

## *Indoor Environmental Health*

Indoor pollutants are increasingly becoming a health issue. This handout covers the top indoor environmental health concerns.

- 1. Lead:** Lead is a toxic metal that is all around us. You are most likely to come in contact with it through lead-based paint and dust that is contaminated with lead. Lead-based paints were banned for use in homes in 1978. There is a good chance that any home, building, school or day care center built before 1978 contains some lead paint. Lead also can be released into the air from industries and aviation gasoline. Lead can enter drinking water through plumbing materials. You can lower the chances of exposure to lead in your home, both now and in the future, by taking these steps:
  - Use only cold water to prepare food and drinks. Hot water is likely to contain higher levels of lead.
  - Anytime the water has not been used for six hours or longer, flush all water outlets used for drinking or food preparation. To do this, let the water run as cold as it can get (5-30 seconds.)
  - Clean debris out of all screens or aerators on faucets on a regular basis.
  - Keep your home clean and dust-free.
  - Wipe up any paint chips or dust with a wet sponge or rag. Clean areas where there is friction and dust collects, such as doors, windows, and drawers.
  - Wash children's hands, bottles, pacifiers and toys often.
  - Teach children to wipe and remove their shoes and to wash their hands after playing outdoors.

**Note:** If you live in a home that was build before 1978, there is a higher risk of lead paint exposure.

- 2. Formaldehyde:** Formaldehyde is a colorless, flammable, strong-smelling chemical that is used in building materials and many household products. It is in pressed-wood products, such as particleboard, plywood, and fiberboard; glues and adhesives; permanent-press fabrics; paper product coatings; cigarettes and certain insulation materials. It is highly irritating to airways, and triggers asthma in people prone to this condition. It is known to cause cancer in animals, and specialists suspect it causes cancer in humans. To limit your contact with formaldehyde:
  - Purchase formaldehyde-free furniture.
  - Make your home smoke-free.
  - Look for exterior grade pressed wood product. They emit formaldehyde at a slower rate.
  - Keep the humidity down and ventilate your home.



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**3. Asbestos:** Asbestos is a mineral fiber that was used to insulate buildings and to reduce the start and spread of fires. It is usually found in homes built before 1970, in pipe and furnace insulation materials, asbestos shingles, millboard, textured paints and other coating materials, and floor tiles. The most dangerous fibers are too small to see. If inhaled, they can build up in the lungs. These fibers can cause lung cancer, mesothelioma (a rare form of cancer), and asbestosis (scarring of the lung). To lower your risk:

- Identify possible products that contain asbestos in your home. If you are unsure if a product contains asbestos, consider testing for it. Contact your state or local public health office to learn more about this. There are also private contractors who are experienced in doing this testing.
- Once you know a product contains asbestos, it is best to leave it untouched, if it is in good condition. If the product needs to be replaced, contact an asbestos consulting company or the public health department for advice on how to contain the product as it is being removed.
- Don't try to vacuum or sweep the debris caused by asbestos products. Only a special vacuum cleaner (class H) can safely be used to clean up asbestos fibers. An ordinary vacuum cleaner, even if fitted with a HEPA filter, cannot be used, because it will release asbestos fibers into the air.
- Consider purchasing a HEPA air filter for your home if you are concerned about asbestos exposure. Asbestos fibers range from 0.1-50 microns in length. The HEPA filter you select must be capable of removing 99.7% of particles in the air as small as 0.3 microns in diameter.



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**Note:** Be aware of possible asbestos exposure if you live in a house built before 1970.

**3. Carbon Monoxide:** Carbon monoxide (CO) is an odorless, colorless, toxic gas. Because it is impossible to see, taste or smell the fumes, CO can kill you before you are aware it is in your home. At lower levels, CO causes mild effects that are often mistaken for the flu. These symptoms include headaches, dizziness, disorientation, nausea and fatigue. Sources of CO include: unvented kerosene and gas space heaters; leaking chimneys and furnaces; back-drafting from furnaces, gas water heaters, wood stoves and fireplaces; gas stoves; generators and other gasoline powered equipment; automobile exhaust from attached garages; and tobacco smoke. To lower your chances of exposure to CO:

- Pay close attention to proper ventilation, particularly in the winter
- Consider purchasing an in-home monitor to alert you to dangerous CO levels.

**4. Radon:** Radon is an invisible, odorless gas. It is produced by the decay of uranium that occurs naturally in soil and water. Radon in homes causes about 21,000 lung cancer deaths each year. The Surgeon General and United States Environmental Protection Agency (EPA) recommend testing and reducing high levels in homes (greater than four picocuries per liter, pCi/L.) To lower your chances of exposure to radon:

- If levels are high, select a qualified radon mitigation contractor to reduce the levels in your home. Radon reduction systems work. Some systems can lower radon levels in your home by up to 99 percent.



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- 5. Secondhand Smoke:** Secondhand smoke is a mixture of the smoke given off by the burning end of a cigarette, pipe, or cigar, and the smoke exhaled by smokers. Secondhand smoke contains more than 4,000 substances. Several of these are known to cause cancer in humans or animals. Children, the elderly and those with heart or lung diseases are particularly at risk from second-hand smoke.

To lower your chances of exposure to secondhand smoke:

- Ask people who smoke to do so outside.
- Be careful of thirdhand smoke. This is nicotine and other components of smoke that linger on clothing and objects. The health effects of thirdhand smoke are unknown, particularly for infants and children.



