



Disinfection and Disposal fact sheet

Pre-cleaning equipment

Disinfectants will not work effectively if equipment has organic materials stuck to it (e.g. mud, fecal material, dried blood, feathers, hair). Therefore, it is important to pre-clean all equipment to remove organic materials. This can be done with a stiff brush and liquid detergent or (because some disinfectants are inactivated by detergents), pre-cleaning may be done with the same agent that will be used in the disinfection step. Check the label of the disinfectant you plan to use for guidance on pre-cleaning.

Disinfecting equipment

The appropriate disinfectant to use when cleaning equipment is determined by the biological agent potentially involved. Below are a few examples:

1. Influenza A viruses (e.g. Highly pathogenic avian influenza – HPAI)
 - a. Liquid detergent, 10% bleach solution, Virkon®, Roccal D Plus®
 - b. http://www.epa.gov/pesticides/factsheets/avian_flu_products.htm
 - c. http://www.aphis.usda.gov/animal_health/emergency_management/downloads/fad_epa_disinfectants.pdf
2. Prion diseases (e.g. Chronic wasting disease – CWD)
 - a. Few effective decontamination techniques have been published, and no disinfectants or sterilants are registered by EPA for reducing the infectivity of prions. However, EPA has issued quarantine exemptions to several states for use of Environ™ LpH™ (a mixture of three phenolic active ingredients) for treatment of surfaces in commercial, government, and veterinary laboratories to reduce the infectivity of prions. Surfaces should be treated for more than 1 hour at 20°C (68°F). Overnight disinfection is recommended for equipment. <http://www.cfsph.iastate.edu/pdf/fad-prep-nahems-guidelines-cleaning-and-disinfection> see page 31.
3. Fungal agents (e.g. White nose syndrome – WNS)
 - a. The most universally available option for treatment of submersible gear is submersion in hot water - this is effective at sustained temperatures ≥50°C (122°F) for 20 minutes.
 - b. https://www.whitenosesyndrome.org/sites/default/files/resource/national_wns_revise_final_6.25.12.pdf

Disposal of carcasses

USDA APHIS Veterinary Services lists the overall order of preference for various disposal alternatives when dealing with infectious carcasses as:

1. On-site composting (must consider biosecurity concerns due to access by scavengers)
2. On-site treatment (mobile incinerators, mobile digesters)
3. On-site burial
4. Off-site composting (must consider biosecurity concerns due to access by scavengers)

5. Off-site landfill or off-site treatment (rendering, incineration, digestion)

http://www.aphis.usda.gov/animal_health/emergency_management/downloads/sop/sop_disposal.pdf

The EPA delegates regulation of infectious waste to the states. Unfortunately, state regulations vary widely in regards to diseased animal disposal. EPA's I-WASTE Tool is useful for planners, emergency responders, and other individuals responsible for making disposal decisions and can be found at <http://www2.ergweb.com/bdrtool/home.asp>.

Disposal of veterinary medical waste and PPE (personal protective equipment)

Waste contaminated with an infectious organism is categorized according to how dangerous the infectious organism is – it will be considered either a Category A or Category B Infectious Substance. Category A Infectious Substances are defined as "Pathogens that have the potential to cause permanent disability, life-threatening or fatal disease in otherwise healthy humans or animals should an incident occur during transportation". Any infectious substance that does **not** meet the criteria for Category A is automatically considered Category B. Contact the Wildlife Health office with any questions regarding the classification of the infectious organism with which you may be working.

Category B veterinary medical waste includes any solid waste that is generated in the diagnosis, treatment, or immunization of animals such as blood-soaked paper towels, discarded gloves, plastic blood tubes, plastic syringes, swabs, and PPE. It also includes sharps such as discarded needles, vaccine vials, and glass blood tubes. These items are typically regulated by States and should be disposed of in accordance with all applicable local, State, and Federal regulations. If possible, obtain the services of a qualified waste disposal company for disposal of veterinary medical waste and PPE, as the company will provide guidance for meeting transport or shipping requirements for veterinary medical waste.

If you are at a remote site where a medical waste treatment facility is not available locally, options include shipment to a waste disposal company, or appropriate on-site disposal.

On-site disposal options include:

1. Autoclaving – waste must be bagged in autoclavable bags; autoclave must be validated for temperature and pressure. See section 8.3.1 Wet Thermal Treatment at http://www.who.int/water_sanitation_health/medicalwaste/077to112.pdf for more details.
2. Chemical inactivation - chemicals are added to waste to kill or inactivate the pathogens it contains; this treatment usually results in disinfection rather than sterilization. Chemical disinfection is most suitable for treating liquid waste such as blood, urine, or sewage. Animal carcasses should not be disinfected chemically. In planning the use of chemical disinfection, requirements for the eventual disposal of the residues should be carefully considered; improper disposal could give rise to serious environmental problems. See section 8.2 Chemical Disinfection at http://www.who.int/water_sanitation_health/medicalwaste/077to112.pdf for more details.
3. Incineration - This refers to use of an incinerator (on-site incinerator, mobile incinerator, municipal incinerator, drum incinerator), **DO NOT** burn in an open bonfire or pit fire. See section 8.1 Incineration at http://www.who.int/water_sanitation_health/medicalwaste/077to112.pdf for more details.
4. Shipment of medical waste to a treatment facility -- see section below on transportation of medical waste

Transportation and shipment of veterinary medical waste

USDOT hazardous materials regulations (49 CFR Parts 171-180).

Category A-contaminated PPE and other veterinary medical waste requires special handling -- contact the Wildlife Health office for information prior to packaging or shipping anything.

Category B-contaminated PPE and other veterinary medical waste is classified as "medical waste" or "clinical waste" or "biomedical waste" or "regulated medical waste" -- these 4 terms are interchangeable and there is variation in how each state uses them in their medical waste disposal regulations. This type of waste falls under "Packing Group II" presenting "medium" danger.

