

My Florida Home Book 2.2: Keeping Your Home Healthy¹

Hyun-Jeong Lee, Audrey Norman²

Indoor Air and the Health of Your Household

Most Americans spend more than half their lives in their home. A home provides shelter, protects its residents from harm, keeps us safe, or so we think. Too easily, we assume that our homes are cleaner and healthier than the outdoors. Unfortunately, this may not always be true.

The U.S. Environmental Protection Agency (EPA, 2008) indicates that indoor air can be much more polluted than outdoor air. While some pollutants may enter our homes from outside, many indoor air pollutants actually originate inside. Pollutants may emanate from your house structure (both new and old), paint, wallpapers, carpet, furniture, or many other possible sources inside your home. To make things worse, if your home isn't taking in enough outdoor air to dilute the level of indoor pollutants and filter them out, the air quality inside your home could decline to such poor levels that your household members feel uncomfortable and possibly sick. Depending on how you manage your home, it can be a comfortable and healthy "home-sweet-home," or

despite your best intentions, it could jeopardize your health.

Health Impacts of Indoor Air

Poor indoor air quality causes both acute and chronic health problems for occupants. Some of these problems can be as minor as irritation of the eyes, nose, and throat, headaches, dizziness, and fatigue. Some health problems, however, can be serious enough to result in death. Many of the immediate minor symptoms may be relieved simply by eliminating the source of the pollution or by minimizing the person's exposure to the source. Sometimes the symptoms show up many years after exposure, while other times the symptoms occur cumulatively, after long or repeated periods of exposure to the pollutant(s).

A healthy indoor environment is important for every occupant. It is most critical to children for a number of reasons. First, children's immune systems are still developing, and compared to adults it is harder for them to recover from some illnesses. Second, the same amount of exposure to harmful

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 2. Hyun-Jeong Lee, assistant professor, Department of Family, Youth, and Community Sciences; Audrey R. Norman, Palm Beach County Extension Director and Extension Agent II; Family and Consumer Sciences, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville 32611.

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sources is a relatively larger, more concentrated dose for children than for adults, considering their smaller body sizes. Third, by nature of their normal behavior, children are more easily exposed to many sources containing harmful chemicals and pollutants, such as soil and dirty toys. Although children are more seriously influenced by their surroundings, they cannot control the environments around them and are dependent on adults to provide a healthy environment (HUD, 2006). Of course, people of any age with temporarily or permanently weakened immune systems are more susceptible to the negative ramifications of poor indoor air quality (Parrot, Atilas, & Vogel, 2006).

Basics for Healthy Homes

Florida Cooperative Extension educators suggest the following basic guidelines for maintaining healthy air quality in your home:

- No smoking inside your home.
- Keep your home dry (indoor relative humidity below 60%) and clean up mold.
- Use carbon monoxide alarms and smoke detectors.
- Keep your home clean, free from bugs and excessive dust.
- Test your children for lead.
- Test your home for radon.
- Test water (well or pipe).
- Use pesticides only as directed in user instructions on the product label.

If you think anyone living in your home is sick, and you suspect that it is because of any indoor environment issue, see a doctor immediately, get medical help first, and then contact your local Health Department.

If you know what the source of the problem is, please follow the instructions given to you by reliable government agencies for the appropriate remedy. While this book summarizes basic information on

some of the major indoor air pollutants, the information here is limited.

You can find the reliable instructions from the following:

- U.S. Environmental Protection Agency (or EPA) at <http://www.epa.gov>
- U.S. Center for Disease Control and Prevention (or CDC) at <http://www.cdc.gov>
- Your local Health Department

Location: _____

Website address: _____

Telephone number: _____

Indoor Air Pollutants

Mold

Have you seen black or orange stains on your bathroom tile's grout? Well you guessed it—that, dear reader, is mold. Molds, of course, have become a part of daily life. And necessarily so! Without it, we would not be able to enjoy some of the finer things in life—yogurts, cheeses, antibiotics.... There are, however, good molds and bad molds; and what you saw in the bathroom the other day...not so good.

Mold is a type of fungus and it thrives in warm and humid environments. Florida's heat and humidity provide the ideal habitat for molds of all kinds. Because mold reproduces by releasing spores into the air, mold problems can go undetected until it has grown into a colony, as in our grout example. Certain molds really are toxic, however, and not only cause health problems, but also result in damage in building structures, as well as discoloration and deterioration of furniture, books, and other items.

Health Impacts of Mold

Mold exposure occurs by touching it, or by inhalation of air containing its spores. Exposure may cause allergic symptoms and health problems. Reactions differ from person to person depending on their health conditions. Reactions can be as minor as sneezing, coughing, or runny nose, but could be as serious as chronic sinus problems, nosebleeds, asthma, skin and/or eye irritation, headaches, difficulty concentrating, and even memory loss.

