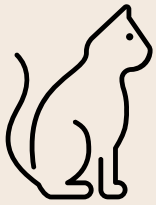
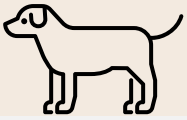
Veterinary Health & Safety:

Preventing Hazardous Exposures Among Veterinary & Animal Care Workers





Division of Epidemiology, Environmental and Occupational Health
Consumer, Environmental and Occupational Health Service
Environmental and Occupational Health Surveillance Program
nj.gov/health/workplacehealthandsafety/occupational-health-surveillance

NJHealth
New Jersey Department of Health

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Veterinary health settings have unique considerations compared with human health care settings. The restraint of animals and the veterinary environment adds complexity to handling medications and underscores the necessity to provide veterinary specific hazard safety information and guidelines.

Veterinarian and animal care workers can be at increased risk for adverse health effects for both short-term and chronic exposures due to improper handling of hazardous substances, including hazardous drugs and pesticides. This toolkit was prepared by the New Jersey Department of Health (NJDOH) Occupational Health Surveillance Unit to help reduce exposures to hazardous substances and reduce needlestick injuries among veterinary health staff. Chemical hazards can include cleaning and disinfectant agents, chemotherapeutics, euthanasia agents, anesthetic gases, and vaccines. It is important to understand the hazards and health risks in veterinary health settings to protect the health and safety of veterinary workers.

Although this toolkit focuses on exposures to hazardous substances, it is recognized that there are also biological, physical, and psychological hazards experienced by veterinary and animal care workers. Additional resources on veterinary safety and health regarding these hazards are provided by the National Institute for Occupational Safety and Health (NIOSH) and can be found at: cdc.gov/niosh/topics/veterinary/default.html. In addition, any controlled substances must be used in accordance with all applicable federal and state laws and regulations. For more information, refer to the New Jersey Drug Control Unit: njconsumeraffairs.gov/dcu.

NOTE: In the event of a chemical exposure and you need immediate assistance, contact the New Jersey Poison Center Help Line at 1-800-222-1222.

Safe Handling of Hazardous Drugs

Case Study

Veterinary worker presented to the emergency department after a splash to the eye while administering a sedative (ketamine, dexdomitor, and butorphanol). Patient complained of red eye and irritation and feeling foggy, weakness in legs, and nausea.

What could have been done to prevent this exposure:

- ✓ Use appropriate personal protective equipment (PPE), such as protective eye wear and gloves.
- ✓ Train employees on first aid measures such as flushing out the eye.

What are the risks to veterinary staff?

Workplace exposures to hazardous drugs (HDs) can cause acute and chronic adverse health effects, including hearing loss, cardiac arrest, hair loss, nausea, rashes, cancer, infertility, and reproductive outcomes. **There is no level of exposure to HDs that is considered to be safe**.

What are considered HDs?

HDs are those that can cause health effects at any dose.

Most common HDs are chemotherapeutic agents; however other common drugs, including some sedatives, antithyroid drugs, and immune suppressants, are considered hazardous (see table page 3).

How can you be exposed?

All aspects of handling HDs can lead to exposure if proper precautions are not taken. Exposure can occur when:

- Dispensing
- Administering
- Through animal excretions (urine, feces, vomit)
- Spills
- Waste management
- Storing
- Transport
- Receiving
- Cleaning
- Disposal

Staff can be exposed through skin contact, ocular or mucous membrane splashes, accidental ingestion, inhalation, and needlestick injuries to the skin.

Recommendations for Handling HDs

- Follow employer provided training on safe handling of drugs.
- When handling HDs, use appropriate PPE, such as single use, impermeable gowns, chemotherapeutic gloves, eye/face shields, and N95 fit-tested respiratory masks to protect against aerosols and droplets.
- Administer drugs in designated location with appropriately restrained animal.
- Use engineering controls, such as Luer-Lok tip syringes, and needleless devices, closed-system transfer devices.
- Exercise extra caution if pregnant, breastfeeding, or of reproductive age.

Facilities must determine appropriate PPE based on the HD handling activity and the facility's assessment of risk. For additional information on PPE requirements, refer to NIOSH's *Managing Hazardous Drug Exposure: Information for Healthcare Settings* (cdc.gov/niosh/docket/review/docket233c/pdfs/2023-130.pdf) and the USP General Chapter <800> (usp.org/compounding/general-chapter-hazardous-drugs-handling-healthcare).

