CONDITION

Bug spray poisoning

Learn how insecticide and insect-repellent exposure can affect the body, what first-aid steps to take, and when to seek urgent help.

WHAT IT IS
Poisoning from insecticide or insect-repellent exposure

BODY SYSTEM
Nervous system, lungs, digestive tract, skin and eyes

MAIN SYMPTOMS
Eye or skin irritation, coughing, nausea or vomiting, dizziness

WHAT CAUSES IT
Toxic insecticide or insect-repellent exposure

HOW IT IS DIAGNOSED
Product identification and clinical assessment

MAIN TREATMENT
Decontamination and supportive care

CAN IT BE CURED?
Sometimes - most mild exposures improve

IS IT AN EMERGENCY?
Sometimes - trouble breathing, collapse, seizure or unresponsiveness

LONG-TERM OUTLOOK
Usually good after mild exposure, with delayed nerve problems possible after severe poisoning

Overview

Bug spray poisoning happens when an insecticide or insect repellent causes harmful effects after it is swallowed, inhaled, sprayed into the eyes, or absorbed through the skin. The term "bug spray" covers many products, so the possible effects depend on the ingredients, amount, route of exposure, and person exposed.

Household insect-killing sprays often contain pyrethrins or pyrethroids. Pyrethrins come from chrysanthemum flowers, while pyrethroids are similar chemicals made in a laboratory. These products can irritate the skin, eyes, airways, and digestive system. Serious poisoning is less common with normal household use, but it can occur after a large or concentrated exposure.

Some agricultural, veterinary, or pest-control products contain organophosphates or carbamates. These chemicals interfere with an enzyme needed for normal nerve function.

Significant exposure can cause heavy secretions, muscle weakness, breathing problems, seizures, and other life-threatening effects.

Insect repellents are different from insecticides. Repellents such as DEET are applied to skin or clothing to discourage insect bites rather than kill insects. Incorrect use or swallowing a large amount can still cause poisoning.

If an exposure has just happened, contact a poison center promptly rather than waiting for symptoms. In the United States, call Poison Control at 1-800-222-1222 . The service is free and available 24 hours a day. Have the product container or label nearby if this can be done safely.

Call emergency services immediately if the person has trouble breathing, collapses, has a seizure, or cannot be awakened.

Symptoms

Symptoms may begin within minutes, but the timing varies. Concentrated products and exposures involving the lungs may produce faster or more serious effects.

Pyrethrin and pyrethroid products commonly cause irritation. A person may have burning or watery eyes, coughing, throat irritation, nausea, vomiting, headache, or dizziness. Skin contact can cause redness, itching, tingling, numbness, or a burning sensation. These unusual skin sensations are called paresthesia and are often most noticeable on the face.

People with asthma or sensitive airways may develop wheezing after inhaling a spray. Rarely, pyrethrins can trigger a serious allergic reaction, especially in someone who is sensitive to related plants or ingredients.

DEET exposure can irritate the eyes and skin. Swallowing it may cause nausea, vomiting, abdominal discomfort, drowsiness, or confusion. Severe effects, including seizures, are possible after substantial exposure but are not expected from correct use.

Organophosphate and carbamate poisoning produces a different pattern. These chemicals can cause too much activity of acetylcholine, a substance that carries messages between nerves, muscles, and glands. Possible symptoms include:

Breathing problems are the greatest immediate concern in severe organophosphate poisoning. They may result from airway secretions, narrowed airways, weak breathing muscles, or effects on the brain.

Pet flea and tick products can also cause human exposure. Some contain concentrated pesticides, and products intended for animals should never be used on people.

- Pinpoint pupils, blurred vision, or eye pain

- Heavy sweating, tearing, drooling, or a runny nose
- Vomiting, diarrhea, or abdominal cramps
- Coughing, wheezing, or large amounts of airway secretions
- A slow or sometimes fast heart rate
- Muscle twitching, weakness, or loss of coordination
- Confusion, unusual sleepiness, seizures, or loss of consciousness

Causes and risk factors

Poisoning may follow an accidental swallow, a leaking container, poor ventilation, incorrect mixing, or use of more product than the label directs. Spraying toward the face or applying a product in an enclosed space increases inhalation and eye exposure.

Young children are at higher risk of accidental swallowing because they explore with their hands and mouths. An unlabelled drink bottle or food container creates particular danger because a pesticide may be mistaken for something safe.

Workers who mix, load, or apply pesticides may experience larger or repeated exposures. Risk rises when protective clothing is missing, damaged, or not appropriate for the product. Bringing contaminated work clothing or equipment into the home can expose other household members.

Other factors that may increase harm include:

A product's smell does not reliably show how toxic it is. Likewise, an odor that lingers does not necessarily mean poisoning has occurred. The label and the person's symptoms provide more useful information.

- Using agricultural concentrates in or around the home
- Mixing different products without label instructions
- Applying insect repellent beneath clothing or on irritated skin
- Spraying near food, cooking surfaces, flames, or heating equipment
- Re-entering a treated area before the label says it is safe
- Having asthma or another condition that makes airway irritation harder to tolerate

Diagnosis

Diagnosis begins with identifying the product and understanding how the exposure happened. A clinician or poison specialist may ask for the product name, active ingredients, concentration, estimated amount, time of exposure, and symptoms. A photograph of the label can be useful if the container should not be transported.