Mold Prevention

As mentioned earlier, mold likes warm and humid conditions. Like anything, mold needs something to eat so that it can grow. It can feed on natural fibers used in clothing and furnishings, paper products, glues, such as those sometimes used in bookbinding, and materials in some grout. Soap "scum" left on shower stalls and shower curtains can provide the required nutrients for some mold growth. That is why the silicon caulking around bathtubs and the tile grout in bathrooms are spots where you can find mold very easily. If you do not have adequate ventilation in your bathroom and don't do a quick clean of the shower or tub after each use, moisture accumulates and the warm, humid air and damp grout and caulking provide perfect conditions for mold growth.

How, then, can we prevent mold? It may be disappointing, but mold is a part of nature and there is no way to keep it entirely at bay. We can, however, minimize its presence by keeping our house cool, dry, and clean enough to discourage its growth.

Keep relative humidity (or RH) below 60% and temperature below 77 F indoors if you think mold may be an issue for your home. From any hardware store, you can easily get an affordable analogue (one with needle) or digital humidity meter that measures relative humidity. Dry any wet surface or items as soon as possible and do not leave anything wet more than 24 hours. Keep your house clean to minimize nutrients for mold. Especially, remove any food residue immediately and refrigerate perishables.

Mold Removal

When you find mold inside your home, it means that there is a moisture problem, which can be leaky plumbing or a faulty seal in your home envelope whether or not you can see it. It is very important to find and fix the source of problem in addition to cleaning up the mold. Otherwise, the mold will appear again very soon. If you cannot find the source, you will need to get professional help. Depending on the source, you may have more mold problems somewhere you do not see, such as behind a wall. If the moldy area is larger than 10 square feet (about the

size of a 3x3 square), you definitely need to get professional help.

If the mold is small enough for you to clean it up by yourself, you can remove it by scrubbing the moldy surface using dishwashing detergent or laundry detergent and water, or a mild solution of bleach diluted with water. Minimize exposing your skin and eyes directly to the mold or inhaling the mold spores. Wear waterproof gloves (e.g., rubber gloves), protective goggles, and an N-95 respirator. You can easily purchase N-95 respirators at most hardware stores. After clean-up, dry the wet area thoroughly to prevent further mold growth.

Carbon Monoxide (CO)

Carbon monoxide (CO) is a deadly toxic gas that kills more than 500 people in the United States every year. Colorless, tasteless, odorless, and insidious, CO exposure can result in serious illness, injury, or death.

When carbon-based fuels (gas, coal, wood, or oil) are incompletely combusted, they emit carbon monoxide. When you use fuel-burning appliances indoors without taking the necessary precautions, or when the appliances fail to work properly, your household is at risk of CO exposure. Common sources of CO are:

- Gas ovens and stoves
- Gas or charcoal grills
- Gas, oil and kerosene space heaters, furnaces, boilers, and water heaters
- Wood-burning fireplaces and stoves
- Vehicles
- Tobacco smoke

Health Impacts of Carbon Monoxide

The symptoms of CO poisoning can be similar to flu and as minor as nausea or dizziness, but CO poisoning can cause brain damage, loss of sight and hearing, loss of consciousness, or even death. Regardless of a person's health, CO can hurt anybody.

CO Poisoning Prevention

Here are basic tips to prevent CO poisoning:

- Have at least one CO alarm in your home.
- Make sure that you have proper ventilation systems for fuel-based appliances or fireplaces.
 - Run your kitchen exhaust fan that draws fumes outside your home when you are using fuel-based appliances.
 - When you do not have an exhaust fan or other ventilation system, open your window for natural ventilation.
- Check the fuel-burning appliances occasionally to ensure that they work properly.
- Do not idle your vehicle in a garage regardless of whether the garage door is open or closed.
- Do not smoke inside your home.

Carbon Monoxide Alarm

Again, you cannot smell or see CO—without a CO alarm, it could go dangerously undetected. (CO alarms used to be known as CO detectors, as they look similar to smoke detectors.) You can purchase CO alarms in most hardware or discount stores for \$20–50. When shopping for a CO alarm, make sure to choose one bearing the UL label, which mean the device passed qualification testing by Underwriters Laboratory. Install CO alarms within 10 feet of every sleeping area, and on each level of a multilevel home.

Florida building code (9B-3.0472) requires installation of CO alarms in every new building (construction permit issued on or after July 1, 2008) with a heater or appliance powered by fossil fuels, a fireplace, or an attached garage. New buildings must have an operational CO alarm installed within 10 feet of each room used for sleeping purposes. In new construction, the CO alarms should receive their primary power from the building wiring when such wiring is served from the local power utility. In addition, the alarms shall have battery backup.

