

# GLOBAL INDOOR HEALTH NETWORK

"WORKING TOGETHER FOR HEALTHY INDOOR ENVIRONMENTS"

<http://globalindoorhealthnetwork.com>

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This special edition of the GIHN Newsletter highlights reports from government agencies. It's interesting to see how the government agencies' understanding of, and interest in, indoor air quality has disappeared (or has been minimized) over the past few decades.

## Global Burden of Disease

One methodology used to evaluate the impact on global health due to certain causes of disease and injury is known as the Global Burden of Disease (GBD).

"The original Global Burden of Disease Study (GBD 1990 Study) was commissioned by the World Bank in 1991 to provide a comprehensive assessment of the burden of 107 diseases and injuries and ten selected risk factors for the world and eight major regions in 1990."

The WHO published their first report on the GBD concept in 1996. In a 2006 report by the WHO, they "estimated 24% of the disease burden (healthy life years lost) and an estimated 23% of all deaths (premature mortality) was attributable to environmental factors. Among children 0–14 years of age, the proportion of deaths attributed to the environment was as high as 36%."

Beginning in the spring of 2007, a new GBD project was initiated. The new Global Burden of Diseases, Injuries, and Risk Factors Study (the GBD 2010 Study) "is the first major effort since the original GBD 1990 Study to carry out a complete systematic assessment of global data on all diseases and injuries. The GBD 2010 Study brings together a community of experts and leaders in epidemiology and other areas of public health research from around the world to measure current levels and recent trends in all major diseases, injuries, and risk factors, and to produce new and comprehensive sets of estimates and easy-to-use tools for research and teaching."

The results of the GBD 2010 study were announced on December 14, 2012. The study is presented as seven articles. **We would have expected this study (the GBD 2010) would include a discussion on indoor microbial contamination. Unfortunately, there was nary a reference to mold, mould, fungi, microbial or biological contaminants in any of the seven articles. This is a glaring omission. It's very disappointing that they neglected to address this important public health issue in the study.**

See 1988 U.S. EPA report on page 2

## 1988 Report by the U.S. Environmental Protection Agency (EPA)

In a 1988 report from the U.S. Environmental Protection Agency (EPA):

### The Inside Story: A Guide to Indoor Air Quality

“In the last several years, a growing body of scientific evidence has indicated that the air within homes and other buildings can be more seriously polluted than the outdoor air in even the largest and most industrialized cities. Other research indicates that people spend approximately 90 percent of their time indoors. Thus, for many people, the risks to health may be greater due to exposure to air pollution indoors than outdoors.”

#### Pollutant Sources

“There are many sources of indoor air pollution in any home. These include combustion sources such as oil, gas, kerosene, coal, wood, and tobacco products; building materials and furnishings as diverse as deteriorated, asbestos-containing insulation, wet or damp carpet, and cabinetry or furniture made of certain pressed wood products; products for household cleaning and maintenance, personal care, or hobbies; central heating and cooling systems and humidification devices; and outdoor sources such as radon, pesticides, and outdoor air pollution.”

“Some sources, such as building materials, furnishings, and household products like air fresheners, release pollutants more or less continuously. Other sources, related to activities carried out in the home, release pollutants intermittently. These include smoking, the use of unvented or malfunctioning stoves, furnaces, or space heaters, the use of solvents in cleaning and hobby activities, the use of paint strippers in redecorating activities, and the use of cleaning products and pesticides in housekeeping. High pollutant concentrations can remain in the air for long periods after some of these activities.”

***This report also includes information about what to do if you have indoor air quality problems in your office or apartment.***



## 1988 Report by the U.S. Environmental Protection Agency (EPA)--continued

### Indoor Air and Your Health

**“Health effects from indoor air pollutants may be experienced soon after exposure or, possibly, years later.”**

“Immediate effects may show up after a single exposure or repeated exposures. These include irritation of the eyes, nose, and throat, headaches, dizziness, and fatigue. Such immediate effects are usually short-term and treatable. Sometimes the treatment is simply eliminating the person's exposure to the source of the pollution, if it can be identified. Symptoms of some diseases, including asthma, hypersensitivity pneumonitis, and humidifier fever, may also show up soon after exposure to some indoor air pollutants.”

