
Section 10

Pesticide Poisonings

All pesticides are poisons. They are used to control or kill specific pests like weeds, insects, fungi or rodents, but they can affect humans too. Some pesticides are more poisonous (toxic) than others and a small dose will produce harmful effects. Other pesticides are less toxic and a larger dose is necessary to cause any effect. But, no matter how toxic, all pesticides can be harmful. You must always take precautions to protect yourself, and others, from being exposed to pesticides.

Pesticide Poisonings in Canada

Hundreds of pesticide poisonings are reported in Canada each year. These poisonings often involve young children who have been exposed to domestic pesticide products. Remember that all pesticide products, even the ones you use around your home, can cause poisoning.

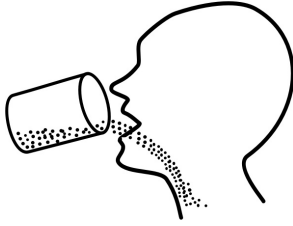
How do Accidental Poisonings Occur?

Pesticides can enter your body in three ways:

- ▶ through your mouth (oral ingestion - swallowing)
- ▶ through your skin and eyes (absorption - dermal exposure)
- ▶ through your lungs (respiratory - inhalation - breathing in).

You can be poisoned by a pesticide, without realizing that the pesticide has entered your body.

Through Your Mouth (Ingestion)



Poisoning can result when pesticides enter your body through your mouth. This can happen if:

- ▶ Pesticide is put into a food or drink container. Someone may eat or drink the pesticide by mistake.
- ▶ Pesticide is stored in a container that is not labelled properly.
- ▶ You smoke, eat or drink while you apply pesticides.
- ▶ You eat some food that has recently been treated with a pesticide.
- ▶ Pesticide splashes into your mouth while you are mixing the pesticide, applying it, or during clean up.
- ▶ You wipe your mouth with a contaminated glove or clothing.

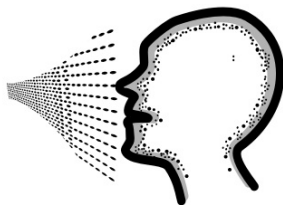
Because the stomach and the intestines absorb chemicals quickly, the poisoning may be very serious. Some pesticides can also severely burn your mouth, throat and stomach.

To Prevent Ingestion

Store pesticides in their original containers, away from children or unauthorized persons. Make sure the original label can be read.

- ▶ Never store pesticides in food or drink containers.
- ▶ Wash your hands and face after you handle pesticides and before you eat, drink or smoke.
- ▶ Never store food, drink, chewing gum or tobacco products in areas where pesticides are stored or handled.
- ▶ Never use your mouth to siphon pesticide liquids or to clean clogged sprayer nozzles.
- ▶ Use a face shield when mixing concentrates.

Through Your Skin and Eyes (Dermal Exposure)



Poisoning can result if a pesticide enters your body through contact with your skin or eyes. This is the most common kind of exposure. How much pesticide your body will absorb (**absorption**) depends on the condition of your skin, the part of the body contacted and the pesticide formulation. The **absorption rate** describes how fast your body takes in the pesticide.

Your body will take in pesticides more easily if:

- ▶ You have cuts, scrapes or abrasions on your skin.
- ▶ Your skin is moist or sweaty.
- ▶ The pesticide stays on your skin for a long time.
- ▶ Certain parts of your body are exposed. For example, the absorption rates for the insecticide parathion are:
 - ear canal 47%
 - scalp 32%
 - palms of the hand 12%
 - forearm 8.6%
 - eyes and scrotal area 100%.
- ▶ The pesticide contains solvents. For example, emulsifiable concentrates (EC) contain solvents which may be absorbed more easily than granular pesticides.
- ▶ Adjuvants are mixed with the pesticide. Some adjuvants, such as emulsifiers, can allow the pesticide to pass through your skin more quickly. Stickers can cause the pesticide to stick more easily to your skin, clothing and personal protective equipment. Spreaders and wetting agents may cause the pesticide to spread out and contaminate larger areas of skin, clothing and equipment.

Eyes

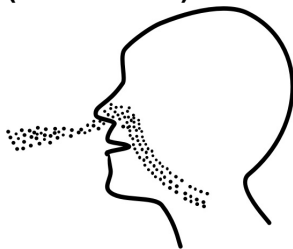
Give special attention to protecting your eyes. Although your eyes are only a small part of the total skin on your body, they absorb pesticides easily. Some pesticides can irritate your eyes and some can also cause temporary or permanent blindness.

