CVMBS Philosophy Regarding Infection Control

Infection control, biosecurity, and biosafety are essential functions at all health care and research facilities, including veterinary hospitals. Good infection control practices are not the only feature defining excellence in veterinary care, but it is impossible to achieve excellent patient care without employing logical infection control procedures. Procedures used at the JLV-VTH are intended to reduce the risk of all nosocomial and zoonotic illness and are specifically tailored to address contagious disease threats as they are encountered in this unique environment. This document summarizes the basic measures to be used in the prevention and control of infectious diseases in the Veterinary Teaching Hospital. This SOP documents official JLV-VTH policies regarding control of infectious diseases. As such, all personnel working in the JLV-VTH are required to know and follow all procedures and policies listed in this document. It is the responsibility of all JLV-VTH Personnel (including students and volunteers) to recognize infectious disease risks at the Veterinary Teaching Hospital, and to correct or report breaches in infection control procedures. Specific questions concerning this document or prevention or control of infectious diseases should be addressed to Infection Control Personnel or the members of the JLV-VTH Infection Control Committee. This document is regularly reviewed and modified; updates are posted on the JLV-VTH Infection Control Web Page <http://goo.gl/57M200>. All personnel are encouraged to submit suggested revisions for the Infection Control and Bioscurity SOP in writing to a Committee member for presentation to the Infection Control Committee at a regular meeting.

NOTE: Sections of this document with blue colored text are navigational hyperlinks.

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Clostridium difficile

Clostridium perfringens

Coccidiodomycosis (Coccidioides immitis)

Cryptosporidiosis (“Crypto” - Cryptosporidium parvum)

Dermatophilus congolensis (“Rain rot” or “rain scald”)

Erysipelothrix rhusiopathiae (Erysipelas in pigs, erysipeloid in humans)

Escherichia coli O157:H7

Giardiasis

Hantavirus

Influenza Virus

Larva Migrans—cutaneous, visceral, and ocular

Leptospirosis

Listeriosis (Listeria monocytogenes)

Lyme disease (Borelia burdorferi)

Monkeypox

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Parapox viruses (Orf and Bovine Papular Stomatitis viruses)

Rabies

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Scabies (Zoonotic)

Sporotrichosis (Sporothrix schenckii)

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Toxoplasmosis (Toxoplasma gondii)
Infection Control and Biosecurity Standard Operating Procedures   James L. Voss Veterinary Teaching Hospital

I. General Infection Control Standard Operating Policies and Procedures (SOP)

CVMBS Philosophy Regarding Infection Control: Infection control, biosecurity, and biosafety are essential functions at all health care and research facilities, including veterinary hospitals. Good infection control practices are not the only feature defining excellence in veterinary care, but it is impossible to achieve excellent patient care without employing logical infection control procedures. Procedures used at the JLV-VTH are intended to reduce the risk of all nosocomial and zoonotic illness. Infection control and biosecurity procedures used at the JLV-VTH are specifically tailored to address contagious disease threats as they are encountered in this unique environment.

Goals for the JLV-VTH Infection Control Program

✓ Protect hospital personnel and clients from exposure to zoonotic disease agents.
✓ Create an environment where patient care can be optimized by minimizing the risk of nosocomial infection.
✓ Optimize educational experiences for students regarding biosecurity and infection control by demonstrating appropriate infection control and disease surveillance practices.
✓ Provide outreach to clients and other members of the public regarding the control and prevention of infectious diseases in animals and humans.
✓ Protect operational capabilities at the JLV-VTH.

Infection Control Principles: The following principles have guided the development of all procedures described in this document: These precautions help prevent disease transmission from staff to patient, patient to patient and patient to staff.

✓ **Optimize hygiene** through the use of standard precautions including hand washing, proper attire and barrier protection, minimizing unnecessary contact with patients, appropriate disposal of infectious materials and proper cleaning and disinfection.

✓ **Break transmission cycles** by understanding routes of disease transmission, creating barriers to direct and indirect transmission of infectious agents for patients with differing risks for contagious disease transmission, and effective use of hygiene protocols. This includes consideration of traffic patterns and housing of patients, as well as traffic patterns of personnel and guests within the VTH.

✓ **Target and refine infection control procedures** through surveillance and other investigative procedures.

✓ **Enhance education and awareness** regarding nosocomial and zoonotic disease risks through optimizing communication about the purpose for these guidelines and procedures.

1.0 Optimizing Hygiene

1.1 **Hand hygiene is the single most important factor affecting the risk of transmitting infectious disease agents.** Effective hand hygiene kills or removes microorganisms on the skin while maintaining hand health and skin integrity (i.e. prevents chapping and cracking of skin). Sterilization of the hands is not the goal of routine hand hygiene - the objective is to reduce the number of microorganisms on the hands, particularly the number of microorganisms that are part of the transient microflora of the skin, as these include the majority of opportunistic pathogens on the hands. These transient microbes may be picked up by contact with a patient, another person, contaminated equipment, or the environment.

There are two methods of removing/killing microorganisms on hands: washing with soap and running water or using an alcohol-based hand sanitizer. Alcohol-based hand sanitizers are not effective against certain pathogens, including bacterial spores (e.g. clostridial spores) and Cryptosporidium spp. Nonetheless, alcohol-based hand sanitizers may be useful even if alcohol-resistant pathogens like *Clostridium difficile* are present. The improved hand hygiene compliance seen with alcohol-based hand sanitizers and their efficacy against other pathogens are important aspects of infection control. Routine use of these products has not resulted in detectable increases in *C. difficile* infection rates in human hospitals. However, if hands are potentially contaminated by one of these organisms, hand washing with soap and running water should be performed if possible. Although even antimicrobial soaps are similarly
Infection Control and Biosecurity Standard Operating Procedures

ineffective against these pathogens directly, the physical process and mechanical action of hand washing can decrease the number of these organisms on the hands. Alcohol is also not as effective against non-enveloped viruses (e.g. canine parvovirus, feline panleukopenia virus) as it is against most other microbes. As for clostridial pathogens, hand washing with soap and running water is likely more effective, and should be used whenever possible when these pathogens are involved.

VTH Personnel with patient contact or those that handle biological samples are encouraged to maintain short fingernails and to wear minimal jewelry on their hands in order to minimize contamination and improve cleanability of hands.

- **Hands should be washed:**
  - Before and after handling each patient
  - After touching blood, body fluids, secretions, excretions and contaminated items, whether or not gloves are worn
  - Immediately after gloves are removed
  - Between tasks and procedures on the same patient to prevent cross-contamination of different body sites
  - After handling laboratory specimens or cultures
  - After cleaning cages or stalls
  - Before meals, breaks, smoking or leaving work for the day
  - Before and after using the restroom

- **Recommended technique for hand washing:**
  1. Remove all hand and arm jewelry.
  2. Wet hands and forearms with warm water.
  3. Add at least 3-5 mls (1-2 full pumps) of soap to palm of hand.
  4. Lather up and vigorously scrub each side of the hands beyond the wrist for 10-30 seconds, cleaning between fingers, under rings and fingernails.
  5. Rinse under warm water until all soap residue is removed.
  6. Dry hands with paper towel or warm air dryer.

If it is not possible to wash your hands immediately wet wipes with alcohol or hand sanitizers can be used until you have access to warm water and soap.

