Pesticide Certification Training Series

First Aid for Pesticide Poisoning

Jim T. Criswell
Extension Pesticide Coordinator

Pesticides continue to be important tools in protecting our food and fiber from insects, diseases, weeds and rodents. They are also important in controlling insects and other pests that carry human diseases as well as in maintaining our comfort by controlling biting and nuisance pests in our indoor and outdoor living areas. When properly used, pesticides are beneficial to us; misused, they can be dangerous. Consequently, safety must be continually stressed.

In nearly all poisoning cases due to pesticides, careless handling or improper storage was the cause of the poisoning. According to statistics from the National Clearing House for Poison Control Centers, every year children lead the list of pesticide poisoning cases reported. The same source reports that in 1976 pesticides were number eight out of 25 categories of products injested by children under 5 years of age. Nearly all pesticide deaths, in both children and adults, are caused by eating or drinking the product. Some pesticide applicators are killed when they breathe a pesticide or get it on their skin, but deaths from occupational exposure are now unusual. Pesticide accidents can be reduced by following a few basic safety rules.

Always read and follow all of the instructions on the label. Everything you need to know to apply the product safely is on the label. Read all of the label before purchasing the product and reread it again before mixing the product, before applying the product, and before storing or disposing of unused portions of the pesticide or of the empty containers.

Besides instructions and precautions, the label has one of three "signal words" that show how dangerous or toxic the contents are to people (Table 1). Signal words and toxicity levels are determined by the LD_{50} (the dose that will produce death in 50% of exposed test animals) of the pesticide. The lower the LD_{50} the higher the toxicity of the pesticide. For example, a pesticide with an oral LD_{50} of 500 would be much less toxic than a pesticide with an LD_{50} of 5.

Stay out of treated fields, areas or buildings at least until sprays have dried and dusts have settled or longer if the label says so. Some labels have field re-entry statements which tell how long to stay out of treated fields unless you are wearing protective clothing. Field laborers should not be working in the field when pesticide applications are being made and should not re-enter the treated field until the re-entry period has expired unless they are provided with protective clothing as specified by the label.

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http://www.osuextra.com

Table 1. Categories of Acute Toxicity

Categories	Signal Word Required on Label	LD_{50}* mg/kg Oral	Dermal
Highly Toxic	"Danger" Poison (printed in red) with skull and crossbones	0-50	0-200
Moderately Toxic	'Warning',	51-500	201-2,000
Slightly Toxic	"Caution"	501-5,000	2,001-20,000
Relatively Non-Toxic	None	over 5,000	over 20,000

*The dose required to produce death in 50 percent of exposed test animals.

Recognizing Pesticide Poisoning

You should be aware of the early symptoms of poisoning. The symptoms of pesticide poisoning may be similar to those of other types of poisoning and of other diseases. Heat exhaustion, food poisoning, asthma and other illnesses are sometimes confused with pesticide poisoning. The pesticides associated with each chemical class of pesticides (i.e. organophosphates, carbamates, etc.) generally produce similar patterns of symptoms. The poisoning may be so mild that it can scarcely be detected, or it may become increasingly severe, depending upon the dose absorbed. One or more symptoms (headache, dizziness, nausea, etc.) may be common to many kinds of illnesses, whether caused by poisons or by viruses, bacteria, etc. It is not one or two symptoms but the pattern of symptoms that makes it possible to tell one kind of poisoning from another. Some clues to pesticide poisoning are sensations that only the applicator is aware of, such as nausea or headache; others, like an ashen skin color, can be noticed by someone else.

There are two kinds of pesticide poisoning. Acute poisoning is the severe poisoning which occurs after exposure to a single dose of pesticide. The appearance of symptoms may be

sudden and dramatic or may be delayed. Chronic poisoning is the poisoning which occurs as the result of repeated, small, nonlethal doses over a long period of time. Many symptoms may appear such as nervousness, slowed reflexes, irritability, or a general decline of health.

The following are general symptoms of pesticide poisoning:

Mild poisoning or early symptoms of acute poisoning: headache, fatigue, weakness, dizziness, restlessness, nervousness, perspiration, nausea, diarrhea, loss of appetite, loss of weight, thirst, moodiness, soreness in joints, skin irritation, and irritation of eyes, nose and throat.

Moderate poisoning or early symptoms of acute poisoning: nausea, diarrhea, excessive saliva, stomach cramps, excessive perspiration, trembling, no muscle coordination, muscle twitches, extreme weakness, mental confusion, blurred vision, difficulty in breathing, coughing, rapid pulse, flushed or yellow skin, and weeping.

Severe or acute poisoning: fever, intense thirst, increased rate of breathing, vomiting, uncontrollable muscle twitches, pinpoint pupils, convulsions, inability to breath, and unconsciousness.

Medical doctors may be uninformed as to the symptoms and treatment of pesticide poisoning. This is due to the few cases which they treat. Commercial applicators or other large volume users should tell their doctor which of the pesticides (particularly the more toxic ones) they use so that he will know the symptoms and the treatment and have antidotes on hand.

