



## Reducing Pesticide Exposure in Children and Pregnant Women



Children may be especially sensitive to the health risks of pesticide exposure as their internal organs are not fully developed. For example, their immune systems may not be able to protect them against pesticides and their excretory systems may not be able to excrete these chemicals. Pesticide exposure may also permanently affect development negatively by blocking the absorption of nutrients necessary for development.

This issue of the *Northwest Bulletin* presents results of recent research on children and pesticides, and provides specific recommendations for reducing children's exposures.

In the editorial, Elaine Faustman discusses the biochemical, molecular, and exposure mechanisms underlying children's susceptibilities to pesticides and other chemicals in the environment. This knowledge will help develop new models for assessing risks to normal development and learning.

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Children's behaviors also put them at high risk. They crawl on floors and play on lawns—places where pesticide residues collect—and put objects into their mouths. They consume more milk, applesauce, apple and orange juice—foods that may have high pesticide loads—per pound of body weight than adults. However, as Kathryn Toepel points out, children who consume an organic diet can reduce pesticide metabolite levels in their urine.

Children of farmworkers are at especial risk for pesticide exposure. Their parents may bring pesticide residues from the agricultural fields into the home, where these residues are slow to degrade because they are not exposed to rain or sun. And pesticides may drift from fields into areas where children play. Beti Thompson presents specific recommendations for farmworkers and their families on how to reduce their exposure to pesticides. The recommendations result from a 5-year randomized controlled trial in the Yakima Valley.

And while many people associate pesticides problems with agriculture, many products used around the home and schools are also dangerous; insect repellents for personal use, flea and tick sprays, powders, and pet collars, products that kill mold and mildew, weed killers, and swimming pool chemicals are examples. The good news is communities and individuals are exploring alternatives to chemical pesticides. For example, schools are adopting Integrated Pest Management (IPM). The Alaska State Report briefly outlines use of IPM in its state schools. Other state reports highlight their efforts to track and investigate pesticide-related illnesses in order to identify trends and problem situations, and recommend preventions.

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**Northwest Bulletin:**  
**Family and Child Health**

## Editorial

### Innovative Approaches in Assessing Children's Exposure to Pesticides

*Elaine Faustman, Ph.D.*

According to the World Health Organization, more than 33% of diseases of children under five years are caused by environmental exposures. Children are unique both in their exposures and their biological responses to environmental contaminants. University of Washington (U.W.) School of Public Health and Community Medicine scientists are studying many aspects of children's environmental health—these studies rely on the active and dynamic involvement of families and their communities. At the Center for Child Environmental Health Risks Research (CHC), our primary goal is to conduct cutting-edge research on the mechanisms of children's susceptibility to pesticides and to use what we learn to improve children's health.

#### Understanding How and When Children are at Risk

Children are not just small adults. Because their bodies and minds are still developing, children are more susceptible than adults to the effects of pesticides and other environmental hazards. This was highlighted in the National Research Council's report "Pesticides in the Diets of Infants and Children." Yet even today, many risk assessments for environmental agents still fail to fully account for risks in children.

***Children are not just small adults. Because their bodies and minds are still developing, children are more susceptible than adults to the effects of pesticides and other environmental hazards.***

Scientists continue to be amazed by the beautiful and highly complex orchestration of developmental pathways that occurs to ensure development of healthy children. For example, the development of the human brain and nervous system produces 100 billion nerve cells and 1 trillion glial cells! We also know from studies done in the 1980s that exposure to environmental chemicals during critical "windows" of development can have devastating effects. More recently, we have found that early exposures to environmental chemicals can result in subtle changes that affect functioning but are not evident until much later in a child's development. These silent changes that can occur during fetal development and in early childhood contribute not only to adverse neurodevelopmental and behavioral changes but also to adult diseases, including obesity and neurodegenerative diseases (Parkinson's and Alzheimer disease). This emphasizes the importance of minimizing exposure to potentially toxic agents early in a child's life.

The Center's research into the biochemical, molecular, and exposure mechanisms that underlie children's susceptibility to pesticides and other chemicals in the environment will help develop new models

for assessing risks to normal development and learning. Studies at CHC focus on early molecular responses to environmental chemicals in an effort to identify the first signs of alterations in normal development, and conditions when these alterations are still reversible. New toxicogenomic tools offer very sensitive tests to track such molecular responses; however, more effort is needed to interpret the importance of these changes for children's health, especially given the dynamics of normal developmental molecular processes.