- **Recommended method for using a hand sanitizer:**
  1. Remove all hand and arm jewelry.
  2. Ensure hands are visibly clean (if soiled, follow hand washing steps).
  3. Apply between 1 to 2 full pumps or a 2-3 cm diameter pool of the product onto one palm.
  4. Spread the product over all surfaces of hands, concentrating on finger tips, between fingers, back of the hands, and base of the thumbs. These are the most commonly missed areas.
  5. Rub hands until product is dry. This will take a minimum of 15 to 20 seconds if sufficient product is used.
  6. Hands must be fully dry before touching the patient or patient's environment/equipment for the hand rub to be effective, and to eliminate the rare risk of flammability in the presence of an oxygen-enriched environment, as may occur in the presence of gas anesthetic machines.

1.2 **Barrier Nursing Precautions** should be appropriate for the type of procedures being performed and the type of exposure anticipated. These guidelines apply to working with infected tissues or body fluids, treating live animal in cages or stalls, cleaning cages or stalls occupied by animals with infectious diseases or handling the carcasses of an animal that has died of a potential infectious/zoonotic disease.

[Return to Top]
- Please refer to the “Contagious and Zoonotic Disease Matrix” for information about routes of disease transmission for contagious agents of concern, and to obtain information about important requirements for personal protective equipment (PPE).
- Wear gloves and protective clothing such as lab coats, smock, apron or coveralls when you are handling patients known or suspected to be infected with infectious or zoonotic diseases.
- Gloves, disposable splash shields, and protective eyewear should be worn for procedures that commonly result in the generation of droplets, splashing of blood or other body fluids, or the generation of bone chips.
- Employees that have been medically cleared, fit-tested, and received approval by CSU Environmental Health Services should wear appropriate N-95 respirators when managing patients known or suspected to be infected with zoonotic disease agents that are transmitted by small particle aerosols (e.g., patients with plague, tularemia, tuberculosis, anthrax, Q-fever, influenza [in ferrets, pigs, or birds], or hantavirus).
- If a glove is torn or a needle stick or other injury occurs, the glove should be removed and replaced with a new glove as soon as patient safety permits.
- Washable boots, shoes or shoe covers enhance the ability to prevent spreading of infectious material throughout the hospital.

1.3 Standard Attire: [Return to Top] The JLV-VTH maintains a dress code to promote professionalism and to assist with Infection Control efforts (for details see http://www.vth.colostate.edu/VTHDressCode.pdf) This Infection Control SOP discusses attire only from the perspective of infection control and biosecurity.
- To minimize the risk for transmitting contagious agents via soiled clothing, all personnel must wear clean attire, including footwear, at all times when working with patients.
- Because of the ever-present risk for clothes to become contaminated during patient care activities, at least one extra set of clean protective garments should be available at all times.
- Students should always wear freshly laundered outer garments at the beginning of their workday. The JLV-VTH provides a washer and dryer for student use in the small animal patient grooming area for this purpose.
- Dedicating attire specifically for use in the JLV-VTH is the first line of defense against taking animal and human pathogens to your home environment.
- All personnel working with patients or their environments are encouraged to wear hospital-dedicated attire (clothing, footwear, and outer garments that are worn only when working at the JLV-VTH or while on field service duty) and not worn elsewhere.
- All personnel are required to wear footwear and protective garments when working with patients or their environments that is appropriate to the job at hand. For example coveralls and heavy boots or shoes are the most appropriate footwear and protective outer garments when working with large animal patients.
- All personnel working with patients or their environment are required to wear closed toe footwear that is safe, protective, clean, and cleanable. Footwear that becomes soiled or contaminated must be cleaned and disinfected and should not be constructed of a porous or absorbent material. From a safety perspective, footwear that may be appropriate for use in the small animal hospital may not be appropriate for use in the large animal hospital.
- Specific requirements regarding attire to be worn in various hospital sections are listed under the corresponding hospital service.
- Personnel that work in both the small and large animal hospitals must have attire available that is appropriate for different areas of the hospital.

1.4 Minimize Unnecessary Contact with Patients. [Return to Top] Accomplishing the patient care and teaching mission of the JLV-VTH obviously requires intensive contact with multiple patients through routine activities. However, it is important to remember that this contact is accompanied by the potential for transmission of infectious and or zoonotic agents.
• All personnel should minimize contact with patients whenever reasonable in order to minimize the risk of nosocomial exposure for these patients, especially if not directly responsible for their care.

• Primary clinicians may at their discretion allow and encourage students to contact animals for teaching purposes. If, for the purpose of teaching, students are asked to perform examinations or assist with procedures on multiple patients, their hands must be washed between patients, and stethoscopes and other equipment must be wiped with alcohol or hand sanitizer between patients.

• Personnel that contact patients known or suspected of being infected with contagious pathogens must be limited to only those essential for appropriate patient management.

• When appropriate, patients should be monitored by observation without physical contact. Whenever possible personnel should utilize web cameras for general monitoring of patients’ conditions in order to minimize foot traffic past or into these patient care areas. Web cameras can be accessed at http://oghmaprod.cvmbs.colostate.edu/cameras.cfm. This website can only be accessed from computers in the JLV-VTH unless special login and password are obtained.

• In order to decrease the potential for inadvertent trafficking of infectious agents, personnel should also minimize, when possible, movements into areas used by different services. For example, entry to CCU and the Large Animal Breezeway should be limited to personnel assigned to that service. When possible, medicine personnel should minimize visiting areas used by surgery personnel, personnel assigned to the large animal hospital should avoid visiting areas used by small animal personnel, etc.

• Personnel should avoid entering stalls except when necessary (e.g., avoid entering stalls during rounds).

• When possible, personnel should work in areas with higher likelihood of being contaminated last (after working on patients in other areas).

1.5 Food and Drink [Return to Top]

• Food or drink for personnel should not be consumed or stored where animals are examined, treated, or housed.

• Personnel are also prohibited from eating, drinking, or storing food in areas where biological specimens are handled, or medications are compounded or stored. This includes records rooms, hallways, junior surgery laboratories, exam rooms, the breezeway, or reception areas.

• It is permissible for food and drink to be consumed and stored in small animal hospital rounds rooms, technicians’ offices, and the food animal classroom. Food should not be left out for extended periods, and should be stored in covered containers at all times. Because eating and drinking is allowed in these areas, animals are never allowed in these areas.

• Storage of food and beverages for personnel is not allowed in any refrigerator or freezer used to store medications, or biological specimens. These refrigerators and freezers must be clearly labeled accordingly.

• Microwaves used in animal care areas (e.g., equine medicine records room) are not to be used to heat food intended for people.

1.6 Disposal of Infectious Waste [Return to Top]

• Precautions should be taken to prevent injuries caused by needles, scalpels, and other sharp objects. To prevent needle injuries, personnel should avoid recapping needles, purposely bending or breaking needles, or removing needles from disposable syringes. Sharps should be placed in a puncture-resistant container for disposal; consult with staff in charge of your area or Infection Control Personnel if the size of large syringes or sharps prevents placement in regular sharps containers.

• Waste should be bagged in the area where it was generated and re-bagged once outside of the contaminated area.

