
Author(s)		
AA Location	1-5	
Web address		
Title	Biological contamination in the HVAC system	Biological contamination of HVAC systems can be a major source of poor indoor air quality. It can host microbes of all kinds, which accounts for 1/3 of all indoor air quality issues. It is recommended to upgrade filtration efficiency, clean/maintain HVAC system and drainage pan regularly, maintaining humidifiers, and placing makeup air intakes away from possible sources of pollution like the street or dock.
Author(s)	Chin S. Yang, PhD	
AA Location	1-6	
Web address		
Title	Colonization of Cladosporium spp. Of painted metal surfaces associated with heating and air conditioning	It was discovered that Cladosporium cladosporioides and C. herbarum colonized the painted surfaces inside of register vents and HVAC systems. They were also found in abundance around and inside of crawl spaces.
Author(s)	Journal of Industrial Microbiology	
AA Location	1-7	
Web address		

Humidity Control		Synopsis
Title	Dust Mite Allergen	Dust mites are found in home all around the world and largely rely on humidity above 50% to survive. They are typically found residing in bedding and pillows. **They are known to cause asthma in children, trigger asthma attacks (85% of asthmatics are allergic to dust mites), hay fever and asthma, and aggravate atopic dermatitis**. The best way to prevent and control dust mites is to **maintain relative humidity below 50%**, wash bedding in hot water, **use HEPA filters**, dust-resistant bedding, replace carpet with hardwood, and vacuum regularly.
Author(s)		
AA Location	1-8	
Web address		
Title	Relative moldiness index as predictor of childhood respiratory illness	A birth cohort study was done to evaluate the occurrence of atopy and atopic respiratory disorders in infants at one year of age in association with moldy or water damaged home environments and house dust mite prevalence. **It was found that Group 1 molds were in higher concentrations in homes of children who had respiratory illness**. There was a **two times greater risk of developing wheezing in infants when there was mold/water damage present.**
Author(s)	Journal of Exposure Science & Environmental Epidemiology	
AA Location	1-9	
Web address		
Title	Association between sensitization to Aureobasidium pullulans and severity of asthma	It has been determined in previous studies that **exposure to aspergillus and aureobasidium in the first three months of life increased the risk of developing allergic rhinitis before the age of 5**. It has also been determined that **mold allergy is a risk factor for severe asthma**. In this study, sensitivity to **A pullulans was associated with severity of asthma**. There was also a **high rate of sensitivity to mold in both asthmatic patients and the control group (98% and 66%, respectively).**
Author(s)	Annals of Allergy, Asthma & Immunology	
AA Location	1-10	
Web address		
Title	Indoor air quality scientific findings resource bank	In surveys, it was discovered that about half of US homes have visible evidence of mold contamination or building dampness. It was also found to be common in schools and offices. Mold exposure in the indoor environment is associated with **upper respiratory symptoms, cough, wheeze, and asthma exacerbation**. Dust mite allergens also greatly **increase the severity of asthma and the development of asthma**. It is also associated with **allergic rhinitis, sneezing, runny nose, postnasal drip, congestion, and atopic dermatitis**.
Author(s)	IAQ Science	
AA Location	1-15	
Web address	https://iaqscience.lbl.gov/dampnes	

