CAFO Air Pollution and Children: A Prescription for Precaution

The vulnerability of children must be considered when identifying potential adverse health effects from large-scale confined animal feeding operations (CAFOs). Several noteworthy research efforts have focused specifically on the effects of CAFO-generated air emissions on young children and children of farm operators. The literature also includes numerous articles regarding the physical vulnerabilities of children to all types of air pollution. Children are not just “small adults” – as a result of their size, age, and developmental status, children are more vulnerable than adults to the health threats posed by environmental irritants and toxins.

In 2003, the American Public Health Association called for a moratorium on the construction of new CAFOs until more research could be completed regarding the public health effects of these facilities. The APHA specifically cited concerns about the potential harmful impacts of CAFOs on reproductive health, infants, and children. The Canadian Medical Association, the Michigan State Medical Society, and the Missouri Association of Osteopathic Physicians and Surgeons have also called for a moratorium on CAFOs. When we pair the two issues – air quality and kids, and air quality and CAFOs – we should recommend a “prescription for precaution” and protect young children from CAFO emissions until research proves to the health community that these emissions do not harm children.

Ambient (outdoor) air pollution is now recognized as an important problem, both nationally and worldwide. Our scientific understanding of the spectrum of health effects of air pollution has increased, and numerous studies are finding important health effects from air pollution at levels once considered safe. Children and infants are among the most susceptible to many of the air pollutants. In addition to associations between air pollution and respiratory symptoms, asthma exacerbations, and asthma hospitalizations, recent studies have found links between air pollution and pre-term birth, infant mortality, deficits in lung growth, and possibly, development of asthma.

Being small makes a big difference. Children two years of age and under have ten times the risk of adults from exposure to toxins.

Ounce for ounce, children drink more water, eat more food, and breathe more air than adults, resulting in disproportionately higher exposures to contaminants in water, food, and soil.

It may take even less exposure to a particular pollutant to trigger an asthma attack or respiratory event due to the sensitivities of the developing respiratory system.

Neurotoxins such as lead and other toxic chemicals, even at low levels, can disrupt the brain’s wiring causing permanent, irreversible learning and behavior problems.

Public health scientists now recognize that hydrogen sulfide is a potent neurotoxin, and that chronic exposure to even low ambient levels causes irreversible damage to the brain and central nervous system. H2S is present in CAFO emissions. Children are among the most susceptible to this poison gas.


Concentrated animal feeding operations near schools may pose asthma risk. Children who attend school near large-scale livestock farms may be at a higher risk for asthma, according to recent study by University of Iowa researchers led by Joel Kline, M.D., professor of internal medicine in the UI College of Medicine. (Sigurdarson, Sigurdur T. and Joel N. Kline. "School Proximity to Concentrated Animal Feeding Operations and Prevalence of Asthma in Students." CHEST. Vol. 129 (6). June 2006. [http://www.chestjournal.org/content/129/6/1486.full](http://www.chestjournal.org/content/129/6/1486.full))


The immune systems of infants are weaker than those of healthy adults. Their skin is thinner and more permeable, and they have a larger surface area for absorption relative to weight. The lungs and airways of infants are especially susceptible to harm from toxins, particulate matter and ozone in the air. (Wolf, Vicki. “The Health Effects of Air Pollution Part VII: Dangers for infants living in a toxic environment.” CLEAN Health. 2004. [www.cleanhouston.org/health/health_effects/health7.htm](http://www.cleanhouston.org/health/health_effects/health7.htm))

Research suggests exposure to odor has an effect on secretory immune function and is particularly important in that it documents a physiologic effect among neighbors of industrial hog operations. (Avery, Rachael. “Health Effects Associated with Exposure to Airborne Emissions from Industrial Hog Operations in Eastern North Carolina.” The Graduate School at the University of North Carolina at Chapel Hill. 2003.)

Recent research was performed to investigate relationships between school exposures and respiratory health of middle school-aged children. The findings identify a plausible association between exposure to airborne pollution from swine CAFOs and wheezing symptoms among adolescents. (Mirabelli, Maria C., Wing, Steve, Marshall, Stephen W., and Wilcosky, Timothy C. "Asthma Symptoms Among Adolescents Who Attend Public Schools That Are Located Near Confined Swine Feeding Operations." Pediatrics. Vol. 118 (1). July 2006. [http://pediatrics.aappublications.org/cgi/content/abstract/118/1/e66](http://pediatrics.aappublications.org/cgi/content/abstract/118/1/e66))

Timing is an important factor in infant exposure. In its first two years of life, an infant has critical periods of development when even small amounts of a toxic substance can have a very serious, lifelong effect. Windows of vulnerability for brain development occur in these first two years. At this stage even a small dose of a particular toxin may be more devastating than a much larger dose at a different or later stage. Early infancy, childhood, and puberty are also critical windows of vulnerability for reproductive effects from exposure to toxins. Certain exposures during the infant or childhood stage could affect the development of the respiratory, nervous, endocrine and immune systems and could increase the risk of cancer later in life. (Wolf, Vicki. “The Health Effects of Air Pollution Part VII: Dangers for infants living in a toxic environment.” CLEAN Health. 2004. [www.cleanhouston.org/health/health_effects/health7.htm](http://www.cleanhouston.org/health/health_effects/health7.htm))
Air pollution has been linked to a variety of respiratory illnesses, including permanent reduction in lung capacity and asthma. The number of U.S. children afflicted with asthma has increased dramatically: reports that between 1980 and 1994, the number of children under age four afflicted with asthma grew 160 percent; and according to Western Michigan University Office of Health Promotion and Education, the number of school-age children with asthma increased 100 percent from 1980-1998.


A study by the Pew Environmental Health Commission on the increasing incidence of asthma in the United States found that genetics “loads the gun” for a predisposition for asthma, but it is the environment that “pulls the trigger” on the alarming growth of this disease.


Fetuses appear to be particularly vulnerable to environmental toxins and may not be able to clear them from their bodies or repair damaged DNA.


The breathing zone is lower for children than adults, and heavier pollutants tend to concentrate at lower levels in the air.


Asthma prevalence in rural children is comparable with rates found in large cities of the U.S. Midwest.


The potential induction of asthma is of special concern because the self-reported prevalence of asthma has increased 75% in the entire population (and 160% in children under the age of five) from 1980 to 1994.


Repeated exposure to odorous irritants can induce chronic respiratory disorders including asthma.


The elevated vulnerability to environmental exposures in young children is due to the fact that they breathe more air per pound of body weight than adults.


Direct health care costs for asthma in the U.S. total approximately $14.7 billion annually; indirect costs (lost productivity) add another $5 billion for a total of $19.7 billion.


Children spend more time and play more vigorously outdoors, leading to greater exposure. They tend to focus less on symptoms, and they may not stop playing even if they are wheezing.