- If shipping small amounts of material that fits inside a standard sample shipping container, ship medical waste the same as shipping Biological Substances:
 - See the Wildlife Health office Standard Operating Procedures for Sample Packaging and Shipping:
<https://drive.google.com/a/doi.gov/file/d/0B3x1H-hqLMYGMHVSUFZEMzhBWDJvNm9Ebnp6QmIVb2VIQlpJ/view?usp=sharing>
 - Also see the table below. FWS has a contract with Federal Express, making Non-bulk medical waste shipments via air transport the easiest for most field stations.
- If shipping large bulk amounts of material, see the table below for requirements.

Medical Waste – using a contract carrier (such as FedEx or UPS) for “UN 3291 Regulated Medical Waste, n.o.s.”

Package Size	Shipment Method	Max Net Mass	Max Capacity	Max Water Capacity	Inner Container	Outer Container	Labels
Non-bulk	Ground*	882 lbs.	119 gal. (as a receptacle for liquid or solid)	1,000 lbs. (as a receptacle for a gas)	as described in the "Sample Packaging and Shipping" protocol	UN standard packaging; must be a drum (steel, aluminum, plywood, fiber or plastic) or a box (wood, plywood, reconstituted wood or fiberboard)	orientation label, infectious substance hazard label, UN number and the letters "RQ" (reportable quantity), along with "UN3291 Regulated Medical Waste, n.o.s" clearly written on package
Non-bulk	Air	882 lbs.	119 gal. (as a receptacle for liquid or solid)	1,000 lbs. (as a receptacle for a gas)	as described in the "Sample Packaging and Shipping" protocol	A rigid non-bulk packaging conforming to the general packaging requirements of 49 CFR 173.24 and 173.24a ¹	orientation label, Biohazard label, UN number and "UN3291 Regulated Medical Waste, n.o.s" clearly written on package

Package Size	Shipment Method	Max Net Mass	Max Capacity	Max Water Capacity	Inner Container	Outer Container	Labels
Large	Ground*	> 882 lbs.	> 118.9 gal.	3 cubic meters	plastic bag for solids or a rigid container for liquids ²	Only the following are authorized for the transportation of liquid or solid waste: Metal: 50A, 50B or 50N; Rigid plastic: 50H	orientation label, infectious substance hazard label, UN number and "UN3291 Regulated Medical Waste, n.o.s" clearly written on package
Large	Air	> 882 lbs.	> 118.9 gal.	3 cubic meters	plastic bag for solids or a rigid container for liquids ²	Only the following are authorized for the transportation of liquid or solid waste: Metal: 50A, 50B or 50N; Rigid plastic: 50H	orientation label, infectious substance hazard label, UN number and "UN3291 Regulated Medical Waste, n.o.s" clearly written on package
Bulk	Ground*	> 882 lbs.	> 119 gal. (as a receptacle for liquid or solid)	> 1,000 lbs. (as a receptacle for a gas)	must be contained in non-bulk inner packagings ²	wheeled cart ³ or bulk outer packaging (BOP) ⁴	orientation label, UN number, identification numbers on each side and each end along with Biohazard label, and "UN3291 Regulated Medical Waste, n.o.s" clearly written on package
Bulk	Air	Bulk packagings are not authorized for transportation by aircraft. 49 CFR 172.102					

***NOTE that FedEx does not accept packages containing infectious substances (including medical waste) for shipment via ground.**

n.o.s. = not otherwise specified;

UN = United Nations;

proper shipping name = UN designated name for material to be shipped; for medical waste it is "UN3291 Regulated Medical Waste, n.o.s.";

fiberboard = containers are classified as type "G" fiber containers, and "fiberboard" is cardboard

¹ The ThermoSafe Insulated Shipper box meets these requirements. If a contract carrier isn't used, then the specific packaging requirements of 49 CFR 173.197 applies and UN standard packagings must be used. UN standard packagings must be a drum (steel, aluminum, plywood, fiber or plastic) or a box (wood, plywood, reconstituted wood or fiberboard). An example can be found here: <http://www.grainger.com/product/Transport-Drum-8WU39?functionCode=P2IDP2PCP>

² Inner packagings must be durably marked or tagged with the name and location of the shipper, except when the entire contents of the large packaging, Cart or BOP originates at a single location and is delivered to a single location.

- Solids: Use a plastic film bag with a volume not exceeding 46 gallons. Waste material containing absorbed liquid can be packaged in the bag if there is sufficient absorbent material to absorb all liquid during transportation. The bag must be marked and certified by the manufacturer as having passed the tests prescribed in ASTM D 1922 and ASTM D 1709. The bag may not weigh more than 22 lbs. when filled.
- Liquids: Must be packaged in a rigid inner packaging conforming to the provisions of subpart B of this part. Liquid materials are not authorized for transportation in inner packaging having a capacity greater than 5 gallons.

³ Cart must consist of a solid, one-piece body with a nominal volume not exceeding 437 gallons. Must be constructed of metal, rigid plastic or fiberglass fitted with a lid to prevent leakage during transport. Inner packaging must be placed into a cart and restrained to minimize the risk of breakage.

⁴ BOP (bulk outer packaging) must be constructed of metal or fiberglass and have a capacity of at least 3.5 cubic meters and not more than 45 cubic meters. Each BOP must have bottom and side joints of fully welded or seamless construction and a rigid, weatherproof top. Each opening in a BOP must be fitted with a closure to prevent the intrusion of water or the release of any liquid during all loading, unloading and transportation operations. In the upright position, each BOP must be leak-proof and able to contain a liquid quantity of at least 79.2 gallons with closures open.

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