Humidity Control		Synopsis
Title	Allergies and Fungus	In a 1989 study of seven different studies, it was found that 23% of the 400 subjects who had asthma or hay fever also had a sensitivity to basidiospores. In Seattle, 44% were allergic and 13% had an allergic reaction. It is recommended to keep humidity below 50% in the home and to use dust mite covers on bedding and furniture.
Author(s)	Environment, Health, and Safety Online	
AA Location	1-24	
Web address	https://www.ehso.com/fungusaller	
Title	Sinus Infection	Sinusitis is an infection that can either be acute or chronic and has symptoms such as **headache, pressure in face or head, cough, fever, and nasal congestion**. Sinusitis can either be caused by a virus, allergies, or fungi. **Fungi is particularly associated with chronic sinusitis. In severe cases, sinusitis can lead to surgery, blindness, coma, and death if left untreated.**
Author(s)	WebMD	
AA Location	1-27	
Web address	https://www.webmd.com/allergies	
Title	Air-o-cell method interpretation guide	A guide providing interpretation and instruction on locating indoor air pollution sources. Exposure to mold can cause **cold and flu-like symptoms, allergy hay fever, and asthma. Mold needs 3 basic criteria to colonize: moisture source, food source, lack of air flow or disturbance**. Other aerosols found in the home are fiberglass fibers, bioaerosols such as pollen, and opaque particles (like from combustion). Of bioaerosols and aerosols, mold spores and opaque particles are the most common in the indoor environment.
Author(s)	Environmental Analysis Associates	
AA Location	1-29	
Web address		
Title	Hypersensitivity pneumonitis from residential exposures	A case study was done on a woman who presented with **summertime cough for 8 year**s and had to be put on long term corticosteroids. **A mold infestation was discovered in her basement and only after moving away did her symptoms go away and she was able to stop steroid treatment.** HP has typically been associated with mold contamination in HVAC systems or humidifiers. In one Canadian survey respiratory symptoms were associated with mold and damp buildings.
Author(s)	Env. Health Perspectives	
AA Location	1-30	
Web address		
Title	Exposure to Alernaria alternata in US homes is associated with asthma symptoms	In a study of 831 homes and 2,456 individuals, it was discovered that with increasing amounts of the fungi Alternaria alternata found in the home increased the prevalence of current symptomatic asthma and also increased the odds of having asthma symptoms in the past year. Thus **it can be concluded that there is a positive association between current asthma symptoms and exposure to Alternaria alternata.**
Author(s)	Journal of Allergy and Clinical Immunology	
AA Location	1-5	
Web address		

Humidity Control		Synopsis
Title	Implementation of the toxic mold protection act	The Toxic Mold Protection Act of 2001 was created to address the health effects of indoor mold exposure in California and to propose guidelines on the prompt and safe removal of said molds. A permissible exposure limit was also requested to be identified. It has been determined that damp/moldy buildings pose adverse health effects such as cough, wheeze, and worsening of asthma. It also introduces other allergens such as dust mites and cockroaches into the environment, both of which can cause respiratory illness.
Author(s)	CA Department of Health Services	
AA Location	1-8	
Web address		
Title	Molds, toxic molds, and indoor air quality	Mold growth in homes have multiple adverse health effects such as effects on the **mucous membranes and central nervous system, headaches, attention deficit, concentrate, dizziness, respiratory symptoms, gastrointestinal problems, liver damage, and more**. It can even **cause chronic conditions like sinusitis and worsening of asthma.** Molds proliferate in environments with high relative humidity or places of water leaks not quickly repaired. This paper was prepared for Assembly member Alan Lowenthal to provide background information on mold and indoor air quality.
Author(s)	California Research Bureau	
AA Location	1-9	
Web address		
Title	Occupation asthma induced by chrysonilia sitophilia in a worker exposed coffee grounds	Summarizes a care report in which after a coffee dispenser operator developed **cough, dyspnea, rhinitis, and conjunctivitis** after being exposed to an orange mold in older coffee ground storings. The mold was identified as Chrysonilia sitophila.
Author(s)	Clinical and Vaccine Immunology	
AA Location	1-11	
Web address		
Title	Chronic illness associated with mold and mycotoxins: is naso-sinus fungal biofilm the culprit?	It was found in a study that chronic fatigue syndrome was linked to exposure to aflatoxins, which is a toxin produced by fungi. **90% of these individuals had been previously exposed to a water damaged building and/or mold. Mycotoxins are typically present in the urine of chronically ill individuals.** Mold and water damaged buildings are known to produce mycotoxins, VOCs, exotoxins, and other toxic metabolites. **Adverse health effects of these environments include upper/lower respiratory disease, central and peripheral neurological deficits, chronic fatigue, and more**. One hypothesis on how fungi are able to persist inside of the body for long periods of time is their existence in biofilm communities.
Author(s)	Toxins	
AA Location	2-1	
Web address		

