

**HEALTH HAZARDS
IN
VETERINARY PRACTICE**

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SECTION EIGHT
PESTICIDE HAZARDS

PESTICIDE HAZARDS

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Pesticides are extensively used as sprays, dips, and systemics to treat arthropod pests of animals. Unlike traditional drugs, misapplication of pesticides endangers the user as well as the patient. Those applying toxicants to animals are particularly at risk because they handle concentrated pesticides, make applications frequently, and deal with an unpredictable patient. This Section will discuss the selection and safe handling of toxicants, and will highlight applicable laws.

HANDLING

Safe pesticide use requires precautions during storage, mixing, application, and disposal of the unused portion. The label is the best source of information on precautions and methods of handling, but even these measures do not eliminate all hazards. Handling procedures should be appropriate to the toxicity and properties of the pesticide involved. Although the applicator inevitably absorbs toxicants during handling or use, good technique minimizes exposure.

There are three routes of absorption: oral, respiratory and dermal. Each route requires special precautions. Oral exposure is the most preventable; pesticides should be handled away from areas where people eat or smoke, and applicators should wash and change clothing before eating or smoking. Respiratory exposure is more difficult to eliminate because spray or dust applications produce droplets, particles, or vapors. Accumulations of vapors can be prevented by good ventilation during all phases of handling. A National Institute for Occupational Safety and Health (NIOSH) approved filter mask captures most of the droplets and particles produced during application. A well-fitting, NIOSH-approved pesticide respirator (which includes filters for droplets and particles) offers adequate protection for almost any veterinary situation. Since not all veterinary applications require the use of respiratory protection devices, label information and manufacturer's instructions should be consulted.

The most common route of absorption is dermal. The active ingredients of most pesticides are readily absorbed through the skin, especially if the skin is abraded. Protective clothing includes unlined rubber boots, coveralls, rubber aprons, unlined rubber gloves, unlined plastic hats, and face shields. Handling concentrates requires use of all these items. In less dangerous situations, the applicator may choose the appropriate items for the job at hand. Proper care of protective clothing is essential. The applicator should wash rubber and plastic items after each use, taking care not to expose himself to pesticide residues. Furthermore, protective gear should be replaced regularly because such articles will eventually absorb pesticide. Coveralls and other textiles exposed to pesticide require daily washing, preferably in a machine used only for that purpose. When this is not possible, contaminated textiles should be washed separately to prevent transfer of chemicals to other clothing. Concentrates spilled on any kind of protective gear are extremely difficult to remove, and therefore items contaminated with concentrates should be discarded. Unfortunately, protective clothing does not completely prevent exposure of the skin to toxicants. However, bathing at the end of the day (or following prolonged applications of pesticides) significantly reduces absorption.

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Each aspect of handling requires its own safety precautions. The storage area should be secure from unauthorized entry, located away from food stuffs, have good ventilation, and be arranged so that any spill would contaminate only the smallest possible area. Signs on the outside of the area and on the outside of the building should warn firemen of the presence of pesticides. Maintaining a listing of the current inventory of pesticides and their date of purchase is recommended. A spill kit should be located in the storage area. Such a kit includes, at a minimum, absorbent material (e.g., clay granules, vermiculite), container, shovel, and protective equipment. Decontaminants, sand snakes (to contain spills), and jelling agents are useful additions to the spill kit.

Mixing is the most dangerous process in handling pesticides because the applicator is exposed to the toxicant in a concentrated form. Full protective equipment should be worn when mixing any pesticide concentrate. The mixing area should be arranged to prevent spread of spills or entry of spilled materials into floor drains. Good ventilation directing vapors away from the applicator is essential. Laboratory areas may be modified for mixing when a separate mixing room is impractical.

Potential exposure during application depends on the manner of application. Spraying may produce respirable droplets and vapors, which may cause contamination of clothing, making a change of clothes essential. Skin absorption is also likely during dipping operations, especially if clothing or shoes become soaked. Systemic, liquid formulations are particularly hazardous because of their concentrated form.

Disposal of pesticide containers, excess pesticide solutions, and rinse solutions from washing equipment requires the same care as other aspects of handling. Containers emptied of liquids should be rinsed three times with 10% of their volume of water. They may then be recycled to the manufacturer or destroyed. The best way to dispose of excess pesticide solution is to apply it for its intended use. Rinsate, if possible, should be used as a diluent for mixing. Disposal must be undertaken in such a way that surface and subsurface waters are not contaminated.

Accidents during any phase of handling require quick action. In the case of a spillage on a person, contaminated clothing should be removed immediately and affected skin washed with soap and water. Pesticide in the eyes should be removed by copious rinsing (no less than 15 minutes) in an eye bath or under a faucet. Emergency advice is available from poison control centers (Table 1) or from the manufacturer of the product. A call to the physician before arrival of the patient is useful, especially if the name of the product and its active ingredients can be provided. If possible, a copy of the product's label should accompany the patient.

Selection of Toxicants:

Proper selection of pesticides contributes to their safe use. The least toxic effective product should be selected. Veterinarians need to know the degree of toxicity of the product selected in order to take appropriate precautions. A general idea of a product's toxicity is provided by a signal word on the label. If any of the hazard indicators in Table 2 apply to the product, then the appropriate signal word appears. The manufacturer and poison-

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information agencies (Table 1) can provide helpful information in the selection of a product, including a description of its toxicity.

Legal Requirements

The label provides a description of the only legal applications of the product. Use of the product for any other purpose is a violation of the law.

When the words "RESTRICTED USE" appear on a label, the product is considered hazardous enough to require that only certified applicators use it. Veterinarians are exempt from this requirement under some circumstances. Current information on licensing requirements is available from the Texas Department of Agriculture; (512) 475-6346.

Proper disposal of pesticide waste is also required by Texas law. Label directions on disposal are legally binding unless the pesticide is included in the federal Resource Conservation and Recovery Act (RCRA). Disposal is more complicated if RCRA applies. Dr. L. Mohrman, Bureau of Solid Waste Management, Texas Department of Health, (512) 458-7271, can provide guidance.

Additional Reading

Morgan, D. Recognition and Management of Pesticide Poisonings. U.S. Environmental Protection Agency, EPA-540/9-80-005. Call U.S. EPA Technical Information Center at (202) 382-3556 for availability or order by title and stock no. 055-000-00214-2 for \$5.00 from U.S. Government Printing Office, Washington, D.C. 20402. An excellent practical manual designed for the physician.

Hayes W. Pesticides Studies in Man. Baltimore: Williams and Wilkins, 1982. A thorough review of toxic effects and metabolism of pesticides.

Ware, G. Pesticides: Theory and Application. San Francisco: W. H. Freeman and Co. A review of all aspects of pesticides intended for the general reader.

Farm Chemicals Handbook edited by Farm Chemicals magazine. Meister publishing Co., Willoughby OH 44094, (216) 942-2000. Published annually, an excellent source for identification, general use, toxicity, and manufacturers (including telephone numbers) of pesticides.