First Aid for Pesticide Poisoning

First aid is the initial effort to assist a victim while medical help is on the way. The first step in any poisoning emergency is to call an ambulance or doctor, or both, except when you are alone with the victim. In this situation you must make certain that the victim is breathing and is not further exposed before you leave to make a phone call.

Take the pesticide container or label with you for the doctor. If this is not possible, make sure you know what pesticide the victim was using. Refer to the active ingredients statement on the label and write down the ingredients listed as well as any information regarding treatment of persons exposed to the pesticide.

While waiting for the doctor or ambulance to arrive, give first aid as follows.

What to Do for Pesticide Poisoning

Poison on the Skin

The faster the poison is washed off the patient, the less injury will result.

Remove clothing.

Drench skin with water (shower, hose, faucet, pond).

Cleanse skin and hair thoroughly with detergent and water. (Detergents and commercial cleansers are better than soap.)

Dry and wrap the victim in a blanket.

WARNING: If at all possible, do not allow any pesticide to get on you while you are helping the victim.

Chemical Burns of the Skin

Remove contaminated clothing.

Wash with large quantities of running water.

Immediately cover loosely with a clean, soft cloth.

Avoid use of ointments, greases, powders and other drugs in first aid treatment of burns.

Pesticides in the Eye

It is most important to wash the eye out as quickly, but as gently, as possible.

Hold eyelids open and wash eyes with a gentle stream of clean running water. Continue washing for 15 minutes or more.

Do not use chemicals or drugs in wash water. They may increase the extent of the injury.

Inhaled Poisons (Dusts, Vapors, Gases)

If the victim is in an enclosed space, do not go in after him without an air-supplied respirator.

Carry patient (do not let him walk) to fresh air immediately. Open all doors and windows.

Loosen all tight clothing.

Apply artificial respiration if breathing has stopped or is irregular. If the heart has stopped, perform cardio-pulmonary resuscitation.

Keep patient as quiet as possible.

If patient is convulsing, watch his breathing and protect him from falling and striking his head. Keep his chin up so his air passage will remain free for breathing.

Prevent chilling (wrap patient in blankets, but don't overheat). Do not give alcohol in any form.

Swallowed Poisons

The most important choice you must make when aiding a person who has swallowed a pesticide is whether you should make the victim vomit. The decision must be made quickly and accurately; the victim's life may depend on it. Usually it is best to get rid of the swallowed poison fast. But there are exception:

Never induce vomiting if the victim is unconscious or in convulsions. The victim could choke to death.

Never induce vomiting if the victim has swallowed a corrosive poison. A corrosive poison is a strong acid or alkali such as dinoseb, and the victim will complain of severe pain and have signs of severe mouth and throat burns.

Never induce vomiting if the person has swallowed petroleum products (kerosene, gasoline, oil, lighter fluid). Most pesticides that come in liquid formulations are dissolved in petroleum products. The words "emulsifiable concentrate" or "solution" on the pesticide label are signals not to induce vomiting in the poison victim if he has swallowed the concentrates. Concentrated petroleum products (like corrosive poisons) cause severe burns. They will burn as severely when vomited back up. If the victim has swallowed a diluted form of these products, however, he should be forced to vomit immediately.

Usually the label will advise you in the First Aid Statement or Statement of Practical Treatment whether a person who has swallowed pesticide should be made to vomit.

How to Induce Vomiting

Do not waste a lot of time inducing vomiting. Use it only as first aid until you can get the victim to a hospital. Make sure the victim is lying face down or kneeling forward while vomiting. Do not let him lie on his back because vomited matter could enter the lungs and do more damage.

- First give the patient large amounts of milk or water—1 to 2 cups for victims up to 5 years old, up to a quart for victims 5 years and older.
- Induce vomiting by using syrup of ipecac (use only on physician's orders) or by putting your finger or the blunt end of a spoon at the back of a victim's throat. Do not use anything that is sharp or pointed! A glass of soapy water will also cause the victim to vomit.

Dilute Poison Quickly

The best first aid for a person who has swallowed a poison is to dilute the poison as quickly as possible and to neutralize the acid or alkali causing the burns. Also, get the victim to a hospital without delay.

- For acid- or alkaline-based pesticides, give the victim water or, preferably, milk—1 to 2 cups for victims under 5 years, up to a quart for patients over 5 years. Milk is better than water because it dilutes and helps neutralize the poison. Water only dilutes the poison.
- If you are sure the poison is an acid, give the victim milk of magnesia (1 tablespoon to 1 cup of water), baking soda or chalk in water.
- If you are sure the poison is an alkali, give the patient lemon juice or vinegar.

"Universal Sponge"

Use these "sponges" to absorb excess poisons only after first aid suggestions for the corrosive or noncorrosive poisons are followed.

Activated Charcoal

It absorbs many poisons at a high rate. Mix it with water into a thick soup for the victim to drink. Activated charcoal is found in aquarium filters or is available from a drug store.

Homemade Absorber

A homemade "universal sponge" for poison is a mixture of 4 tablespoons of toast (burnt black), 2 tablespoons of strong tea (instant ice tea mix will do), and 2 tablespoons of milk of magnesia. This is used to absorb and neutralize most poisons.

