Environmental Health In Schools

CHILDREN'S ENVIRONMENTAL HEALTH NETWORK

Chemical toxicants and biological agents in the classroom, on the playground, in the science lab, or in other school facilities can lead to health risks and adverse learning conditions. They can affect many different body systems and impact health, learning, productivity, and self esteem.[i]

Children spend hours every day in and around their school facilities. However, few steps have been taken to protect children from environmental toxicants in the school environment.

Other than lead[ii], asbestos,[iii] and radon,[iv] the Federal government has not instituted requirements or guidelines that would protect children from the same chemical exposures that require employee notification and other worker protections. Although students may indirectly benefit from the Occupational Safety and Health Administration (OSHA) and National Institute for Occupational Safety and Health (NIOSH) activities that cover school employees, OSHA and NIOSH have no jurisdiction for investigating the health impact of exposure to students. Additionally, only 26 states have OSHA coverage for their public employees.[v]

Specific health effects and toxicants of concern in the school environment include:

AIR POLLUTANTS, AIR QUALITY, and ASTHMA

Children are especially susceptible to air pollutants. The airways of young children are smaller than those of adults. Inhalation of air pollutants that would produce only a slight response in an adult can result in a significant obstruction in the airways of a young child. Children have increased oxygen needs compared to adults, they breathe more rapidly and, therefore, inhale more pollutants per pound of body weight than adults. They often spend more time engaged in vigorous outdoor activities than adults.

- Asthma is the leading serious chronic illness among children.[vi] The number of children with asthma in the United States is rapidly growing, increasing by 75 percent between 1980 and 1994.[vii] Asthma is the number one cause of hospitalization among children under the age of 15.[viii]

- Asthma is the leading cause of school absenteeism due to a chronic illness.[ix] The U.S. Environmental Protection Agency estimated that American children lost 17 million school days in 1997 due to the disease, and that parents lost 5 million work days in order to care for their children with asthma-related illness.[x] Nearly 1 in 13 school-age children has asthma.[xi]

- The impact of asthma falls disproportionately on African-American and certain Hispanic populations and appears to be particularly severe in urban inner cities.[xii] These differences include both the incidence of asthma as well as mortality rates. In 1997, non-Hispanic Black children living in families with incomes below the poverty level were found to have the highest rates of asthma.[xiii] Between 1980 and 1993, death rates for asthma were consistently highest among blacks aged 15-24 years.[xiv]

- Major indoor triggers of asthma attacks include irritants such as commercial products (paints, cleaning agents, pesticides, perfumes), building components (sealants, plastics, adhesives, insulation materials), animal and insect allergens, environmental tobacco smoke, and molds.[xv] Many of these triggers can be found in schools.[xvi]

- Air pollutants such as particulate matter[xvii] and ozone[xviii] also can trigger asthma attacks.

- Although the causes of asthma are not yet known, one recent 10-year study found that ozone was linked to causing asthma, especially among physically active school age children living in high ozone communities.[xix]

- Nitrogen dioxide and sulfur dioxide decrease lung function in asthmatics.[xx] Long-term exposure to air pollution (such as nitrogen dioxide and particulate matter) slows children's lung development over time. While these are generally thought of as outdoor air pollutants, these agents will be found in schools that keep windows open much of the year. In addition, children will encounter these pollutants during school hours while on the playground or sports field during recess, physical education and sporting events.

- Poor indoor air quality can reduce a person's ability to perform specific mental tasks requiring concentration, calculation, or memory.[xxi]

- Air quality problems inside school buildings can arise from a variety of sources, such as mold growth from excessive moisture, chemical emissions, insufficient fresh air supply, pollutants, and high radon levels.[xxii]

- 27% of schools in a U.S. General Accounting Office survey reported unsatisfactory ventilation. 22% reported unsatisfactory indoor air quality generally.[xxiii]

- An EPA investigation of 29 schools across the country found inadequate ventilation in most of the schools.[xxiv]

LEARNING DISABILITIES -- DEVELOPMENTAL DISABILITIES

Seventeen percent of children under 18 have been diagnosed with one or more developmental disabilities. These disabilities include Attention Deficit-Hyperactivity Disorder (ADHD) and autism and are the result of complex interactions among genetic,

environmental and societal factors that impact children during vulnerable periods of development.[xxv]

- A recent Centers for Disease Control and Prevention (CDC) report indicated that approximately 1.6 million elementary school-aged children (7 percent of children 6-11 years of age) have been diagnosed with ADHD, which is also known as Attention Deficit Disorder (ADD).[xxvi]

- A recent National Institute of Environmental Health Sciences (NIEHS) study indicated that the incidence of ADHD may be greatly underestimated by school and public health officials. In the study, parents reported more than 15 percent of boys in grades one through five had been diagnosed with ADHD. Overall, more than nine percent of all fourth and fifth grade children studied were taking medication to treat ADHD.[xxvii]

- Known or suspected causes of brain and nervous system disorders are exposure to lead, methylmercury, and some pesticides, therapeutic drugs and food additives.[xxviii] Other chemical classes suspected of developmental neurotoxicity include cancer chemotherapy medications, polyhalogenated hydrocarbons, psychoactive drugs, and solvents.

MERCURY

Schools are places where children and elemental mercury may come together via thermometers and barometers, in laboratory courses or "show-and-tell." Mercury can also be released through broken fluorescent light tubes or thermostats. Elemental mercury is a liquid at room temperature but readily volatizes to a colorless and odorless vapor.