Although these recommendations focus on HDs, caution should be used for handling of ***any drug,*** *including using appropriate PPE, such as gloves and eye protection****.***

USP General Chapter <800>

Be sure to follow appropriate guidelines outlined under USP General Chapter <800>. The standards set by USP <800> on the safe handling of HDs are not only to protect human patients and health care workers but also workers in veterinary health settings who come into contact with HDs. The USP <800> uses *NIOSH's List of Antineoplastic and Other Hazardous Drugs in Healthcare Settings, 2016* to help determine which drugs are hazardous. NIOSH considers a drug to be hazardous if they show one or more of these characteristics in humans or animals: carcinogenicity, teratogenicity or developmental toxicity, reproductive toxicity, organ toxicity at low doses, genotoxicity, or structure and toxicity profiles of new drugs that mimic existing hazardous drugs. See table below for a list of HDs commonly used in veterinarian settings.

- USP General Chapter <800>: usp.org/compounding/general-chapter-hazardous-drugs-handling-healthcare
- NIOSH complete list of HDs: cdc.gov/niosh/docs/2016-161
- American Veterinarian Medical Association (AVMA) News, USP Revised Compounding Standards Go Into Effect: avma.org/news/usp-revised-compounding-standards-go-effect

Drug	Classification					
NIOSH Group 1 Hazardous Drugs Commonly Used in Veterinary Practice						
	IARC Grp. 1 Carcinogen	**IARC Grp. 2A Carcinogen**	**IARC Grp. 2B Carcinogen**	**FDA Pregnancy Category C**	**FDA Pregnancy Category D**	**FDA Pregnancy Category X**
Bleomycin			X		X	
Carboplatin					X	
Chlorambucil	X				X	
Cyclophosphamide	X				X	
Cytarabine					X	
Doxorubicin		X			X	
Lomustine		X			X	
Melphalan	X				X	
Mitoxantrone			X		X	
Procarbazine		X			X	
Vinblastine					X	
Vincristine					X	
Vinorelbine					X	
NIOSH Group 2 Hazardous Drugs Commonly Used in Veterinary Practice						
Apomorphine				X*		
Chloramphenicol	X			X		
Cyclosporine	X			X		
Dexrazoxane				X*		
Diethylstilbestrol	X					X
Methimazole					X	
Phenoxybenzamine			X	X		
Spironolactone**				X		
NIOSH Group 3 Hazardous Drugs Commonly Used in Veterinary Practice						
Clonazepam					X	
Fluconazole				X		
Misoprostol						X
Pamidronate					X	
Zoledronic acid					X	
Zonisamide					X	

*Genotoxic in several in vitro assays

**Tumor producing in lab studies

Food and Drug Administration (FDA) Drug Pregnancy Risk Categories:

Category C: Risk cannot be ruled out (no adequate studies in humans, but animal studies demonstrated fetal risk).

Category D: Evidence of risk (studies in pregnant women have demonstrated a risk).

Category X: Contraindicated in pregnant women (risks of the drug outweigh potential benefits).

International Agency for Research on Cancer (IARC):

Group 1 (Carcinogenic to humans): There is sufficient evidence the agent causes cancer in humans.

Group 2A (Probably carcinogenic to humans): There is sufficient evidence the agent causes cancer in humans.

Group 2B (Possibly carcinogenic to humans): Limited evidence and less than sufficient evidence in animals.

- **NIOSH often updates the above information. For a more comprehensive list and to check for updates, visit**: cdc.gov/niosh/docs/2016-161

Receiving and Storage of HDs

- Exposure control measures should begin as soon drugs are in the facility.
- List of HDs should be posted.
- Staff should be able to identify hazardous inventory when it arrives.
- Hazardous inventory should be handled with gloves.
- Drug packages, bins, shelves, and storage areas should be clearly labeled as hazardous.
- Store HDs separate from other inventory and from food and drinks.
- Spill kit should be kept available and procedures for handling spills should be posted.