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#### **Why is it Difficult to Identify the Potential and Magnitude of Risks for Children from Pesticides?**

The articles presented in this issue show that children are exposed to pesticides through multiple routes. Katherine Toepel's article highlights the lower exposures for children eating an organic diet compared to a conventional diet. Beti Thompson's article discusses ways in which children of farmworkers are exposed to pesticides and how to reduce that exposure. The Center's studies indicate that the variability in an individual's day-to-day pesticide exposures (as assessed by measurements of urinary metabolites) can be more than 10-fold higher than the variability in exposures seen between individuals. It is important for us to identify the factors that contribute to this variability in order to develop effective public health promotion programs. These factors can include, for example, seasonal differences in pesticide exposure (during growing or dormant seasons), differences in meteorological conditions, differences in residential versus agricultural use of pesticides, and differences in types of agricultural tasks and crops.

Two factors that can contribute to individual differences in susceptibility are (1) genetic differences in the metabolism of pesticides and (2) age at exposure. Center investigators are identifying key genetic variations (polymorphisms) in enzymes involved in the detoxification of pesticides, in particular the organophosphate pesticides, and how these genetic differences contribute to an individual's susceptibility to specific pesticides. Recent CHC studies have shown that children do not reach adult levels of detoxifying enzymes (paraoxonase 1) until they are two years old. This leaves young children less capable of protecting themselves if exposed to a pesticide. These stages of development are also some of the most highly sensitive windows of susceptibility because of the concurrent development of the nervous system. Recent studies conducted in partnership

### **Pesticide Safety Tips**

- ♦ Don't buy more pesticide than you will need. If you have left-over pesticide, store the product away from children's reach, in a locked cabinet or garden shed.
- ♦ Purchase ready-to-use pesticides rather than concentrates.
- ♦ Don't use products for pests that are not indicated on the label and don't use more pesticides than directed by the label.
- ♦ Before applying a pesticide, remove children, pets, and their toys from the area and keep them away until the pesticide has dried or as recommended by the label.
- ♦ Never transfer pesticides to other containers that children may associate with food or drink.
- ♦ If your use of a pesticide is interrupted, properly reclose the package and be sure to leave the container out of the reach of children while you are gone.
- ♦ Do not allow children to handle insect repellants and do not apply to children's hands. When using on children, apply to your own hands and then put it on to the child.
- ♦ Wash skin treated with insect repellent with soap and water or bathe. Wash treated clothing before wearing again.
- ♦ Teach children that "pesticides are poisons" —something that they should not touch.
- ♦ Alert others to the potential hazard of pesticides, especially care givers and grandparents.

#### **Resources:**

U.S. Environmental Protection Agency  
[www.epa.gov/pesticides/factsheets/pest\\_ti.htm](http://www.epa.gov/pesticides/factsheets/pest_ti.htm)

Children and Poisoning: Seconds Matter  
 Purdue University Pesticide Program, Purdue Cooperative Extension Service  
[www.btny.purdue.edu/Pubs/PPP/PPP-53.pdf](http://www.btny.purdue.edu/Pubs/PPP/PPP-53.pdf)



with researchers at the Children's Health Center in Berkeley, California, have suggested that variations in paraoxonase 1 may correlate with adverse developmental outcomes resulting from pesticide exposure.

**Recent CHC studies have shown that children do not reach adult levels of detoxifying enzymes (paraoxonase 1) until they are two years old. This leaves young children less capable of protecting themselves if exposed to a pesticide.**

Studies of children living in New York City have shown significant decreases in urinary pesticide levels following implementation of regulatory limits on residential pesticide use. Recently, the Environmental Protection Agency announced additional limits on pesticides, including restrictions on agricultural pesticide uses. Studies are needed to track these changes and determine if pesticide exposures are reduced for children living in the Pacific Northwest, as they were for children living in New York City.

#### **Importance of Community-Based Studies**

Community partnerships are necessary for developing sound scientific research that can be translated from "the bench to the home." The community-based children's health study discussed in Beti Thompson's article identified significant pathways through which children of farmworkers are exposed to pesticides. Scientists are working to identify intervention efforts focused on these pathways that can decrease

and minimize children's exposures. The design as well as implementation of this study would not have been possible without partnering with the community. The community advisory board suggested measuring pesticides in the dust on vehicles used by farmworkers in order to provide a "missing link" in the field-to-home exposure routes. This is just one example of the importance of community-based research studies to protect children's health.

Ensuring children's health is a challenging yet highly rewarding goal of scientists at the U.W. School of Public Health and Community Medicine. This goal is accomplished only with recognition of the complexity of developmental dynamics and the interactions between genes and the environment. Community partners and multidisciplinary research teams are essential for identifying significant and effective public health interventions.

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## Can pesticides harm an unborn baby?