“The likelihood of immediate reactions to indoor air pollutants depends on several factors. Age and preexisting medical conditions are two important influences. In other cases, whether a person reacts to a pollutant depends on individual sensitivity, which varies tremendously from person to person. Some people can become sensitized to biological pollutants after repeated exposures, and it appears that some people can become sensitized to chemical pollutants as well.”

“Other health effects may show up either years after exposure has occurred or only after long or repeated periods of exposure. These effects, which include some respiratory diseases, heart disease, and cancer, can be severely debilitating or fatal. It is prudent to try to improve the indoor air quality in your home even if symptoms are not noticeable.”

Click [here](#) to read the entire report.

See 1989 U.S. EPA Report on page 3

## 1989 Report by the U.S. Environmental Protection Agency (EPA)

In a 1989 report from the U.S. Environmental Protection Agency (EPA):

### U.S. EPA Report to Congress on Indoor Air Quality. Volume II: Assessment and Control of Indoor Air Pollution

“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.”

“In the 1970s, new energy-conserving building designs introduced tight building shells, inoperable windows, and centrally controlled ventilation systems which could operate with minimal introduction of outdoor air. These designs combined with the emission of indoor air pollutants from synthetic building materials, cleaning and pest control products, office machines, smoking, and biological sources, have caused increases in indoor air pollution levels.”

“The physiological reactions to these pollutants, coupled with the psycho-social stresses of the modern office environment, and the wide range of human susceptibility to indoor air pollutants has led to some tentative classifications of acute building sickness: building related illness, sick building syndrome, and multiple chemical sensitivity.”

“The population health risks posed by exposure to indoor air pollutants appear to be significantly greater than the health risks posed by some of the environmental problems that receive the most public concern and governmental funding, including hazardous and non-hazardous waste sites, and contaminated sludge.”

“It is known that microbial contamination can cause significant damage to buildings and equipment, and there is anecdotal evidence that damage can be so severe as to make a building unfit for human occupation.”



## 1989 Report by the U.S. Environmental Protection Agency (EPA)--continued

“Some molds are known to produce mycotoxins. Such toxins produce direct toxic effects as well as immunosuppression. At low concentrations, some mycotoxins produce gastrointestinal lesions, hematopoietic suppression, and suppression of reproductive function. Toxicity to the central nervous system produces symptoms such as anorexia, lassitude, and nausea.”

“Some fungi also produce mycotoxins which are known to be highly potent systemic poisons. The concentration of mycotoxins in the spores of toxigenic fungi are often very high. **While the effects of these poisons are primarily known from their ingestion, it is reasonable to assume that these toxins have a systemic effect when inhaled, since inhalation more effectively allows systemic entry for dissolved substances.**”

“Many costs of indoor air pollution have not been calculated. Nevertheless, because of the large numbers of people and buildings potentially affected, as well as the wide range of effects for which there is an economic cost component, it is reasonable to conclude the aggregate costs of indoor air pollution amount to tens of billions of dollars per year.”

***This report includes a lot of additional information about building systems, ventilation, sampling, measuring and modeling pollutants, cancer vs non-cancer effects, economic impacts, engineering and operating controls, indoor air quality standards, etc.***

Click [here](#) to read the entire report.

See 1991 U.S. GAO report on page 4

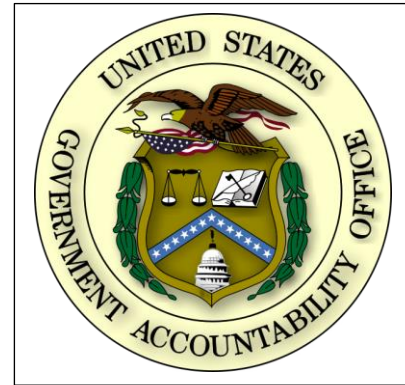
## 1991 Report by the U.S. Government Accountability Office (GAO)

In 1991, the U.S. Government Accountability Office (GAO) issued a report to Congress titled: **“Indoor Air Pollution: Federal Efforts are Not Effectively Addressing a Growing Problem.”** Here are a few excerpts:

“In the 1970s increased emphasis on energy conservation measures, such as using more energy-efficient building materials and reducing the air exchange rates of ventilation systems, resulted in increases in indoor air pollution in offices and homes. For example, energy efficiency measures sometimes result in lower air exchange rates for ventilation systems and cause pollutants, such as second-hand tobacco smoke, dust mites, carbon monoxide, benzene, and pesticides, to remain indoors and contribute to indoor air problems. Additionally, certain materials used in carpets, insulation, and home and office furniture contribute to the overall indoor air problem by giving off chemical emissions. Therefore, the elevated levels of such pollutants increase the health risks--headaches, fatigue, respiratory diseases, and cancer--for building occupants when such materials, along with air exchange rate reductions, are employed.”