When you hear CO alarm sounds:

- Get outside right away.
- Call 911 using any phone outside your home to report the situation. Do not come back into your home to call.
- Seek medical attention immediately for the right treatment.
- Do not come back into your home until all problems are fixed and professionals confirm the safety of the home.

Lead

Lead is a metallic element that has been recognized as one of the most harmful poisons that threatens human health. In the past, lead was used to make paint for easier application until federal law banned it. In 1978, the Consumer Product Safety Commission prohibited the use of lead-based paint on interior and exterior residential surfaces, toys, and furniture.

Children can absorb lead from dust in the air we breathe, by eating paint chips with lead in them, and through soil that contains lead. Lead can be also brought to your home if any of your household members is working with lead and does not clean his/her body and clothes before coming home. Surprisingly, lead is still found in pottery, ceramic cookware, jewelry, toys, and even candies that are imported from certain foreign countries.

Health Impacts of Lead

Lead poisoning has been proven to influence development of brain, nervous system, and kidney. In addition, it slows down physical growth, causes behavior and learning problems, and even death.

Lead Poisoning Prevention

- If you have children, age six years or under, have them tested for lead poisoning.
- If you are living in or plan to purchase an old home built before 1978, test the house and water for lead.

- If you are living in or around a home built before 1978, do not let your children play in bare soil anywhere near the property.
- Do not let your children put toys or cords containing wires in their mouths.
- Do not let your children eat any food without washing their hands.
- If any household members work in a place where people handle lead, make sure the person washes him/herself and entirely changes his/her clothes before coming home.

Lead Removal

Get professional help to remove lead paint or lead dust. Never attempt to remove either by yourself.

Lead Poisoning Prevention Real Estate Notification and Disclosure Rule

The U.S. Department of Housing and Urban Development (or HUD) and the U.S. Environmental Protection Agency (EPA) require disclosure on lead-based paint and paint hazards before the sale or lease of most housing built before 1978. Property owners who sell or rent housing built before 1978 must do the following:

- Make disclosure of all known lead-based paint and/or lead-based paint hazards in the housing.
- Disclose available reports pertaining to lead-based paint and/or lead-based paint hazards in the housing.
- Provide the buyers/renters with the EPA brochure, *Protect Your Family from Lead in Your Home*.
- Include warning language in the contract as well as signed statements from all parties (buyers, renters, etc.) that requirements were completed.
- Allow buyers a 10-day opportunity to perform lead testing on the housing in question.

Radon

Radon is a natural radioactive gas that causes cancer. Radon comes from the natural (radioactive) breakdown of uranium in soil, rock, and water and gets into the air you breathe. Radon can be found all over the United States. It can get into any type of building through cracks or gaps in building structures, any foundation flaws, or through the water supply.

Health Impacts of Radon

EPA reports indicate that radon is the second leading cause of lung cancer in the United States followed by first-hand smoking. Lung cancer due to radon exposure kills over 20,000 people every year. Radon has the same effects on both smokers and non-smokers.

Radon Testing

The EPA and the Surgeon General of the United States have recommended that all houses be tested for radon. For more information on radon testing, call the National Radon Information Line at 1-800-SOS-Radon or 1-800-767-7236. As with a home inspection, if you decide to test for radon, you may do so before signing your contract, or you may do so after signing the contract as long as your contract states the sale of the home depends on your satisfaction with the results of the radon test.

Asbestos

Asbestos is a mineral fiber that was used in various products to strengthen, add heat insulation and fire resistance. Previously, asbestos was included in many types of building and insulation materials and some textured paint until 1977 when the use of asbestos was banned. Most products made recently do not contain asbestos.

Sources of Asbestos Problems

People absorb asbestos by inhaling asbestos fibers. When items containing asbestos are in good condition without damage, they usually do not release asbestos fibers. Products that may contain asbestos in homes are:

- Insulation of old homes that were built between 1930 and 1950
- Some roofing and siding shingles
- Some artificial ashes and embers sold for use in gas-fired fireplaces
- Some vinyl and rubber floor tiles and backing on vinyl sheet flooring and adhesives
- How water and steam pipes in old houses
- Some insulations of oil and coal furnaces and door gaskets

Health Impacts of Asbestos

Exposure to small amounts of asbestos usually does not have serious impacts on human health. However, if a person is exposed to high levels of asbestos fibers for a long time, the exposure can increase the risk of lung problems including:

- Lung cancer
- Mesothelioma (a cancer of the lining of the chest and the abdominal cavity)
- Asbestosis (in which the lungs become scarred with fibrous tissue)

The risk of lung cancer from inhaling asbestos fibers is greater if a person smokes.