Pregnant women should avoid pesticides, whenever possible. There is no proof that exposure to pest-control products at levels commonly used at home pose a risk to the fetus. However, all insecticides are to some extent poisonous and some studies have suggested that high levels of exposure to pesticides may contribute to miscarriage, preterm delivery, and birth defects. Certain pesticides and other chemicals, including PCBs (polychlorinated biphenyls), have weak, estrogen-like qualities called endocrine disrupters that some scientists suspect may affect development of the fetus's reproductive system.

A pregnant woman can reduce her exposure to pesticides by controlling pest problems with less toxic products such as boric acid (use the blue form available at hardware stores). If she must have her home or property treated with pesticides, a pregnant woman should:

- ◆ Have someone else apply the chemicals and leave the area for the amount of time indicated on the package instructions.
- ◆ Remove food, dishes, and utensils from the area before the pesticide is applied. Afterwards, have someone open the windows and wash off all surfaces on which food is prepared.
- ◆ Close all windows and turn off air conditioning when pesticides are used outdoors, so fumes aren't drawn into the house.
- ◆ Wear rubber gloves when gardening to prevent skin contact with pesticides.

Health care providers also have some concerns about the use of insect repellants during pregnancy. The insect repellant DEET (diethyltoluamide) is among the most effective at keeping bugs from biting; however, its safety during pregnancy has not been fully assessed. If a pregnant woman uses DEET, she should not apply it to her skin. Instead, she should place small amounts on her socks and shoes and outer clothes, using gloves or an applicator to avoid contact with her fingers.

**Information from March of Dimes Pregnancy & Newborn Health Education Center**

[www.Marchofdimes.com](http://www.Marchofdimes.com)

## Reducing Children's Pesticide Exposure in Yakima Valley Farming Communities: Simple Messages that Work

Beti Thompson, Ph.D.

The lower Yakima Valley of Washington State has been called the “fruit bowl of the nation.” This agriculturally rich valley produces many crops such as apples, pears, cherries, grapes, and hops. The cultivation and harvesting of these crops is labor intensive. Organophosphate (OP) pesticides are widely used in the valley. These pesticides are designed to kill living organisms and are generally regarded as potentially hazardous to humans. The Environmental Protection Agency (EPA) has instituted steps to protect farmworkers from exposure to OP pesticides. Despite this, farmworkers are still exposed while on the job. Further, farmworkers accumulate agricultural chemicals on their clothing and skin, and carry these chemicals into their homes. This take-home pathway plays an important role in exposing children of farmworkers to environmental toxicants.



Winning entry for elementary school calendar contest

Children are at higher risk of harm from pesticide exposure because of their higher rates of metabolism, less mature immune systems, and different hand to mouth behaviors than adults. In epidemiologic studies, elevated risks of cancers, neurobehavioral flaws, and congenital malformations have been associated with pesticide exposure among children.

The University of Washington's Center for Child Environmental Health Risks Research conducted a five-year randomized controlled trial to evaluate the effectiveness of community-based education activities in reducing pesticide levels in the homes of farmworkers in the lower Yakima Valley. After identifying 24 communities (16 towns and eight labor camps), we randomly assigned half to the intervention and half to the control. Project staff developed the intervention with advice from a community advisory board comprised of farmworkers, growers and their associations, regulatory agencies, the local health department, the department of agriculture, the department of labor and industries, the local EPA, local media including a Spanish-speaking radio station, the farmworkers' union, local farmworkers' clinics, and advocates for farmworkers. The study was funded by the National Institute for Environmental Health Sciences and the EPA.

### Community Education Activities

The intervention consisted of many educational activities. For example, staff at information booths at health fairs, community festivals and block parties provided educational materials; and presentations were made at church events and worksites, including orchards and farms. A pesticide puppet show, developed by a local university, was shown at block parties and festivals. At elementary schools, a calendar contest was held annually to promote pesticide protection messages (see illustration at left). In addition, messages

about protecting against pesticide exposure were included in the curriculum at English as a Second Language and citizenship classes, as well as preschools such as HeadStart.

Small group activities, such as home health parties where friends and relatives gathered in the home of a “host,” were popular. Often at these parties a trained promotora, or lay health educator, gave a guided 30-45 minute discussion about a specific pesticide topic. Finally, volunteer promotoras and staff talked to individuals about the importance of protecting one’s family from pesticide exposure. These volunteers went door-to-door and spoke at grocery stores and other places farmworkers gathered.