To Prevent Absorption Through Your Skin and Eyes:



- ▶ When you handle or use pesticides always wear protective clothing, including chemically-resistant gloves.
- ▶ When you repair equipment contaminated with pesticides wear protective clothing, including chemically resistant gloves.
- ▶ Wear goggles or a faceshield when you mix pesticides or load tanks. This equipment will protect your eyes from liquid splashes and spills, and from harmful dusts when you work with dust, granular or powder formulations.
- ▶ Before you eat, drink or smoke wash your hands and face.
- ▶ Before you use the toilet wash your hands thoroughly. Also be careful not to contaminate yourself with pesticides that may be on your outside clothing.
- ▶ Do not wipe your face or eyes with contaminated gloves or clothing.
- ▶ Remove contaminated clothing immediately if you spill pesticides on yourself. Shower right away and put on clean clothes.
- ▶ Do not go back into a sprayed area until the re-entry time shown on the label has passed. If there is no recommended re-entry time, wait until the spray droplets have dried.
- ▶ After you use pesticides wash and shower as soon as possible.
- ▶ Wash clothes worn during pesticide handling separately from other laundry after each day of spraying.
- ▶ Don't store clean clothing and personal items in areas where pesticides are stored or handled.

Through Your Lungs (Inhalation)



Poisoning can result if pesticides enter your body through your lungs. Once the pesticide reaches the lungs, it is absorbed almost completely. Most small particles and spray droplets are too large to enter the lungs directly. However, they will build up in your nose and nasal passages. They may eventually enter the body through the saliva in your mouth. Small spray droplets are a greater inhalation hazard than larger droplets. They are easier to inhale, and can enter the lungs directly. Inhalation is the biggest danger when applying fumigants.

To Prevent Inhalation:

- ▶ Wear a respirator when necessary. Make sure it is the correct type and that it fits properly.
- ▶ Do not smoke while you apply pesticides. Do not store smoking supplies in areas where pesticides are stored or handled.
- ▶ Do not go back into a treated area or room too soon. Follow the directions on the label or, if no re-entry time is listed, wait until the spray droplets have dried.

Learn the Symptoms of Pesticide Poisoning

Learn to recognize the symptoms of pesticide poisoning.

Act quickly - Mild symptoms can quickly change to severe symptoms. Stop the exposure and call the Poison Information Centre.

Stay calm - Severe symptoms do not always mean that the patient is severely ill. Get medical help as soon as possible.

Symptoms

Mild Symptoms:

Headache, fatigue (tired feeling), loss of appetite, dizziness, weakness, nervousness, nausea, perspiration, diarrhoea, loss of weight, thirst, moodiness, irritation of the skin, eyes, nose or throat.

Moderate Symptoms:

Nausea, trembling, loss of muscular co-ordination, excessive saliva, blurred vision, constricted throat or chest, laboured breathing, flushed or yellow skin, abdominal cramps, vomiting, diarrhoea, mental confusion, perspiration, rapid pulse, cough.

Severe Symptoms:

Vomiting, loss of reflexes, not able to breathe or increased breathing rate, muscle twitching, tiny pupils, convulsions, unconsciousness, thirst, fever.

Always read the Toxicological Section of each pesticide's label before you use the product. This section lists the specific poisoning symptoms to watch for. You will need this toxicological information for the doctor if a poisoning occurs.



Don't Waste Time

Symptoms will vary with the pesticide, the exposure and the individual. Sometimes the symptoms of pesticide poisoning may be confused with the symptoms of food poisoning, asthma, flu, heat exhaustion or other illnesses. So, if you, or anyone else, has been exposed to a pesticide, and shows any of these poisoning symptoms, call the Poison Information Centre. **Don't wait.**

Sensitization to Pesticides and Allergic Responses

Some people are more sensitive to certain pesticides than others. One person may develop symptoms from a pesticide while a fellow worker is not affected. Sometimes a person will show no reaction to a pesticide when first exposed to it, but months later when exposed again, that same person may react. Keep track of the pesticide products you work with, so you will know if you are becoming sensitive to any of them.

Some pesticides cause skin irritations or dermatitis when they are used in bright sunlight. Watch for this reaction if you are using pesticides such as captan, trifluralin and atrazine.

Acute and Chronic Poisoning

There are two kinds of poisoning, acute and chronic.

- ▶ **Acute poisoning** occurs from a single dose or exposure. Symptoms are usually immediate and severe.
- ▶ **Chronic poisoning** occurs when a person is exposed to many small doses of pesticide over a longer period of time. Symptoms appear when a sufficient amount of the pesticide builds up in the body.

Avoid Pesticide Poisoning

If you handle pesticides carefully, you can reduce the risk of pesticide poisoning. But don't think you're totally safe just because you have never experienced acute poisoning symptoms. We don't yet know all the effects of long term exposure to pesticides. Always use protective clothing and personal protective equipment, and always take special care when you handle any pesticides.

Know the Poisoning Risks for the Products You Use

Pesticides that are in the same chemical family can have similar effects on your body and can cause similar poisoning symptoms. However, don't assume that all products within a chemical family will have the same toxicity.

The potential hazard for a pesticide to cause a poisoning is specific to each pesticide product. Read the label and the Material Safety Data Sheet for each pesticide product that you use.

How products are formulated will affect their toxicity. Two products that contain the same active ingredient can have different toxicities.