“In 1989 and 1990 indoor air legislation was introduced in the Congress that called for more direct focus on indoor air by establishing a national program to reduce the human health threat caused by such pollution. Although the Senate passed its indoor air bill, the Congress did not enact any of the proposed legislation. Similar legislative proposals were introduced in both houses of the Congress in 1991. These legislative proposals go beyond research and require more emphasis on source control and mitigation of indoor air pollution.”

***More than 10 years later, in 2002 and 2005, proposed legislation about the health effects of indoor mold was again presented to Congress. It has now been more than 20 years since that original legislation was presented in 1989, and we are still waiting for Congress to take action.***



## 1991 Report by the U.S. Government Accountability Office (GAO)--continued

“Even though EPA recognizes that indoor air pollution represents a serious health risk with symptoms ranging from eye irritation, headaches, and fatigue to respiratory diseases and cancer, funding levels have not been commensurate with these health risks. In its Unfinished Business report, EPA ranked indoor air pollution fourth among 31 environmental problems in terms of the risk it poses to human health and the environment based on the opinions of a task force of 75 EPA scientists, engineers, and managers.”

Click [here](#) to read the entire report.

## 2008 Report by the U.S. Government Accountability Office (GAO)

*The 2008 GAO report is very similar to this one from 1991. The 2008 report is titled **“Indoor Mold: Better Coordination of Research on Health Effects and More Consistent Guidance Would Improve Federal Efforts.”***

***Even though the second report was 17 years later, there was little change in the message or conclusions. In fact, it was really just a revised version of the original 1991 report.***

Click [here](#) to read the entire report.



## 1995 Report by the U.S. Government Accountability Office (GAO)

From a 1995 report by the U.S. Government Accountability Office (GAO):

### School Facilities: Condition of America's Schools

"The nation has invested hundreds of billions of dollars in school infrastructure to create an environment where children can be properly educated and prepared for the future. Almost exclusively a state and local responsibility, this infrastructure requires maintenance and capital investment. However, public concern is growing that while laws require children to attend school, some school buildings may be unsafe or even harmful to children's health."

"The Department of Education has not assessed the condition of the nation's school facilities since 1965 (*so 30 years had passed before this new report in 1995*)."

"Twenty percent of the U.S. population, nearly 55 million people, spend their days in our elementary and secondary schools. Studies show that one-half of our nation's 115,000 schools have problems linked to indoor air quality."

**"Based on estimates by school officials in a national sample of schools, we project that the nation's schools need about \$112 billion to repair or upgrade America's multibillion dollar investment in facilities to good overall condition. Of this, \$11 billion (10 percent) is needed over the next 3 years to comply with federal mandates that require schools to make all programs accessible to all students and to remove or correct hazardous substances such as asbestos, lead in water or paint, materials in underground storage tanks (UST), and radon or meet other requirements."**

"Congress passed the Education Infrastructure Act of 1994, in which it stated that "improving the quality of public elementary and secondary schools will help our Nation meet the National Education Goals." Despite these efforts, many public elementary and secondary schools are in substandard condition and need major repairs due to leaking roofs, plumbing problems, inadequate heating systems, or other system failures."

Click [here](#) to read the entire report.



## 1982 Report by the World Health Organization (WHO)

From a 1982 report by the World Health Organization (WHO) titled:

### Indoor Air Pollutants: Exposure and Health Effects

"The increased concern about indoor air quality has led to the organization of a number of studies and meetings on the subject."

**"The first "sick" buildings were recognized prior to 1960, and since then there have been increasing numbers of case reports in several countries, particularly during the last six years."**

"Although indoor air quality has always been a public and personal health concern, in recent years the problem has come into sharper focus. Additional and new sources of contaminants are being introduced, and increased energy costs have brought a tendency to reduce ventilation and infiltration, with resulting complaints by occupants."