***Small group activities, such as home health parties where friends and relatives gathered in the home of a “host,” were popular.***

#### **Protect Your Family from Pesticide Exposure**

All education activities focused on simple, culturally-appropriate, messages to teach farmworkers, their spouses, and their children how to protect themselves from pesticide exposure. Many of these messages focused on breaking the take-home pathway. (See table 1 for a summary.)

#### **Reduce Exposure at Work**

Farmworkers were encouraged to wear clothing to help protect them from getting pesticides on the skin, including hats, bandanas, long sleeved shirts, long pants, socks, and closed-toe shoes or boots. Pesticide handlers, who mixed, loaded, or sprayed pesticides were advised to wear a chemically resistant suit, respirator, gloves, goggles, and boots. Farmworkers were also told, as is mandated by the EPA, to refrain from entering recently sprayed fields. To help reduce dermal contact, farmworkers were counseled to wash hands frequently with soap and water, especially before eating, drinking, smoking, or using the bathroom. They were also encouraged to drink large quantities of water to help their bodies eliminate toxic chemicals.

#### **Avoid Spreading Pesticides into the Home**

Pesticide residues cling to clothing as well as to skin. Farmworkers were encouraged to remove clothing that could not be easily washed, such as hats and boots, before entering the home and store them in places not accessible to children. They were also encouraged to shower immediately after coming home from work to remove residues from the skin. To keep residues on work clothing from re-contaminating farmworkers, we recommended that work clothing be washed in hot water with a strong detergent separately from other clothing.

Table 1. Messages to help farmworkers and their families reduce their exposure to pesticides:

- Wear appropriate protective work clothes
- Do not enter recently sprayed fields
- Wash hands frequently with soap and water
- Drink 6-8 glasses of water a day
- Remove boots and hats before entering home
- Shower and put on clean clothes immediately after returning home from work
- Wash work clothes after one wearing and separately from other family laundry
- Wash children’s hands and toys frequently
- When picking up children from daycare directly after work, use a clean blanket or towel to carry them
- Do not let children play in fields or swim in irrigation ditches
- Always wash fruits and vegetables before eating
- Clean home, car, and pets regularly
- Use and store pesticides safely
- Use pesticide alternatives in the home and garden
- Protect against sprays drifting into the yard from nearby fields

#### **Protect Children**

Children often play on floors where pesticide residues tend to collect in house dust. These residues are unlikely to degrade because they are not exposed to sunlight or rain. We recommended that families frequently clean their houses, cars, and pets. In addition, because pesticide sprays might drift into areas where children play outside, we encouraged families to wash children’s hands and toys. Often farmworkers must pick up their children at daycare centers before they have a chance to bathe. In these situations, we encouraged them to wrap their children in clean blankets or towels to avoid contact with pesticide residues on parents’ clothing and skin.

***Children often play on floors where pesticide residues tend to collect in house dust. These residues are unlikely to degrade because they are not exposed to sunlight or rain.***

Finally, we developed messages for families that focused on reducing their exposures to other sources of pesticides (see last five items in the table above).

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These messages have been well-received by farmworkers and their families. The project has reached over 2,000 people with messages that encouraged them to implement pesticide safety health behaviors. Data suggest that farmworkers' safety practices are changing to be consistent with some of the project recommendations. In this way, we hope to protect children of the lower Yakima Valley from pesticide exposure.



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The Oregon Department of Human Services Immunization Program and the Washington State Department of Health Immunization Program CHILD Profile are hosting the 2007 Northwest Immunization Conference on May 15 & 16, 2007. The conference will be held at the Hilton Portland and Executive Tower in Portland, Oregon.

For more information on the agenda, CE credits, and registration, please visit the conference Web site at [www.regonline.com/immunization2007](http://www.regonline.com/immunization2007).

If you have any questions, contact Lonnie Malone at 360-236-3529 or [lonnie.malone@doh.wa.gov](mailto:lonnie.malone@doh.wa.gov).



# Organic Diets Significantly Reduce Children's Exposure to Organophosphorus Pesticides

Kathryn Toepel, M.S.

People choose to eat organic foods for a variety of reasons. Avoiding exposure to chemicals, such as pesticides, is one of them. Reducing pesticide exposure is especially important for parents who want to provide healthy foods to their growing and developing children. The effect of low-level, long-term exposure to pesticides from food is not well understood but the concern is that organophosphorus (OP) pesticides, a commonly used group of insecticides, could affect the development and growth of young children. Evaluating children's pesticide exposure from diets has been a priority since the National Research Council (NRC) released a report titled *Pesticides in the Diets of Infants and Children* in 1993.

