We live with molds all around us. They are on surfaces, in the ground, and in the air. We tend to think of them as a "natural" part of the environment whose only hazardous effects might consist of an occasional sneeze. In quantity, however, molds can cause serious health effects and even death.

How much is too much? We don't want to become paranoid about a few black lines of mold between the tiles in the bathroom shower. But we should worry about places where the odor of mold is detectible, where there is water-damage, when items have visible patches of mold on them, or when mold invades ventilation ducts and systems. These conditions require the following:

1. **Worker notification.** If molds are suspected to be present in significant amounts in a workplace, all workers must be informed about the health effects caused by mold. Workers should see their doctors if they suspect they have any of the following problems:

   * **Irritation** of the respiratory tract and eyes can be experienced by all workers if exposure is high enough.

   * **Allergy** symptoms only occur in those people who have developed a reaction to particular molds. The levels of exposure at which symptoms occur varies greatly among individuals. Overexposure can actually cause people who were not previously sensitive to molds to develop the allergy. Once the allergy exists, it is usually a life-time problem. Allergies may get worse with each exposure. Symptoms range from eye itching and hay fever to life-threatening asthma attacks, hypersensitivity pneumonia, and anaphylactic shock.

   * **Toxicity.** Some molds, just like the mushrooms to which they are related, produce powerful poisons. One toxic mold called *Stachybotres chartarum* was once used in germ warfare. High exposures can cause neurological damage and even death. Other toxic molds include *Aspergillus flavus* and *Aspergillus versicolor.*

   * **Infection.** Some molds can grow in the lungs or other organs. These infections are difficult to treat. This usually occurs only in people with compromised immune systems such as those with AIDS or on chemotherapy.

   * **Immune system damage.** The drug, cyclosporin, used to depress the immune systems of organ transplant patients, is a mycotoxin. A number of mold species produce cyclosporin and similar toxins that are can alter immune function. Some experts think that damage to the immune system may also make people more likely to develop allergies to molds. (Allergies are essentially an over-reaction of the immune system.)
2. **Identification.** The molds can be identified to be sure that none of the highly toxic forms are present. Taking samples can be done several ways. One simple method is to take a strip of clear scotch tape, 1/2 or 3/4 inch wide and a strip 2-3 inches long, and place it on an area where surface mold is present. Lift the tape, stick it on shiny aluminum foil, and place these in a small Ziploc® bag. Bulk mold samples from ventilation ductwork or from growths found behind walls can also be collected and sent to a laboratory.

3. **Air Sampling.** Often employers and workers want the air tested to see how much mold is present. Air sampling is complicated by the fact that molds only release their spores at irregular intervals depending on the vagaries of temperature and humidity. Negative air sampling results may not mean there is no mold problem. If mold odors are strong, there probably is a problem.

   Air samples are beneficial when: a) they show that mold species indoors are significantly different from those found outdoors indicating that molds are growing indoors; b) personal sampling of workers doing tasks in which molds may be disturbed, and c) sampling near an air supply defuser when it is suspected that molds have invaded the ventilation system.

4. **Report to workers.** In accordance with Occupational Safety and Health Administration (OSHA) regulations, all reports of mold identification, air sampling, and any other data which relates to workplace conditions must be shared with workers (29 CFR 1910.20). Workers who develop symptoms while occupying or working in mold infested buildings should consult with their doctors. People who exhibit severe symptoms such as asthma attacks or hypersensitivity pneumonia should leave the building and return only after the mold has been professionally abated.

5. **Abatement** usually consists of removal and replacement of infested building materials, carpets, and water damaged objects. Workers must not clean up significant amounts of mold unless they are trained to do so. Even then, they must wait until the molds are identified and an industrial hygienist or safety professional provides a list of precautions workers need to take. Some jobs can be done with Tyvek® suits, N100, R100, or P100 respirators, goggles, and HEPA vacuums. Others require more elaborate equipment. Workers who exhibit severe symptoms from mold exposure, who are already allergic to molds, or who are immune-compromised must not do this work.

6. **Killing molds.** Powerful fumigants and disinfectants are sometimes used to kill molds. However, disinfection must be combined with removal of all mold contaminated materials. Dead and dormant mold particles and spores still can provoke symptoms.