"With the growing recognition that air pollutant concentrations often vary considerably according to location and time, and that people often spend 80-90% of the whole day within enclosed spaces, it is necessary to determine the total exposure of individuals and populations to different air pollutants in order to assess the adverse health effects associated with them. Epidemiological studies of the health effects of air pollution should ideally be based on personal total exposure, although in practice this is not always possible and personal passive monitoring is often the only feasible way of acquiring such exposure data."

Click [here](#) to read the entire report.

See 2009 WHO report on page 6

## 2009 Report by the World Health Organization (WHO)

From a 2009 report by the World Health Organization (WHO) titled **“Guidelines for Indoor Air Quality: Dampness and Mould.”**

**“Healthy indoor air is recognized as a basic right. People spend a large part of their time each day indoors: in homes, offices, schools, health care facilities, or other private or public buildings. The quality of the air they breathe in those buildings is an important determinant of their health and well-being. The inadequate control of indoor air quality therefore creates a considerable health burden.”**

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

“The prevalence of indoor dampness varies widely within and among countries, continents and climate zones. It is estimated to affect 10–50% of indoor environments in Australia, Europe, India, Japan and North America. In certain settings, such as river valleys and coastal areas, the conditions of dampness are substantially more severe than the national average.”

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**“Several widely acknowledged global trends contribute to the conditions associated with increased exposure to dampness and mould:**

- **energy conservation measures that are not properly implemented (tightened building envelopes, ventilation deficits, improper insulation);**
- **urbanization (migration, building type and density, urban degradation, housing availability and social inequity);**
- **climate change (increasing frequency of extreme weather conditions, shifting of climate zones); and**
- **the quality and globalization of building materials and components, construction concepts and techniques.**

**These conditions increase the risks of adverse health effects due to biological contaminants of indoor air.”**



## 2009 Report by the World Health Organization (WHO)--continued

“Biological agents of relevance to health are widely heterogeneous, ranging from pollen and spores of plants (mainly from outdoors), to bacteria, fungi, algae and some protozoa emitted outdoors or indoors. They also include a wide variety of microbes and allergens that spread from person to person. There is strong evidence regarding the hazards posed by several biological agents that pollute indoor air; however, the WHO working group convened in October 2006 concluded that the individual species of microbes and other biological agents that are responsible for health effects cannot be identified. This is due to people often being exposed to multiple agents simultaneously, to complexities in accurate estimation of exposure and to the large numbers of symptoms and health outcomes due to exposure. The exceptions include some common allergies, which can be attributed to specific agents, such as house dust mites and pets.”

“Exposure to microbial contaminants is clinically associated with respiratory symptoms, allergies, asthma and immunological reactions.”

“Mycotoxins, or fungal toxins, are low-relative-molecular-mass biomolecules produced by fungi, some of which are toxic to animals and human beings. Mycotoxins are known to interfere with RNA synthesis and may cause DNA damage.”

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***This was a good start, but (similar to the IOM report in 2004) this report by the WHO excluded many key research papers.***

Click [here](#) to read the entire report.

See 2010 and 2011 WHO reports on page 7

## 2010 Report by the World Health Organization (WHO)

From a 2010 report by the World Health Organization (WHO) titled:

### Guidelines for Indoor Air Quality: Selected Pollutants

“Clean air is a basic requirement of life. The quality of air inside homes, offices, schools, day care centres, public buildings, health care facilities or other private and public buildings where people spend a large part of their life is an essential determinant of healthy life and people’s well-being. Hazardous substances emitted from buildings, construction materials and indoor equipment or due to human activities indoors, such as combustion of fuels for cooking or heating, lead to a broad range of health problems and may even be fatal.”

**“Indoor exposure to air pollutants causes very significant damage to health globally—especially in developing countries.** The chemicals reviewed in this volume are common indoor air pollutants in all regions of the world. Despite this, public health awareness on indoor air pollution has lagged behind that on outdoor air pollution.”

“The substances considered in this review (benzene, carbon monoxide, formaldehyde, naphthalene, nitrogen dioxide, polycyclic aromatic hydrocarbons (especially benzo[a]pyrene), radon, trichloroethylene and tetrachloroethylene) have been added to the guidelines.”

