



Pediatric and Adolescent Medicine
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ENVIRONMENTAL HAZARDS

Children may be particularly susceptible to exposure to chemicals and other toxins: they are rapidly growing and consume more water and food per body weight than adults; they have a greater surface area (skin) relative to body size, which may lead to increased absorption; they are inquisitive about their surroundings and more commonly put things in their mouths than adults; they are more likely to be on the ground and floor where certain contaminants "settle out," and they may not recognize dangerous situations. Additionally, they also carry a lifetime burden of exposure: symptoms/disease may develop acutely or take many years to be manifest.

Although standards exist to determine "safe" levels of various environmental toxins, these guidelines are not "set in stone," nor do they ensure safety.

With the increased trend to build energy efficient homes, indoor air pollution has become a potentially greater problem (less movement of outside air into the home, plus potential for increased concentration of "sealed in" pollutants).

TOBACCO SMOKE: "passive" smoking produces a mixture of suspended hydrocarbons and other irritating chemicals; children of parents who smoke are more likely to have an increased incidence of upper airway infections, otitis, bronchitis, pneumonia, and reactive airway disease (asthma); throat and lung cancer may be long term consequences. Recommendation: **STOP SMOKING! (1-800-QUITNOW)**. If you must smoke, smoke outside! Do not smoke in a child's presence, particularly in small, poorly ventilated spaces like a car.

RADON: a colorless, odorless gas that comes from radium containing soil, water, and building materials. It is the most significant source of background radiation and may be responsible for 5-20,000 deaths from lung cancer per year. Radon breaks down into "daughter" by-products that become attached to particulate matter that is then inspired and deposited in lung tissue. Danger of exposure is enhanced in the lower levels (basement) of a house, particularly with a poorly sealed foundation and poor ventilation.

- Recommendation: test your home! Spot checks and 90 day kits are available;
- Best to test the basement during the winter months for a "peak" level. Information is available from the EPA (www.epa.gov/radon) about testing and methods to resolve an existing problem. Despite various quoted acceptable levels of radon, there is No safe level of exposure!

WOOD STOVES, KEROSENE HEATERS, and GAS RANGES: the first two may emit a mixture of hydrocarbons and respiratory irritants; the latter give off nitrogen dioxide, a colorless, odorless respiratory irritant: the problems are increased by inadequate cleaning or venting. Carbon monoxide is also a problem when these appliances are used indoors and are not properly vented.

- Recommendation: proper venting & cleaning are essential, especially in families with a history of chronic respiratory disease (asthma)

FORMALDEHYDE: found in particle board, paneling, plywood, adhesives, and foam insulation, particularly in mobile homes; it can cause eye and nose irritation, wheezing, dry skin, nausea, and lethargy. Other paints, waxes, varnishes, and cleaning products can emit volatile organic compounds, as well: **VENTILATE!!!**

CARBON MONOXIDE: a colorless, odorless, tasteless gas that interferes with oxygen delivery to the body; may be given off by heaters, stoves, fireplaces, chimneys: Be certain to inspect appliances annually; **install CO detectors.**

MOLD, DUST MITES, ANIMAL DANDER, COCKROACHES: effects often made worse by damp, humid conditions.

ASBESTOS: fiber commonly found in older insulation products; causative factor in rare form of lung cancer (mesothelioma). Insulation is not a problem if in intact condition; but it becomes friable with age and/or if disturbed, causing it to become "breathable." Federal guidelines exist for its inspection, care, and removal. Of some concern in schools undergoing renovations.

PESTICIDES, INSECTICIDES, HERBICIDES: multiplicity of products for treatment of house plants, lawns, vegetable gardens, extermination, etc. By the very nature of the products they are chemicals poisonous to living things, but are deemed "safe" by the manner in which they are used to minimize human toxicity: malathion, lindane, DEET, etc.

- Recommendations: store products safely and follow directions for use carefully.
- Keep children away from recently treated lawns, carpets, furniture, etc.
- Wash produce carefully (ask about organically grown fruit & vegetables).