Warnings

- Never try to give anything by mouth to an unconscious victim.
- In an emergency, use any source of fairly clean water such as irrigation canals, lakes, ponds, watering troughs, etc. Don't let the victim die while you worry about how dirty the water is.

Shock

Sometimes poison victims go into shock. If untreated or ignored, shock can kill a victim even if the poison injuries would not have been fatal.

Symptoms

The skin will be pale, moist, cold and clammy. The eyes will be vacant and lackluster with dilated pupils. Breathing will be shallow and irregular. The pulse will be very weak, rapid and irregular. The victim may be unconscious or in a faint.

First Aid for Shock

Unless he is vomiting, keep the victim flat on his back with his legs raised 1 to 1 $^{1}/_{2}$ feet above his heat level.

Keep the victim warm enough to prevent shivering. Do no overheat.

If the victim is conscious and has not swallowed any poison, give small amounts of water or a dilute salt solution ($^{1}/_{2}$ teaspoon of table salt to 1 quart of water). Give as often as the victim will accept it.

Keep the victim quiet and reassure him often.

First-Aid Kit and On-the-Job Use

A well equipped first-aid kit that is always readily available can be important in a pesticide emergency. Make up your own Pesticide First-Aid Kit from a lunch pail, tool box or a sturdy wooden box. It should have a tight fitting cover with a latch so it won't come open or allow pesticides to leak inside. Label it clearly with paint or a waterproof marker.

Contents of First Aid Kit

1. A small plastic bottle of a common detergent, used to wash pesticides quickly off the skin.
2. A small plastic container of salt or syrup of ipecac. Salt is used with water to aid a person in shock.
3. A box or plastic container of baking soda or a bottle of milk of magnesia. These mixed with water will neutralize acidic chemicals that have been swallowed.
4. A plastic bottle of lemon juice or vinegar. These are used with water to neutralize basic or alkaline chemicals that have been swallowed.
5. A small package or bag of activated charcoal. Mixed with water and swallowed, activated charcoal acts as an absorber of all pesticides.
6. A shaped plastic airway for mouth-to-mouth resuscitation.
7. A thermos or large plastic bottle (at least 1 pint) of clean water.
8. Simple adhesive bandages, a roll of gauze and tape. All cuts and scrapes should be covered to prevent pesticides from easily entering the body.
9. Change for an emergency phone call should be taped to the inside cover of the first aid kit.
10. A small, plastic, empty jar with a tight fitting lid is useful as a drinking glass for inducing vomiting or feeding activated charcoal. It also can be used for collecting vomited matter to take to a doctor.

Medical Antidotes

Medical antidotes are also available to neutralize the poisoning effects of a few other pesticides. Taken improperly, however, these antidotes can be more dangerous than the effects of the pesticide itself. Medical antidotes should be prescribed or given only by a physician. There are no known antidotes for some pesticides. Once a lethal dose has been ingested, the effects are irreversible and terminal.

Any pesticide applicator working with highly toxic carbamate and organophosphate pesticides should have his cholinesterase level tested at regular intervals throughout the spray season. The enzyme cholinesterase regulates the chemical transmission of nerve impulses, and the poison victim will die without it. Both carbamate and organophosphate pesticides attack this enzyme in the blood and make it useless.

After a physician has determined the applicator's base level of cholinesterase, a simple blood test will show if this level has decreased. If the cholinesterase level has decreased, the applicator has been overexposed to either organophosphate or carbamate pesticide. He should avoid further contact with these pesticides until his cholinesterase level has returned to normal. In severe cases, medical antidotes must be given.

Atropine sulfate and protopam chloride (2-PAM) can be given to counteract the effects of organophosphates. Atropine sulfate can also be used to treat poisoning from carbamates; however, 2-PAM cannot be used for this purpose. These materials should not be taken unless actual organophosphate or carbamate poisoning has occurred.

Poison Control Centers

A Poison Control Center has been established in Oklahoma to provide pertinent information on all types of poisoning, including pesticide poisoning. This center is listed at the end of this Fact Sheet. Post the telephone number of the nearest poison control center close to your telephone. Give your doctor the number of the poison control center nearest you and tell him what pesticides you will be using. He can then determine the poisoning symptoms and appropriate treatment and have antidotes on hand if a poisoning should occur.

The National Poison Control Center has created a nationwide telephone number that can be called. This number will connect the caller with the nearest Poison Control Center. Thus, someone in north central Oklahoma is likely to be connected to the Poison Control Center in Wichita, KS. The number is **1-800-222-1222**.

Some of the preceding material was adapted from the Pesticide Applicator Training manual - Northeastern Regional Pesticide Coordinators and the Illinois Pesticide Applicator Study Guide.

Poison Control Centers

OKLAHOMA

State Coordinator
The Oklahoma Poison Control Center
Oklahoma Children's Memorial Hospital
940 NE 13th
Oklahoma City, OK 73104
405-271-5454
or
1-800-222-1222

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405-271-5454

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