In regard to secondhand smoke:

“Worldwide, 40% of children, 33% of male non-smokers, and 35% of female non-smokers were exposed to second-hand smoke in 2004. This exposure was estimated to have caused 379,000 deaths from ischaemic heart disease, 165,000 from lower respiratory infections, 36,900 from asthma, and 21,400 from lung cancer. 603,000 deaths were attributable to second-hand smoke in 2004, which was about 1.0% of worldwide mortality. 47% of deaths from second-hand smoke occurred in women, 28% in children, and 26% in men.”

Click [here](#) to read the entire report.



## 2011 Report by the World Health Organization (WHO)

From a 2011 Report by the World Health Organization (WHO) titled:

### Environmental Burden of Disease Associated with Inadequate Housing

“The findings confirm that housing is a significant public health issue and that policy-makers need to address it as a priority. Furthermore, they show the potential for primary prevention of a wide range of diseases and injuries through the improvement of housing conditions. However, public health workers cannot tackle the challenge alone. Healthy housing is a multisectoral responsibility, achievable only if all relevant players contribute to it, including not only public health, but also housing, engineering and construction, environment, social welfare, urban planning, and building management. The combination of actions from all these sectors shows the complexity of the subject as well as its great potential to increase the health status of our populations through providing adequate, safe and healthy homes.”

“A consistent association between dampness and mould problems in indoor environments and respiratory symptoms and asthma has been observed in a large number of studies conducted across many geographical regions.”

Click [here](#) to read the entire report.

See *1989 Massachusetts report* on page 8

## 1989 Report by the Commonwealth of Massachusetts

In a 1989 report by The Commonwealth of Massachusetts, Special Legislative Commission on Indoor Air Pollution:

### Indoor Air Pollution in Massachusetts

*This Special Commission was comprised of people from several disciplines including numerous state senators and representatives and individuals from:*

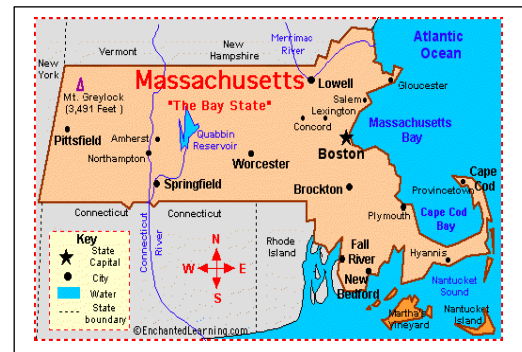
- Massachusetts Department of Public Health
- U.S. Environmental Protection Agency (EPA)
- American Lung Association
- Massachusetts State Board of Building Regulations
- Harvard School of Public Health
- Massachusetts Department of Labor and Industries
- American Lung Association
- The building industry, etc.

*There is a lot of good historical information in this report, and it explains in detail that the health impact of indoor air pollution has been known for decades. For example, the report states that **sick building syndrome has been known since World War I, but the first published research paper on the topic did not happen until 1948 in England.** The following statements are excerpts from the Massachusetts report.*

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*"Indoor air pollution is a growing problem in the United States and accounts for up to 50% of all illnesses."*

*"The indoor air we breathe often contains pollutants which may have health effects ranging from annoying to deadly. Major pollutant types found in indoor environments include tobacco smoke, radon gas, formaldehyde, asbestos, volatile organic compounds, pesticides, combustion products and biological contaminants. For most of these pollutants, concentrations measured indoors exceed levels found outdoors yet current environmental air pollution laws and regulations are not protective of these indoor environments. They focus instead on the outdoor environment even though individuals spend about ninety percent (90%) of their time indoors."*



## 1989 Report by the Commonwealth of Massachusetts (continued)

*"Biological contamination of indoor environments ranks third in NIOSH's list of indoor air health threats after poor ventilation and building fabric contaminants. Types of biological contamination range from animal dander, pollen and dust to bacteria, fungi, and viruses. Poor ventilation, stagnant water in ventilation systems, and relative humidity levels falling outside the 40-60% range have been implicated as causes of high indoor air concentrations of these biological contaminants. High humidity and moisture concentrations support proliferation of biologicals in ventilation systems."*

*"The Commission's efforts confirm the seriousness of the indoor air pollution health threat, which worsened with the energy conservation efforts of the 1970s. More insulation and tighter construction led to lower ventilation rates and build-up of contaminants. Many 'sick' buildings have been identified where occupants suffer severe or recurring discomforts such as headaches, dizziness, fatigue, eye irritation, and respiratory problems. Other conditions attributable to indoor air contaminants include: cancer; bronchitis; pneumonia; heart, circulatory and respiratory problems; impaired vision; skin rash; chemical sensitivity; birth defects; and mental, nervous and immunological disorders."*

Click [here](#) to read the entire report.



