



Kids on the Frontline in Iowa

The science is very clear: our food system's continued reliance on pesticides is harming the health of children in Iowa's rural communities and beyond.

Children in agricultural communities who live near working farms are exposed to pesticides above and beyond the exposures kids across the country share from residues on food and applications in schools, parks, homes and gardens.

Pesticides applied in agricultural fields rarely stay put. Monitoring shows that they often drift from fields and contaminate water, soil and house dust at levels that put the human health—and particularly the health of children—at risk. These chemicals are found in nearby homes, schools and playgrounds where rural children can breathe, touch and drink them without knowing they are there.

In recent years, the science linking pesticide exposure—even at very low levels—to childhood health harms has grown continuously stronger. The evidence is particularly compelling for childhood cancers and neurodevelopmental harms. National health data show that these and other childhood diseases and disorders are on the rise.

Scientists have understood for years that children are particularly vulnerable to the harms of pesticides. Relative to their size, kids eat, breathe and drink much more than adults; an infant takes in about 15 times more water per pound of body weight. Up to age 12, a child inhales roughly twice as much air. For rural children, studies suggest that economic and social stressors can further amplify the health risks of agricultural chemicals.

Children living in agricultural communities—in Iowa and beyond—are bearing the burden of our ongoing reliance on pesticides. It's time to build a system of food and farming that protects and promotes the wellbeing of all children, while also supporting thriving rural economies and ensuring a safe and healthy food supply.

State agriculture in focus

Agriculture is integral to Iowa's economy. The state is second only to California in terms of the value of agricultural production, and farming represents more than 30 percent of the Iowa economy. Iowa has more than 88,000 individual farms—the third highest number in the nation—covering more than 30 million of the state's 36 million acres.

Well over a million of Iowa's three million residents live in rural areas, a significantly higher percentage than the national average (40 vs. 19 percent). Many of these families live near agricultural fields where pesticides are sprayed.

TABLE 1 Pesticides commonly used on corn & soy

Active ingredients	Type of pesticide	Used on corn	Used on soy	Common trade names	Health effects
Acetochlor	Herbicide	X		Surpass, Warrant	Carcinogen, suspected endocrine disruptor, slight toxicity
Atrazine	Herbicide	X		Aatrex	Carcinogen, suspected endocrine disruptor, slight toxicity
Chlorpyrifos	Insecticide	X	X	Dursban, Lorsban	Suspected endocrine disruptor, cholinesterase inhibitor, moderate toxicity
Esfenvalerate	Insecticide	X	X	Asana XL	Suspected endocrine disruptor, moderate toxicity
Glyphosate salts	Herbicide	X	X	Honcho Plus, Roundup Powermax	Probable carcinogen,* slight toxicity
Lambda-cyhalothrin	Insecticide	X	X	Lambda-Cyhalothrin 1EC	Suspected endocrine disruptor, moderate toxicity
Mesotrione	Herbicide	X		Callisto	Unknown, insufficient data
S-metolachlor	Herbicide	X	X	Dual II Magnum	Possible carcinogen, insufficient data for other health effects

*Sources: USDA data and industry pesticide labels. Specific data on use of these chemicals in Iowa is not available. For associated health effects, see PAN's whatsonmyfood.org & pesticideinfo.org. *The World Health Organization listed glyphosate as a probable carcinogen in 2015.*

Key crops & pesticides

Although organic production is growing rapidly in Iowa—the number of certified farms nearly doubled between 2000 and 2010—the vast majority of Iowa's crops are produced with synthetic pesticides.

Iowa is ranked first in the country in production of both corn and soybeans. Combined, these two crops cover more than 23 million of the state's 30 million planted acres. Over the past 15 years, corn and soy farming has largely shifted to varieties that are genetically modified to tolerate intensive herbicide use.

Iowa does not track pesticide use at the state level, but according to data from the U.S. Department of Agriculture, herbicides were applied to 97 percent of cornfields across the country in 2014, and 98 percent of soybean fields in 2012.

