WORKPLACE SOLUTIONS

From the National Institute for Occupational Safety and Health

Safe Handling of Hazardous Drugs for Veterinary Healthcare Workers

Summary

Veterinary healthcare employees working where hazardous drugs are handled may face health risks. Many of these workers treat small companion animals (primarily cats and dogs), but also larger animals such as horses, with antineoplastic and other drugs that may be hazardous to humans. NIOSH recommends establishing a program to provide appropriate protective measures for veterinary healthcare workers exposed to hazardous drugs.

Description of Exposure

Hazardous drugs are defined as having specific health effects (such as skin rashes, cancer, and reproductive effects) and high toxicity at low doses [NIOSH 2004]. Most hazardous drugs in veterinary medicine are used to treat animal illnesses such as cancer [Mair and Couto 2006]. The risk of exposure for veterinary health care workers is similar to that for human healthcare settings.

In the United States, an estimated 500,000 veterinary healthcare workers are potentially exposed to hazardous drugs or drug waste at their worksites [BLS 2007]. Many are women of reproductive age. These workers include veterinarians, technicians, kennel workers, cleaning and maintenance workers, and office staff.

Veterinary workers may be exposed to hazardous drugs when they handle drug vials; compound, administer, or dispose of hazardous drugs; clean up spills; touch surfaces that are contaminated with these drugs; or clean bedding, cages, kennels, or waste of treated animals [Meijster et al. 2006]. Skin absorption, inhalation, and ingestion are the most likely ways these workers may be exposed. Needlestick or sharps injuries pose a risk of exposure in veterinary health care settings [NIOSH 2007a].

Administration of medications to animals presents additional exposure opportunities for workers not encountered with human patients. Many hazardous drugs and their metabolites can be excreted in urine and feces for up to 72 hours or more [Cass and Musgrave 1992]. In addition, oral medications may be present in vomitus for several hours [Mader et al. 1996].

Controls

Recommendations on handling hazardous drugs and waste are summarized below [OSHA 1999; NIOSH 2004; ASHP 2006; USP 2008; Polovich 2009]. Specific recommendations for the safe handling of antineoplastic drugs in veterinary medicine are available [Lucroy 2001; Takada 2003; Fielding and Lacroix 2009].

Policies and Procedures

- Ensure that hazardous drugs are prepared or administered only by trained personnel in designated areas that are limited to authorized personnel.
- Post a sign to warn employees that they are working in an environment where hazardous drugs are handled.
- Warn employees who are pregnant, breastfeeding, or of reproductive age of the potential health effects, especially during the first trimester when a woman may not know she is pregnant.
- Document and retain evidence that workers have been trained in and understand these procedures.

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Training Requirements

- Train workers to recognize and understand the risks of working with hazardous drugs, and the risks of working in an environment where these drugs are handled.
- Train workers how to care for and use personal protective equipment (PPE) [NIOSH 2009].

Receiving and Storage

- Begin exposure control when hazardous drugs enter the facility.
- Ensure that all personnel are able to identify hazardous inventory upon arrival. Handle all hazardous inventory with gloves. Label clearly with a hazardous designation.
- Store hazardous drugs separately from other inventory, and separate from food/drink.
- Keep a spill kit available in case inventory arrives damaged [ASHP 2006].

Drug Preparation

- Prohibit eating, drinking, chewing gum, applying cosmetics, or storing food or drinks within the hazardous drug preparation area.
- Use PPE, including chemotherapy gloves [ASTM 2005], non-permeable gowns, respiratory protection, underpads, eye and/or splash protection, shoe covers and spill kit [NIOSH 2009].
- Use a proper containment device: preferably a 100% vented biological safety cabinet or compounding aseptic containment isolator. A horizontal laminar flow hood (clean bench) only protects the drug and not the worker. [OSHA 1999; NIOSH 2004; ASHP 2006; USP 2008].
- Use a proper closed-system drug transfer device (CSTD) in low-volume facilities (e.g. 2 or less drug preparations per week) without a clean room [NIOSH 2004; USP 2008].
- Properly clean all equipment, counters, and other surfaces. No universal cleaner exists for all chemotherapy drugs. Bleach solution can be used to disinfect and a strong detergent and water rinse may remove most drug residues. Repeating the cleaning steps should provide addition drug removal.
- Wash hands with soap and water after drug compounding.