7. **Mold Control.** Clean up can never remove every trace of mold. Reinfection should be expected unless the conditions are changed that allowed mold to grow are controlled including:
   * Do not allow anyone to bring contaminated objects back into the building such as carpets, upholstered furniture, papers, and other absorbent items which are not easily disinfected.
   * Wash other objects and surfaces with a disinfectant such as a 1:10 bleach solution and use a HEPA vacuum for residual dust.
   * Avoid installing new materials which are especially subject to reinfection and which act as repositories for mold and spores such as carpeting, drapes, or other porous materials.
* Provide environmental controls. Molds do not thrive when the humidity and/or temperature are relatively low. The building's ventilation system must be capable of consistent temperature and humidity control. Especially do not let the ventilation system be a source of contamination: clean ducts and air handlers, use the best quality air filters, and change these filters when recommended by manufacturers or sooner.

These basic points should help in planning policies and protecting the workers. If you have further questions, contact ACTS.

The following article appeared in the Sept 2003 ACTS FACTS.

**EPA FINDS MOLDS CAUSE ALLERGIES IN MICE**

*Source: BNA-OHR, 33(30), p. 710, 7/24/03*

Respiratory exposure to two types of mold caused significant allergic responses in female mice similar to those observed in human allergic lung disease, a scientist with the Environmental Protection Agency said July 21.

According to Marsha Ware, an immunologist with EPA's National Health and Environmental Effects Research Laboratory in Research Triangle Park, NC, the study she and other scientists conducted suggests that the molds–*metarhizium anisopliea* and *stachybotrys chartarum*–could have a role in the induction of asthma. The effect in mice exposed to a third mold the researcher studied–*penicilliun chrysogenum*–was less significant, she said.

Ward presented her research results at an indoor air quality symposium in Durham, NC. She noted that previous studies have associated molds with the exacerbation of asthma, but this study indicates they may contribute to the induction of allergic asthma.

During the course of the meeting, EPA scientists discussed the recent trend to minimize the health effects of molds. Referring to this controversy, Marc Menetrez, director of research on bio-contamination with EPA's National Risk Management Laboratory in Research Triangle Park, NC, said "we don't trivialize the issue and we prefer that others do not."

Sometimes it is necessary to show that allergies are not psychological in origin by inducing the condition in animals. MR.
NIOSH RELEASES REPORTS ON MOLD AND POOR AIR QUALITY

In June, the National Institutes for Occupational Safety and Health (NIOSH) published four health hazard evaluation (HHE) reports of workplaces affected by mold and poor indoor air quality:

1. At Benefit Healthcare in Great Falls, MT, culturable fungi, cockroach allergens, temperature problems, and carbon dioxide were found to be associated with a 17.1% diagnosed asthma prevalence as opposed to a prevalence of 11.4 statewide (HHE No. 2001-0255-2868).

2. At Nassau Community College in Garden City, NY, it was found that working in a building with visible mold significantly increased a worker's odds of having wheezing, chest tightness, shortness of breath, and sinus symptoms (HHE No. 200-0168-2871).

3. At the Somerset County Assistance Office in Somerset PA it was shown that the 55 species of culturable fungi identified in indoor air samples were related to symptoms. NIOSH reported 92% of their questionnaire respondents reported nasal symptoms, 52% reported shortness of breath, 40% reported chest tightness, and 38% reported wheezing (HHE No. 2001-0067-2896).

4. In the Fayette County Courthouse in Uniontown PA, it was shown that inadequate ventilation and mold were associated with employees complaints (HHE No. 2002-0343-2902).

NIOSH RECOMMENDATIONS. To address poor indoor air quality and mold found at all four sites, NIOSH recommended that the workplaces:

- promptly fix water leaks and replace material that has been wet for a day or longer;
- provide adequate fresh air to all work areas;
- promptly remove visible mold;
- conduct medical surveillance for work-related respiratory problems; and
- communicate to workers what is being done to improve air quality.

NIOSH also recommended that workers promptly notify maintenance personnel of water leaks, understand work-related respiratory problems, and consult a doctor about persistent work-related symptoms.

There were many other ACTS FACTS articles specifically on mold. ACTS can provide them to interested people. But of most significance in recent years was the debate about just how toxic mold really is. In 2007, this issue came to a head and ACTS FACTS covered the story as reported in the Wall Street Journal. (Next page)
MOLD: TOXIC OR NOT?

(dailyreportonline misattributed this article to William Bulkeley, 6/07)

Mold was a big toxic hazard in the 1990s and then it dropped off the front pages. Suddenly it was not considered to be much of a threat anymore. People filing cases for health effects from mold were losing more often than winning. How did this happen?

THE ANSWER. David Armstrong, a reporter for the Wall Street Journal seems to have found the answer. He looked at the case of Colin and Pamela Fraser who suffered headaches, rashes, respiratory infections and fatigue after moving to a New York City apartment. They attributed their health problems to mold and tried to sue the cooperative that owns their building. However, the court wouldn’t let their medical expert testify that mold caused their health problems. The state trial judge said that this position is “unsupported by the scientific literature.”

