

Script for "Pesticides & Human Health"

Slide 1. Pesticides are designed to kill or harm pest. But pesticides can also harm or kill people. This is chapter 6 of the Pesticide Applicator Core Training Manual, Pesticides and Human Health.

Slide 2. Pesticides vary in how poisonous or toxic they are. This simple formula helps determine the risk of handling a particular pesticide.

Hazard = Exposure x Toxicity

Hazard is the risk of the pesticide to cause injury and is a function of both exposure and toxicity.

Toxicity is how poisonous the pesticide is.

Exposure is how the pesticide enters the body.

Slide 3. There are 4 ways pesticides can enter the body. The pesticide comes into contact with 1. the skin. Dermal exposure

1. the mouth or is swallowed. Oral exposure.
2. the lungs. Pesticide vapors or dust are inhaled. Inhalation
3. the eyes.

Slide 4. The most common way pesticides enter the body is through the skin. To help reduce dermal exposure wear the correct personal protective equipment (PPE) and always wash your hands after handling pesticides or contaminated items. If skin comes into contact with a pesticide -rinse with water

- remove contaminated clothing
- and wash with plenty of soap and water

Slide 5. Different parts of the body absorb pesticides at different rates. For example, your hands are not very absorbent compared with other parts of the body. The head is 4 times more absorbent and the genital area is 11 times more absorbent than your hands. Remember to always wash your hands before using the bathroom.

Slide 6. Pesticide poisoning from oral exposure is very dangerous. Oral exposure can occur from splashing, putting contaminated items and hands in or near mouth, such as food or cigarettes, or accidentally ingesting the pesticide. If a pesticide is splashed on to the mouth or swallowed

- rinse mouth with water

- and induce vomiting unless

- the victim is unconscious,
- the victim is having convulsions,
- the pesticide is corrosive,

- or the label says DO NOT INDUCE VOMITING.

Slide 7. Most pesticide poisonings of children occur because pesticides were removed from their original containers and stored in an unlabeled common container such as milk jugs and soda bottles. KEEP PESTICIDES IN THEIR ORIGINAL LABELED CONTAINERS.

Slide 8. Pesticides can damage your nose, mouth, throat and lungs when you breathe in pesticide dusts and vapors. If pesticides are inhaled

- get victim to fresh air and loosen any tight clothing that might restrict breathing.
- keep all air passages (nose and mouth) open and free from obstructions
- perform artificial respiration if necessary

Slide 9. Your eyes also easily absorb pesticides. Eye exposure can cause temporary or permanent blindness. If pesticides contact your eyes, wash with pure, clean water for 15 or more minutes and seek medical attention.

Slide 10. First aid treatments are different for each pesticide and method of exposure. Always read the pesticide label BEFORE using the product so you know what to do in case of a poisoning.

Slide 11. The other half of the risk equation is toxicity. The pesticide label gives a quick indication of how poisonous the pesticide is – the signal word.

Slide 12. The signal word is determined by measuring acute toxicity. Acute toxicity is the ability of a pesticide to cause damage with 24 hours after a single exposure. Tests are done to measure the acute toxicity of all 4 methods of exposure.

Slide 13. Acute toxicity is expressed as "lethal dose 50 percent" and "lethal concentration 50 percent," or the LD₅₀ and LC₅₀. This is the single dose of pesticide that kills ½ or 50% of the test animals it is given to.

Slide 14. Another way to think about the LD₅₀/LC₅₀ is the higher the LD₅₀, the less toxic the pesticide – it takes more to kill. The lower the LD₅₀, the more toxic – it takes less to kill.

Slide 15. Based on the LD₅₀, pesticides are separated into 4 categories. Category I is the most toxic and category IV is the least toxic. For example, a moderately toxic pesticide (which has an adult lethal dose of 1 teaspoon to 1 ounce) would be placed in category II and given the signal word WARNING.

Slide 16. Pesticides with high acute toxicity are placed in category I, the signal word DANGER/POISON appears on the label, they have a low LD₅₀ and they can kill or harm you in very small amounts such as droplets.