Humidity Control		Synopsis
Title	Development of new-onset chronic inflammatory demyelinating polyneuropathy following exposure to WDB	Two cases of chronic inflammatory demyelinating polyneuropathy (CIPD) were reported from the same water damaged building contaminated with mold. Considering the rarity of this condition, the cause was attributed to mold exposure. CIPD has symptoms of **limb weakness, areflexia, large fiber sensory loss, numbness, tingling, gait imbalance, depression, anxiety, memory and concentration problems, chronic fatigue and pain, and more.** The direct cause of these two cases of CIPD were likely from the mycotoxins produced by the mold in the home. In one study of 119 people **exposed to heavy mold, 83% had significantly impaired motor and/or sensory controls**. Another study reported 105 mold exposed patients had **slow reaction times, memory, concentration, balance, and dexterity problems.**
Author(s)	Journal of Neurology Research	
AA Location	2-2	
Web address		
Title	Diagnosis and Treatment of Illness caused by contaminants in Water Damaged Buildings	The entire document goes into depth of the many health effects caused by different indoor air pollutants, particularly molds, mycotoxins, bacteria, and VOCs. In summary, indoor air pollution from damp/moldy buildings is a major cause of morbidity and mortality worldwide and **affects 10-50% of indoor environments in Europe, North America, Australia, India, and Japan**. The potential **systems effected by exposure to WDB is vascular, digestive, respiratory, nervous, cutaneous, urinary, reproductive, and immune. Mycotoxins are particularly cytotoxic and disrupt vital cellular processes. The extent of the problem of WDB is widespread: 50% U.S. schools, 47% US homes, 45% US office buildings**.
Author(s)	Global Indoor Health Network	
AA Location	2-2	
Web address		
Title	Spatial gradients of fungal abundance and ecology throughout a damp building	In this study, it was found that fungal growth in one location of a building affects fungal counts in the rest of the building as well. This suggests that there is no isolation of a fungal contamination site in a building and is likely spread through the HVAC system.
Author(s)	American Chemical Society	
AA Location	2-4	
Web address		
Title	Mold and Insurance	This guideline offers statistics in mold litigation and insurance. As of 2003, **mold claims cost between $15,000-$20,000 dollars** when regular claims not involving mold cost between $3,000-$4,000. US insurers paid **at least $3 billion in mold claims in 2002.** There was a significant increase in the number of mold claims in the US due to publicity of the problem.
Author(s)	Insurance Information Institute	
AA Location	2-21	
Web address		

Humidity Control		Synopsis
Title	WHO confirms that mold is a health hazard	WHO reported in July 2009 that mold is a human health concern in the indoor environment. It is estimated that between **10-50% of indoor environments in Europe, North America, Australia, India, and Japan have indoor dampness issues**. Indoor dampness promotes mold and microbial growth which produces a variety of mycotoxins, spores, cell fragments, allergens, VOCs, B-glucans, and endotoxins. These all pose as a human health hazard. Instead of treatment for exposure, it is recommended to prevent exposure. **This can be done by proper ventilation that prevents excess humidity and appropriate temperature control.**
Author(s)	WHO	
AA Location	2-25	
Web address	https://www.who.int/airpollution/g	
Title	Effects of Mycotoxins on Neuropsychiatric Symptoms and Immune Processes	Evidence across many studies were evaluated on the health effects mycotoxins cause. In adults, it was found to cause **malaise, fatigue, cognitive impairment, and physical and emotional symptoms. More specifically, it affected learning and memory, psychomotor speed, and emotional functioning.** Most studies concluded that mycotoxin exposure lead to neuropsychological and neurobehavioral detriments. In children, mycotoxin exposure was found to be associated with **acute pulmonary hemorrhage in infants, respiratory issues, persistent wheeze and cough, deficits in intelligence, and cognitive development.** Multiple studies have also **found a significant link in mycotoxin exposure and autism in children. Mycotoxin exposure has been also been linked to asthma, wheezing, bronchitis, musculoskeletal pain, headaches, and anxiety and depression.**
Author(s)	Clinical Theurapeutics	
AA Location	4-12	
Web address		
Title	Allergic aspergillosis of the respiratory tract	Inhalation of the mold Aspergillus is the most common way to develop aspergillosis. It has also been known to cause and worsen asthma. A fungus sensitization has been associated with asthma and its severity in multiple studies.
Author(s)	European Respiratory Review	
AA Location	4-24	
Web address		