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**The American Cancer Society Guide to Quitting Smoking can be found at**  
<http://www.cancer.org/Healthy/StayAwayfromTobacco/GuidetoQuittingSmoking/guide-to- quitting-smoking-toc>

- 6. Volatile Organic Compounds:** Volatile organic compounds (VOCs) are released as gases from certain solids or liquids. VOCs include a variety of chemicals, some of which may affect your health sooner or later. Thousands of products release VOCs. Examples include: paints and lacquers, paint strippers, cleaning supplies, pesticides, building materials and furnishings, cosmetics and fragrances, office equipment such as copiers and printers, correction fluids and carbonless copy paper, graphics and craft materials including glues and adhesives, permanent markers, and photographic solutions. The EPA states that the levels of about a dozen common organic pollutants are two to five times higher inside homes than outside. This is regardless of whether the homes are located in rural or highly industrial areas. To lower your chances of exposure to VOCs:

- Make sure you get enough fresh, clean air into your home.
- Open windows and doors after you bring new products containing VOCs into your house, such as new carpets, furniture, or drapes.
- Some cleaning products give off fewer VOCs than others. Choose green cleaning products that are low in VOCs. Use products that avoid formaldehyde, toluene, methylene, chloride, xylene, benzene, and ethylene glycol. Baking soda and vinegar can successfully be used for most indoor cleaning!
- Follow manufacturers' labels when using household chemicals. If the label says "Use in a well ventilated area," go outside or to an area near an exhaust fan or open window.
- Dispose of chemicals properly. Your local landfill will have a special area for hazardous chemicals. This prevents the chemicals from entering our water supply.
- Buy only enough paints, cleaners and solvents for immediate use to prevent storing these products in your home. Follow instructions on the product label. Keep lids on tightly. Store products in a separate room, preferably an outdoor shed, or in areas with proper ventilation.



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- Use a high efficiency particle arresting air purifier with a filter that is designed to remove airborne chemicals. For example, HEPA filters can be fitted with a special VOC filter.
- Choose flooring carefully. Vinyl and synthetic carpets are high in VOCs. Instead, look for natural fibers such as wool, cotton, pre sealed hardwood, or hardwood sealed with water-based polyurethane, linoleum, ceramic tile, bamboo, cork, or recycled glass.
- Read labels to find low-VOC products and purchase nontoxic paint.

### CONSUMER RESOURCES

- Green Products: <http://www.goodguide.com/>
- Environmental Working Group's Skin Deep Cosmetic Database  
<http://www.ewg.org/skindeep/>

**8) Flame Retardants (Polybrominated Diphenyl Ethers--PBDEs):** It is common practice to add chemicals to products to lower their ability to burn. Chemical fire retardants are found especially in products made with synthetic materials that burn easily. Some of the more common ones include: mattresses, couches, pillows and children's car seats that are made with polyurethane foam. Some of the most toxic are brominated fire retardants (BFRs), which include chemicals known as polybrominated diphenyl ethers (PBDEs). Scientists have found that children who come into contact with very small doses of these chemicals at critical points in their development can be harmed. It can damage their reproductive systems and cause decreased motor skills, learning, memory and hearing, as well as changes in behavior. The PBDEs in everyday items like furniture, computers, televisions and other electronics leach into homes. This can expose children to amounts exceeding the EPA's recommended safe level.

- Because of outdated and ineffective regulation in California, called TB 117, foam products must be labeled if they contain flame retardants. Avoid products with the label, "California TB117." They likely contain flame retardants.
- For products you own or plan to purchase, contact the manufacturer and ask if any flame retardants were used. If so, ask what kind was used. Avoid PBDEs and Deca-BDEs.
- Support efforts to reform fire safety laws. Toxic fire retardants are often added to products even though there is little evidence that the benefits outweigh the risks.

### ENVIRONMENTAL INTOLERANCES

If you are interested in reading about environmental intolerances such as Multiple Chemical Sensitivity, you may want to see our handout ***An Integrative Approach to Environmental Intolerances: Multiple Chemical Sensitivity and related illnesses.***

- [Patient version](#)
- [Clinician version](#)



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### RESOURCES TO SHARE AND DISCUSS WITH YOUR HEALTH PRACTITIONER

1. [CDC Tutorial](http://www.atsdr.cdc.gov/csem/csem.asp?csem=17&po=0) (In-depth tutorial on how to take an Environmental Exposure History in a patient). <http://www.atsdr.cdc.gov/csem/csem.asp?csem=17&po=0>
2. [CDC Adult Environmental Health Questionnaire](#)
3. Physicians for Social Responsibility Pediatric Environmental Health Toolkit (Pediatric Tool Kit for Clinicians on Environmental Health in children with materials for the office and for the patients' families) <http://www.psr.org/resources/pediatric-toolkit.html>
4. [I PREPARE Mnemonic Pocket Guide](#). Tool for clinicians taking an exposure history. Designed by the Agency for Toxic Substances and Disease Registry.
5. Reproductive Environmental Health Assessment <http://www.psr.org/chapters/wisconsin/assets/pdfs/reproductive-environmental.pdf>

### Bibliography

1. EPA Indoor Environmental Air Quality: <http://www.epa.gov/iaq/>.
2. EPA Pollution Prevention and Toxics: <http://www.epa.gov/oppt/>.
3. CDC Healthy Homes/Indoor Air Quality: <http://www.cdc.gov/HealthyHomes/ByTopic/AirQuality.html>.
4. Crinnion WJ. [The CDC fourth national report on human exposure to environmental chemicals: what it tells us about our toxic burden and how it assists environmental medicine physicians](#). Alternative medicine review: a journal of clinical therapeutic 15(2):101-9 Jul, 2010.
5. Arizona Center for Integrative Medicine Clinician CME Course, Environmental Medicine: An Integrative Medicine Approach.

***The information in this handout is for general education. It is not meant to be used by a patient alone. Please work with your health care practitioner to use this information in the best way possible to promote your health.***

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**Notes:**