Policies and Procedures for Employers

- Train personnel to handle HDs upon hire and regularly throughout year.
- Train personnel on PPE use, administration, storage, preparation, transport, spill control, and waste disposal.
- Update your list of HDs in your facility yearly.
- Conduct a yearly Assessment of Risk, which takes the following into consideration:
    - Type of HD (i.e., antineoplastic, non-antineoplastic, or reproductive risk only)
    - Dosage form (i.e., capsule, tablet, or liquid)
    - Risk of exposure
    - Packaging
    - Manipulation required
    - The alternate containment strategies and/or work practices that will be used.
- Post warning signs in areas where staff work with HDs.

Training Staff on Handling HDs

- Document and retain evidence that workers have been trained in and understand HD handling procedures.
- Only trained personnel should handle HDs in areas limited to authorized personnel.
- Post signage to indicate HD handling area and restricted access. Appropriately clean and disinfect area to remove HD residuals.
- Educate employees who are pregnant, breastfeeding, or of reproductive age of potential health effects.

Recommendations for Cleaning Areas Where Hazardous Drugs are Handled

The USP General Chapter <800> has outlined compliant cleaning procedures for cleanup following the use of HDs. If compounding of HDs is being done within the facility, the products used and the protocols for cleaning compounding surfaces must also be in compliance with USP <800>.

- Written procedures for cleaning should be made available to staff.
- Staff should be appropriately trained.
- To prevent the spread of HD residues, it is important to not use a spray bottle while cleaning and to apply agents with a wipe.

Four Main Cleaning Steps for Areas Where HDs are Handled as Outlined by USP <800>

Step	Purpose	Example Agents
Deactivation	Render drug inactive or inert	As listed in the HD labeling or other agents that may incorporate Environmental Protection Agency (EPA)-registered oxidizers (e.g., peroxide formulations, sodium hypochlorite, etc.)
Decontamination	Remove inactivated drug residue	Materials that have been validated to be effective for HD decontamination or through materials proven to be effective through testing, which may include alcohol, water, peroxide, or sodium hypochlorite
Cleaning	Remove organic and inorganic material	Germicidal detergent
Disinfection (for sterile Compounding areas)	Destroy microorganisms	EPA-registered disinfectant and/or sterile alcohol

For detailed procedures on cleaning areas where HDs have been handled, or where compounding is performed, refer to the USP General Chapter <800>: usp.org/compounding/general-chapter-hazardous-drugs-handling-healthcare.

Cleaners and Disinfectants

Case Study

Veterinary worker presented to urgent care complaining of a burning sensation in her eye after she got a drop of disinfectant in her eye. She was exposed at work while she was cleaning a dog kennel.

What could have been done to prevent this:

- ✓ Use appropriate personal protective equipment, such as protective eye wear and gloves.
- ✓ Train employees on first aid measures, such as flushing out the eye.

What's the Difference Between Cleaners, Sanitizers, and Disinfectants?

Cleaning and disinfecting are not the same thing. Veterinary health care workers are at risk of exposure to many different chemical hazards including disinfectants and other cleaning agents. It's important to understand the hazards and know the differences between cleaning, sanitizing, and disinfecting.

Cleaners

- All-purpose cleaners (certified green cleaners/soap/detergent and water) remove dirt, grime and most bacteria and viruses. Cleaning also helps remove mold and allergens that can trigger asthma sypmtoms. **Cleaning should be performed before any sanitizers or disinfectants are used to remove visible organic debris.**

Sanitizers

- Reduce microorganisms to safe levels on non-porous surfaces (i.e., metals, glass, hard plastic). Labels should specify the surfaces they are intended for. Must be registered and are regulated by the US Environmental Protection Agency (EPA).

Disinfectants

- Kill multiple organisms, including bacteria and many viruses, on non-porous surfaces. They are pesticides regulated and registered by the EPA. Examples of uses include on surfaces and objects contaminated with blood and body fluids, such as exam room tables and counters, treatment area tables and counters, laboratory area.

What are the health impacts from chemical hazards?

Health impacts include skin irritation, burns and eye damage, respiratory irritation, including triggering asthma symptoms, oral, gastrointestinal, and systemic toxicity if swallowed, cancer, and possibly death.