***Reducing pesticide exposure is especially a concern for parents who want to provide healthy foods to their growing and developing children.***

A recent study conducted by Lu et al. at the University of Washington provides useful information about the contribution of OP pesticides in children's diets to their total pesticide exposure. This research is a follow-up to a 2003 study that compared pesticide metabolite levels in urine in children who ate primarily organic diets to children who ate primarily conventional diets. Results showed that children who ate conventional diets had urinary pesticide metabolite levels six times higher than those who ate organic diets.

## Pesticide Safety Tips: Foods

- ♦ Wash and scrub all fresh fruits and vegetables thoroughly under running water.
- ♦ Peel fruit and vegetables when possible to reduce dirt, bacteria, and pesticides. Discard outer leaves of leafy vegetables. Trim fat from meat and skin from poultry and fish because some pesticide residues collect in fat.
- ♦ Eat a variety of food from a variety of sources. This will give you a better mix of nutrients and reduce your likelihood of exposure to a single pesticide.

From the U.S. Environmental Protection Agency  
[www.epa.gov/pesticides/food/tips.htm](http://www.epa.gov/pesticides/food/tips.htm)

In the Lu et al. study, suburban children who normally consumed conventional diets were placed on organic diets for five days. The organic diets included fresh fruits and vegetables, juices, processed fruit and vegetables (e.g., salsa), and wheat- or corn-based items (e.g., pasta, cereal, popcorn, or chips). Researchers monitored OP metabolite levels in the children's urine daily before, during, and after the five days. They found that certain metabolite levels dropped rapidly and significantly after switching diets. The levels for chlorpyrifos and malathion, OP pesticides used on produce and wheat, dropped to non-detectable levels 24-28 hours after switching to an organic diet. The urinary metabolite levels of two other OP pesticides did not change because children were exposed to these pesticides either from animal-based foods not controlled in the study or from non-dietary sources.

***Researchers monitored OP metabolite levels in the children's urine daily before, during, and after the five days; and found that certain metabolite levels dropped rapidly and significantly after switching diets.***

These results support the NRC's conclusion that dietary intake of pesticides represents a major source of exposure for infants and children.

Not only do organic foods help reduce some pesticide exposures, there are many nutritional benefits to eating fruits and vegetables. Children should be encouraged to eat a balanced diet that includes a wide variety of produce even when organic foods are unavailable or unaffordable.

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#### Produce ranked from highest\* to lowest\*\* by pesticide load.

Rank	Fruit or Vegetable	Score
1	Peaches	100*
2	Apples	89
3	Sweet Bell Peppers	86
4	Celery	85
5	Nectarines	84
6	Strawberries	82
7	Cherries	75
8	Pears	65
9	Grapes – Imported	65
10	Spinach	60
11	Lettuce	59
12	Potatoes	58
13	Carrots	57
14	Green Beans	53
15	Hot Peppers	53
16	Cucumbers	52
17	Raspberries	47
18	Plums	45
19	Grapes – Domestic	43
20	Oranges	42
21	Grapefruit	40
22	Tangerine	38
23	Mushrooms	37
24	Cantaloupe	34
25	Honeydew Melon	31
26	Tomatoes	30
27	Sweet Potatoes	30
28	Watermelon	28
29	Winter Squash	27
30	Cauliflower	27
31	Blueberries	24
32	Papaya	21
33	Broccoli	18
34	Cabbage	17
35	Bananas	16
36	Kiwi	14
37	Sweet Peas – Frozen	11
38	Asparagus	11
39	Mango	9
40	Pineapples	7
41	Sweet Corn – Frozen	2
42	Avocado	1
43	Onions	1**

This ranking was developed by the Environmental Working Group based on the results of nearly 43,000 tests for pesticides on produce collected by the U.S. Department of Agriculture and the U.S. Food and Drug Administration between 2000 and 2004.  
[www.ewg.org/sites/foodnews/walletguide.php](http://www.ewg.org/sites/foodnews/walletguide.php)

# State Reports

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## Alaska Report



### Keeping Children Safe at School: Alaska's Integrated Pest Management Program

*Yvonne Goldsmith, M.S.*



The Alaska Department of Environmental Conservation (DEC) has a Pesticide Control Program that delivers a variety of services to protect the environment and encourage safe pesticide use. Since 1998, pesticides may not be distributed or sold unless they have been registered with DEC. Services provided by DEC through the Pesticide Control Program include market place inspections, training pesticide applicators, issuing permits for projects requiring pesticide usage, and providing information on the United States Environmental Protection Agency's (EPA) Worker Protection Standard. In addition, DEC certifies individuals who use, supervise, purchase, or sell an EPA restricted-use pesticide.