Humidity Control		Synopsis
Title	Could a 1911 farmhouse have healthier indoor air than a new home Part 3	This article contrasts more modern homes to a 1911 farm home. Much in the construction of buildings has changed - there is A/C, and plaster was replaced with gypsum board. Plaster does not grow mold, though gypsum board does (it is made of cellulose, a growing medium for mold). Relative humidity above 50 also supports fungi growth. Mix this with gypsum board, the perfect growing medium, and fungi is born. Atlanta averages 65% relative humidity throughout the year, so maintaining humidity control is crucial. **Proper MERV 8 filters are also recommended to prevent the spread of fungi spores throughout the HVAC system. By controlling the humidity in the home, dust mites are also kept at bay.** Not only does it **reduce this major allergen for asthmatics, but also conserves energy** as the HVAC system is not having to work twice as hard to both reduce the humidity *and* cool the home.
Author(s)		
AA Location	5-12	
Web address		
Title	Mold & Indoor Air Quality	Molds have the capability of producing volatile organic compounds that when exposed can cause **headaches, attention deficit, inability to concentrate, and dizziness.** Mold spores are also a common allergen and can cause **runny nose and eyes, throat irritation, coughing, sneezing, and chronic illnesses such as sinusitis and asthma.** Molds can also produce mycotoxins which can also have a toxic effect on humans such as various **inflammatory responses and headache, dizziness, dermatitis, diarrhea and impaired or altered immune function.**
Author(s)	Health and Energy	
AA Location	5-12	
Web address	http://healthandenergy.com/mold	

Humidity Control		Synopsis
Title	Research Committee Report on	This 161 page report includes a summary of evidence backed by hundreds of credited scientific research publications that cover water-damaged buildings, the biocontaminants they produce, and the human health effects associated with them (primarily chronic inflammatory response syndrome). Of most importance in this document is explanation on why the ACOEM and AAAAI consensus statements on the lack of adverse health effects from WDB should not be accepted. It has been found that both statements were flawed in their scientific integrity in both intention, interpretation, methods, and bias of the report written. They also cited a 2000 Gots/Kelman paper that revealed conflicts of interest, as the authors were involved in defense litigation of mold. In contrast, there have been **89 references cited covering biocontamination (molds, bacteria, and their by-products such as mycotoxins and mVOCs) due to excess moisture in buildings and homes.** These compounds are known to cause a variety of human health effects including **irritation in the eyes, nose, throat, and lungs, and associated with hypersensitivity pneumonitis and asthma**. **GAO and WHO also recognize WDB exposure to induce inflammatory responses. 34 non-governmental references were cited that confirms that presence of mycotoxins and other materials that induce inflammatory responses will be found in WDB**. 64 references were cited that shows consistent adverse health effects in animals exposed to contaminants typically found in WDB. **40 studies including 50,000 patients have been cited that confirm adverse health effects from WDB exposure. This is especially important in comparison to "Nay-Sayers" like ACOEM and AAAAI because they involve human research whereas the Nay-Sayers do not**. **88 studies cited have also shown that inhalation rather than ingestion is the route of exposure that causes the adverse health effects from WDB. 37 studies cited have proven that the immune responses experienced by those exposed to WDB are exclusive to WDB and cannot be attributed to another illness except those involving biologically produced neurotoxins. 70 studies cited proof that exposure to biocontaminants produced by WDB causes cognitive deficits and inflammation. 95 studies were cited that identified a link between inflammation and mold.**
Author(s)	Policyholders of America	
AA Location	5-13	
Web address		

