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“The chemicals in pesticides are designed to attack the nervous system of such household pests as rodents and insects. They also destroy weeds and fungi. But studies show that these chemicals can also have an effect on our nervous system and brain as well as on our immune system and reproductive system. Children are especially vulnerable to exposure.

Children have a double whammy. Their nervous system is immature and, thus, more susceptible to exposure to pesticides. And these pesticides build up in body tissue over time. Children are likely to be exposed to pesticides at home, in school, in food and water, and by direct exposure.

Parents need not feel helpless. The information in this article will show how to reduce a child’s risk of exposure. Information is provided on websites to go to get more detailed information.”

- Larry B. Silver, MD

Why are pesticides a concern?

Pesticides are poisons designed to kill pests such as rodents, insects, weeds and fungi. Many common pesticides contain potent neurotoxic chemicals that attack and disable portions of the nervous system and brain. Studies suggest that this is true not only for pests, but for humans as well.

Exposure to high levels of pesticides can cause a range of acute, flu- and malaria-like symptoms including headaches, weakness, nausea, respiratory distress, convulsions, coma, and death, accounting for an estimated 20,000 fatalities per year worldwide.¹ Lower levels or chronic pesticide exposure can also lead to loss of appetite, behavioral/mood disturbances (including confusion, excitement, mania, disorientation, or moodiness), or depression. Other symptoms of exposure include stinging eyes; itchy skin; twitching; muscle aches, stiffness, spasms, or tremors; and paralysis.² There are many different pesticides, and each has its own characteristic exposure symptoms.

Because children are still growing, their nervous systems and brains

are more vulnerable to toxics in their environment. Even moderate exposures to pesticides have been linked to learning, behavioral, and developmental disabilities.³ Children who have been exposed to pesticides have shown a loss of both cognitive (thinking and reasoning) and motor function.⁴

Not only do pesticides threaten children’s brain development, but repeated, low-level exposures to pesticides can also affect the skin, eyes, cardiovascular and respiratory systems, gastrointestinal tract and liver, kidneys, and blood.¹ Studies have linked pesticides to reproductive disorders,¹ endocrine (hormone) disruptions,^{1,5} cancers⁵ and immune system problems that make people more vulnerable to disease.⁶ Most recently, pesticide application has been linked to Parkinson’s disease.⁷

If you or those you care for have been exposed to pesticides and/or have any of these health problems, talk with your health care provider about the possibility that pesticides may be affecting your health.

How are we exposed to pesticides?

Huge amounts of pesticides are used to control pests. In 2001, more than 1.2 *billion* pounds of the active ingredients in pesticides were used in the United States, and more than 5 billion pounds worldwide.⁸ Pesticides were sprayed or applied in these places:

- **On land:** agricultural fields, golf courses, sports fields, playgrounds, roadsides, gardens and lawns.
- **At home:** professional exterminations and carpet treatments, flea sprays and

dips for dogs and cats.

- **Inside schools and community buildings:** professional exterminations and carpet treatments, pressure-treated (CCA) lumber.
- **On bodies:** head lice treatments, insect and tick repellants.
- **On food:** during cultivation on farms as well as after harvesting to deter fungal growth during shipping.

During spraying on crops and gardens and in homes, substantial amounts of pesticides can drift into nearby "off-target" areas such as residential areas, water supplies, home gardens and playgrounds.⁹ Humans, pets and wildlife that use these contaminated areas are exposed directly. Pesticides can remain on shoes and feet and be carried into the house where residues will contaminate carpets and other surfaces and mix with house dust.

Many pesticides build up in body tissues over time,

so milk and meat from livestock fed pesticide-treated crops can also contain pesticides.¹⁰ Fish and seafood can also be contaminated by runoff from agricultural and other land use of pesticides. Even more concerning, fetuses and infants are exposed to the pesticides that have built up in their mother's bodies. While breastfeeding is still the best choice for infant nutrition, studies have revealed that both amniotic fluid¹¹ and breast milk¹² contain pesticides that can be passed on to the fetus and infant.