• Additionally, use orange sticky notes (i.e., “SPECIAL ATTENTION REQUIRED” sticky notes) to identify materials that may be contaminated, after completely filling out the requested information.
• If an infectious disease (excluding rabies or plague/tularemia) is suspected, trash must be sealed in trash bags for waste disposal. Seal the bag with tape then double bag and seal with tape, spray the surface of the bag with Neutral Disinfectant Cleaner or Accel, and discard in dumpster.
• If a known zoonotic agent is suspected or involved, consult your primary clinician. Seal the trash bag with tape then double bag and seal, spray the surface of the bag with Neutral Disinfectant Cleaner or Accel, and transport to the disposal area. Materials from Small Animal Isolation will be placed into clear, autoclavable biohazard bags, clearly labeled with the department and disease, and delivered to the diagnostic laboratory (Room 233, DMC 2nd Floor) during regular business hours (8 am – 5 pm). The diagnostic lab must be notified prior to delivering the bag (970-297-5204). When materials are dropped off for autoclaving, material should be placed in a large, red biohazard bag available which will be made available by diagnostic laboratory personnel. A request form will be provided by the diagnostic lab and should be filled out, using account number HO#8032. Under no circumstances are materials to be delivered to the diagnostic lab without first calling and receiving approval from diagnostic lab personnel.
• Biological samples collected from patients with elevated contagious disease risk should be sealed in plastic bags and labeled with the appropriate information prior to submission to diagnostic laboratories. Care should be taken to avoid contaminating the outside of plastic bags.
• Cleaning and bandaging of wounds known to be infected with infectious agents of concern (e.g., MRSA or other highly resistant bacteria) should not be conducted in high traffic areas and should occur in areas that can be easily cleaned and disinfected. Barrier precautions should be used to prevent contamination of hands and attire, and care should be taken to avoid environmental dissemination through drainage of flush solutions or careless handling of bandage materials. Please follow procedures in this document for environmental disinfection and disposal of these materials.

2.0 Basic Cleaning and Disinfection: [Return to Top] Personnel using disinfectants in the VTH are expected to be familiar with this basic cleaning and disinfection section in order to understand the activity of and potential interactions among the various disinfectants used in the VTH.

2.1 General Disinfection Protocol for Contaminated Surfaces (See page 20 for a summary of detergents and disinfectants approved for use in the JLV-VTH and pages 154 and 158 for instructions about disinfection of contaminated surfaces in the Large and Small Animal Hospitals)

1. Gloves and appropriate attire should be worn whenever using disinfectants. Gloves worn for regular patient examination (exam gloves) or gloves worn during routine cleaning operations (rubber cleaning gloves) provide adequate protection when using disinfectants. Additional personal protective equipment (mask, face shields, goggles, impervious clothing, boots) should be worn only when there is a probability of splash from the disinfection process resulting in contact that is not merely incidental.
2. Remove all visible debris prior to disinfection. The presence of gross contamination will inactivate most disinfectants. If a hose is used to de-bulk material, care must be taken to minimize aerosolization and further spread of potentially infectious agents.
3. Wash the affected areas with water and detergent or soap; scrubbing or mechanical disruption is always needed to break down biofilms and residual debris that prevents or inhibits the disinfection process.
4. Thoroughly rinse the cleaned area to remove any detergent residue. Note: Some disinfectants may be inactivated by detergents; therefore it is very important to rinse well after washing the area.
5. Allow area to drain or dry as much as possible to prevent dilution of disinfectant solutions.
6. Wet area thoroughly with Neutral Disinfectant Cleaner. Disinfectant should remain in contact with surfaces for a minimum of 15 minutes, particularly if an infectious agent is suspected.
7. Remove excess disinfectant with water, clean paper towels, mop, or squeegee.
8. Disinfectant should be rinsed off all surfaces or allowed to dry for a sufficient amount of time (per disinfectant label) prior to housing a patient in a cage or stall.
9. All multiple use areas (stocks, examination rooms, examination tables etc.) where animals are examined or treated, should be cleaned and disinfected immediately following use by personnel responsible for the patient - irrespective of infectious disease status of the individual animal.

10. Prevent contact of blood or body fluid with any non-intact skin or mucous membrane when conducting these procedures.

11. After disinfecting, remove the protective attire and wash your hands.

12. For non-routine disinfection measures (e.g. Virkon misting), only personnel trained and approved to wear and use the required personal protective equipment will be allowed access to areas being disinfected.

2.2 Disinfectants:  [Return to Top] A variety of disinfectants are used at the VTH in order to decrease the likelihood of transmission of infectious agents. Several factors have been considered when choosing disinfectants for a particular use in the VTH.  (See page 20 for a summary of detergents and disinfectants approved for use in the JLV-VTH, and pages 154 and 158 for instructions on cleaning and disinfection procedures)

- Disinfectants vary in their toxic and irritation potential for people and animals. In general alcohols, povidone iodine, and chlorhexidine solutions are used when contact with skin or other tissues is likely or required. Other cleaning and disinfecting agents such as bleach (hypochlorite), Virkon, phenols and quaternary ammonium compounds are only applied to equipment or facility surfaces.
- Disinfectants can only reliably be expected to be effective when applied to clean, non-porous surfaces. Some materials such as unsealed wood and dirt essentially cannot be disinfected or decontaminated through routine procedures. In addition, non-porous surfaces will not be reliably decontaminated if disinfectants are applied in the presence of dirt, oil, biofilms and biological materials.
- Disinfectants vary greatly in their spectrum of activity. In general, protozoa such as Cryptosporidium, bacterial spores, mycobacterium, and non-enveloped viruses are very hardy and resistant to disinfection.
- Organic material rapidly deactivates most disinfectants. The likelihood that organic material will be present on surfaces should be considered when choosing a disinfectant.
- Ensuring maximal decontamination requires that disinfectant solutions be applied at appropriate dilutions and be left on surfaces for an adequate amount of contact time (often at least 10-15 min).
- Although most disinfectants are used for their short-term decontamination activity, some disinfectants maintain residual disinfectant activity when left on surfaces for longer periods.
- It is critical to rinse and remove all residues from previous disinfectant. Neutral Disinfectant Cleaner and bleach will react to produce a noxious gas.

2.3 Footbaths and Footmats:  [Return to Top] Infectious agents are frequently recovered from floor surfaces in the environment around infected animals. Investigations at the VTH show that use of footbaths and footmats containing 1% Virkon-S® solution are associated with significantly reduced recovery of bacteria from soles of rubber boots. In addition, Virkon-S® has a broad spectrum of activity, and retains activity fairly well in the presence of dirt and organic material. As such, 1% Virkon-S® is used in all disinfectant footbaths and footmats throughout the JLV-VTH.

- Footbaths solutions are changed in the evening on Mon, Wed, Fri, and Sun, by cleaning crews.
- Footbaths should be changed whenever they are judged to contain excessive amounts of bedding or dirt.
- Footmats or footbaths should be refilled by anyone that notices they are dry or low on volume; this is the responsibility of ALL people working in this area (students, staff, or faculty).
- Personnel are required to use footbaths or footmats appropriately whenever they are encountered. Footbaths require full immersion of feet, and therefore water impervious footwear must be worn wherever footbaths are employed.
- Footmats do not require full immersion of feet, as the mat is designed to place solution on the soles and sides of the soles of shoes. However, splash contact with the tops and sides of shoes occurs commonly, and impervious footwear is strongly recommended for personnel working in areas where footmats are used.
2.4 Disinfection Protocol for Instruments and Equipment:  

- All JLV-VTH equipment must be appropriately cleaned and decontaminated prior to its return to Central Supply in order to minimize the risk of transmission of contagious disease agents. Equipment used specifically in small or large animal hospital areas will be discussed under their respective hospital areas. *(See page 20 for a summary of detergents and disinfectants approved for use in the JLV-VTH and pages 154 and 158 for instructions on cleaning and disinfection procedures)*

- All instruments, equipment or other objects, including stethoscopes, thermometers, clipper blades, etc. must be sterilized or disinfected between uses on different patients with confirmed or suspected infectious diseases.