For more information, see DEC's Web site at:  
[www.dec.state.ak.us/eh/pest/index.htm](http://www.dec.state.ak.us/eh/pest/index.htm).

#### School Integrated Pest Management

DEC advocates the use of Integrated Pest Management (IPM) to combat pests that can be found in schools such as lice, silver fish, rats and mice, and wasps and bees. There is a delicate balance between protecting children from unnecessary exposure to pesticides and protecting them from the health risks associated with pests. IPM incorporates a multi-tactic approach, considering a combination of cultural, physical, biological, and chemical pest management strategies.

For more information about school IPM, visit:  
[www.dec.state.ak.us/eh/pest/ipm.htm](http://www.dec.state.ak.us/eh/pest/ipm.htm)

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# Idaho Report



## Promoting and Ensuring Safe Agricultural and Environmental Practices

*Kathryn Dallas, M.S.*

*Jessica Atlakson, M.S.*

The Idaho State Department of Agriculture (ISDA) promotes and ensures safe agricultural and environmental practices that protect Idaho's citizens, including sensitive populations, such as pregnant women and children. Through education and enforcement, ISDA ensures compliance with federal and state laws governing pesticide use. Its six programs focus on enforcement, worker protection, waste pesticide disposal and container recycling, urban pesticide use, and water quality; and are essential in implementing the Federal Insecticide, Fungicide, Rodenticide Act (FIFRA).

- The **Enforcement Program** investigates pesticide complaints and monitors pesticide use.
- The **Idaho Worker Protection Standard/Farm Worker Safety Program** promotes and enforces proper pesticide use and pesticide awareness.
- The **Container Recycling Operation (CROP)** is a cooperative venture with private industry to recycle empty pesticide containers.
- The **Pesticide Disposal Program** offers free disposal of unused pesticides in an environmentally conscientious manner.
- The **Urban Pesticide Program** promotes Integrated Pest Management in non-agriculture communities.

The **Water Quality Program**, the focus of this article, protects Idaho's ground and surface water quality. This program implements ground water monitoring and protection projects related to agricultural activities. The two major goals of the program are the protection of drinking water and the raising of awareness of the potential health risks of exposure to pesticides through drinking water. Its success in achieving these goals is dependent upon dissemination of information to, and local coordination with, agriculture communities and the public. The program implements Idaho's Rules Governing Pesticide Management Plans for Ground Water Protection (PMP Rule). The PMP Rule outlines responses when pesticide concentrations are detected in ground water. For any pesticide detection, ISDA will notify the well owner

and water users, and conduct pesticide applicator education. Depending upon the concentration level, ISDA may also continue monitoring to determine likely sources, encourage voluntary best management practice for pesticide applicators, establish an area of pesticide restriction or prohibition through rule making, and evaluate regulatory actions over time.

Working with pesticide users and the public, ISDA will continue to implement pesticide laws and rules in order to protect human health and the environment from the adverse effects of these chemicals. For more information on programs that are mentioned in this article, along with other important ISDA programs, please visit ISDA's website at [www.idahoag.us](http://www.idahoag.us).



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## Oregon's Pesticide Analytical Response Center

*Lauren Slusser, M.P.H.*

Pesticides are widely used in agriculture, commercial, and home settings. Unintentional misuse of these insecticide, herbicide, fungicide, and related products can result in acute adverse human health effects, environmental contamination, and plant damage. Misuse of pesticides can also negatively affect domestic animals and wildlife. In Oregon, the Pesticide Analytical Response Center (PARC) coordinates investigations and collects and analyzes information about reported incidents of pesticide exposure. The PARC Board is composed of eight state agencies<sup>1</sup> that have jurisdiction over various aspects of pesticide use. The board consults with physicians, toxicologists, and epidemiologists from two state universities.

Pesticide poisonings are commonly reported to PARC by the affected individual or through one of the member agencies. By law, health care providers are required to report suspected or known cases of human pesticide poisoning to the Oregon Public Health Division, Department of Human Services. Public health personnel are required to investigate such cases. Investigators are also available to assist physicians in determining if an exposure and illness are related, and whether other people may have been affected by the exposure.

The center does not have regulatory authority so information about pesticide incidents is shared with member agencies that have jurisdiction. Each member agency conducts its own investigation and takes necessary enforcement action. Final incident investigation findings are submitted to PARC. The center maintains regular contact with various government agencies, and public and private organizations to facilitate investigations of specific incidents, identify potential problems, and assist in developing solutions.