- Alkalis, aldehydes, chlorine halogens, phenols, and quaternary ammonium compounds cause irritation to skin and eyes, respiratory tract, and mucous membranes. Alkalis can cause severe skin burns. Peroxygen compounds in powdered form may cause mucous membrane irritation.
- Aldehydes, such as Cidex OPA, should be used in a well-ventilated area.

How can you limit your exposure?

Cleaning and disinfectant methods all have health and safety considerations for people, animals, and the environment.

- Limit sanitizer and disinfectant use to situations and settings where there is elevated infectious disease risk (such as contact with animal bodily fluids).
- Use appropriate PPE, such as gloves, eye protection, and masks/respirators if appropriate.
- Use of disinfectants is not recommended in places such as homes and offices when there is no elevated risk of infectious microorganisms or where plain detergents would be effective in removing infectious organisms.
- Provide training on protocols for safe use. The best resource on toxicities and risks of chemicals are the Safety Data Sheets (SDS).

Choosing the right products

No one product works for all circumstances when cleaning and disinfecting.

Cleaners

Go for less toxic cleaning products, like green cleaners, that have been tested and certified by a third-party group such as Green Seal, EcoLogo, EPA's Safer Choice, or EPA's Design for the Environment (older EPA logo).

Disinfectants

Disinfectant products differ in how they can handle certain organisms and hazards as well as surfaces they can be used on. Disinfectants that are commonly used on a daily basis differ from those used for specific situations or surfaces. Product concentrations and exposure times also may vary and should be taken into consideration. Higher concentration and longer exposure times to disinfectants can increase health and safety risks and damage surfaces. Select products with short contact time (the time the product must be left wet and in contact with germs to kill them).

Additional information on disinfectant types can be found at:
cfsph.iastate.edu/Disinfection/Assets/characteristics-of-selected-disinfectants.pdf

Recommended Cleaning Protocols for Veterinary Health Care Settings

Clean surfaces before disinfecting: Cleaning first removes organic matter such as body fluids, fecal matter, dirt, and other debris that can prevent the disinfectant from getting to any organisms.

Read labels: Follow manufacturer's instructions, particularly for dilution and contact time.

Areas/Objects	Clean with green cleaner	Disinfect	PPE*	Product options	Cadence
Infrastructure (non-animal): Windows, high countertops, glass, walls	Yes		Gloves	Neutral detergent with water or EPA-approved cleaning product	Monthly
Non-animal high contact surfaces: Doorknobs, cabinet handles, stair railings, computer keyboards, mouses, countertops	Yes		Gloves	Neutral detergent with water or EPA-approved cleaning product	Biweekly
Animal contact surfaces Floors, tables, and counters in the following areas: exam room tables, treatment area, surgical suite, hospitalization and boarding areas	Yes	Yes	Gloves; eye protection	EPA-registered disinfectant AND Neutral detergent with water or EPA-approved cleaning product	Immediately after use
Floors	Yes	Yes	Gloves; eye protection	EPA-registered disinfectant AND Neutral detergent with water or EPA-approved cleaning product	Daily; In exam rooms before/after each patient visit
Administrative areas	Yes		Gloves	Neutral detergent with water or EPA-approved cleaning product	Biweekly
Staff kitchen area	Yes		Gloves	Neutral detergent with water or EPA-approved cleaning product	Daily
Reusable equipment: Water bowls, food bowls, litter boxes, diagnostic equipment, stethoscope	Yes	Yes	Gloves; eye protection	EPA-registered disinfectant AND Neutral detergent with water or EPA-approved cleaning product	After each use
Laboratory area: Cytology, diagnostic preparation area (area where fecals are processed for shipment), hematology	Yes	Yes	Gloves; eye protection	EPA-registered disinfectant AND Neutral detergent with water or EPA-approved cleaning product	Daily or when visibly soiled

*This is the recommended PPE to use; however, assess the risk of splashing, aerosolization, and skin contact during your cleaning and disinfecting. Consider additional PPE, such as gowns, if concern for contact with infectious materials during cleaning and disinfecting. Depending on disinfectant/concentration, masks may also be considered.

Implement Safe Work Practices When Using Cleaners & Disinfectants

Read Labels

- Follow manufacturer's instructions for use for cleaners and disinfectants, particularly dilution and contact time instructions.
- Check label for use on animal contact surfaces and if effective against target pathogens.