Corn and soy combined account for more than 60 percent of all pesticide use nationwide, according to the most recent USDA figures. More than 1,000 herbicide products are currently registered for use on corn (the most common are listed in Table 1), and more than 300 are registered for use on soybeans.¹

Pesticide exposure & children's health

Children in agricultural communities can face exposure to pesticides in air, water and dust, both at home and at school or on playgrounds. A review of 35 studies published between 1995 and 2013 found that pesticides drifting from fields are a significant source of dust contamination.²

In one Iowa study, pesticides were measured in dust samples from 25 farm and 25 non-farm homes, with farm homes defined as those located on active farming land where at least one of seven pesticides were used (2,4-D, acetochlor, alachlor, atrazine, chlorpyrifos, glyphosate or metolachlor).³ Researchers found that for all pesticides measured, levels were higher in farm homes than non-farm homes. The same researchers found significantly higher levels of the herbicide atrazine in the bodies of fathers, mothers and children from farm homes.⁴

Many studies show that children of farmers and farm-workers also face “take home” exposures when family members who work with pesticides carry residue home in their vehicles and on their clothing, shoes and skin.

Childhood cancer

According to the Centers for Disease Control and Prevention, leukemia and brain tumors are the most common—and fastest rising—types of cancer among children; these two childhood cancers have risen between 40 and 50 percent since 1975. The science linking pesticide exposure to increased risk of these two cancers is particularly strong.

Pesticide exposure during pregnancy, and exposures of either the mother or the father before conception, have all been found to increase childhood cancer risk. Several studies—including one conducted in six Midwestern states, including Iowa—found that living in rural, agricultural areas can increase a child's risk of leukemia.

The Agriculture Health Study

The Agricultural Health Study (AHS) examines risks associated with pesticide exposure. It investigates cancer and other health outcomes over time among 52,000 private and commercial pesticide applicators licensed to apply restricted-use pesticides in Iowa and North Carolina. See <http://aghealth.nih.gov/>.

Data from the Agricultural Health Study (see box) showed that among 17,000 children of Iowa pesticide applicators, those whose fathers had been exposed to pesticides at work prior to conception, had an increased risk of childhood lymphomas—including Hodgkins lymphoma. The odds of cancer were highest among those children whose fathers had used the pesticides aldrin, dichlorvos or a carbamate during the pregnancy.

Neurodevelopmental effects

Many studies have linked prenatal and early childhood exposure to pesticides with increased risk of developmental disorders and delays. Even at very low levels, these early life exposures can cause permanent injuries to the developing human brain—which is particularly vulnerable to toxic chemicals.

One 2015 Harvard study linked higher levels of pyrethroid metabolites in children's bodies with increased rates of ADHD. Symptoms increased by 50 percent for every ten-fold increase in metabolite levels.⁵

Some of the strongest studies associating pesticides with harms to the developing brain have shown that risk increases significantly among pregnant mothers living near agricultural fields. One California study, for example, found that women who lived within a mile of fields where organophosphate or pyrethroid insecticides were sprayed were more likely to have children on the autism spectrum.⁶

Researchers reviewed more than two dozen studies published between 2002 and 2012 exploring the impact of pesticide exposure on children's developing nervous system. They found that “all but one of the 27 studies evaluated showed some negative effect of pesticides on neurobehavioral development,”⁷ including reduced IQs, motor development and developmental disorders.

Some 15 percent of all U.S. children—one of every six—now have one or more developmental disabilities, according to government data. The number continues to grow, with a 17 percent increase in affected children between 1997-2008. The percentage of students in Iowa with intellectual disabilities is more than double the national rate (2.43 vs. 0.96 percent). The number of Iowa children diagnosed with ADHD is above the national average as well.⁸

Necessary changes

It's time to build a system of food and farming that protects and promotes the wellbeing of our children—while also supporting thriving rural economies and ensuring a safe and healthy food supply. The following common-sense changes are both possible and long overdue.

- ▶ We urge Secretary Northey, the head of the Iowa Department of Agriculture and Land Stewardship, to improve Iowa's systems for protecting farmers from pesticide drift, including online reporting of drift incidents, faster testing and larger fines for crop damage.
- ▶ At both the state and national level, policymakers need to set ambitious pesticide use reduction goals, and establish publicly accessible pesticide use reporting systems to track and reward progress toward this goal. We urge Secretary Northey to establish such a system. Use reporting in Iowa would also allow public health experts to better understand pesticide exposures among Iowa's rural children, and take steps to protect their health.
- ▶ Federal and state agencies must prioritize action on pesticides that are most harmful to children. In addition, protective pesticide-free buffer zones should be established around schools, daycare centers and other sensitive sites in rural agricultural areas across the country.
- ▶ We need to provide significant and meaningful support, incentives and recognition for farmers stepping off the pesticide treadmill. National and state programs must prioritize investment in healthy, sustainable and resilient agricultural production.



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For a full list of relevant resources, see the report *Kids on the Frontline* at www.panna.org/KoF.