The information and data that PARC compiles is used to identify patterns of problems and recommend changes that

<sup>1</sup>*Agencies include the Departments of Agriculture, Environmental Quality, Forestry, and Fish and Wildlife; as well as the Public Health Division, Oregon-OSHA, Office of the State Fire Marshall, and the Oregon Poison Center.*

member agencies or the Environmental Protection Agency (EPA) might take to prevent future problems. For example, PARC identified a pattern of cases where the use of an indoor home paint that had an anti-mildew product added to it resulted in a number of human illnesses. PARC worked with the EPA to change the product label to indicate the product was for exterior use only. This helped solve the problem.

In another example, three emergency medical technicians and two police officers experienced symptoms after responding to an emergency where two individuals became ill reentering their home after an indoor commercial pesticide treatment. All five emergency responders entered the home even though they were unprepared for a hazardous atmosphere. As a result of this incident, PARC developed a training module for local emergency responders about the need for personal protective equipment in hazardous situations.

Visit [www.oregon.gov/ODA/PEST/parc.shtml](http://www.oregon.gov/ODA/PEST/parc.shtml) to learn more about PARC. To report a pesticide incident to PARC, call 503-986-6470 or e-mail [parc@oda.state.or.us](mailto:parc@oda.state.or.us).

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*Lauren Slusser, M.P.H., is the pesticide and occupational health program coordinator for the Oregon Department of Human Services. She works with various organizations and government agencies to investigate, identify trends, and prevent adverse health effects related to pesticide poisonings in Oregon State.*

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# Washington Report



## Preventing Pesticide Exposure through Illness Monitoring in Washington State

Joanne Bonnar Prado, M.P.H.

Washington State is a leader in protecting children, workers, and other state residents from exposure to toxic substances. Washington is one of nine states that actively tracks and investigates pesticide-related illnesses. Since 1970, the Washington State Department of Health (DOH) has investigated cases of pesticide illness and built a nationally recognized system to monitor and prevent these illnesses.

DOH uses pesticide illness data to support recommendations about pesticide policy and to educate health care providers, schools, and the general public. These data are important tools in preventing farmworkers and their families from being exposed to pesticides. Our Pesticide Program staff attend community health fairs and help train pesticide handlers who work at farms to avoid pesticide exposure. Our data are also used to strengthen consumer safety education. DOH's Web site informs schools about the hazards of using pesticides when children are present and encourages the use of safer pest control methods at schools and homes.

From 2000-2004, DOH investigated 709 cases of pesticide illness in the agricultural environment and 745 cases not related to agriculture. Farmworkers who apply pesticides are at greatest risk since they may work with concentrated forms of highly toxic pesticides. To detect the early warning signs of pesticide overexposure in farmworkers who handle pesticides, DOH public health lab partners with the Washington State Department of Labor and Industries (L&I) to monitor cholinesterase, an important blood enzyme. DOH alerts L&I and the worker's doctor if enzyme levels are abnormal so that the worker can be protected from further exposure.

DOH works with many partners to monitor and prevent pesticide illnesses in children and pregnant women. The Washington [State] Poison Center and the Washington [State] Association of Migrant and Community Health Centers contact us when pesticides may be involved in an illness. State and local agencies and community groups use the findings from these investigations to target their prevention efforts. DOH does not investigate chronic illness or latent exposure

situations.

In 1989, the Washington State Legislature created a special multi-agency panel to monitor pesticide-related incidents. Representatives from several state agencies meet regularly with representatives from the University of Washington and Washington State University, the Washington [State] Poison Center, and others. The Pesticide Incident Reporting and Tracking Review (PIRT) panel centralizes information about pesticide complaints into one annual report, identifies illness trends or problem situations, and recommends preventions. A representative from DOH serves as chairperson of the PIRT panel.

If you suspect that pesticide exposure may have made you sick, you can report this directly to the DOH Pesticide Program. Contact information is available at the Web site. Health care providers and others may also contact the Washington [State] Poison Center to report an illness.



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### Resources:

Washington State Department of Health, Pesticide Program  
[www.doh.wa.gov/ehp/ts/Pest/default.htm](http://www.doh.wa.gov/ehp/ts/Pest/default.htm)

Activities of the PIRT panel and annual reports of pesticide incidents in Washington

[www.doh.wa.gov/ehp/ts/PIRT/default.htm](http://www.doh.wa.gov/ehp/ts/PIRT/default.htm)

Washington State Department of Health, School Environmental Health and Safety Program

[www.doh.wa.gov/ehp/ts/School/default.htm](http://www.doh.wa.gov/ehp/ts/School/default.htm)

Integrated Pest Management in schools and homes in Washington

[www.ecy.wa.gov/programs/swfa/upest/](http://www.ecy.wa.gov/programs/swfa/upest/)