Asbestos Poisoning Prevention, Repair and Removal

You cannot tell if a material has asbestos without professional testing unless the material is clearly labeled with this information. Therefore, treat the material as if it contains asbestos. Even sampling without professional help is not recommended.

Asbestos causes health problems when it releases asbestos fibers. If a material that contains (or you suspect it contains) asbestos is in a good condition, just leave it as is and do not worry. However, if the material is damaged, and it starts releasing dusts and fibers, limit access to the area where the material is located and get professional help to repair or remove it.

Never dust, weep, or vacuum debris that may contain asbestos. It will disturb asbestos fibers and release them to the air. Get professional help. The professional should remove the debris with wet mopping and equipment with special HEPA (High Efficiency Particulate Air) filters.

Before you remodel your home, get professional help to identify existence of asbestos in your home. Asbestos professionals should perform any major treatment of asbestos including sampling, repair, and/or removal. If you hire any housing professionals for home inspection or remodeling, and if you are concerned about possible asbestos problems in a home, you need to find professionals who have trained specifically for asbestos treatment and have enough experiences.

Other Indoor Pollutants

Tobacco Smoking

Smoking produces carbon monoxide and various harmful chemical compounds (including formaldehyde and benzene) that threaten human health. Chemical compounds that are released from smoking are called "environmental tobacco smoke (ETS)," which is the same as second-hand smoke. Exposure to the compounds (ETS) released from another person's smoking is called passive smoking, involuntary smoking, or second-hand smoking.

The U.S. Environmental Protection Agency (EPA) reports that second-hand smoking causes approximately 3,000 lung cancer deaths among nonsmokers every year in the United States, and that it increases the risk of heart disease in nonsmokers. In June 2006, the Surgeon General released a major report concluding that secondhand smoke causes disease and death in children and nonsmoking adults.

Especially, second-hand smoking is found to have serious impacts on children's health. Exposure to second-hand smoking increases risks of various health problems in children including:

- Asthma
- Sudden Infant Death Syndrome (SIDS)

- Lower respiratory tract infections (e.g., pneumonia and bronchitis)
- Middle ear infections

Formaldehyde

Formaldehyde is a chemical used widely in the manufacturing of building materials and numerous household products. Common sources of formaldehyde in homes are pressed-wood products including hardwood plywood wall paneling, particleboard, fiberboard, furniture, and urea-formaldehyde foam insulation (UFFI). Some press drapes, textiles, and adhesives are also sources of formaldehyde.

Formaldehyde causes watery eyes, burning sensations in the eyes and throats, nausea and breathing problems. If you experience any of these symptoms after bringing in new possible sources of the formaldehyde, improve ventilation to bring the gas out of the enclosed space. If the problem resists, consult a physician and your local Health Department for further help.

Pesticides

Many households have pest problems inside and outside their homes. Pesticides are chemicals that are designed to prevent and kill the pests. If the pesticides are not properly used or stored, however, they can be very dangerous to human health for a simple reason: the chemicals that pesticides contain to kill pests can also harm people. A study by the American Association of Poison Control Centers concludes that approximately 71,000 U.S. children were exposed to or poisoned by common household pesticides in 2004. Symptoms of exposures to the pesticide can be minor and temporary, such as dizziness, nausea, and itchy skin. However, they can also cause long-term cancer or lung damage, as well as neurological, developmental, and reproductive disorders, which may not be discovered until long after exposure. It is very important to use pesticides according to the product instructions and store them in a location that children cannot reach.

Volatile Organic Compounds (VOCs)

Volatile organic compounds (VOCs) are various types of gases that are emitted from certain solids or liquids. The EPA indicates that concentrations of many VOCs are up to ten times higher in our homes than outdoors. Common sources of VOC emissions in homes include:

- Paints, paint strippers and other solvents
- Wood preservatives
- Aerosol sprays
- Household cleaning products
- Air fresheners
- Dry-cleaned clothing (perchloroethylene emissions)
- Automotive products including fuels

Some health impacts of the VOCs are short-term, but some are chronic. Depending on levels of exposure, VOCs can cause minor and temporary health problems such as eye, nose, and throat irritation, headaches and nausea, as well as damage to the liver, kidneys, and central nervous system.

To minimize exposure to VOCs in home:

- Use products that have no or minimal VOCs emissions
- Do not let anyone smoke indoors
- Properly store or discard any fuel or automotive chemicals
- Vent dry-cleaned items in the open air before bringing them indoors.

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