



Kids at Risk: Pesticides & Children's Health

Children are especially vulnerable to the health impacts of pesticides. Health professionals, educators, and public health advocates agree that school pesticide use can seriously affect children's immediate and long-term health. The National Parent Teacher Association, the National Education Association, and many other organizations have joined in calling for reduced school pesticide use.

As a result of health concerns raised by health professionals across the country that led to changes in the national pesticide law, the U.S. EPA has begun assessing pesticides for their health effects on children. The agency recently ordered the phaseout of two popular home and school use pesticides—chlorpyrifos (Dursban) and diazinon—in part because of their effects on children's nervous systems.

Pesticides harm human health

Pesticides are linked to a variety of acute and chronic health effects. Acute symptoms of overexposure include headache, nausea, diarrhea, dizziness, skin rash, asthma attack, and respiratory irritation. These symptoms often appear similar or identical to illnesses from other causes such as "the flu," resulting in frequent misdiagnosis of pesticide-related illness. Chronic effects of pesticides may remain undetected for weeks, months, or even years after exposure. Multiple scientific studies, however, link pesticides to cancer, birth defects, nervous system disorders, and immune deficiency.

Children are especially susceptible to pesticide exposure

Children are not "little adults." Children's vulnerability to pesticide exposure is increased by their greater cell division rates and early stage of organ, nervous, reproductive, and immune system development.¹ Pesticide concentrations in their fatty tissues may be greater because their fat as a percentage of total body weight is lower.²

A 1993 National Research Council of the National Academy of Sciences report shows that children are more susceptible than adults to the health effects from low-level exposures to some pesticides over the long-term.³ Animal studies also suggest that the young are more vulnerable to the effects of some toxic chemicals. A review of 269 drugs and toxic substances, including a number of

pesticides, reveals that new-born rodents die from pesticide exposure more often than adults in 86% of cases.⁴

Children are likely to receive relatively greater pesticide exposure than adults

In addition to being more vulnerable to pesticide toxicity, children's behavior and physiology make them more likely than adults to encounter pesticides. For example, most pesticide exposure is through the skin—the largest organ—and children have much more skin surface area for their size than adults.⁵ Similarly, their higher respiratory rate means they inhale airborne pesticides at a faster rate.⁶

Children's characteristic contact with floors, lawns, and playgrounds also increases exposure. Very young children frequently put fingers and other objects in their mouths, risking even greater exposure. The breathing zone for children is closer to the floor, where pesticides re-enter the air after floor surfaces are disturbed. Finally, children may bring home more than their homework—they may track school pesticides into their homes, presenting additional opportunity for exposure.

Childhood exposures can come from pesticide residues in dust and carpets

Although pesticides contaminate air, soil, food, water, and surfaces, studies that examine children's pesticide exposure indicate that the largest number and highest concentrations of chemicals often accumulate in household dust.⁷ Because children's breathing zones are closer to the ground, they incur greater exposure to pesticides in carpets and dust than adults.

Carpets are long-term reservoirs for pesticides sprayed indoors.⁸ Research assessing pesticide exposure from home carpet dust found an average of 12 pesticides in carpet dust samples, compared with 7.5 in air samples from the same residences. Moreover, 13 pesticides found in the carpet dust were not detected in the air. Diazinon appeared in nine of 11 carpets tested.⁹ Carpet cleaning may release pesticides into the air, providing another opportunity for inhalation.¹⁰

Residues often refuse to go away

School districts frequently attempt to reduce exposure risk by applying pesticides after-hours, while students are not present. However, numerous studies indicate that pesticides may remain potent indoors for days, weeks, even months after application. Sunlight, rain, and soil microbes are not present to break down or carry away indoor pesticides, which thus persist much longer than in the outdoor environment.¹¹ Some pesticides can linger indoors for months and years. Indoor air concentrations of several kinds of pesticides may be more than 10 to 100 times higher than outdoor concentrations.¹² Even non-persistent pesticides last much longer indoors because they are not exposed to sunlight and water.¹³ For example, one study detected air levels of diazinon 21 days after application at 20% of levels immediately after application.¹⁴

Not all indoor dust residues stem from indoor use. One study showed residues of 2,4-D and dicamba—herbicides used by some Washington school districts—could be tracked inside on shoes. Untreated areas, including lawn area and carpets, showed levels of 2,4-D, most likely due to spray-drift or track-in from nearby applications. Researchers estimated that residues of 2,4-D can persist in household carpet dust as long as one year.¹⁵ Another study showed that after a single spray application in an apartment, chlorpyrifos continued to accumulate on both plush and hard-plastic children's toys, as well as on surfaces, for two weeks.¹⁶

When our children's health is at stake, we had better be safe than sorry. Given the serious health risks of childhood pesticide exposure, many school districts in Washington and nationwide are adopting least-toxic pest control practices.

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3. National Research Council, *Pesticides*.

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For more information on school pest control that protects children's health, contact the Washington Toxics Coalition at (206) 632-1545 or info@watoxics.org