

# ACUTE EFFECTS, DIAGNOSIS, AND TREATMENT OF PESTICIDE INJURIES

Acute pesticide injury may be misdiagnosed because it frequently mimics other illnesses. Acute pesticide injury may cause or exacerbate such illnesses as gastroenteritis, bronchitis, intrinsic asthma, pneumonia, epilepsy, meningitis, septic shock and brain hemorrhage. In fact, the symptoms associated with West Nile virus, which include fever, head and body aches, skin rash, confusion, and muscle weakness, are also associated with pesticide poisoning.

Acute poisoning often results from exposure to neurotoxic pesticides (organophosphates and carbamates). A recent CDC report on human exposure to environmental chemicals states, "The acute effects of the organophosphates from intentional and unintentional overdoses or from high-dose agricultural exposure are well known and include neurologic dysfunction that results from inhibition of acetylcholine breakdown in neural tissue."<sup>1</sup> Exposure to pesticides can cause an array of acute symptoms, including blurred vision, salivation, diarrhea, nausea, vomiting, bronchoconstriction, headache, confusion, muscle pain, or sometimes seizures, coma, and in some cases, death.

The enclosed reference chart is designed to alert health professionals to the signs of acute illness associated with exposure to pesticides and herbi-

Vomiting  
Nausea  
Diarrhea  
Headache  
Joint Pain  
Dizziness  
Flu?  
Food Poisoning?  
Asthma?  
or  
Pesticide Injury?

cides. It contains information on symptoms and treatments for both moderate and severe complications linked to exposure to insecticides and herbicides commonly used in agriculture, the workplace, and home settings. Refer to EPA's "Recognition and Management of Pesticide Poisonings" for more detailed information about diagnosis and treatment for each of these chemicals. (See below for information on how to obtain a copy of this handbook.)

Recognition of chemical poisoning is crucial for proper care, and conducting an exposure history interview is necessary to correctly diagnose an acute pesticide illness. (See Exposure History insert.) Also note that pesticide product ingredients labeled as "inert," which are not identified by chemical name because of trade secret law, often comprise more than 80 percent of a pesticide formulation and can be equally or more toxic than the active ingredient listed on the product label. The U.S. EPA does not require acute toxicity testing for most inerts.

*Note: Every effort has been made to ensure that the information provided in this kit is accurate. However, before any recommended treatment in this brochure is undertaken, it is strongly advised that you seek formal consultation with experts in the field.*

## RESOURCES

### Maryland Poison Center

Toll Free: 1 (800) 222-1222  
TDD: (410) 706-1858

### National Pesticide Information Center

Telephone: 1 (800) 858-7378  
(9:30am-7:30pm EST, 7 days/week)  
Web site: <http://npic.orst.edu>  
E-mail: [npic@ace.orst.edu](mailto:npic@ace.orst.edu)

### EPA Office of Pesticides Program

"Recognition and Management of Pesticide Poisonings"  
On-line version in English or Spanish:  
<http://www.epa.gov/oppfead1/safety/healthcare/handbook/handbook.htm>.  
Hard copy: Document # EPA 735-F-98-003.  
Contact the National Service Center for Environmental Publications at (800) 490-9198 or visit their web site at [www.epa.gov/ncepihom/nepishom](http://www.epa.gov/ncepihom/nepishom).

<sup>1</sup> Centers for Disease Control and Prevention (2003). "Second National Report on Human Exposure to Environmental Chemicals." National Center for Environmental Health, Division of Laboratory Sciences, Centers for Disease Control, Atlanta, Georgia. NCEH Pub. No. 02-0716. January, p.159.

# OVERVIEW: DIAGNOSING AND TREATING PESTICIDE INJURIES

1. Remove contaminated clothing and decontaminate skin with soap and water.
2. Take exposure history. (See Exposure History insert.)
3. If patient has a suspected pesticide injury, consultation with the Maryland Poison Center at 1 (800) 222-1222 or the National Pesticide Information Center hotline at 1 (800) 858-7378 may be advisable.
4. The first three tests that should be ordered are a blood count, a biochemical screen, and a urinalysis.
5. The most common diagnostic test for organophosphate or carbamate poisoning is a red blood cell and serum cholinesterase. It is helpful to have a baseline for this test first. If the patient is exhibiting signs of chronic low-level pesticide poisoning, the red blood cell and serum cholinesterase with dibucane level should be taken immediately and repeated again within a week to see if any change in these levels occurs. Treatment should not be delayed pending results of laboratory tests.
6. Urinary alkyl phosphates and phenols, which are more sensitive to low-level exposure than cholinesterase levels, can be useful for documenting exposure in the first 48 hours.
7. A routine liver profile is also helpful.
8. Although expensive, nerve conduction times may be a useful diagnostic tool.
9. GI decontamination (if ingested and indicated). Charcoal is recommended in certain cases.
10. Supportive care, including cardiac monitoring, oxygenation, airway preservation and aggressive hydration are generally indicated.
11. Specific antidotes sometimes indicated: (e.g., atropine and/or pralidoxime for organophosphates, atropine alone for carbamates).

Source: California Physicians for Social Responsibility (2000). Presentation: Pesticides and Human Health: A Resource for Health Care Professionals.

## MARYLAND DHMH LABORATORY TESTING

Available Summer, 2003

The Maryland Department of Health and Mental Hygiene Laboratories Administration Division of Environmental Chemistry will soon be able to conduct biomonitoring tests. For information on when the laboratory will begin to receive physician requests for biomonitoring and for more information on the tests themselves, contact Ms. Deborah Miller-Tuck, Director, Toxic Organics Program at (410) 767-4388 or millertuckd@dnhm.state.md.us.



### MD DHMH LABORATORY TESTING

TEST	MATRIX	CONTAINER	PRESERVATIVE	VOLUME REQUIRED	TURN-AROUND TIME
Analysis of 11 organochlorine pesticides using gas chromatography - mass spectrometry	Urine	High density polypropylene cup	NA	50 ml	3 days
Analysis of 6 organophosphate pesticides metabolites using gas chromatography - mass spectrometry	Urine	High density polypropylene cup	NA	50 ml	3 days
Analysis of pyrethroid metabolite using gas chromatography - mass spectrometry	Urine	High density polypropylene cup	NA	50 ml	3 days
Analysis of heavy metals using inductively coupled plasma - mass spectrometry	Urine	High density polypropylene cup	NA	50 ml	3 days

### PESTICIDE EXPOSURES REPORTED TO POISON CENTERS, 1996

RANK	PESTICIDE OR PESTICIDE CLASS	CHILDREN <6 YEARS	TEENS AND CHILDREN 6-19 YRS.	TOTAL*
1	Organophosphates	700	3274	4002
2	Pyrethrins and pyrethroids**	1100	2850	3950
3	Pine oil disinfectants	1336	903	2246
4	Hypochlorite disinfectants	808	1291	2109
5	Insect repellents	1081	997	2086
6	Phenol disinfectants	630	405	1040
7	Carbamate insecticides	202	817	1030
8	Organochlorine insecticides	229	454	685
9	Phenoxy herbicides	63	387	453
10	Anticoagulant rodenticides	176	33	209
	All other pesticides	954	3604	4623
	Total all pesticides/disinfectants	7279	15,015	22,433

\*Totals include a small number of additional cases with unknown age.

\*\*Rough estimate: includes some veterinary products not classified by chemical type.

Source: American Association of Poison Control Centers, Toxic Exposure Surveillance System, 1996 data.

## MARYLAND PESTICIDE NETWORK

www.mdpestnet.org • info@mdpestnet.org • (410) 849-3909