- Think twice before signing up for routine exterminator or lawn services; ask questions about chemicals being used: ask about an "integrated pest management system;" physician, local consumer agency, Poison Control (800-222-1222) may be good additional sources of information.
- (In using insect repellants, DEET containing products are much more effective than alternatives; there is the potential for absorption through the skin; the lowest possible concentration of the product should be used---there are products, such as Skintastic that are made for pediatric use; it should be applied only once a day, so stay away from combo bug repellant---sun screens).

HEAVY METALS: deposited in food, air, water soil. All of these metals can be associated with acute or chronic toxicity, and cause neurological, blood, gastro-intestinal, and kidney disease.

1. **LEAD:** primarily found in old paints, as well as from auto emissions, lead soldered pipes, pottery glazes, contaminated air from smelting plants, and even newspaper print.
 - Lead screening is a universal practice in young infants and children; be careful if re-modeling an older house; keep acid containing beverages (OJ) out of imported pottery; read paint labels carefully, even if they say "non-toxic." Test tap water as necessary.
2. **CADMIUM:** paint and batteries. Dispose of these products properly (not by tossing in a trash can)
3. **ARSENIC:** found in soils/water contaminated by mining, smelting, insecticide use, and in playground equipment and decks with treated wood, and seafood, poultry, etc.
4. **MERCURY:** there are 3 important forms of environmental mercury:
 - Elemental mercury can exist in liquid or vapor form as in thermometers, batteries, florescent lights, dental amalgams, etc. Most mercury comes from the burning of fossil fuels. Elemental mercury is fat soluble; it is oxidized to inorganic mercury, which is then toxic to the kidneys and the nervous system. The Mad Hatter in Alice in Wonderland was a victim of occupational exposure to mercury vapor.
 - Inorganic mercury used to be present in folk remedies, anti-bacterials, and teething powders etc.
 - The syndrome of acrodynia (swollen, painful red fingers and toes, rash, increased blood pressure, numbness, and kidney damage) was a common occurrence in children exposed to some of these products (in the 1940's).
 - Organic mercury (methyl- and ethyl-mercury) have been used in fungicides, pesticides, antiseptics, etc. It is ubiquitous in the environment (bacteria readily methylate elemental mercury, and it can accumulate in the food chain, particularly in high concentrations in large predator fish, like shark, swordfish, king mackerel, tilefish, and tuna (albacore).
 - Ethylmercury had been used as a preservative in vaccines as thimersol; presently administered vaccines (with the exception of influenza vaccine) are essentially thimersol free!
 - Recommendations: pregnant and nursing women should consume no more than 4-6 ounces of tuna per week, and avoid the other listed fish species.

GENERAL GUIDELINES:

Water: there is no data to suggest that bottled water is a better (or safer) alternative to tap water. Many of the contaminants in our municipal water supply come from chlorination, lead, bacteria, pesticides, industrial solvents, etc. Home water purification systems can remove a substantial amount of most, but not all, of these contaminants. Common brand names are: Culligan, Kenmore, GE, Aquasana, etc. (see www.nsf.org)

Air: the air we breathe is affected by where we live and how effective industrial and automobile fumes, etc. are controlled. Particulate matter, bacteria, volatile organic compounds, odors can present a variety of health hazards. New home construction which ensures a "tighter" seal and, therefore, less ventilation of interior space, can magnify the in home problems.

Be certain to have your furnace and gas appliances inspected and in good condition; control humidity and mold; consider having duct work cleaned at intervals, as well as an electrostatic air filter on your furnace and "in room" purifiers (the better systems--still inexpensive---eliminate mold and spores, odors, pet dander, tobacco smoke, other air born allergens). Avoid systems that produce ozone---see Consumer Reports, Sept. 2010.

Food: there may not be a particular advantage to buying "organic" produce; however, pesticide free dairy products, growth hormone and antibiotic free beef may reduce unnecessary exposure to these chemicals. Also, certain farm raised fish, such as salmon, may have higher concentrations of PCB's: the fish raising technology involves recirculation of water and waste. There is no "free ride" and for the most part our food chain is remarkably safe. Read labels and buy judiciously!

For further information:

The Mid-Atlantic Center
For Children's Health &
The Environment
1-866-622-2431