## 1998 Report by the California Department of Health Services

From a 1998 report by the California Department of Health Services (Environmental Health Investigations Branch) titled:

### Health Effects of Toxin-Producing Molds

#### Mechanisms of Action

“Some strains of *Stachybotrys chartarum* can produce mycotoxins of the trichothecene and spirolactone families. The trichothecene mycotoxins satratoxins G and H are potent protein synthesis inhibitors and cause immunosuppression in laboratory animals. In experimental animal studies, the trichothecenes affect rapidly proliferating tissues such as skin and mucosa, as well as lymphatic and hematopoietic tissues (Ueno, 1983). In laboratory animals, acute exposure to large amounts of trichothecene toxins results in a rapid release of sequestered white blood cells into circulation, while repeated or chronic exposure destroys granulocytic precursor cells in bone marrow leading to white cell depletion. Among the reported cellular effects are: mitogen B/T lymphocyte blastogenesis suppression; decrease of IgM, IgG, IgA; impaired macrophage activity and migration-chemotaxis; broad immunosuppressive effects on the cellular and humoral-mediated immune response leading to secondary infections; and, paradoxically, increased spontaneous antibody producing cells in the spleen (Corrier, 1991).”

“Toxigenic strains of SC may also produce spirolactones (stachybotrylactone) and spirolactams (stachybotrylactam), toxins which produce anticomplement effects (Jarvis, 1995). Possible synergistic effects between the trichothecenes and these mycotoxins have not yet been evaluated. Although laboratories can test a sample of *Stachybotrys chartarum* for its ability to produce mycotoxins, *in vitro* results do not necessarily equate with the *in vivo* situation. Therefore, a fungus that produces toxins in the lab may not do so in the field, or vice versa. It has been suggested that to assure the safety of any exposed individual, whenever *Stachybotrys chartarum* is identified, it should be considered as a potential mycotoxin-producing organism (Jarvis, 1994).”



## 1998 Report by the California Department of Health Services (continued)

“Positive skin reactions to the fungus have been found in some asthmatics living or working in *Stachybotrys*-contaminated rooms, suggesting a hypersensitivity component in addition to the potential for mycotoxicosis. Thus the fungal spores themselves or chemicals carried on the spores may produce either allergenic or toxigenic effects (Flannigan, 1991).”

#### Routes of Exposure

**Due to its wet, slimy growth characteristics, it is unusual for spores from active *Stachybotrys* colonies to become aerosolized. However, when colonies of this fungus die and become dehydrated, there is increased risk for air dispersion. Portals of possible entry into the body include inhalation and dermal absorption when the fungus is found on walls or in carpets.**

***Several case reports were discussed, followed by this statement about the American Academy of Pediatrics:***

#### American Academy of Pediatrics

On April 6, 1998, the American Academy of Pediatrics (AAP) Committee on Environmental Health released a statement concerning toxic effects of indoor molds and acute idiopathic pulmonary hemorrhage in infants. They recommend that until more information is available on the etiology of this condition, pediatricians should try to ensure that infants under 1 year of age are not exposed to chronically moldy, water-damaged environments (AAP, 1998).

Click [here](#) to read the entire report.

See 2010 and 2011 OSHA Reports on page 10

## 2010 Report by the Occupational Safety & Health Administration (OSHA)

From a 2010 report by the Occupational Safety & Health Administration (OSHA):

### A Brief Guide to Mold in the Workplace

Indoors, mold growth should be avoided. Problems may arise when mold starts eating away at materials, affecting the look, smell, and possibly, with the respect to wood-framed buildings, affecting the structural integrity of the buildings. Molds can grow on virtually any substance, as long as moisture or water, oxygen, and an organic source are present.