- After using materials that are sterilized between uses must be cleaned and sanitized using the dishwasher or cleaned with soap and water and disinfected with a 0.5% chlorhexidine solution prior to returning to Central Supply for sterilization.

- Additionally, use orange sticky notes (i.e., “SPECIAL ATTENTION REQUIRED” sticky notes) to materials (e.g., laundry or instruments) that may be contaminated, after completely filling out the requested information.

- **Thermometers:**
  - Glass thermometers are not to be used in the JLV-VTH in order to decrease risks associated with broken thermometers and mercury exposures.
  - Electronic and disposable thermometers (Tempa Dot®) are used instead. Personnel are encouraged to use disposable thermometers (Tempa Dot®) whenever possible. This will decrease the potential for exposing patients and personnel to infectious agents through contact with thermometers used on multiple patients.
  - Personnel using electronic thermometers on multiple patients should use disposable thermometer covers at all times, discarding after each use. These are available in multiple locations throughout the hospital.
  - Electronic thermometers should also be thoroughly disinfected daily using alcohol and/or chlorhexidine wipes. Plastic thermometer cases should be regularly soaked in disinfectant solution.
  - Probes from thermometers used in continuous temperature monitoring should be thoroughly disinfected between patients by wiping or washing to remove gross fecal material and soaking in alcohol and/or chlorhexidine solutions.
  - Multi-use thermometers should never be used on patients that have a high risk of enteric disease caused by contagious pathogens (e.g., parvovirus enteritis or salmonellosis). Instead, disposable thermometers or individual thermometers are assigned for use with each patient, and discarded after discharge.

- **Endoscopes:**
  - Endoscopes should only be cleaned and disinfected by approved faculty or staff members.

- **Stethoscopes:**
  - It is recommended that stethoscopes be cleaned regularly with soap and water, and disinfected between patients with alcohol or hand sanitizer. Immediate cleaning and disinfection is required when stethoscopes are visibly soiled or after examination of a patient with a suspect infectious disease.
2.5 Summary of Detergents and Disinfectants Approved for Use in the JLV-VTH

<table>
<thead>
<tr>
<th>Disinfectants and their Dilutions</th>
<th>Activity in Organic Material</th>
<th>Spectrum of Activity</th>
<th>Comments</th>
</tr>
</thead>
</table>
| **Chlorhexidine (Nolvasan®)** 0.05%-0.5% | Rapidly Reduced | - Mycoplasmas: V. Effective  
- Mycobacteria: Variable  
- Gm+ Bacteria: V. Effective  
- Gm− Bacteria: V. Effective  
- Pseudomonas: Ltd. Activity  
- Rickettsiae: Ltd. Activity  
- Env. Viruses: Ltd. Activity  
- Chlamydiaceae: Ltd. Activity  
- Non-Env. Viruses: No Activity  
- Fungal Spores: Ltd. Activity  
- Bacterial Spores: No Activity  
- Cryptosporidia: No Activity  
- Prions: No Activity | - Broad antibacterial spectrum but limited in effectiveness against viruses.  
- Used to disinfect materials that patients closely contact (muzzles, endotracheal tubes, etc)  
- Easily inactivated by soaps and detergents. Inactivated by anionic detergents.  
- Low toxicity potential; Typical dilutions are non-irritating even when contacting mucosa.  
- Residual effect on skin diminishes regrowth.  
- Only function at limited pH (5-7).  
- Toxic to fish, should not be discharged into the environment. |
| **Povidone Iodine (Betadine®)**  | Rapidly Reduced | - Mycoplasmas: V. Effective  
- Mycobacteria: Ltd. Activity  
- Gm+ Bacteria: Effective  
- Gm− Bacteria: Effective  
- Pseudomonas: Effective  
- Rickettsiae: Effective  
- Env. Viruses: Effective  
- Chlamydiaceae: Effective:  
- Non-Env. Viruses: Ltd. Activity  
- Fungal Spores: Effective  
- Bacterial Spores: Effective  
- Cryptosporidia: No Activity  
- Prions: No Activity | - Broad spectrum.  
- Very low toxicity potential; appropriately diluted solutions are suitable for use on tissues or on materials that contact skin or mucous membranes. People can become sensitized to skin contact. Dilution of iodophors increases free iodine concentration and antimicrobial activity. Staining of tissues and plastics can occur. Stable in storage. Inactivated by organic debris and qac’s. Requires frequent application. Corrosive. |
| **Alcohol (90% isopropanol or 70% denatured ethanol)** | Reduced | - Mycoplasmas: V. Effective  
- Mycobacteria: Effective  
- Gm+ Bacteria: V. Effective  
- Gm− Bacteria: V. Effective  
- Pseudomonas: Effective  
- Rickettsiae: Ltd. Activity  
- Env. Viruses: Effective  
- Chlamydiaceae: Ltd. Activity  
- Non-Env. Viruses: No Activity  
- Fungal Spores: Ltd. Activity  
- Bacterial Spores: No Activity  
- Cryptosporidia: No Activity  
- Prions: No Activity | - Broad spectrum.  
- Very low toxicity potential  
- Appropriately diluted solutions are suitable for use on tissues or on materials that contact skin or mucous membranes.  
- No residual activity on surfaces.  
- Fast acting  
- Leaves no residue.  
- Rapid evaporation.  
- Extremely flammable. |
### Sodium Hypochlorite (Bleach)*

*Used for disinfection of clean surfaces, especially to augment the spectrum of activity of Neutral Disinfectant Cleaner (note: bleach should not be mixed with Neutral Disinfectant Cleaner).

**Dilutions:**
- 1:64 = ¼ cup (2oz) per gallon of water. *Appropriate for most applications in JLV-VTH*
- 1:32 dilution = 1/2 cup (4oz) per gallon of water.
- 1:10 dilution = 1 ½ cups per gallon of water. *Limited use—very strong*

- **Rapidly Reduced**
  - Mycoplasmas: V. Effective
  - Mycobacteria: Effective
  - Gm+ Bacteria: Effective
  - Gm– Bacteria: Effective
  - Pseudomonas: Effective
  - Rickettsiae: Effective
  - Env. Viruses: Effective
  - Chlamydiaceae: Effective
  - Non-Env. Viruses: Effective at higher concentrations
  - Fungal Spores: Effective
  - Bacterial Spores: Effective
  - Cryptosporidia: No Activity
  - Prions: No Activity

- **Broad spectrum.**
- Relatively low toxicity potential with standard dilutions, although higher concentrations or prolonged contact can result in irritation to mucous membranes or skin.
- Can be used in the presence of anionic detergents; not affected by water hardness.
- Inexpensive
- Bactericidal activity is reduced with increasing pH, lower temperatures, and in the presence of ammonia and nitrogen, which is important to consider when urine is present. Also inactivated by cationic soaps/detergents, sunlight and some metals.
- Chlorine gas can be produced when mixed with other chemicals. Strong oxidizing (bleaching) activity that can damage fabric and is corrosive on metals such as sliver, and aluminum (not stainless steel).
- Limited stability for stored solutions.