Humidity Control		Synopsis
Title	Mycotoxin List	Mycotoxins are secondary metabolites of molds. Exposure to mycotoxins via inhalation from molds growing indoors from indoor environments have negative effects on multiple systems in the human body such as: vascular, digestive, respiratory, nervous, cutaneous, urinary, reproductive, and immune system. **For example, specific health effects include hemorrhaging, diarrhea, vomiting, necrosis, bleeding in lungs, tremors, depression, headache, nephrotoxicity, infertility, suppression of immune system, and more.**
Author(s)		
AA Location	VOC-4	
Web address		
Title	Mycotoxin	Mycotoxins are secondary metabolites of fungi. Fungi are present wherever humidity, temperature, and organic matter are sufficient. Some mycotoxins are well known due to their association with common indoor molds. **One is Aflatoxin, produced by Aspergillus. It is a known potent carcinogen and has been directly associated with adverse health effects such as liver cancer. Ochratoxin is one produced by Penicillium and Aspergillus. It is a known carcinogen and nephrotoxin and linked to tumors in the urinary track. In the indoor environment, the fungus Stachybotrys chartarum is a main concern because it produces a high number of mycotoxins. It has been associated with various respiratory tract problems and inflammation and allergies. Inhalation of S. chartarum causes allergic sensitization, inflammation, and cytotoxicity in the respiratory tract. Moisture control and ventilation is of importance in the home in order to prevent fungi and other biocontaminant growth.**
Author(s)		
AA Location	VOC-5	
Web address	https://en.wikipedia.org/wiki/Myco	
Title	Aflatoxin	Aflatoxin is a mycotoxin produced by Aspergillus and are toxic and one of the most carcinogenic toxins known. High humidity and temperature is one of the favorable conditions for Aspergillus growth. **High level acute exposure can cause hepatic necrosis and chronic exposure can lead to stunted growth and development in children. It also acts as a mutagen which causes a DNA mutation that leads to liver cancer and tumors.**
Author(s)		
AA Location	VOC-7	
Web address	www.aflatoxin.info/health.asp	

Humidity Control		Synopsis
Title	Occurrence of toxigenic Aspergillus versicolor isolates and sterigmatocystin in carpet dust from indoor environments	Sterigmatocystin is a mycotoxin produced by Aspergillus. A study collecting carpet dust samples from damp indoor environments was done. Of the 11 samples taken, 2 showed low concentrations of sterigmatocystin. It can be concluded that this mycotoxin can occasionally be found in carpet dust from damp buildings.
Author(s)	Applied and Environmental Microbiology	
AA Location	VOC-8	
Web address		
Title	Sterigmatocystin	The Berkeley Carcinogenic Potency Database has reported that the mycotoxin produced by Aspergillus, Sterigmatocystin, **produces tumors in the liver and vascular system in rats and in the vascular system of female mice. It also produces tumors in the liver of Cynomolgus monkeys.**
Author(s)	Carcinogenic Potency Database	
AA Location	VOC-9	
Web address	https://files.toxplanet.com/cpdb/ch	
Title	Mycotoxins	Mycotoxins are a known hazard to human health. Chronic exposure can cause cancer, kidney toxicity, and immune suppression and acute exposure can cause turkey C syndrome, human ergotism, and stachybotryotoxicosis. The mycotoxins of highest concern are aflatoxins, ochratoxins, sterigmatocystin, citrinin, ergo alkaloids, trichothecenes, and more. The most adverse health effects have been through the ingestion route of exposure, those inhalation has also been considered. **There have been several studies that have detected different mycotoxins in air-borne dust, wallpaper, and dust in ventilation systems of water-damaged/damp buildings. The people from these buildings have reported irritation in the eyes and respiratory tract, headache, skin irritation, and fatigue.** Though it can not been pinpointed whether it was a mycotoxin that induced these symptoms in damp buildings, inhalation of toxigenic spores and direct skin contact are still deemed important routes of exposure.
Author(s)	American Society for Microbiology	
AA Location	VOC-12	
Web address		