#### *Use of Biocides*

**The use of a biocide, such as chlorine bleach, is not recommended as a routine practice during mold remediation.**

Biocides are toxic to animals and humans, as well as to mold. If you choose to use disinfectants or biocides, always ventilate the area, using outside air if possible, and exhaust the air to the outdoors. When using fans, take care not to extend the zone of contamination by distributing mold spores to a previously unaffected area. **Never mix chlorine bleach solution with other cleaning solutions or detergents that contain ammonia because this may produce highly toxic vapors and create a hazard to workers.**

Some biocides are considered pesticides, and some states require that only registered pesticide applicators apply these products in schools, commercial buildings, and homes. Make sure anyone applying a biocide is properly licensed where required.

Fungicides are commonly applied to outdoor plants, soil, and grains as a powder or spray. Examples of fungicides include hexachlorobenzene, organomercurials, pentachlorophenol, phthalimides, and dithiocarbamates.

**Do not use fungicides developed for outdoor use in any indoor application, as they can be extremely toxic to animals and humans in an enclosed environment.**

Click [here](#) to read the entire report.



## 2011 Report by the Occupational Safety & Health Administration (OSHA)

From a 2011 report by the Occupational Safety & Health Administration (OSHA):

### Indoor Air Quality in Commercial and Industrial Buildings

Indoor air quality (IAQ) is a major concern to businesses, schools, building managers, tenants, and workers because it can impact the health, comfort, well-being, and productivity of the building occupants. OSHA recognizes that poor IAQ can be hazardous to workers' health and that it is in the best interest of everyone that building owners, managers, and employers take a proactive approach to address IAQ concerns.

**IAQ has been identified by the EPA as one of the top five most urgent environmental risks to public health.**

Good IAQ in buildings is an important component of a healthy indoor environment. It contributes to a favorable and productive environment for building occupants, giving them a sense of comfort, health, and well-being. Significant increases in worker productivity have also been demonstrated when the air quality was adequate.

Failure of building owners and operators to respond quickly and effectively to IAQ problems can lead to numerous adverse health consequences. Health effects from indoor air pollutants may be experienced soon after exposure or, possibly, years later.

**Long-term effects due to indoor air pollutants may include respiratory diseases, heart disease, and cancer, all of which can be severely debilitating or fatal.**

Click [here](#) to read the entire report.

See 1985 Study funded by U.S. Army on page 11

## 1985 Study on the Effects of Inhaled Mycotoxins (funded by the U.S. Army)

The insurance industry, defense experts and other naysayers like to say that you can't get sick from mycotoxins unless you eat them. That statement is false!! The following excerpts are from a 1985 research study funded by the U.S. Army. The paper is titled **"Toxicologic and Analytical Studies with T-2 and Related Trichothecenes."**

"Swine and rats have been used to assess the effects of exposure to T-2 toxin. Acute systemic T-2 toxicosis is a cardiovascular shock syndrome characterized by reductions in cardiac output and blood pressure and increased plasma concentrations of epinephrine, norepinephrine, thromboxane B, 6-keto- PGF<sub>9</sub>, and lactate. An initial leukocytosis is followed by a leukopenia. Serum-bound calcium concentrations decrease, while magnesium, phosphorus, and potassium increase. There was greater variation in the levels of selected cardiac bulk electrolytes of rats dosed with T-2 toxin than in control animals. In swine, myocardial, brain, renal, splenic, and pancreatic blood flow decreased, while that of the adrenals, liver, and gastrointestinal tract was increased or not affected following T-2 toxin administration."

"Sublethal and/or lethal intravenous injections of T-2 toxin produce heart and pancreatic lesions, in addition to the well-documented radiomimetic lesions. Grossly, there are subendocardial hemorrhages, pinpoint white foci in the myocardium, and pancreatic edema. Microscopic and ultrastructural changes in the heart include myofiber degeneration, vacuolization, necrosis, and mineralization with formation of hypercontraction bands. Pancreatic changes consist of acinar degeneration and necrosis which progress to a diffuse suppurative necrotizing pancreatitis."