Pediatric Environmental Health Specialty Unit at the University of Washington

<http://depts.washington.edu/pehsu/>

Washington Poison Center

[www.wapc.org/](http://www.wapc.org/)

Institute for Children's Environmental Health

[www.iceh.org](http://www.iceh.org)

# Resources

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## **Beyond Pesticides: National Coalition Against the Misuse of Pesticides**

Provides information on pesticides and alternatives to their use.  
[www.beyondpesticides.org/index.html](http://www.beyondpesticides.org/index.html)

## **California Department of Pesticide Regulation**

Pesticide Info: Don't Play Around with Children and Pesticides.  
[www.cdpr.ca.gov/docs/factshts/kids2.pdf](http://www.cdpr.ca.gov/docs/factshts/kids2.pdf)

## **Center for Child Environmental Health Risk**

The center conducts research into the biochemical, molecular and exposure mechanisms that underlie children's susceptibility to pesticides in order to develop new models for assessing pesticide risks to normal development and learning.  
<http://depts.washington.edu/chc/index.html>

Committee on Environmental Health, American Academy of Pediatrics. *Pediatric Environmental Health*. 2003. Elk Grove Village, IL: American Academy of Pediatrics.

## **Consumer Information Center**

Pesticides and Food.  
[www.pueblo.gsa.gov/cic\\_text/food/pesticides-andfood/food.html](http://www.pueblo.gsa.gov/cic_text/food/pesticides-andfood/food.html)

Environmental Protection Agency. 2003. *America's Children and the Environment: Measures of Contaminants, Body Burdens, and Illnesses*. Second edition.  
[www.epa.gov/envirohealth/children/report/index.htm](http://www.epa.gov/envirohealth/children/report/index.htm)

## **Environmental Protection Agency**

Children's Health Protection.  
Provides information on protecting children from environmental risks.  
<http://yosemite.epa.gov/ochp/ochpweb.nsf/content/homepage.htm>

## **Environmental Protection Agency**

Pesticides.  
Provides information about pesticides, including their health and safety, environmental effects, and science and policy. It also includes an on-line publication "10 Tips to Protect Children from Pesticides and Lead Poisonings around the Home."  
[www.epa.gov/pesticides/](http://www.epa.gov/pesticides/)

## **Institute for Children's Environmental Health**

Learning and Developmental Disabilities Initiative.  
The initiative fosters collaboration among learning and developmental disability organizations, researchers, health professionals, and environmental health and justice groups to address concerns about the impact of environmental pollutants on healthy brain development.  
[www.iceh.org/LDDI.html](http://www.iceh.org/LDDI.html)

## **National Center for Farmworker Health**

Provides information services and products to a network of more than 500 migrant health center service sites in the United States, as well as other organizations and individuals serving the farmworker population.  
[www.ncfh.org/](http://www.ncfh.org/)

## **National Institute of Environmental Health Sciences (NIEHS)**

NIEHS Kids' Pages.  
This Web site provides fun activities for children where they can learn about the impact of the environment on human health; the NIEHS mission; and possible careers in health, medicine, science, mathematics, and the environment.  
[www.niehs.nih.gov/kids/home.htm](http://www.niehs.nih.gov/kids/home.htm)

## **National Library of Medicine**

Enviro-Health Links—Pesticide Exposure.  
This extensive Web site provides links to information on pesticides, including a glossary, data and research, and law and policy.  
<http://sis.nlm.nih.gov/enviro/pesticides.html>

## **National Library of Medicine**

Tox Town: Environmental Health Concerns and Toxic Chemicals Where You Live, Work, and Play.  
This interactive Web site is designed for students above elementary-school level, educators, and the general public.  
<http://toxtown.nlm.nih.gov/>

## **National Library of Medicine**

TOXLINE (Toxicology Literature Online).  
This on-line database provides over 3 million bibliographic citations with information covering the biochemical, pharmacological, physiological, and toxicological effects of drugs and other chemicals, including pesticides.  
<http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?TOXLINE>

## **National Pesticide Information Center**

This Web site is a cooperative effort of Oregon State University and the U.S. Environmental Protection Agency.  
<http://npic.orst.edu/>

School Pesticide Reform Coalition and Beyond Pesticides. 2003. *Safer Schools: Achieving a Healthy Learning Environment through Integrated Pest Management*.  
[www.beyondpesticides.org/schools/publications/IPMSuccessStories.pdf](http://www.beyondpesticides.org/schools/publications/IPMSuccessStories.pdf)

## **Washington Toxics Coalition**

Provides information on how to reduce pesticide use in the home, garden, and schools and other public places.  
<http://www.watoxics.org/>