### Quaternary Ammonium Compounds

*(Neutral Disinfectant Cleaner)*

*Primary surface disinfectant used at the JLV-VTH (spot disinfection as well as general environmental disinfection)*

**Dilution:** 1/2oz (15ml) per gallon of water. =1:256

One plastic sample cup (fecal cup)=4oz

**Contact time:** at least 15 minute

- **Moderate**
  - Mycoplasmas: Effective
  - Mycobacteria: Variable
  - Gm+ Bacteria: V. Effective
  - Gm– Bacteria: Effective
  - Pseudomonas: No Activity
  - Rickettsiae: Ltd. Activity
  - Env. Viruses: Effective
  - Chlamydiaceae: No Activity
  - Non-Env. Viruses: Ltd. Activity
  - Fungal Spores: Ltd. Activity
  - Bacterial Spores: No Activity
  - Cryptosporidia: No Activity
  - Prions: No Activity

- **Broad spectrum.**
- Irritation and toxicity is variable among products, but these compounds are generally non-irritating and have low toxicity at typical dilutions.
- Inactivated by anionic detergents.
- Some residual activity after drying.
- More effective at alkaline pH.
- Less effective in cold temperatures.
- Stable in storage.
- Inactivated by hard water.
- Inactivated by soap/detergents (e.g. Tide with Bleach)
### Oxidizing Agents:

*Hydrogen Peroxide, Virkon-S® and Trifectant® (Peroxymonosulfate), Peroxigard and Accel (accelerated hydrogen peroxide).*

**Virkon is used in all disinfectant footbaths and for disinfectant misting (directed mist disinfection) in the large animal hospital.**

- **Dilution:** 1.3 oz powder per gallon of water (10 grams per liter of water) is a 1% solution.
- **Spray bottle:** 5 mls powder (5 grams) added to 500 mls water. (1% solution)
- **Contact time:** At least 15 minutes.

**Accel is used for disinfection in the Small Animal Isolation Units at a 1:40 dilution (0.5% H₂O₂ Concentration)**

- **Dilution of 7% concentrate:** 3.2 oz per gallon of water (1:40).
- **Spray bottle:** 25 ml per 1 liter of water (1:40 dilution)
- **Contact time:** At least 15 minutes.

### Phenols

*(Environ LpH*)

**Used only for disinfection of instruments and necropsy areas that may be contaminated with prions (e.g., CWD, scrapie).**

<table>
<thead>
<tr>
<th>Variable in class</th>
<th>Very Good</th>
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<tbody>
<tr>
<td>Mycoplasmas: V. Effective</td>
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<tr>
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<td></td>
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<tr>
<td><strong>Prions:</strong> No Activity</td>
<td></td>
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<tr>
<td><strong>Broad spectrum.</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Irritation potential is variable among compounds in this class, but phenolic disinfectant products are generally considered highly irritating and should not be used on surfaces that contact skin or mucosa.</strong></td>
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<tr>
<td><strong>Concentrations over 2% are highly toxic to animals, especially cats.</strong></td>
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<tr>
<td><strong>Activity not affected by water hardness.</strong></td>
<td></td>
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<tr>
<td><strong>Some residual activity after drying.</strong></td>
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<tr>
<td><strong>Effective over broad pH range.</strong></td>
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<tr>
<td><strong>Non-corrosive.</strong></td>
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<tr>
<td><strong>Stable in storage.</strong></td>
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</tbody>
</table>

*Broad spectrum.*

- Products listed have very low toxic potential but can cause skin irritation through drying, especially as powder or in concentrated solutions.
- Other compounds not used in JLV-VTH can be very toxic (e.g. chlorine dioxide)
- No harmful decomposition products.
- Residual activity on surfaces.
- Virkon solutions lose activity within a few days after mixing. Accel solutions are active for 36 months.
- Poor lipid solubility.
- Less active at low temperatures.
- Corrosive to plain steel, iron, copper, brass, bronze, and vinyl, and rubber.
- Add powder to warm water to aid in mixing.
- Wear a dust mask and rubber gloves when preparing solutions to avoid irritation.
3.0 Breaking Transmission Cycles

3.1 Routes of Disease Transmission: Many disease agents can survive for extended periods of time in the air, on surfaces and in organic material. Pathogenic disease agents can spread from animal-to-animal, animal-to-human or even human-to-animal, through inhalation, oral consumption, contact with nasal or ocular mucosal surfaces, and direct contact via fomites or vectors. Awareness of these routes of disease transmission can help mitigate their potential effects. Please refer to the “Contagious and Zoonotic Disease Matrix” when developing differential lists for patients to ensure that all diseases of high concern have been considered. This matrix provides information about routes of disease transmission for all agents of concern.

- **Aerosol and droplet transmission** occurs when infectious agents contained in aerosol droplets are passed between susceptible species. Many airborne droplet exposures are best characterized as medium- to large-particle aerosols (i.e., >100 μm) and these larger particles are not inhalable; thus they cannot cause true respiratory exposures, but can still cause infections through contact with mucosa or conjunctiva. Clear face shields are very effective in helping to minimize exposure risks to infectious droplets (e.g., fecal material, urine, pus, etc). In contrast, true respiratory protection (e.g., N-95 respirators and PAPRs) are necessary to protect against respiratory exposure for disease that are transmitted as small-particle aerosols. NOTE: surgical masks are not respirators, but can protect against oral and nasal droplet exposures. Most pathogenic agents do not survive for extended periods of time within the aerosol droplets and as a result, close proximity of infected and susceptible animals is required for disease transmission. The greater the distance between animals, the less likely transmission will occur. Aerosol transmission may occur in a veterinary hospital through close contact of animals and/or humans. Aerosols can also be generated through medical procedures, such as surgery, or post-mortem examinations. Infectious agents may be freshly aerosolized (e.g., a sneezing cat with feline respiratory virus), or can be re-aerosolized by high-pressure washing of cages, stalls or pens or on dust particles by air currents. Temperature, relative humidity and ventilation play important roles in aerosol transmission of pathogens.

- **Oral transmission** involves exposure to infectious agents by the gastrointestinal route. This also can occur inadvertently through inhalation of aerosolized material and subsequent swallowing of materials through the nasopharynx, such as through droplet exposures. Contaminated environmental objects include equipment such as food and water dishes, and any other items an animal could lick or chew. Feed and water contaminated with feces or urine are frequently the cause of oral transmission of disease agents. In people, oral contact with contaminated hands is commonly part of the transmission cycle for oral-fecal agents, which exemplifies the need for excellent hand hygiene among personnel working around animals. Appropriate handling and segregation of patients with diarrhea will help control the spread of potentially infective organisms in feces as will proper cleaning and disinfecting of food and water dishes.

- **Direct contact transmission** requires an animal or person to directly contact another infected animal or person.

- **Indirect contact transmission** occurs through contact with surfaces or materials that have been contaminated with a variety of substances (e.g., blood, discharge from wounds, saliva, nasal secretions or aerosolized respiratory droplets, genitourinary secretions, fecal material, etc). It is important to remember that patients in the hospital have a high likelihood of being infected with contagious pathogens, and therefore surfaces throughout the facility have a high likelihood of being contaminated with infectious agents. As such, the most important method of reducing the potential for direct and indirect contact transmission is the segregation of infected animals and minimizing contact with them. Since not all infected animals show signs of illness, generalized efforts to decrease the likelihood of animals coming into direct contact and segregating patients in different populations (e.g., inpatients and outpatients) are warranted.

- **Fomite transmission**: Fomites are objects that serve as intermediates in contact transmission cycles. Virtually any object can serve as a fomite, even a person acting as a caregiver. For example: a door knob, keyboard, telephone, clothing, thermometer, stethoscope, hose, leash, brush, shovel, etc., are all items that can be contaminated with infectious agents and serve as an exposure source involved in contagious disease
transmission. An important aspect of fomite transmission is that portable items can be contaminated near one patient and then be a source of transmission for patients or personnel in other areas of the hospital. The most important means of controlling transmission by fomites is through proper cleaning and disinfection, use of barrier nursing precautions, separation of equipment, as well as the appropriate recognition and segregation of diseased animals. Whenever possible, clinically ill animals should be handled and treated only after all healthy animals have been handled or cared for.