**"Swine and rats were used to study toxic effects of T-2 toxin, diacetoxyscirpenol (DAS), and deoxynivalenol (DON), common trichothecene fungal toxins. According to a previous study, it was estimated that the pigs retained approximately 1/3 of the amount of nebulized toxin. Acute toxicosis from T-2 and DAS is a cardiovascular shock syndrome similar to, but distinct from, that of an endotoxin. The syndrome is similar following exposure by oral, inhalation, or intravascular routes."**



## 1985 Study on the Effects of Inhaled Mycotoxins (funded by the U.S. Army) –continued

"The pathologic effects of T-2 toxicosis were evaluated in 8 pigs. They were administered T-2 toxin in intravenous doses of 0.0 mg/kg (2 pigs) and 0.6 mg/kg (6 pigs) dissolved in 2.5 mL of 50 percent ethanol and were killed 24 and 48 hours later. On gross examination, pancreatic edema, multifocal subendocardial hemorrhages, and pinpoint white foci were present scattered throughout the myocardium of one pig killed at 48 hours. Myofiber degeneration and necrosis with contraction bands were seen in all T-2-dosed pigs, mainly in the subendocardial region. Although the lesions were present throughout the heart, they were predominant in the atria, papillary muscles of the left ventricle and lower left and upper right ventricles. In addition, myofiber vacuolization was another morphological alteration observed in some affected muscle bundles. Vacuolization was more often detected in papillary muscles of the left ventricle. Ultrastructural changes consisted of areas of sarcoplasmic edema with myofibrillar disorganization and loss of Z and M bands, as well as glycogen accumulation in mildly affected myocytes. In severely damaged myocytes, hypercontraction bands with myofibrillar lysis or marked distension of sarcoplasmic reticulum with myofibrillar lysis was evident."

"Pancreatic changes consisted of multifocal acinar degeneration and necrosis. These changes became a suppurative necrotizing pancreatitis in the pigs killed at 48 hours. Early ultrastructural changes consisted of dilation of the membranous portion of the rough endoplasmic reticulum and disorganization, as well as mitochondrial swelling and loss of cristae."

Click [here](#) to read the entire 480-page report.

See *Additional Reports* on page 12

## Additional Reports from Government Agencies

The following additional reports from government agencies are also of interest.

### Federal Emergency Management Agency (FEMA)

#### Dealing with Mold and Mildew in Your Flood Damaged Home

"Of the thousands of molds that exist, some are known allergens (aggravating or causing skin, eye, and respiratory problems), and a few molds produce harmful mycotoxins that can cause serious problems. But all molds, in the right conditions and high enough concentrations, are capable of adversely affecting human health. The potential for health problems occurs when people inhale large quantities of the airborne mold spores."

"Typical symptoms reported from mold exposure include:

- Respiratory problems - wheezing, asthma attacks, etc.
- Nasal and sinus congestion or dry, hacking cough
- Eye irritation - burning, watery, redness
- Nose or throat irritation - sneezing fits, bloody noses
- Skin irritations - rashes or hives
- Nervous system - headaches, memory loss, mood changes
- Aches and pains"

Click [here](#) to read the report.

The following report from **FEMA** is from 1992.

#### Repairing Your Flooded Home

Click [here](#) to read the report.

**Next Newsletter: March 1, 2014**



## Additional Reports from Government Agencies (continued)

### U.S. Army

**Toxicologic and Analytical Studies with T-2 and Related Trichothecene Mycotoxins (1985).** Click [here](#).

**Medical Management of Biological Casualties (2004).** Click [here](#).

**Medical Textbook: Medical Aspects of Chemical and Biological Warfare (1997).** Click [here](#).

### U.S. Navy

**U.S. Navy "Guidance for Navy and Marine Corps Personnel Recovering from a Hurricane Disaster (2005).** Click [here](#).

**U.S. Navy "Mold and Other Biological Contaminant Assessments: Investigating, Sampling and Interpreting Results" (Chapter 13, Section 2).** Click [here](#).

**U.S. Navy "Mold Cleanup, Remediation and Clearance Sampling" (Chapter 13, Section 3).** Click [here](#).

**U.S. Navy "Mold Investigation Medical Guidance" (Chapter 13, Section 4).** Click [here](#).

## Quick Links:

**Website:** <http://globalindoorhealthnetwork.com>

**Health Effects:**  
[http://globalindoorhealthnetwork.com/health\\_effects.html](http://globalindoorhealthnetwork.com/health_effects.html)

**Position Statement:**  
[http://globalindoorhealthnetwork.com/files/GIHN\\_position\\_statement\\_Revised\\_12\\_17\\_2012.pdf](http://globalindoorhealthnetwork.com/files/GIHN_position_statement_Revised_12_17_2012.pdf)

**Working Together for Healthy Indoor Environments**