

Children at Risk From Indoor Air Pollution

- With respect to determining the risk of exposure to industrial chemicals, researchers emphasize: "Children are not little adults." Physical differences, socioeconomic status and activity patterns are among the key reasons why children are more vulnerable to exposure and face greater health risks from industrial chemicals than adults.
- On average, children spend 85% of their time indoors: 70% at home, 15% at other indoor locations, 4% in enclosed transit, 1% outdoor transit and 10% outdoors.
- Children living in poverty are more likely to live in public housing or blue-collar neighborhoods in close proximity to industry – a primary source of outdoor air pollution, which can be brought indoors via heating, ventilating and air-conditioning (HVAC) system.
- Children living in urban settings are at increased risk for asthma.
- 2.5 million children in the United States have chronic and/or high-risk medical conditions, which places them at higher risk from indoor air pollution.

Health Risks Associated With Indoor Air Pollution

- Airborne pollutants, including potential carcinogens, reproductive toxins and human irritants, are 2 to 10 times higher indoors when compared with outdoor levels and can be as much as 1,000 times higher in newly constructed and renovated indoor spaces.
- Indoor air in the United States is 2 to 5 times more polluted than outdoor air.
- People received their highest personal exposures to volatile organic compounds (VOCs) in homes, followed by outdoors (18% to 34%) and offices (2% to 38%).
- Volatile organic compounds are among the most prevalent of all indoor air, with as many as 100 to 1,000 different VOCs in the air where children can easily inhale them.
- More than 200 commonly used industrial chemicals are able to damage the human brain; about 50% of these chemicals are considered high-volume production chemicals.
- A wide range of chemicals may cause adverse reproductive, developmental and neurotoxic effects, including metals (lead, mercury, manganese, arsenic and cadmium); organic solvents (methylene chloride, glycol ethers and trichloroethylene); pesticides (DDT, atrazine, chlorpyrifos, parathion and lindane); ETS and nicotine; and polychlorinated biphenyls (PCBs).
- Chemicals identified as endocrine disruptors include dioxins, PCBs, alkylphenols, bisphenol A, phthalate esters and various pesticides.
- Some chemicals may have health impacts at extremely low levels, which are not seen at higher levels, including genital changes, asthma and allergies in children.
- Exposure to very small traces of VOCs and some industrial chemicals in homes and schools can disrupt the endocrine system, gene activation and brain development.
- Children exposed to total VOCs of more than 60 micrograms per cubic metre were four times more likely to have asthma than those exposed to lower levels of VOCs
- Damp buildings and exposure to mold bioaerosols are risk factors for developing asthma in children and not just in making asthma symptoms worse asthma.

Health Problems Linked to Indoor Air Pollution

Asthma

- Asthma is the most common chronic disorder in childhood, with more than 6.7 million children (9.1%) affected; one-half of which have allergic asthma.
- 9 million children under the age of 18 have been diagnosed with asthma at some point in their lifetime.
- Asthma accounts for 12.8 million missed school days each year.
- From 1980 to 1994, the proportion of Americans with asthma increased by 75%.
- In children under the age of five, the proportion grew by 160%.
- Nearly 4 million children have had an asthma attack in the previous year.
- Since 1980, the number of deaths among children with asthma under 19 years old has increased by nearly 80%.

Autism Spectrum Disorders

- Although there are as yet no conclusive links between autism spectrum disorders (ASD) and chemical exposure, a recent review of scientific literature on the causes of neurodevelopmental disorders implicated a number of industrial chemicals including lead, methylmercury, polychlorinated biphenyls, arsenic and toluene.
- Estimates suggest that around 6 in 1,000 people in the world have ASD, with more boys affected than girls.
- In the United States, 560,000 people ages 0 to 21 years have ASD.
- Autism spectrum disorder occurs in about 1 in 500 births in the United States, compared with Down Syndrome, which occurs in 1 in 800 births; juvenile diabetes, which occurs in about 1 in 400 or 500 children; and cancer, which occurs in 1.5 per 10,000 children.

Cancer

- Children undergoing treatment for cancer have suppressed immune systems, which make them more susceptible to adverse health effects from indoor air pollutants.
- In 2005, nearly 15 per 10,000 children ages 0 to 14 years and 17 per 100,000 children ages 0 to 19 years had cancer.

Developmental Disabilities

- Developmental disabilities affect 3% to 8% of the 4 million children born each year.
- Exposure to environmental toxins causes 3% of developmental disabilities.
- Interactions between environmental factors and individual genetic susceptibility cause 25% of developmental disabilities.
- About 10% of neurobehavioral disorders are caused by environmental toxins, excluding those caused by maternal alcohol, tobacco and drug abuse.
- One in six children experiences some form of neurodevelopmental delay, in many cases due to maternal alcohol, tobacco or drug use. In some children, the delays may be attributed to environmental toxins, such as lead, mercury, pesticides and solvents, or to nutritional deficiencies.