

Indoor Environmental Toxicants

Short communication

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The world has a large inventory of old houses and apartment buildings. Conditions in these units contribute to the presence of lead, asbestos, radon, mold, volatile organic compounds, pest droppings, pesticide residues, and combustion products as indoor environmental pollutants, some of which are known asthma triggers [1]. Although environmental and health officials work to raise public awareness about residential indoor environmental quality, health problems from indoor environmental pollutants persist. The U.S. Environmental Protection Agency has reported that pollutant levels can be higher indoors than outdoors. By one estimate, pollutant levels can be 10 to 100 times higher inside than outside [2].

Biological contaminants in homes include viruses, bacteria, mold, dust mites, animal dander, and pollen. The latter four of these are known asthma triggers. An estimated 300 million people worldwide suffer from asthma, and this number increases by 50% every ten years [3]. This illness is a growing concern for children. In the United States alone it is responsible for 14 million missed school days annually, is the third-ranking cause of hospitalization of children under 15 years of age, and entails an estimated \$3.2 billion per year in costs of treating children under 18 years of age [4]. Volatile organic compounds (VOCs) are emitted from certain building materials, pesticides, paints, paint strippers, solvents, and hobby supplies and can include benzene, styrene, xylene, methylene chloride, tetrachloro-ethylene, and formaldehyde, among others. Many of these are known or suspected human carcinogens [5].

Radon is a colorless, odorless, and tasteless radioactive gas. It is a decay product of uranium, which is present in trace amounts in soils all over the world. Uranium decays to radium - both of these are solid elements. But radium decays to radon, which is a gas. It then moves easily through soils, especially porous, sandy, or gravelly soils. Radon pathways into buildings include cracks in basement floors and foundation walls. Radon is the second leading cause of lung cancer. In the U.S. radon is estimated to be responsible for 21,000 deaths every year [6].

Combustion Products are another category of indoor environmental pollutants. They consist of nitrogen oxides, sulfur dioxide, carbon monoxide, respirable particles and water. Nitrogen oxides and sulfur dioxides are lung irritants, but carbon monoxide can kill. Combustion pollutants enter the indoor environment when they leak from home appliances and equipment that burn gas, oil, kerosene, or wood. Human exposure to low levels of carbon monoxide results in symptoms that mimic those of influenza. Exposure to higher levels can kill [7].

Lead, which is related to a variety of disorders and is particularly dangerous to children, can be a common component of house dust. While lead poisoning through ingestion has received substantial attention, airborne lead is an often-overlooked source of exposure. In homes painted before 1978, lead-based paint was commonly used on double-hung windows, which shed the paint as dust when the sashes rub against each other [8]. Asbestos was used as insulation on heating systems and heating ducts. In some older homes, it actually covers entire boilers. Exposure to asbestos causes asbestosis, a type of lung cancer, mesothelioma, which is cancer of the chest lining, and lung cancer. Abatement of both lead and asbestos are not do-it-yourself activities. The removal of these elements is regulated in the U.S., and must be performed by certified abatement contractors [9].

The most effective strategy for controlling indoor air pollution is to control the problem at its source. Ventilation is also important, especially in the case of moisture. Expel moisture to the outside through exhaust fans that are vented to the outdoors. In the case of combustion pollutants, regular servicing of heating systems and other appliances that are combustion based is necessary. Radon gas can be controlled through mitigation in existing homes and with radon-resistant construction techniques in new homes. Exposure to some VOCs, can be hazardous to human health. Adequate ventilation should be provided when using these materials. Low- or no-VOC emitting products are now available and should be considered as safer alternatives. Lead and asbestos are present in older homes and apartments and pose considerable health risks to humans. Only trained professionals should perform abatement or encapsulation of both materials. Children are



at a higher risk of health problems from pollutant exposure, especially because air in the child breathing zone is more polluted than it is in the adult breathing zone [10]. Awareness of these issues is a critical first step in improving air quality in homes and apartments.

References

1. US Environmental Protection Agency (EPA) (2023). Protect Indoor Air Quality in Your Home.
2. Laquatra J (2016) Healthy Indoor Environments. *JSM Health Educ Prim Health Care* 1(1): 1004.
3. Braman SS (2006) The global burden of asthma. *Decreasing the Global Burden of Asthma* 130(1).
4. US Environmental Protection Agency (EPA) (2023) Asthma Awareness.
5. US Environmental Protection Agency (EPA) (2023) What Are Volatile Organic Compounds (VOCs)?
6. National Cancer Institute (2011) Radon and Cancer.
7. US Environmental Protection Agency (EPA) (2022) What Are Combustion Products?
8. US Environmental Protection Agency (EPA) (2022) Learn About Lead.
9. National Cancer Institute. (2021) Asbestos Exposure and Cancer Risk.
10. Tripathii E, Laquatra J (2018) Managing indoor air quality in the child breathing zone: risk analysis and mitigation. *Journal of Architectural Engineering* 24(1).

