

## What are Pesticides?

Pesticides are chemical or biological agents that are used to protect crops from insects, weeds, and infections. Acutely toxic organophosphate (OP) pesticides are widely used in the United States.

## What crops are pesticides used on?

Pesticides are used on fruits, vegetables, wheat, rice, olives and canola pressed into oil, and on non-food crops such as cotton, grass, and flowers. The OP pesticides malathion and chlorpyrifos are commonly used on all fruits, vegetables, and wheat. Pesticides are used on crops that are fed to animals, although residue from pesticides is generally not found in meat or dairy products.

## How do people get exposed to pesticides?

The most common way most infants, children and adults are exposed to pesticides is by eating them on and in our food. Workers in agriculture and occupational settings touch and breathe in pesticides, putting them at risk for acute and chronic poisoning.

## What are the health risks?

Most studies of the health effects of pesticides have focused on occupationally exposed people, like farmworkers and pesticide applicators. Acute OP pesticide poisonings result in symptoms like nausea, abdominal cramps, diarrhea, dizziness, anxiety and confusion, which can be quite severe but are often reversible.

There have also been many studies in groups of people who work with pesticides but who have not experienced acute poisonings serious enough to result in these kinds of symptoms. These studies have found that chronic, lower dose exposure is associated with respiratory problems, memory disorders, skin conditions, depression, miscarriage, birth defects, cancer and neurological conditions such as Parkinson's disease. There have been fewer studies of people without known occupational exposures, but one study with a nationally representative sample showed increasing odds of ADD/ADHD for 8-15 year olds with increasing levels of OP pesticides metabolites in urine.<sup>1</sup>

## Who is most at risk?

Fetuses, infants, growing children, pregnant and nursing mothers, and women of childbearing age are most at risk for adverse health outcomes from exposure to pesticides. Children are more at risk than adults because children eat more relative to their body weight than adults eat. Exposures during vulnerable periods of development can be particularly dangerous. These vulnerable periods include fetal



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development, infancy, early childhood, and puberty. Fetuses are exposed to pesticides through the mother's diet. Infants are exposed through breast milk.

Acute poisoning is a persistent problem among agricultural and occupational workers who handle pesticides and track them into their homes where family members get exposed. People who live near agricultural fields may be exposed by drift from aerial spraying.

## What Fruits and Vegetables have the most Pesticides?

The Environmental Working Group (EWG) publishes the *Shopper's Guide to Pesticides in Produce* that identifies what types of produce are most likely to be contaminated with pesticides.<sup>2</sup> EWG recommends eating organic versions of these 'Dirty Dozen' fruits and vegetables: apples, celery, sweet bell peppers, peaches, strawberries, nectarines (imported), grapes, spinach, lettuce, cucumbers, blueberries (domestic), and potatoes. In addition, EWG recommends organic green beans and kale. It is worth noting that pesticide residues can also be found in fruit and vegetable juices.

EWG also lists 15 fruits and vegetables that are lowest in pesticides, making it safer to eat conventional versions. These include onions, sweet corn, pineapple, avocado, cabbage, sweet peas, asparagus, mangoes, eggplant, kiwi, cantaloupe (domestic) sweet potatoes, grapefruit, watermelon and mushrooms.

## Is Organic Food More Nutritious?

A diet high in fresh fruits and vegetables provides optimal nutrition and dietary variety. However, no studies have shown direct health benefits or disease protection from eating an all organic diet. There is no conclusive evidence that organic food is more nutritious than conventional food.

People eat organic food for other reasons than nutrition. For example, those who eat an organic diet are exposed to fewer disease-causing pesticides, and organic farming is more sustainable and better for the environment.<sup>3</sup>

## What government agencies are involved?

The federal Environmental Protection Agency (EPA), the Food and Drug Administration (FDA) and the US Department of Agriculture (USDA) all play a role in regulating and measuring pesticides in food.

The EPA is responsible for regulating pesticides by enforcing the 1996 Food Quality Protection Act. The EPA registers pesticides for use in the US, evaluates potential new pesticides and their proposed uses, reviews the safety of older pesticides, registers pesticide producers, and enforces pesticide requirements. EPA has enacted stricter safety standards for infants and children and restricted many OP pesticides from residential use in order to reduce exposures in children.

The FDA oversees the safety of the U.S. food supply, which includes monitoring pesticide residues in food.