- **Vector transmission** occurs when an insect or arthropod acquires a pathogen from one animal and transmits it to another. Heartworm and West Nile virus are examples of diseases transmitted by vectors. Fleas, ticks, flies, and mosquitoes are common biological vectors of disease. The most effective means to prevent transmission of vector-borne pathogens is the elimination or reduction of the insect vector, or at a minimum, separation of the vector from the host.

### 3.2 Zoonotic Infections in Personnel:

While the risk of contracting a zoonotic disease among the general population is, on average, low, veterinarians and other people that routinely contact animals have an increased risk of exposure to zoonotic disease agents.

In cases of exposure to suspect or confirmed cases of zoonotic diseases, all known client, referring veterinarian, student, and staff contacts should be recorded and reported to the Director of Infection Control. The Director of Infection Control and faculty clinician in charge of the case will then work together to ensure that all potentially exposed individuals are contacted, as well as the necessary local and state health officials (when applicable).

Any persons with known or suspected infections associated with work at the JLV-VTH are strongly encouraged to seek medical attention immediately after reporting the event to a supervisor. Also, any known or suspected exposure to zoonotic agents should be reported to the Director of Infection Control or the JLV-VTH Director’s office by the veterinarian with primary responsibility for the patient. The Director’s office can provide to you or your physician the name of health care providers that are specifically knowledgeable with respect to zoonoses and occupational exposures of veterinary personnel (see specific recommendations regarding plague, leptospirosis and rabies).

All personnel with concerns or questions regarding exposure to zoonotic agents are strongly encouraged to contact their health care provider. Friends or family members of JLV-VTH Personnel or students, who might have increased risk of serious consequences of zoonotic infection, are encouraged to discuss potential risks with the JLV-VTH supervisor, section chief, the Director of Infection Control or their own health care provider.

### 3.3 Personnel with Special Infectious Disease Risks:

Personnel, clients and students whose immune systems are compromised are at greater risk from exposure to zoonotic diseases. Immune status is affected by many conditions and those at increased risk may include: children under the age of 5, pregnant women and the elderly. While the profound immune suppression is caused by diseases like HIV/AIDS, other diseases and conditions that can compromise or alter immune function include pregnancy, organ failure, diabetes, alcoholism and liver cirrhosis, malnutrition or autoimmune disease. Certain treatments can also be associated with immune suppression, including radiation therapy, chemotherapy, chronic corticosteroid therapy, or immunosuppressive therapy associated with bone marrow or organ transplants, implanted medical devices, splenectomy, or long-term hemodialysis. It is important to note that some of these conditions or diseases may have a social stigma, making it difficult for a person to share their personal health information.

All personnel, including students, are encouraged to inform supervisors, service chiefs, VTH Director, and/or the Director of Infection Control about any special health concerns (e.g., pregnancy, immunosuppression, etc.) that might impact the risk or consequences of infection with zoonotic agents prior to handling any patients. All discussions will be kept confidential; however, communication among staff about the situation may be necessary.
for implementation of appropriate precautions and/or alteration of normal clinical or teaching procedures in the hospital.

3.4 Visitors in the JLV-VTH: [Return to Top] Educating the public about the role that veterinarians have in society is an important function of the College of Veterinary Medicine and Biomedical Sciences, and allowing visitors to have some access to the JLV-VTH supports this mission. However, there are unique safety and health risks associated with exposure to the JLV-VTH environment, and visitors are a potential mechanism for spreading infectious agents in the hospital environment.

- Visitors must be directly supervised while visiting the JLV-VTH. Physical contact with patients that are not owned by those specific visitors is not allowed. Tours for the public are coordinate through the JLV-VTH Director’s office and are led by trained personnel (typically veterinary students).
- Visitors are never allowed to enter Small Animal Isolation, Equine Isolation, or Livestock Isolation except with the express permission of Infection Control Personnel.
- VTH Personnel supervising visitors should use appropriate opportunities to educate them about zoonotic and nosocomial disease hazards that are associated with hospitalization of animals.
- Visiting lay people should not be allowed to enter anesthesia preparation areas, surgery theaters, or any Large Animal Hospital patient housing area.
- Special arrangements can be made by contacting the JLV-VTH Director’s Office or the Director of Infection Control in order to allow visiting scientists or veterinarians to enter these areas.

3.5 Occupational Safety for Students and Employees: [Return to Top]

- Protecting the health of personnel and clients is a primary mission objective for the JLV-VTH.
  
  - Please contact the JLV-VTH Director’s office or CSU Human Resources (491-2135 or 491-4832) if you have any questions or concerns about health risks related to activities associated with the JLV-VTH. Students may also contact the CVMBS Dean’s office.

- AWARENESS and RESPONSE: All personnel should be aware of the status of high-risk patients and potentially contaminated materials or environments. If exposed to zoonotic agents, for purposes of insurance and worker’s compensation claims, it is important proper reports (workers compensation and/or bite report) should be submitted and appropriate documentation collected. JLV-VTH Director’s office or CSU Human Resources can answer questions or assist with these procedures.

  - Bite Reports -- Students and Employees that have been bitten by a mammal in their duties related to the JLV-VTH must file a bite report with the Larimer Humane Society (available at http://csuvth.colostate.edu/_docs/employee_resources/vth_201107_bite_form.pdf), and employees must also file a workers compensation report http://www.ehs.colostate.edu/WWorkComp/Home.aspx. Please submit a copy of the Bite Report form to the VTH director’s office and take a copy with you to the authorized treating physician. The report requires patient and client information, vaccine history (if available), and referring veterinarian’s contact information.

  - Group exposures to zoonotic agents -- In the event of a group exposure, Infection Control Personnel will contact the appropriate university offices. The CSU Worker’s Compensation Office will submit a multi-person notification that will list the nature of your exposure. This notification will serve as documentation in the event that you have complications as a result of your exposure.

  - Zoonotic disease exposures or injury to individuals -- Individual employees will need to fill out a Worker’s Compensation First Report of Injury Report. This report is located at http://www.ehs.colostate.edu/WWorkComp/Home.aspx. This notification will serve as documentation in the unlikely event that you have complications as a result of your exposure.
  
  - You will be provided with a fact sheet related to your exposure in order to give you more information. Please monitor your health carefully.
• **Illness, zoonotic disease exposure, or Injury to CSU EMPLOYEES** -- Please adhere to the following process if you have symptoms or concerns for your health related to occupation incidents and wish to seek medical evaluation through Worker’s Compensation:

  ➢ **During standard business hours (M-F, 8:00 am to 5:00 pm):** Medical evaluations are performed through one of our Worker’s Compensation, Authorized Treating Physicians (ATP). A list of these providers is available on line at: http://www.ehs.colostate.edu/WWorkComp/HealthContPrint.aspx. It is recommended that you contact the ATP prior to visiting to ensure availability. Please contact Pony Davis at 491-2135 or Kenda Weigang at 491-4832 if you have questions.

  ➢ **After standard business hours (weekends and M-F 5:00 pm to 8:00 am):** If you experience symptoms outside of standard business hours, seek evaluation through Urgent Care or Emergency Room. You will need to see and coordinate additional care through one of CSU’s Authorized Treating Physicians.

