

## Partial List of Studies on Pesticides and Health

1. Higher rates of fetal death observed when a mother's exposure to pesticides occurred during weeks three to eight of pregnancy, the most sensitive time of pregnancy when fetal organs are developing. Fetal death rates were two to three times higher than unexposed groups when pesticides had been applied within one square mile of the mother's residence. Rates were higher with exposure to 3 or more of the five pesticide classes examined 2001.

(Bell et al. "Case-Control Study of Pesticides and fetal Death Due to Congenital Anomalies". *Epidemiology* 2001;12:148-156).

2. Neuroblastoma, which accounts for up to 10% of all childhood tumors, was found to be associated between the use of household pesticides, garden pesticides, and professional extermination. Herbicides were more strongly associated with neuroblastoma than were insecticides (odds ratio 1.9 and 1.3 respectively). Stronger associations were also found for garden pesticides use and diagnosis of neuroblastoma in children after 1 year of age.

(Daniels et al. *Epidemiology* 2001;12(1):20-27).

3. Golf course superintendents have been found to be at a significantly increased risk of four cancer types including - brain cancer, lymphoma (non-Hodgkin's lymphoma, NHL), prostate and large intestine cancer. A study was conducted of 686 deceased members of the Golf Course Superintendents Association of America (1972-1992). Brain cancer and non-Hodgkin's lymphoma rates were over twice the national average. Prostate cancer occurred almost 3 times the national average and intestinal cancer occurred at 1.75 times the national average. Similar patterns of disease rates had also been found previously in other studies of similar occupations.

(Drs. Koss, BC, Burneister, IF, Ogilvie, LK, Fuortes, IJ, Department of Preventive Medicine Health, University of Iowa, *American Journal of Industrial Medicine*, 29(5):501-506, 1996)

4. Cancer health effects of pesticides: systematic review.

(Bassil KL, Vakil C, Sanborn M, Cole DC, Kaur JS, Kerr KJ. Family Medicine Centre, Queen's University, 220 Bagot St, Kingston, ON Canada *Family Physician*. 2007 Oct;53(10):1704-11)

5. Non-cancer health effects of pesticides: systematic review.

(Sanborn M, Kerr KJ, Sanin LH, Cole DC, Bassil KL, Vakil C. *Canada Family Physician*. 2007 Oct;53(10):1712-20)

6. Acute Illnesses Associated With Pesticide Exposure at Schools

(*JAMA -The Journal of the American Medical Association* Vol. 294 No. 4, July 27, 2005)

7. "DREAMS for public awareness model", Porter W et al 1999. Endocrine, immune, and behavioral effects of aldicarb (carbamate), atrazine (triazine) and nitrate (fertilizer) mixtures at groundwater concentrations *Toxicology and Industrial Health* 15(1-2).

8. Semivolatile Endocrine-Disrupting Compounds in Paired Indoor and Outdoor Air in Two Northern California Communities

(Rudel R et al *Environmental Science & Technology*. 2010 Sept)

9. Impact of Prenatal Exposure to Piperonyl Butoxide and Permethrin on 36-Month Neurodevelopment (Horton M et al, *Pediatrics*. 2011 Feb 7)

10. Attention-Deficit/Hyperactivity Disorder and Urinary Metabolites of Organophosphate Pesticides (Bouchard M *Pediatrics*. May 2010)

<http://www.eeb.cornell.edu/biogeonanc/background.htm>

The Nitrogen Assessment Network at Cornell University

*Human alteration of the nitrogen cycle is one of the most dramatic aspects of global change. During my lifetime, the rate at which human activity creates reactive nitrogen – the nitrogen that can lead to water pollution – has increased 7-fold. Synthetic fertilizer is the biggest component of this increase globally, and half of the synthetic nitrogen fertilizer that has ever been used on Earth has been applied in the last 15 years. Fertilizer use and agricultural sources are by far the largest problem contributing to the nitrogen flux down the Mississippi River to the “dead zone” in the Gulf of Mexico.*

Robert W. Howarth, Ph.D.

Hearing on Non-point Source Pollution:

The Impacts of Agriculture on Water Quality

2165 Rayburn House Office Building

April 19, 2007

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<http://www.organicvalley.coop/why-organic/synthetic-fertilizers/>

*Nitrogen is abundant in our atmosphere but rare in the soil – it is naturally “fixed” (converted to soil availability) by bacteria on the roots of leguminous plants, or by a strike of lightning. The Haber-Bosch process was developed in the early 20th century to combine nitrogen from the air with hydrogen at high temperature and pressure to make anhydrous ammonia (NH<sub>3</sub>), the basis for all synthetic nitrogen fertilizers as well as munitions used in warfare. The hydrogen source for the process is natural gas, a non-renewable resource that currently accounts for 80 to 90 percent of the cost of fertilizer production. In the conventional system, our very ability to feed ourselves is dependent upon a non-renewable fossil fuel.*

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1240832/>

Environmental Health Perspectives. 2002 May; 110(5): 445–456.

**How sustainable agriculture can address the environmental and human health harms of industrial agriculture.**

Leo Horrigan, Robert S Lawrence, and Polly Walker

Center for a Livable Future, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland 21205, USA. [lhorriga@jhsph.edu](mailto:lhorriga@jhsph.edu)

**Fertilizers.** In 1998, the world used 137 million metric tons of chemical fertilizers, of which U.S. agriculture consumed about 20 million tons, or 15%. Between 1950 and 1998, worldwide use of fertilizers increased more than 10-fold overall and more than 4-fold per person (11, 12). Tilman (13) estimated that crops actually absorb only one-third to one-half of the nitrogen applied to farmland as fertilizer. Nitrogen that runs off croplands into the Mississippi River and its tributaries has been implicated as a major cause of a “dead zone” in the Gulf of Mexico (14). This zone suffers from hypoxia—a dearth of dissolved oxygen (< 2 mg/L). . . Excess nitrogen in soil can lead to less diversity of plant species, as well as reduced production of biomass. Additionally, some ecologists contend that this decrease in diversity makes the ecosystem more susceptible to chemical fertilizers can gradually increase the acidity of the soil until it begins to impede plant growth (17). Chemically fertilized plots also show less biologic activity in the soil food web (the microscopic organisms that make up the soil ecosystem) than do plots fertilized organically with manure or other biologic sources of fertility (18). Excessive fertilizer use also reduces biodiversity because of the effect that nitrogen runoff is having on ecosystem balance.