Insecticides that Affect Cholinesterase

Organophosphorus and carbamate insecticides are two chemical families that affect the nervous system. They prevent messages from being transmitted accurately through the nervous system because they change the level of the enzyme **cholinesterase**.

Organophosphorus Insecticides

Examples: azinphos-methyl (GUTHION)
chlorpyrifos (LORSBAN)
diazinon
fenthion (SPOTTON)

Carbamate Insecticides

Examples: carbaryl (SEVIN)
methomyl (LANNATE)
carbofuran (FURADAN)
bendiocarb (TRUMPET)

How Does Cholinesterase Work?

To transmit a message through the nervous system, a signal must pass from one nerve cell to the next across gaps called synapses. When the message reaches each synapse a chemical, called acetylcholine, is released to carry the message to the next nerve cell.

Once the message arrives, **cholinesterase** breaks down the acetylcholine. This clears the synapse and leaves it ready to receive the next message.

What Are the Poisoning Symptoms?

If organophosphorus and carbamate insecticides are present in the body, they bind with the cholinesterase and therefore the cholinesterase is not available. If there is no cholinesterase available to break down the acetylcholine, messages continue to be sent to the nerve cells over and over again.

When the messages are sent over and over, the entire nervous system can be affected. This may cause many symptoms including trembling, twitching, convulsions (fits), breathing and heart difficulties, and even death.

If someone has been poisoned by an organophosphorus or carbamate insecticide you must act quickly.

What Should You Do?

Remove the victim from the source of exposure and call the Poison Information Centre right away. The Poison Information Centre will advise you and pass information on to the doctor. The antidotes must be given by a doctor or advanced care paramedic. **Atropine** is effective for both organophosphate and carbamate poisoning. Another antidote, **2-PAM** (Protopam Chloride) is effective for organophosphate poisoning only.

Monitor Your Cholinesterase Level

If you handle or apply organophosphorus or carbamate insecticides on a regular basis, you should have regular cholinesterase blood tests. Your doctor can arrange these tests for you.

You need baseline blood tests.

The first tests should be taken before you handle or use these pesticides. These tests will show what the normal, or baseline, level of cholinesterase is for your body.

You need blood tests during the spray season.

Your doctor will decide how often you should be tested during the spray season. If you may be spraying organophosphorus or carbamate insecticides regularly for several weeks, you may need to have a cholinesterase blood test **as often as every seven to ten days**.

What Do the Tests Show?

Your doctor will compare the results of the blood tests taken during the spray season, when you are handling the products, with your baseline blood tests. This will tell the doctor whether your cholinesterase levels have been reduced.

If the levels are reduced, this shows that you have been exposed to the insecticides. This means that there is a problem with your handling procedures or your personal protective equipment. If your cholinesterase level has significantly decreased, you must stop handling organophosphorus and carbamate insecticides right away. You must not handle them again until further blood tests show that your cholinesterase blood levels have returned to normal.

Prevention

The best protection from pesticide accidents is prevention. To prevent accidental poisoning, take the following precautions:

- ▶ read the label before you use any pesticide
- ▶ follow all label directions
- ▶ keep all pesticides **out of reach of children**
- ▶ store pesticides safely in a locked area
- ▶ dispose of unused pesticides properly
- ▶ keep pesticides in original containers with labels intact
 - make sure the labels can be read
- ▶ never re-use food or drink containers for pesticides
- ▶ wear all the personal protective equipment the label suggests
- ▶ destroy any food (or other items) you suspect may have been contaminated by pesticides
- ▶ do not eat, drink or smoke when you use pesticides
- ▶ provide good ventilation when you use pesticides.

Review Questions



1. Absorption of pesticides through your skin may be increased if you:
 - a) wear chemically resistant gloves.
 - b) wash your skin thoroughly after handling pesticides.
 - c) get medical help as soon as possible.
 - d) wear contaminated clothing.

2. When a pesticide enters the body through the mouth, it is absorbed quickly through the stomach and intestines. Poisoning can be severe and may cause serious illness.

TRUE FALSE

3. Why are small spray droplets a greater inhalation (respiratory) hazard than larger spray droplets?

4. Symptoms of a mild pesticide poisoning include:
 - a) headache, fatigue and nausea
 - b) trembling, blurred vision, laboured breathing
 - c) constricted pupils, convulsions, muscle twitching
 - d) increased breathing rate, unconsciousness

5. The symptoms of pesticide poisoning may be confused with symptoms of food poisoning.

TRUE FALSE

6. What type of poisoning occurs when a person is exposed to many small doses of a pesticide over an extended period of time?

What type of poisoning occurs from a single dose of a pesticide with the symptoms usually being severe and immediate?

7. Not all of the long term effects of pesticides are known and you should use precautions when you handle any pesticide.

TRUE

FALSE

8. What test should you have if you regularly handle or apply organophosphorus and carbamate insecticides?

When should this test be done?

1.

2.