Wear Personal Protective Equipment (PPE)

- Wear appropriate PPE, such as gloves and safety glasses, while handling chemicals.

Do Not Mix Chemicals

- Never mix cleaning products, especially if they have bleach and ammonia. Mixing can form more toxic substances and may casue disinfectants to not work properly.

Choose Safe Cleaning Products

- Select green cleaners certified by a third-party group such as Green Seal, EcoLogo, EPA's Safer Choice, or EPA's Design for the Environment.

Use EPA-Registered Disinfectants

- Make sure product is safe for animal contact surfaces and effective against targeted pathogens.

Properly Store Chemicals

- Store in clean, cool, dry place.
- Store in well ventilated area.
- Store in original containers with labels.

Ventilation

- Ensure there is adequate ventilation when possible.

Make Sure Eye Wash Stations Are Available

- Make stations clear and easily accessible in case of emergency.

Train Staff

- First aid measures if exposed to chemical
- Procedures for cleaning spills
- Proper handling, use, and storage of chemicals
- How to obtain and use hazard information (safety data sheets)

Keeping Animals Safe While Cleaning and Disinfecting

Animals are also at risk to chemical hazards, and exposures can occur by contact with skin and feet or by ingestion. These products can be toxic to the animal and can cause damage to the animal's foot pads or hooves. It is important to make sure their exposures to cleaners and disinfectants are also reduced.

- Avoid using disinfectants when animals are nearby.
- Do not let animals lick, touch, or be close to cleaners or disinfectants.
- Read product labels before using.
    - Some disinfectants are toxic when wet but safe when dry.
    - Some disinfectants recommend cleaning and rinsing after disinfection for animal contact areas, feeders, and waterers.
    - Do not apply disinfectants directly to animals unless specified it can be used directly on the animal.

Pesticides

Case Study

Veterinary worker contacted NJ Poison Center after inhaling Knockout flea area treatment spray being used in the facility. Complained of cough and itchy throat.

What could have been done to prevent this:

- ✓ Wear a respirator if ventilation is inadequate.
- ✓ Train employees on measures such as clearing the area where the product has been aerosolized and ensuring proper ventilation.

What are the risks to veterinary staff?

- Acute health effects include rash, inflammation of the skin, eye irritation, coughing, wheezing, nausea, vomiting, and headache.
- Some pesticides may be carcinogens or may affect the body's endocrine system.
- If pregnant, increased chance of miscarriage, birth defects, or other problems.

How can you be exposed to pesticides?

- When treating animals for fleas, ticks, or mites.
- When working with animals who have been treated with pesticides or have come into contact with a pesticide.
- Through animal excretion (urine, feces, vomit) as pets may have accidently ingested a pesticide.
- Applying pesticide treatments like sprays or fumigants to the veterinary setting.

How can you reduce your exposure?

- Wear appropriate PPE, such as gloves and protective glasses, when handling animals treated with pesticides or when cleaning animal excretions containing pesticides.
- Wash hands with soap and water before eating, drinking, or smoking.
- Read and follow instructions on pesticide labels.
- Make sure there is adequate ventilation when applying pesticide treatments and wear appropriate PPE, such as gloves and safety glasses. If there is not adequate ventilation, wear a respirator when appropriate.
- If you are pregnant, avoid applying pesticides.

Needlestick Injuries

Occupational needlestick injuries are still a common occurrence and can happen at any time during use, disassembly, and disposal of the needle. Needlestick injuries can occur in any setting and injure anyone.

While most needlestick injuries are minor, serious consequences can occur. Potential infections resulting from needlestick injuries include inoculation of bloodborne pathogens, organisms from the animal's skin, organisms from fine-needle aspirates, modified live vaccines, or other chemical hazards. Needlestick injuries can also result in physical trauma, particularly if resulting from animal movement or while using a large gauge needle.