The USDA National Organic Program sets labeling standards for raw, fresh and processed products that contain organic agricultural ingredients. The USDA Pesticide Data Program collects, analyzes, and reports pesticide residues on agricultural products in the U.S. food supply, particularly those highly consumed by infants and children.

## Studies show eating an organic diet can reduce children's exposure to pesticides

Studies have found that children who eat conventional diets have significantly higher levels of OP pesticide metabolites in their urine than do children who eat organic diets.<sup>4</sup> In one study<sup>5</sup>, children were switched from conventional to organic diets. Urinary concentration of the OP pesticide metabolite immediately dropped so low it was undetectable. When a conventional diet resumed, urine concentration of the OP metabolite increased to previous levels. When organic produce is available and affordable, buying organic is a relatively easy way for parents to reduce children's exposure to OP pesticides.

## How can I protect myself and my family?

The health benefits of eating fruits and vegetables are well established. A diet high in fruits and vegetables is associated with lower rates of obesity, cardiovascular disease, and some cancers. The USDA recommends that half the food on your plate be fruits and vegetables.<sup>6</sup>

Since rinsing conventional produce does not wash away all pesticide residue, eating an organic diet is the best way to reduce your exposure to pesticides. In addition, avoiding conventional insect and weed killers in and around your home will reduce your exposure.<sup>7</sup>

## Food for thought

Because of higher production costs, the price of organic produce is 10-40% higher than conventional produce. The USDA is concerned that people might eat fewer fruits and vegetables rather than pay more for organic produce. What choices do you make about buying organic vs conventional produce? Do your choices affect how many fruits and vegetables you eat?

55% of children born in the US are eligible for the Women, Infants and Children (WIC) program that provides food and nutrition education for low-income pregnant and postpartum women, and services to nutritionally at risk children ages birth to five.<sup>8</sup> WIC provides each client \$50/month for food. If WIC permits \$10 of that monthly allotment to be used for fresh produce, how would you spend it if your child was a WIC client?

How should society protect agricultural and industrial workers who are at higher risk for acute and chronic pesticide poisoning because they have direct contact with pesticides at work?



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## References

- 1 Bouchard et al. Pediatrics. 2010 Jun. [www.ncbi.nlm.nih.gov/pubmed/20478945](http://www.ncbi.nlm.nih.gov/pubmed/20478945)
- 2 Environmental Working Group Shopper's Guide to Pesticides in Produce [www.ewg.org/foodnews/summary/](http://www.ewg.org/foodnews/summary/)
- 3 Forman J, Silverstein J; Comm on Nutrition; Council on Environmental Health. Organic foods: health and environmental advantages and disadvantages. Pediatrics. 2012 Nov. [www.ncbi.nlm.nih.gov/pubmed/23090335](http://www.ncbi.nlm.nih.gov/pubmed/23090335)
- 4 Curl CL, Fenske RA, Elgethun K. Organophosphorus pesticide exposure of urban and suburban preschool children with organic and conventional diets. Environ Health Perspect. 2003 Mar. [www.ncbi.nlm.nih.gov/pmc/articles/PMC1241395/](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1241395/)
- 5 Lu C, Fenske RA, et al. Organic diets significantly lower children's dietary exposure to organophosphorus pesticides. Environ Health Perspect. 2006 Feb. [www.ncbi.nlm.nih.gov/pmc/articles/PMC1367841/](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1367841/)
- 6 USDA Choose My Plate [www.choosemyplate.gov/food-groups/](http://www.choosemyplate.gov/food-groups/)
- 7 Find resources and information about pesticides on the Washington Toxics Coalition website at [www.watoxics.org](http://www.watoxics.org)
- 8 WA State Dept of Health WIC Special Supplemental Nutrition Program for Women, Infants and Children [www.doh.wa.gov/YouandYourFamily/WIC.aspx](http://www.doh.wa.gov/YouandYourFamily/WIC.aspx)

## Where to learn more

- US Environmental Protection Agency [www.epa.gov/pesticides/](http://www.epa.gov/pesticides/)
- US Food and Drug Administration <http://www.fda.gov/Food/FoodSafety/FoodContaminantsAdulteration/Pesticides>
- US Dept of Agriculture <http://www.nifa.usda.gov/ProgViewOverview.cfm?prnum=18926>



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