  ➢ **SEEK MEDICAL ATTENTION FROM A CSU-AUTHORIZED TREATING PHYSICIAN WHENEVER POSSIBLE** as initial visit costs will be covered through Worker’s Compensation even if it is determined that your illness is not work related. If you must go to the ER or an Urgent Care provider for the specific reasons listed above, you and/or your insurance carrier will be responsible for all health care costs for illnesses/injuries that are NOT related to your employment.

• **Illness, Zoonotic Disease Exposure, or Injury to CSU STUDENTS** – If students are exposed or injured in the course of activities that relate to their educational assignments, they need to seek treatment from either Hartshorn Health Services or your personal physician. This is not a situation where worker’s compensation applies and treatment and expenses are NOT covered by CSU.

• **Rabies Pre-Exposure Vaccination for Personnel:**

  ➢ Colorado is a rabies endemic region, and veterinary personnel have an elevated risk of exposure to this critically important zoonotic disease. See the rabies section below for detailed information about patient management.

  ➢ All veterinary students are required to complete a fully rabies pre-exposure vaccination series during the first year of their training, unless they have filed an exemption form with the CVMBS Dean’s office (See the official policy at: http://csu-cvmbs.colostate.edu/Documents/dvm-policy-rabies.pdf).

  ➢ Full- to half-time employees: pre-exposure vaccinations and serological testing are provided at the cost of CSU for half- to full-time employees meeting the conditions listed in the algorithm below.

  ➢ Other employees, including hourly-employees, that do not meet this criteria are encouraged to receive vaccination or serological testing at their own cost or at the cost of their supervisory unit.

  ➢ Because CSU does not routinely incur the costs for vaccinations of hourly students, work procedures should reflect measures to avoid exposure

  ➢ Because DVM Students are required to be vaccinated, upon hire as DVM student hourly employees or student interns must provide proof of vaccination or protective titers within the 2 years prior to initiation of work duties in order to be employed in activities with potential risk of rabies exposure.

  ➢ **EMPLOYEES MUST COMPLETE** the CSU Occupational Health Request for Vaccination (http://www.ehs.colostate.edu/WOHSP/PDF/Request_for_Vaccination.pdf) and the Online Risk Assessment in order to be eligible for work-related rabies prophylaxis (Questionnaire available at http://www.ehs.colostate.edu/WOHSP/riskassessment; and Instructions are available at http://www.ehs.colostate.edu/wohsp/pdf/oh_database_instructions.pdf)
### Policies for Pre-Exposure Rabies Vaccination/Serology Provided for CSU Employees

<table>
<thead>
<tr>
<th>EMPLOYMENT TASKS</th>
<th>EXAMPLES OF EMPLOYMENT CATEGORIES</th>
<th>SEROLOGY SCREEN&lt;sup&gt;2&lt;/sup&gt; OR TITER&lt;sup&gt;3&lt;/sup&gt;</th>
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</table>
| • Medical examination of direct physical handling of unvaccinated or client owned veterinary patients that involves potential direct contact of mucous membranes with wet saliva or substances from the central nervous system<sup>4</sup>  
• Direct contact with quarantined animal potentially infected with rabies | Clinical Veterinarian (Faculty, Residents, Interns, Fellows, Postdocs serving a clinical role in the VTH), veterinary technician, veterinary nurse, large animal care, lab animal veterinarians and staff. | Screen every 2 years                             |
| Directly Handling:                                                               |                                                                                                 |                                                 |
| • Potentially infected body tissues or samples for diagnostic testing<sup>4</sup>  
• Waste or carcasses suspected to contain infectious rabies virus               | Diagnostic Lab workers, Cleaning Personnel                                                      | Screen every 2 years                             |
| • Collecting samples from rabies suspect cases                                   | Necropsy workers (specifically tasked)                                                          | Screen every 2 years                             |
| • Rabies virus research<sup>5</sup>                                              | Laboratory or field workers and animal handlers                                                  | Titer every 1 year                               |
| • Propagation or preparation of rabies virus                                     |                                                                                                 |                                                 |
| • Capture or handle wildlife such as skunks, raccoons, foxes, ferrets, canids, and feral cats  
• All bat handling  
• Work in caves | Animal control officers, Wildlife biologists and field workers, bat researchers                  | Screen every 1 or 2 years<sup>6</sup>             |
| • Medical handling of CSU or client owned large/agricultural animals demonstrating neurological signs (horses, cattle, sheep, goats, llamas, alpacas) | Large Animal VTH Veterinarians, Livestock manager and assistant manager                           | Screen every 2 years                             |

1Subject to individual risk assessment. Individuals must be currently enrolled in the CSU Occupational Health Program ([https://wsnet.colostate.edu/cwis86/WOHSP/RiskAssessment/add/AddRisAssessment.aspx](https://wsnet.colostate.edu/cwis86/WOHSP/RiskAssessment/add/AddRisAssessment.aspx))

2SeroLOGY screen only, to recommended cutoff titer (to determine if booster is needed)

3SeroLOGY titer to full endpoint (Quantitative results, to determine exact antibody levels and if booster is needed)

4Blood, urine and feces are not infectious

5Judgement of relative risk and extra monitoring of vaccination status of laboratory workers is the responsibility of the principal investigator (in consultation with CSU’s Institutional Biosafety Committee and Occupational Health Program)

6Frequency based on individual risk assessment

### Respiratory Protection, Splash Shields, and Dust Masks:

- **Zoonotic agents transmitted through aerosols and droplets are a common hazard in the JLV-VTH.** Information about recommended precautions and routes of transmission are available on the “Contagious and Zoonotic Disease Matrix”. Please refer to this resource when developing differential lists for patients to ensure that all diseases of high concern have been considered.

- **Respiratory protection may only be used by JLV-VTH Employees that have been trained, medically screened, fit-tested, and approved by the CSU Environmental Health Services. Every CSU employee who wears respiratory protection must participate in the Respiratory Protection Program. For more information see: [http://www.ehs.colostate.edu/wresp](http://www.ehs.colostate.edu/wresp).**

- Respiratory protection commonly used in the VTH includes N-95 respirators and PAPRs (powered air purifying respirators).
Dust masks, surgical masks, and splash shields are not respiratory protection devices, and do not provide protection from small particle aerosols containing zoonotic agents, chemicals, or vapors. These devices can be worn by anyone in the course of their duties without prior approval.

The use of any and all types of respirators at Colorado State University is subject to review and approval by EHS prior to use. No employee may wear a respirator unless they have been through EHS's respiratory protection program. The OSHA Respiratory Protection Standard regulates any use of respiratory protection.

Students, volunteers, clients, and employees not enrolled in the CSU Respiratory Protection Program MAY NOT use respirators at the JLV-VTH.

Respiratory protection is required when managing patients infected with zoonotic diseases that can be transmitted by small-particle aerosols (e.g., patients with plague, tularemia, tuberculosis, anthrax, Q-fever, influenza [in ferrets, pigs, or birds], or hantavirus).

Splash shields or other PPE should be worn whenever large droplet aerosols are being generated that may contain infectious agents (e.g., pressure cleaning of contaminated areas, managing dogs with leptospirosis, surgery or post-mortem procedures that generate droplet aerosols, etc).