The judge in this case relied in part on a position paper from the American College of Occupational and Environmental Medicine (ACOEM). The paper says that “scientific evidence does not support the proposition that human health has been adversely affected by inhaled mycotoxins in the home, school, or office environment.” Armstrong says:

The paper has become a key defense tool wielded by builders, landlords and insurers in litigation. It has also been used to assuage fears of parents following discovery of mold in schools. One point that rarely emerges in these cases: The paper was written by people who regularly are paid experts for the defense side in mold litigation. The ACOEM doesn’t disclose this, nor did its paper.

CONFLICT OF INTEREST. Armstrong then goes on to document the affiliations of each of the writers and the history of the development and publication of this paper. He also said there were two other medical societies that have published statement on mold also written by legal-defense experts. These societies didn’t disclose this fact either, although one later published a correction saying two authors served as expert witnesses in mold litigation.

A HERO. In the Fraser case, a recently retired toxicologist for Washington state’s health department, came to the rescue. After the judge barred testimony that mold caused health problems, Dr. Ammann, on her own and without pay, provided an affidavit filed with the appellate court saying the judge misinterpreted the research. Now the Frasers are appealing the refusal of the trial judge, state Supreme Court Justice Shirley Werner Kornreich, to let their expert testify that indoor mold caused their health complaints. ACTS wishes them well.

Dec 2007

APPEALS COURT UPHOLDS $1.6M AWARD FOR MOLD INJURY

BNA-OSHR, 37(45), 11/15/05 P. 1017

Competent expert testimony supports a North Carolina jury’s award of $1.6 million in damages to a worker who developed an illness linked to mold exposure on the job, the NC Court of Appeals ruled November 6th (Cameron v. Merisel Properties Inc., N.S. Ct. App., No. 07-54, 11/6/07). The Court found that expert medical testimony provided was sufficient to establish causation.
THE STORY.  Tommy Cameron worked for Merisel Americas, Inc., a computer hardware and software company, at its remote customer call center in Cary, N.C.  Shortly after Cameron began working there in December 1998, he experienced dizziness, and later suffered nausea, blackouts, and falling spells.  Cameron eventually was diagnosed with complete loss of balance function of both inner ears and significant damage to the vestibular organs of both ears.  He continued to work at the call center through April 2000, when he was diagnosed as completely disabled and told by his doctors not to return to the office.

THE LAWSUIT. The lawsuit, filed November 2001 in the NC Superior Court for Wake County, alleged that Merisel knew that Cameron’s workplace was contaminated and dangerous and knew that several of his co-workers also suffered illnesses from exposure.  The suit, which also named the head of maintenance at the call center, claimed the company knowingly and intentionally exposed Cameron to conditions “substantially certain to cause severe bodily injury or death.”

LAWSUIT DISMISSED/REINSTATED. The trial court initially dismissed the lawsuit, finding it was barred by the applicable statue of limitations. That ruling was overturned by the appeals court in March 2004. The case then went to trial. In March, 2006, a jury returned a verdict finding Merisel Properties was liable for damages of $1.6 M for Cameron’s claim and $200,000 for his loss of consortium claim. The head of maintenance was found not liable. On review, the appeals court found in November 2007 that the trial court ruled properly. Regarding causation, the appellate court ruled that the testimony of three experts rose above mere speculation and therefore was sufficient to withstand a challenge to the verdict.

EXPERTS. The appeals court noted that Dr. Joseph Farmer performed various tests on Cameron to determine the cause of his vestibular dysfunction before deciding that it was likely to be due to mold exposure. “Clearly, [Farmer’s] opinion was based on far more than speculation,” the court said.

Dr. Eckhardt Johanning, testified as an expert in the area of occupational and environmental medicine and the effects of mold on health. He said that Cameron’s exposure to mold “more likely than not” was the “competent cause” of his illness, according to the appeals court. That testimony, along with other evidence present in the case was sufficient to show causation, the court said.

COMMENT. Let’s hope this trial marks the end of the practice of throwing out claims for mold injury as “junk science” on the basis of three highly biased position papers, one even published by the American College of Occupational and Environmental Medicine. These papers were actually written by paid experts for the defense side in mold litigation cases (see ACTS FACTS, February, 2007). None of the medical journals disclosed this fact, and only one later published a correction revealing that the authors served as expert witnesses in mold litigation. Meanwhile, many people have been harmed by mold exposure and were unable to obtain damages for their injuries.

And since Cameron’s lawsuit was filed in November 2001 and the appeals court upheld it in 2007, one has to wonder how people whose only recourse is the courts survive these legal ordeals.