



American College of Medical Toxicology

Physicians Specializing in the Care of Poisoned Patients

## **Pesticides**

### **What are pesticides?**

Pesticides are substances designed to kill insects and other organisms. There are many different types of pesticides available for use depending on the 'pest' you are looking to control. Examples of different kinds of pesticides include insecticides, rodenticides, and herbicides, to name a few.

### **How do pesticides work?**

Pesticides are designed to interfere with some biological or chemical pathway critical to the survival of the pest to which it is targeted. When the pesticide interrupts these pathways, the target organism dies.

### **How can pesticides be dangerous to humans?**

While some pesticides target pathways unique to insects, plants, bacteria, or fungi, other pesticides have a broad spectrum of activity. This means that they can have toxic effects in humans as well as in the target species. Pesticides are often stored in places where they are easily accessed – garages, sheds, under sinks. Depending on the particular pesticide, they can be toxic if swallowed, inhaled, or have direct contact with skin.

Different pesticides can cause different toxicities. Pyrethroid pesticides are synthetic derivatives of a substance found within chrysanthemum flowers. Pyrethroids are relatively nontoxic to humans, even with large exposures.

Carbamate pesticides work by increasing the amount of acetylcholine (a neurotransmitter) in the target organism; they cause effects in both pests and humans. Exposures in humans, such as might occur if someone ingested the product, can lead to severe toxicity requiring hospitalization. Organophosphate insecticides also work by increasing the amount of acetylcholine in the target organism; however, organophosphates have longer-lasting effects on neurotransmitter levels in both humans and pests that make them more toxic than carbamate pesticides.

### **What can happen if someone is exposed to pesticides?**

Direct contact with pesticides to the skin can lead to irritation and/or burns of the skin or mucous membranes, sometimes severe. Inhalation of the fumes from containers of pesticides can lead to a feeling of chest tightness and difficulty breathing. Ingestion of either carbamate or organophosphate pesticides can result in the physical effects of having too much acetylcholine in the body – sweating, runny nose, tearing from the eyes, vomiting, diarrhea, slow heart rate, and pulmonary congestion (too much fluid in the lungs). Without proper medical intervention including medications and supportive care, death can occur.

### **What can I do if someone is exposed to pesticides?**

In the event of skin or mucous membrane exposure, irrigate the exposed area with a copious amount of water. Call 1-800-222-1222 to speak with a representative from a Poison Control Center to help with treatment recommendations. If you have any difficulty breathing or swallowing following exposure to a pesticide, call 911 or go directly to the nearest emergency department. Bring the container of the pesticide you were exposed to with you to help guide the medical staff who will be taking care of you.

### **What are other safety facts I should know about pesticides? How can I keep my family safe?**

Proper storage of any toxic chemical is paramount. Keep the pesticides in the original container that they came in – do not offload into plain plastic bottles or other generic containers. Do not keep pesticides within reach of young children. If you have young children, make sure the pesticides are stored away from the house in a locked cabinet or storage shed.

Created by Dorian Jacobs, MD on behalf of the American College of Medical Toxicology