EVEN THOUGH OSHA'S BLOODBORNE STANDARD GENERALLY APPLIES TO OCCUPATIONAL EXPOSURES TO HUMAN BLOOD, BLOOD COMPONENTS, AND OTHER POTENTIALLY INFECTIOUS MATERIALS, **VOLUNTARY COMPLIANCE WITH OSHA'S BLOODBORNE PATHOGEN STANDARD IS STILL RECOMMENDED BY THE AMERICAN VETERINARY MEDICAL ASSOCIATION (AVMA).**

Bloodborne Pathogen Standard:

Occupational Safety and Health Administration (OSHA), Application of the Bloodborne Pathogens Standard to Veterinary Clinics: osha.gov/laws-regs/standardinterpretations/2002-10-15

OSHA, Bloodborne Pathogens and Needlestick Prevention: osha.gov/bloodborne-pathogens

National Association of State Public Health Veterinarians (NASPHV), Compendium of Veterinary Standard Precautions for Zoonotic Disease Prevention in Veterinary Personnel: nasphv.org/Documents/VeterinaryStandardPrecautions.pdf

What if I am exposed?

How can I prevent needlestick injury?

PREPARE FOR NEEDLE USE AND ANTICIPATE RISK

- Anticipate the risk of injury.
- Organize your work area.
- Restrain animals appropriately.
- Plan safe needle handling and disposal, including making sharps containers available.

ALWAYS USE SAFE WORK PRACTICES

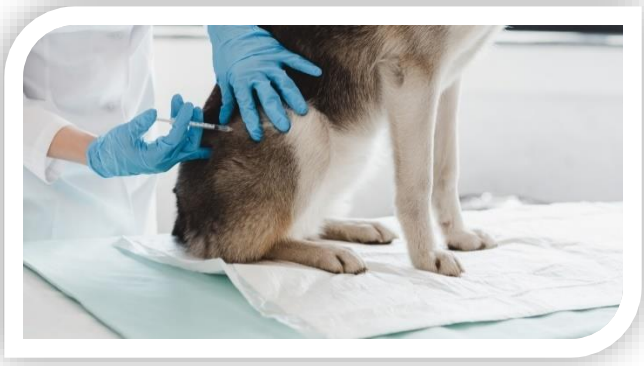
- Avoid passing of sharps.
- Stop working if you feel rushed and remain focused.
- Prevent patient movement as much as possible.
- Wear PPE.
- Keep needles pointed away.
- Avoid manipulation of the needle.
- Use safety engineered sharps devices.

BE PROACTIVE

- Assist in the selection of engineered sharps devices.
- Participate in blood-borne pathogen training and device use training.
- Inform your employer of hazards.
- Evaluate needlestick hazards in the workplace regularly.
- Seek help when injured.

ENSURE PROPER DISPOSAL AND CLEANUP

- Provide sharps containers in easily accessible locations.
- Do NOT recap needle after use.
- Dispose of needles in sharps containers.
- Do not overfill sharps containers.
- Never put your hands into sharps containers.



Additional Resources

Hazardous Drugs

AAHA, 2016 AAHA Oncology Guidelines for Dogs and Cats: aaha.org/wp-content/uploads/globalassets/02-guidelines/oncology/2016_aaha_oncology_guidelines_for_dogs_and_cats.pdf

CDC National Institute for Occupational Safety and Health (NIOSH), Hazardous Drug Exposures in Healthcare: cdc.gov/niosh/healthcare/hazardous-drugs/index.html

CDC NIOSH, Safe Handling of Hazardous Drugs for Veterinary Health Care Workers cdc.gov/niosh/docs/wp-solutions/2010-150

CDC NIOSH, Personal Protective Equipment (PPE) for Health Care Workers Who Work with Hazardous Drugs: cdc.gov/niosh/docs/wp-solutions/2009-106/

CDC NIOSH, NIOSH National Personal Protective Technology Laboratory (NPPTL), Healthcare Respiratory Protection Resources: cdc.gov/niosh/npptl/hospresptoolkit/default.html

CDC NIOSH, NIOSH List of Antineoplastic and Other Hazardous Drugs in Healthcare Settings, 2016: cdc.gov/niosh/docs/2016-161/default.html

Christensen, J.P., Hazardous Drugs: The Hidden Threat to Veterinary Nurses. Today's Veterinary Nurse. November 22, 2023. Available at: todaysveterinarynurse.com/public-health/hazardous-drugs-the-hidden-threat-to-veterinary-nurses