- Mercury is a potent neurotoxicant and children are particularly susceptible to mercury's dangers. Mercury interferes with brain development and more easily passes into the brains of fetuses and young children than into the brains of adults.

- Both short- and long-term exposure to mercury vapor can lead to brain disorders. These include a wide variety of cognitive, personality, sensory and motor disturbances.[xxix]

- Mercury poisoning is linked to kidney and liver damage and reproductive disorders.

- Exposure to high levels of mercury vapor, such as heating elemental mercury in inadequately ventilated areas, have resulted in fatalities.[xxx]

- Mercury-containing products or spills must be properly handled. Even small mercury spills require specialists. Improper clean-up of a mercury release, such as vacuuming up the mercury from a broken thermometer, will spread the mercury into the air.[xxxi]

- In July 2000, the National Academy of Sciences concluded that every effort should be made to reduce the release of mercury into the environment.

PESTICIDES

- Pesticide exposure may result in symptoms ranging from relatively mild headaches and skin rashes to paralysis and death. Some long-term illnesses linked to pesticide exposure may be subtle -- such as neurological disorders or reduced cognitive skills.[xxxii] Long-term illnesses and those with delayed onsets, such as cancer, which may appear years after exposure, can also occur. Most exposures to pesticides cause no symptoms. Even when exposures are symptomatic, they are often misdiagnosed. This may mask the true extent of the illnesses caused by pesticides.[xxxiii]

- Scientific reviews of the U.S. pesticide regulatory system identified important gaps in knowledge about the health effects of pesticides on children's developing systems as well as children's actual exposures to pesticides.[xxxiv] According to the American Academy of Pediatrics, "because the health effects of pesticide exposure on children are not well studied, an approach that reduces their exposure to these chemicals is desirable."[xxxv]

- Pesticide use in schools can be widespread. It can include "routine spraying," ostensibly to prevent the development of problems, in classrooms, hallways, the cafeteria, and other areas. This type of use may result in children being exposed to high levels of pesticides.[xxxvi] Additionally, pesticides can be used in the building when an infestation is noted and pesticides may also be used outside on lawns and playing fields.

- Information about on the amount of pesticides used in the nation's 110,000 public schools is not available. The Federal government does not collect such data, and, as of 1999, only two states collected data on pesticide use in a manner that allows for identifying use in school facilities.[xxxvii]

- From 1993 through 1996, about 2,300 pesticide-related exposures involving individuals at schools were reported, according to the American Association of Poison Control Centers (although these data are not believed to be complete).[xxxviii]

LEAD

- Lead is a potent neurotoxin. Exposure to lead can cause a variety of health effects, including delays in normal physical and mental development in children, slight deficits in attention span, hearing, and learning disabilities of children. Long-term effects can include stroke, kidney disease, and cancer.[xxxix]

- Children of day-care-age who are in lead-contaminated buildings will be at highest risk of adverse outcomes from the exposure, but older children may be effected as well.

- A common source of lead exposure for children today is lead paint and the contaminated dust and soil it generates.[xl] According to a report on the condition of the nation's school facilities by the U. S. General Accounting Office, schools built before 1980 were painted with lead paint.[xli]

- Children may also be exposed to lead through drinking water that has elevated concentrations from lead plumbing materials. Lead contamination in drinking water occurs from corrosion of lead pipes and it cannot be directly detected or removed by the water system.[xlii] According to the EPA, the longer water remains in contact with leaded-plumbing, the more the opportunity exists for lead to leach into water. As a result, facilities with on again/off again water use patterns, such as schools, may have elevated lead concentrations.[xliii]

- Some support was provided to schools through the Lead Contamination Control Act of 1988 to identify and correct lead-in-drinking-water problems at schools, especially water coolers with lead-lined tanks.[xliv]

SCHOOL BUSES and DIESEL EXHAUST

- According to the EPA, diesel engine emissions contribute to serious public health problems including: premature mortality, aggravation of existing asthma, acute respiratory symptoms, chronic bronchitis, and decreased lung function. They have also been linked to increased incidences of various cancers in adults in more than 30 health studies.

- Diesel exhaust is known to be a major source of fine particles that can lodge deep in children's lungs, increasing the likelihood of asthma, chronic bronchitis, heart disease and even premature death.[xlv]

- In the United States, nearly 600,000 school buses transport 24 million students to school daily. Collectively, U.S. children spend 3 billion hours on school buses each year.[xlvi]

- Children who ride diesel school buses are exposed to an excessive amount of toxic diesel exhaust. The excess levels on the buses are 23 to 46 times higher than levels considered to be significant cancer risks according to the U.S. Environmental Protection Agency and federal guidelines. The diesel exhaust exposures are likely to result in an additional 23 to 46 cancer cases per million children exposed.[xlvii]

MOLD

- Mold grows on virtually any substance when moisture and oxygen are present, including ceiling tiles, carpets, wood and paper. Some molds, such as black molds or Stachybotrys, are known to produce potent toxins which can cause impaired breathing and cause allergies.[xlviii]

- Children can be exposed to mold in schools if the building has indoor air that is very damp or if there have been water leaks. Mold may grow within 48 hours if the building materials or furnishings are damp.[xlix]

- The common symptoms of mold toxin exposure include headache, fatigue, diarrhea, nausea and respiratory irritation.[l]

FOR MORE INFORMATION:

Contact the Children's Environmental Health Network (www.cehn.org) at 202-543-4033 or the Healthy Schools Network (www.healthyschools.org) at 518-462-0632.

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