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Indoor Air Pollution, Sources, Health Effects and Control

Indoor air pollution refers to toxic chemical, biological and physical contamination that is encountered in our daily lives in our homes, schools and workplaces. According to the Air Resources Board (ARB), of the US Environmental Protection Agency, many pollutants build up rapidly indoors, resulting in higher levels; between 25 to 62 percent greater than usually found outside, especially in newer homes where tighter construction prevents particles from escaping. These pollutants can cause a variety of health problems and can even be fatal at high levels. The WHO Fact Sheet No. 292 (2011) provides the following astounding facts about indoor pollution:

- Around 3 billion people cook and heat their homes using open fires and leaky stoves burning biomass (wood, animal dung and crop waste) and coal.
- Nearly 2 million people die prematurely from illness attributable to indoor air pollution from household solid fuel use.
- Nearly 50% of pneumonia deaths among children under five are due to particulate matter inhaled from indoor air pollution.
- More than 1 million people a year die from chronic obstructive respiratory diseases (COPD) that develop due to exposure to such Indoor air pollution.

- Both women and men exposed to heavy indoor smoke are 2-3 times more likely to develop COPD.



Household Energy and Health

According to the WHO, (2005) cooking and heating with solid fuels such as dung, wood, agricultural residues or coal is the largest source of indoor air pollution globally. These fuels emit substantial amounts of pollutants, including respirable particles, carbon monoxide, nitrogen and sulfur oxides, and benzene. Much of this fuel is burned with poor ventilation, leading to very high levels of smoke exposure – particularly for women who do most of the cooking, as well as infants, who are often times strapped to the backs of their mothers. Combustion of wood, emits 50 times more household pollution than do gas stoves (Figure 1).

Researches by the World Bank in 2000 and currently by Global Resolve reveal that indoor pollution due to the use of solid fuel in Ghana is a serious problem, and about 96% of the Ghanaian populace uses this type of fuel

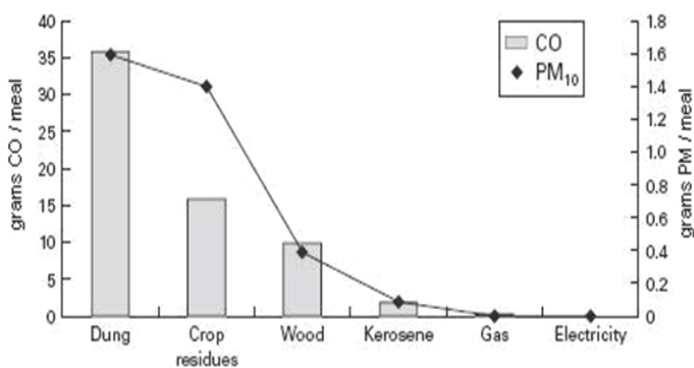


Fig. 1: Household Emissions of Common Cooking Fuels (PM_{10} = particulate matter) Source: Smith et al., 2000

Other Sources of indoor Pollution

Other sources of pollution are: Asbestos, lead and radon; biological agents, such as pet dander, dust and mold. Another important source of indoor pollution is the Volatile organic compounds (VOCs). VOCs are hazardous chemicals that released from consumer products, such as aerosol sprays, solvents, glues and adhesives, cleaning products, paint, air fresheners, building materials, furnishings, office equipment, carpet, craft supplies and dry cleaning chemicals on recently treated clothing. Products of this nature release VOCs when in use or even while stored. Formaldehyde is a common VOC found in furniture, wallpapers and pressed wood products, such as plywood and particleboard. A study carried out by National Institute of Occupational Safety and Health, US, based on over five hundred complaints found that inadequate ventilation and the release of contaminants from indoor and outdoor sources are the primary reasons for indoor air quality problems (Fig 2).

Health Risks of Indoor Air Pollution

Indoor pollution is among the top five environmental risks to public health which also contributes to an annual 8.5 million deaths globally. In terms of environmental contributors to ill health, indoor smoke is responsible for one-third of premature mortality and disability worldwide, second only to unsafe water, sanitation, and hygiene (see Figure 3). Indoor radon exposure, which is the second-leading cause of lung cancer, was rated the number-one environmental health risk. In addition to lung cancer, indoor air pollution can cause other respiratory conditions, such as bronchitis, pneumonia and emphysema. Toxic compounds found inside the home have also been linked to heart disease, headaches, loss of eyesight; impaired mental function, eye, nose and throat irritation, allergic reactions, asthma and damage to the liver, kidney and brain. Some indoor pollutants, such as carbon monoxide, can be fatal.

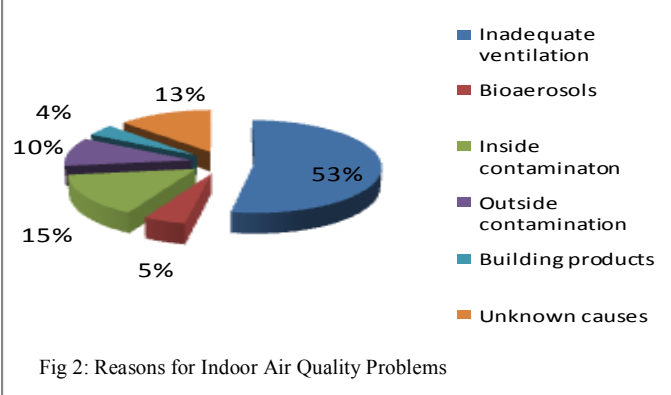


Fig 2: Reasons for Indoor Air Quality Problems

Reducing Indoor Air Pollution

We can minimize or prevent the release of pollutants indoor by simply observing the following recommended habits:

1. Good ventilation is the single most important step towards making your home healthier. Even when you don't notice any ill health effect right now, it is a good idea to try to clean up the air in your home because the air quality in a building is the result of a contest between the pollutants and the ventilation system.
2. Avoid smoking and using fuel wood indoors.
3. Products containing VOCs should be used outside whenever possible and if it must be used indoors, then it must be in properly ventilated areas.
4. Choose alternatives to aerosol sprays whenever possible and do not use gas stoves to heat the house.
5. Choose building materials, furniture and carpet carefully; avoid VOC-containing materials, such as plywood and particle board. When purchasing new furniture and carpet, arrange for items to be aired out prior to delivery, or air them out in the garage or yard before bringing them into the house.

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The Mission of IESS, University of Ghana is: "To meet the nation's needs for broad-based education, training and research in the science, policy and management of environmental and sanitation processes in the wider African and global context."

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References and Further Reading

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- Useful websites**
American Lung Association <http://www.healthhouse.org/iaq>
Occupational Safety and Health Administration (OSHA) <http://www.osha-slc.gov/SLTC>
U.S. Environmental Protection Agency www.epa.gov/iaq
Air Pollution In Your Home . <http://habwwe.wordpress.com/2011/08/30/air-pollution-in-your-home/>

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