Drug Transportation

- When drug preparation is complete, seal the final product in a plastic bag or other sealable container before taking it out of the ventilated cabinet.
- Seal and wipe all waste containers inside the ventilated cabinet before removing them from the cabinet.
- Store and transport hazardous drugs in closed containers that minimize the risk of breakage.

Drug Administration

- Use dedicated cages, kennels or stalls with dedicated drains for animals undergoing treatment with hazardous drugs.
- Use proper PPE and technique during administration.
- Attach drug administration sets to the IV bag, and prime them before adding the drug to the bag. Prime tubing in the containment device or with non-toxic solution whenever possible.
- Remove the IV bag and tubing intact, dispose of items directly in a chemotherapy waste container, and close the lid.
- Remove outer gloves and gowns, and bag them for disposal in the chemotherapy waste container at the location where drug administration was performed.
- Wash hands with soap and water after administering the drug.

Waste Cleaning and Disposal

- PPE should be worn during waste cleanup and disposal procedures, and footwear should not be worn outside the facility.
- Dispose of all hazardous drug waste according to Federal, State, and local regulations (separately from regular waste).
- Double-bag all chemotherapy waste including partially filled vials, undispensed products, unused IVs, needles and syringes, gloves, gowns, mats, and contaminated materials from spill cleanups or animal bodily fluids/waste.
- Place materials with trace wastes (those that contain less than 3% by weight of the original quantity of hazardous drugs)—such as needles, empty vials and syringes, gloves, gowns, and tubing—in chemotherapy waste containers. Assure that such containers protect from sharps injuries. Do not use red sharps containers for drug disposal.
- Dispose of P-listed arsenic trioxide and its containers and any bulk amounts of U-listed drugs [40 CFR* 261.33] in hazardous waste containers at an EPA/Resource Conservation and Recovery ACT (RCRA)-permitted incinerator [EPA 2001].
- Consider disposing of other bulk hazardous drugs (expired or unused vials, ampoules, syringes, bags, and

**Code of Federal Regulations.* See CFR in references.

bottles of hazardous drugs or solutions of any other items with more than trace contamination) in a manner similar to that required for RCRA-defined hazardous wastes.

- Avoid using sprayers or pressure washers to clean the cages, kennels or stalls of treated animals to minimize the aerosolization of hazardous wastes.
- Clean the cages and kennels of treated animals with disposable towels if possible and use disposable towels to clean bodily waste from treated animals.

Spill Control

- Manage hazardous drug spills according to the established, written policies and procedures for each workplace [NIOSH 2004; ASHP 2006].
- Ensure that the written policies and procedures address PPE required for various spill sizes, the possible spreading of material, restricted access to hazardous drug spills, and signs to be posted.
- Ensure that cleanup of a large spill is handled by workers who are trained in handling hazardous materials [29 CFR 1910.120].
- As required by OSHA, follow a complete respiratory protection program, including fit-testing, if you wear respirators such as those contained in some spill kits [29 CFR 1910.134]. Use NIOSH-certified respirators [42 CFR 84]. Surgical masks do not provide adequate protection.
- Dispose of all spill cleanup materials in a hazardous chemical waste container, in accordance with EPA/RCRA regulations regarding hazardous waste—not in a chemotherapy waste or biohazard container.

Medical Surveillance Program

- Conduct reproductive and general health questionnaires at the time of hire and periodically thereafter [NIOSH 2007b].
- Conduct physical examination at the time of hire and then as needed for any worker whose health questionnaire or blood work indicates an abnormal finding.
- Conduct followup for those workers who have shown health changes or have had a significant exposure (substantial skin contact, cleaning a large spill a broken bag, leaking IV line etc.).

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For More Information

For more information about hazardous drugs in health care, visit the NIOSH Web site: http://www.cdc.gov/niosh/topics/hazdrug/

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Safe Handling of Hazardous Drugs for Veterinary Health Care Workers

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