Medical assessment may include checking breathing, oxygen level, heart rate, blood pressure, temperature, pupils, mental alertness, muscle strength, and skin. Clinicians also look for patterns that suggest a specific pesticide group, such as excessive secretions and muscle twitching with organophosphates.

Many mild exposures do not require laboratory testing. For a significant exposure, tests may assess blood sugar, electrolytes, kidney and liver function, and acid-base balance. An electrocardiogram may be used to monitor heart rhythm. A chest X-ray may be needed if coughing, low oxygen, or inhalation of liquid into the lungs is suspected.

Blood tests called cholinesterase levels can support a diagnosis of organophosphate or carbamate poisoning. Results may not be immediately available, and treatment of a seriously ill person should not be delayed while waiting for them.

Symptoms can resemble asthma, a stomach infection, medication effects, low blood sugar, or other forms of poisoning. Product identification helps clinicians separate these possibilities.

Treatment and management

The first step is to stop further exposure without putting anyone else at risk. Move away from the sprayed area and into fresh air. Ventilate the space only if it is safe to do so.

Remove contaminated clothing and place it in a bag away from other people and pets. Wash exposed skin thoroughly with soap and water. Do not scrub aggressively, because this may damage the skin. If a product gets into the eyes, begin rinsing gently with clean, lukewarm water and follow the product label or poison center's instructions.

Do not make the person vomit. Vomiting can allow pesticide or petroleum-based ingredients to enter the lungs, causing chemical lung injury. Do not give food, drink, or home remedies to someone who is drowsy, having a seizure, or unable to swallow normally.

After the immediate exposure is stopped:

Hospital treatment depends on the chemical and symptoms. It may include oxygen, medicines that open narrowed airways, intravenous fluids, treatment for seizures, and close monitoring of breathing and heart function. A breathing tube and ventilator may be needed in severe cases.

Clinicians may use atropine for significant organophosphate or carbamate poisoning. It blocks

dangerous effects such as excessive airway secretions and slowed heart rate. Pralidoxime may be used for certain organophosphate poisonings to help restore nerve and muscle function. These treatments require medical assessment and monitoring.

Activated charcoal is not appropriate for every swallowed pesticide. Clinicians consider the exact product, timing, amount, symptoms, and risk that material could enter the lungs before using it.

Most mild skin or inhalation exposures improve after decontamination, fresh air, and observation. Persistent or worsening symptoms need medical review.

- Call Poison Control or the appropriate local poison information service.
- Follow the first-aid directions printed on the product label.
- Keep the container available, but avoid contaminating a vehicle or treatment area.
- Do not enter a contaminated space to retrieve the product if doing so is unsafe.

Complications

The main complications depend on the product and route of exposure. A liquid that enters the lungs during swallowing or vomiting can cause aspiration pneumonitis, which is inflammation and injury in the lungs. Cough, chest discomfort, fever, or shortness of breath may appear or worsen over several hours.

Severe poisoning can cause respiratory failure, seizures, abnormal heart rhythms, low blood pressure, or coma. Organophosphates may also cause weakness hours to days after the first symptoms improve. In some cases, nerve problems develop later and may affect strength, sensation, or walking.

Forceful eye exposure can injure the surface of the eye. Repeated skin exposure may lead to ongoing irritation or dermatitis, an inflamed and itchy rash.

Complications are more likely after concentrated, intentional, occupational, or delayed-recognition exposures. Early advice from a poison specialist can help determine the safest place and length of observation.

Follow up

A brief, mild exposure may only require home observation when a poison specialist confirms that this is appropriate. Follow the specific monitoring period and instructions provided for that product.

Arrange routine medical follow-up if skin, eye, breathing, digestive, or neurologic symptoms do not resolve as expected. Workers with repeated exposure may need an occupational health review, assessment of protective equipment, and discussion of whether workplace monitoring is needed.

Seek urgent medical care if symptoms are worsening, especially repeated vomiting, increasing drowsiness, wheezing, muscle weakness, persistent eye pain, or a new cough after swallowing a product.

Call emergency services for:

After an accidental exposure, store pesticides in their original containers, with labels intact, in a locked area away from food, medicines, children, and pets. Never transfer bug spray into a cup, bottle, or food container.

- Trouble breathing, blue or gray lips, or severe wheezing
- Collapse, loss of consciousness, or inability to awaken
- A seizure
- Severe confusion or rapidly increasing weakness
- Heavy drooling or airway secretions that interfere with breathing

Sources

- U.S. Environmental Protection Agency. Recognition and Management of Pesticide Poisonings . 6th edition. Office of Pesticide Programs, 2013.
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- National Pesticide Information Center. DEET General Fact Sheet . Oregon State University and U.S. Environmental Protection Agency.
- National Pesticide Information Center. Organophosphates General Fact Sheet . Oregon State University and U.S. Environmental Protection Agency.
- Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health. Organophosphorus Pesticides: Emergency Response Safety and Health Database .
- American Association of Poison Control Centers. Poison Help: First Aid Guidance for Poison Exposures .