Slide 17. The symptoms for acute poisoning vary with the type of pesticide and the method of exposure. Symptoms may appear immediately after exposure, or in a few hours. Some symptoms of acute pesticide poisoning are itching, nausea, weakness, burning lungs, and eye irritation.

Slide 18. The long-term effects of pesticide exposure are referred to as chronic toxicity. These effects don't appear immediately after exposure but can take months to years of repeated exposure to develop.

Slide 19. Illnesses caused by repeated pesticide exposure are cancer, birth defects, blood disorders, brain damage, and kidney problems.

Slide 20. It is difficult to determine the delayed effects of pesticide exposure because low-level exposures may have not immediate injury but repeated exposure increases the risk of health problems.

Slide 21. Pesticides can also cause allergies. Anything that causes an allergy is called an allergen. An allergy develops after more than 1 exposure. The first time you are exposed to the pesticide the body develops a negative response, such as a rash. When you are exposed to the pesticide for a 2nd time, the body displays a more severe negative response. You can see the rash. This response is called an allergic reaction.

Slide 22. Unlike acute or chronic toxicity, allergies are different for everyone. Allergies to pesticides, like those to flowers, milk and chocolate, affect some people and not others. Some common allergic reactions are asthma, a rash, watery eyes, or contact dermatitis.

Slide 23. Some insecticides interact with the nervous system. The nervous system of insects and humans have some common characteristics. Therefore, pesticides targeted at the insect nervous system can affect humans in the same way.

Slide 24. The nervous system of insects and humans is made of special cells called nerves. Nerves communicate with each other, organs, and muscles by using electrical signals. Nerves send an electrical signal to a muscle. For the signal to reach the muscle it has to cross a gap. Special proteins called neurotransmitters carry it across this gap.

Nerves act like spark plugs. They send an electrical signal to start an action. If something happens to that the nerve or spark plug 'misfires,' the muscle or engine does not work.

Slide 25. One of the most common and most toxic insecticides for both insects and humans are the organophosphates.

OP's interfere with the enzyme cholinesterase, which 'cleans' the nerve gap between signals. OP's stop cholinesterase from working, which allows the nerves to continuously 'fire', send electrical signals. The body responds by twitching, convulsing, and seizing. High exposure can kill.

Slide 26. OP's can result in acute poisoning from a single large exposure or several small exposures over time can lead to chronic pesticide poisoning.

Slide 27. Like OP's, carbamates interfere with the enzyme cholinesterase in the nervous system and can lead to acute poisoning. But, carbamates do not "add up" in the body. Eventually, the body will break down and expel the carbamates.

Slide 28. Some symptoms of OP and/or carbamate poisoning are

Mild poisoning – headache, fatigue, dizziness

Moderate poisoning – muscle twitching, inability to walk, and pinpoint pupils

Severe poisoning – unconscious, seizures or even death.

Slide 29. To help avoid OP poisonings, have a cholinesterase blood test during the winter before you are exposed to pesticides. This establishes your base line level of cholinesterase. Then during the season, have periodic tests to see if the cholinesterase level has changed. Your doctor may then instruct you to not use OP or carbamates for a period of time to avoid a pesticide poisoning if your cholinesterase levels are very low. Consult your doctor for more information.

Slide 30. The signs and symptoms of pesticide poisoning are similar to those for heat stress. It is important to know the difference.

Slide 31. The symptoms of heat stress are exhaustion, nausea, dizziness, clammy or hot, dry skin, heavy sweating or not sweating, and confused irrational behavior.

Slide 32. One way to determine if a persons behavior is the result of heat stress or a pesticide poisoning is to look at the victim's eyes. The pupils of a heat stress victim are normal. But the pupils of an organophosphate poison victim are constricted.

Slide 33. If a person is suffering from heat stress move them to a shady, cooler area and splash or sponge cool, clean water on their skin. Drink as much water as possible and call for help.

Slide 34. To review – The health risk of using a pesticide is a function of how poisonous the pesticide is and the amount of exposure. If exposure is low or "0", then the hazard is also low or "0". In other words, even if the toxicity of a pesticide is very high, hazard can be low if exposure is low. Exposure can be reduced by wearing the proper personal protective equipment, and following the label directions.

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