Another common source of exposure is household supplies of pesticides. In 2002, an estimated 69,000 children were exposed to or poisoned by common household pesticides in the United States.⁶

While adult exposures are a concern, children are faced with higher relative exposures to pesticides – children play on floors and on the ground, put their hands in their mouths frequently, and eat more fruits and vegetables per pound of body weight.¹³

How can you reduce your risk of exposure?

Always wash fruits and vegetables.¹⁴ Even after washing and cooking foods, pesticide residues may remain, so peel fruits and vegetables when possible, too. Buy organically grown produce whenever you can, especially those foods most likely to contain chemical residues:¹⁵

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|----------------|-----------------------|
| ▪ nectarines | ▪ spinach |
| ▪ peaches | ▪ bell peppers |
| ▪ strawberries | ▪ potatoes |
| ▪ raspberries | ▪ imported grapes |
| ▪ apples | ▪ blueberries |
| ▪ pears | ▪ cherries |
| ▪ celery | ▪ kale/collard greens |

Though organic foods can be more expensive, it can be less costly to keep your children healthy now than to have to pay for health services later. Ask your grocer to purchase from organic farmers to help make organic food available for all.

Wipe shoes on doormats and leave them at the door to avoid tracking in pesticide residues.

Control dust which can also contain pesticide residues in your home. Vacuum regularly with a HEPA filter vacuum if possible. Use damp dust rags instead of feather dusters which stir up dust and disperse it into the air.

Avoid all use of pesticides on your lawn and garden and in your house. There are safer alternatives for every use of chemical pesticides, such as Integrated Pest Management (IPM) for your home and garden. Avoid lindane, a pesticide in head lice treatments for children. Visit www.beyondpesticides.org/alternatives/factsheets or www.epa.gov/pesticides/food/ipm.htm for suggested alternatives.

Prevent household pests naturally by removing their sources of food, water, and shelter. Fix leaky plumbing and prevent wet spots inside and outside your home, wipe up food residues on countertops, seal pet food containers, keep garbage sealed, rinse recyclable containers, remove woodpiles from

around or inside your home, repair door and window screens, and remove diseased plants and fallen fruit that may attract pests to your garden.

Lock pesticides away from children's reach if you do store them at home. Keep toxics in the original containers and follow all warning label directions.

Talk to neighbors, schools, businesses, and government officials about reducing pesticide use on playgrounds, lawns, roadsides, schools and other public areas. There are alternatives!

Find out more about pesticides

- www.sustainabletable.org
- www.chechnet.org
- www.beyondpesticides.org
- www.watoxics.org/pages/root.aspx
- www.panna.org
- www.pesticides.org
- www.epa.gov/pesticides/factsheets/npic.htm
- www.epa.gov/opp00001/safety/healthcare/handbook/handbook.htm (Clinician's handbook: *Recognition and Management of Pesticide Poisonings*)

This and other Practice Prevention columns are written and published by LDDI staff at the Collaborative on Health and the Environment, with an introduction provided by **LDDI Medical Advisor Dr. Larry B. Silver**. Dr. Silver is a child and adolescent psychiatrist and clinical professor of psychiatry at Georgetown University Medical Center. He has published several popular books for parents, educators and clinicians about learning disabilities, attention deficit hyperactivity disorder, health and mental health. Past president of the Learning Disabilities Association of America, he received their Learning Disabilities Association Award. He also received the Berman Lifetime Achievement Award from the American Academy of Child and Adolescent Psychiatry for his contributions to the study and treatment of learning disabilities. More information about Dr. Silver is available on the LDDI website: www.healthandenvironment.org/initiatives/learning/r/prevention.

For more information or for other Practice Prevention columns, visit the Learning and Developmental Disabilities Initiative online at www.disabilityandenvironment.org or call 360-331-7904.



Footnoted resources

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