Humidity Control		Synopsis
Title	Mold Allergy	Mold grows in damp areas such as the bathroom, kitchen, or basement and is also ubiquitous in the outdoor environment. **A mold allergy causes symptoms such as sneezing, itching, nasal drip and congestion, asthma, and bronchopulmonary aspergillosis.** Allergies cannot be cured and only prevented. It is recommended to avoid contact with the spores by staying indoors when counts are high, **using a HEPA filter in the home, running a dehumidifier (keeping humidity below 45%), repairing water leaks promptly, using an exhaust fan in the bathroom/kitchen, and taking medications such as antihistamines.**
Author(s)	Asthma and Allergy Foundation of America	
AA Location	VOC-13	
Web address	https://www.aafa.org/mold-allergy	
Title	The validity of the environmental neurotoxic effects of toxigenic molds and mycotoxins	A more recent (2008) collection and analysis of studies have been done regarding toxigenic molds and mycotoxins. Common routes of exposure are ingestion, inhalation, and direct skin contact. The most studied mycotoxins are aflatoxin, ochratoxin, zearalenone, fumonisin, HT-2, and vomitoxin. These are all produced by common indoor molds. **Sterigmatocystin is produced by the common mold Penicillium, and has an 80-fold higher toxicity in lung cells. The route of exposure for this mycotoxin is the inhalation of organic dust. It can also cause cancer and suppress the immune system.** Other symptoms associated with the exposure to molds and their mycotoxins **include headache, fatigue, nausea, fevers, nose bleeds, irritation in the nose, lungs, and eyes, cough, memory loss, depression, mood swings, sleep disturbances, anxiety, carcinogenesis, chronic fatigue, vertigo, Vitamin B12 deficiency, and in severe cases, seizures. In one study, 70% of patients exposed to mold experienced neurological symptoms and 64% respiratory symptoms. Many mycotoxins also have carcinogenic properties such as Ochratoxin A, which may cause urinary tract cancer and kidney damage.** The mycotoxins released by indoor molds can also cause Mycotic demyelinating optic neuritis, a neurological order affecting the visual system. One study was done of patients from a water-damaged building that had high counts of mold. **Upper and lower respiratory tract symptoms were reported in 80% and 94% of the subjects. Systemic and neurocognitive symptoms were reported in 74% and 84% of the subjects.**
Author(s)	The Internet Journal of Toxicology	
AA Location	VOC-14	
Web address		

Humidity Control		Synopsis
Title	Mold is a growing concern in the real estate industry	It is advised to home sellers to disclose any environmental problems a home may be facing prior to the sale to avoid future litigation. Home inspections do not always include environmental assessment. Experts recommend "daily maintenance, good air circulation, ventilation, and good lighting", and prompt flood/leak remediation to prevent mold growth.
Author(s)		
AA Location	10-1	
Web address	https://funguyinspections.com/mol	
Title	Public Health and Economic Impact of Dampness and Mold	As of 2007, there were 21.8 million people with asthmas in the US and 21% of those cases are due to exposure to dampness and mold. This costs an estimated $2.5 billion dollars per year. After adjusting for inflation and different number of cases of asthma in 2021, $4.95 billion dollars is being spent on asthma due to dampness/mold in the US per year, or $760.86 per person. Costs aside, the risk for respiratory symptoms increases by 30-50% when exposed to dampness and mold.
Author(s)	Indoor Air Journal, EPA	
AA Location	econ-3	
Web address		