National Association of State Public Health Veterinarians (NASPHV), Veterinary Standard Precautions: nasphv.org/Documents/VeterinaryStandardPrecautions.pdf

Occupational Safety and Health Administration (OSHA), Controlling Occupational Exposure to Hazardous Drugs: osha.gov/hazardous-drugs/controlling-occex#storage

Stull, J.W., et al., 2018 AAHA Infection Control, Prevention, and Biosecurity Guidelines. *Journal of the American Animal Hospital Association*. 2018. 54(6): 297-326. Available at: aaha.org/wp-content/uploads/globalassets/02-guidelines/infection-control/icpb_guidelines.pdf

USP General Chapter <800>, Hazardous Drugs – Handling in Healthcare Settings: usp.org/compounding/general-chapter-hazardous-drugs-handling-healthcare

USP General Chapter <800>, FAQ: go.usp.org/l/323321/2020-06-26/3flhxs/323321/111087/USP_FAQs_on_GC_800.pdf

Cleaners and Disinfectants

Agency for Toxic Substances and Disease Registry (ATSDR), Toxic Substances Portal: cdc.gov/TSP/index.aspx

AAHA. Keep it Clean, Infection Control and Biosecurity in Veterinary medicine: aaha.org/globalassets/05-pet-health-resources/virox_booklet24.pdf

CDC NIOSH, NIOSH Pocket Guide to Chemical Hazards: cdc.gov/niosh/npg

CDC Guideline for Disinfection and Sterilization in Healthcare Facilities, 2008: cdc.gov/infection-control/media/pdfs/guideline-disinfection-h.pdf

CDC NIOSH, Ethylene oxide (used for sterilization): cdc.gov/niosh/topics/ethyleneoxide

CDC NIOSH, Glutaraldehyde: Occupational hazards in Hospitals: cdc.gov/niosh/docs/2001-115

CDC Peracetic Acid Sterilization: cdc.gov/infection-control/hcp/disinfection-sterilization/peracetic-acid-sterilization.html

Iowa State University, Center for Food Security and Public Health, Disinfection 101: Key Principles of Cleaning and Disinfection for Animal Settings: cfsph.iastate.edu/Disinfection/Assets/Disinfection101.pdf

Iowa State University, Center for Food Security and Public Health: Veterinarians: cfsph.iastate.edu/infection-control/disinfection

Iowa State University, Center for Food Security and Public Health, Key Principles of Cleaning and Disinfecting, C&D Basics: cfsph.iastate.edu/Assets/c-d-basics-key-principles.pdf

OSHA/NIOSH InfoSheet: Protecting Workers Who Use Cleaning Chemicals: osha.gov/sites/default/files/publications/OSHA3512.pdf

OSHA, Protect Yourself: Cleaning Chemicals and Your Health: osha.gov/sites/default/files/publications/OSHA_3569.pdf

OSHA, Best Practices for the Safe Use of Glutaraldehyde's in Health Care: osha.gov/sites/default/files/publications/glutaraldehyde.pdf

US Environmental Protection Agency (EPA), CompTox Chemicals Dashboard: comptox.epa.gov/dashboard

US EPA, Selected EPA-Registered Disinfectants: epa.gov/pesticide-registration/selected-epa-registered-disinfectants

Pesticides

CDC NIOSH, About Pesticides and Reproductive Health: cdc.gov/niosh/reproductive-health/prevention/pesticides.html

National Pesticide Information Center (NPIC), Pesticide Information for Veterinarians: npic.orst.edu/health/vet.html

New Jersey Department of Health (NJDOH), Right to Know Hazardous Substance Fact Sheets: nj.gov/health/workplacehealthandsafety/right-to-know

U.S. EPA, Occupational Pesticide Safety and Health: epa.gov/pesticide-worker-safety

Needlestick Injuries

National Association of State Public Health Veterinarians (NASPHV), Compendium of Veterinary Standard Precautions for Zoonotic Disease Prevention in Veterinary Personnel: nasphv.org/Documents/VeterinaryStandardPrecautions.pdf

OSHA, Application of the Bloodborne Pathogens Standard to Veterinary Clinics: osha.gov/laws-regs/standardinterpretations/2002-10-15

OSHA, Bloodborne Pathogens and Needlestick Prevention: osha.gov/bloodborne-pathogens

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