3.6 Clients in the JLV-VTH: [Return to Top]

- Clients are allowed unescorted access to JLV-VTH waiting rooms and adjacent restrooms, pharmacy, business office, library, and the cafeteria. Clients must be escorted to other areas of the hospital by JLV-VTH Personnel.
- Infection Control Personnel may restrict access to patient care areas whenever it is deemed appropriate to minimize risks of zoonotic or nosocomial infections. In addition, clinicians may, at their discretion, exclude clients from patient care areas whenever there are concerns about safety or disruption of the work environment.
- At the primary clinicians’ discretion, clients may be left unattended with their animals in examination rooms, treatment areas, and patient housing areas. However, clients must always be asked to refrain from touching any other animals in the area.
- Clients are NEVER allowed to visit patients that are housed in Small Animal Medicine Isolation, Critical Care Isolation, Equine Isolation, or Livestock Isolation except with the express permission of Infection Control Personnel. Permission will generally only be considered if patients are in critical condition and the likelihood of survival is questionable.
- Clients must always adhere to policies regarding use of barrier nursing precautions that are relevant to their animals and where they are housed.
- Times for patient visitation (visiting hours) are restricted to specific periods determined by hospital sections, unless otherwise expressly permitted by the primary clinician. Copies of visitation policies are available from reception desks.
- VTH Personnel responsible for patient care are required to appropriately educate clients about zoonotic and nosocomial disease hazards that are inherently and necessarily associated with hospitalization of animals.

3.7 Children in the JLV-VTH: [Return to Top] There are unique safety and health risks associated with the JLV-VTH environment. The consequences of a child becoming ill or injured through exposure to the JLV-VTH environment are clearly unacceptable from all perspectives.

- Infection Control Personnel may restrict access to patient care areas whenever it is deemed appropriate to minimize risks of zoonotic infections. In addition, clinicians may, at their discretion, exclude children (minors <18 years old) from patient care areas whenever there are concerns about safety or disruption of the work environment.
- Children (minors <18 years old) are not permitted to remain in the hospital when the parent is working as a member of the JLV-VTH Personnel (including students).
• In order for children to visit the JLV-VTH a parent must sign a “supervised visit” policy agreement form (available from the JLV-VTH Director’s office), even for organized JLV-VTH tours. Exceptions to this procedure are made by special arrangement with the JLV-VTH Directors office for the annual JLV-VTH Open House.
• Children visiting the JLV-VTH must be directly supervised by an adult at all times while in the JLV-VTH.
• All visitors must be restricted from touching any animals except their own. This is especially important for children because of the risk of zoonotic disease and the risk of physical injury.
• Because of the significant potential for patients to injure young children, those under the age of 10 are never allowed to enter Large Animal Hospital patient housing areas.

3.8 Pets in the JLV-VTH: [Return to Top] There are notable health and safety risks related to the presence of non-patient animals in the JLV-VTH. In accordance with CSU policy, animals are not permitted to be in public buildings or offices except under very specific conditions.
• Pets are permitted in the JLV-VTH if they are patients admitted to the hospital, if they are scheduled for blood donation at the JLV-VTH, if they are subjects enrolled in an approved research project, or if they are being used in approved teaching exercises.
• Under extraordinary circumstances, JLV-VTH Personnel may temporarily house animals in the JLV-VTH if express permission is obtained from the JLV-VTH Director’s office.
• Pets may only be housed in patient housing areas and may not be held for extended periods in other patient management areas or in other work areas.
• Personnel must adhere to all JLV-VTH policies when handling and managing animals in the hospital.
• Pets are not allowed in second floor offices, classrooms, or the cafeteria unless they are being used in classroom activities.

4.0 JLV-VTH Risk Communication Regarding Contagious Disease Status of Patients [Return to Top]
• Efficient communication regarding the risk of spreading contagious disease is essential given the complexity of patient care at JLV-VTH and the number of individuals working in this environment. Effective, proactive communication regarding the real and potential infectious status of patients decreases the likelihood of potential nosocomial or zoonotic disease spread.
• For Infection Control concerns at the JLV-VTH, risk communication involves appropriate notification and education about risks related to infectious disease for all individuals who may come into contact with patients with infectious diseases, including zoonotic disease concerns, appropriate precautions necessary to limit spread to personnel or other patients, and appropriate precautions to disinfect areas or materials that may become contaminated.
• All JLV-VTH patients should be evaluated by clinicians and students to identify contagious disease risks. It is the responsibility of the senior clinician assigned to every case to appropriately assess the risk of contagious disease transmission and to institute appropriate infectious disease control efforts consistent with the Infection Control SOP.
• Please refer to the “Contagious and Zoonotic Disease Matrix” when developing differential lists for patients to ensure that all diseases of high concern have been considered.
• INFECTION CONTROL PERSONNEL AND OTHER AFFECTED PERSONNEL (i.e., cleaning personnel, nursing staff, section heads, etc) MUST BE NOTIFIED ABOUT ALL IMPORTANT INFECTIOUS DISEASE HAZARDS (KNOWN OR SUSPECTED).
  ➢ This includes, but is not limited to, diseases with the potential to cause zoonotic disease, highly contagious diseases, highly pathogenic diseases, bacteria with multiple drug resistance or important resistance patterns (e.g. MRSA or MRSP), disease agents that are highly persistent or difficult to disinfect using routine hygiene practices, or diseases of regulatory concern.
At their earliest opportunity, the veterinarian responsible for the case must notify all affected personnel about the recognition of the specifics related to this situation. They must also notify personnel regarding changes in the housing (e.g., when moving into isolation units), and at the time of discharge.

This is most efficiently done by sending an email to the Contagious Disease Alert listserv (VTH-Contagious-Dz-Alert@colostate.edu), which will notify Infection Control Personnel, heads of sections and nursing staff, and cleaning personnel. This email should include the patient signalment, veterinarian assigned to the case, housing area, and the known or suspected contagious disease.

Additionally, use orange sticky notes (i.e., “SPECIAL ATTENTION REQUIRED” sticky notes) to identify rooms, cages, kennels, stalls, or other materials (e.g., laundry or instruments) that may be contaminated, after completely filling out the requested information.

- All significant contagious disease risks must be appropriately communicated to JLV-VTH Personnel and clients in order to effectively manage the threat of infection in people and animals that might have contact with a particular patient.
- Be aware that the infectious disease status of a patient may change during hospitalization, and the risk communication materials must also be updated.

4.1 Communication Tools: [Return to Top]

- A variety of tools are available to aid and promote effective communication, awareness, and education regarding infectious disease hazards and appropriate measures for controlling the associated risks to patients, personnel and clients.

- VTH Infection Control Email Listservs:
  - The VTH uses electronic mail forums or lists (Email Listservs) to facilitate communication regarding infectious disease hazards in the hospital. General information about using listservs, subscribing, unsubscribing, etc., can be obtained from the CSU ACNS website (http://www.acns.colostate.edu/?page=listserv).
  
  - **VTH-Contagious-Dz-Alert@colostate.edu:**
    - **Purpose:** To provide communication and improve awareness regarding patients with increased risks for contagious and/or zoonotic disease at the VTH.
    - **It is very important for the veterinarian managing the case to send an email to the Contagious Disease Alert listserv (VTH-Contagious-Dz-Alert@colostate.edu) AT THE TIME THAT THE SUSPICION OF CONTAGIOUS DISEASE IS RECOGNIZED,** which will notify Infection Control Personnel, heads of sections and nursing staff, and cleaning personnel.
    - **People Sending Emails:** Open to anyone, **required when patients are initially recognized and when housing or other management changes (e.g., when patients are admitted to isolation or discharged).**
    - **People Receiving Emails:** Select personnel from Infection Control, Animal care, Facilities, Small Animal Hospital, Large Animal Hospital, and Diagnostic Laboratory.

  - **VTH-Salmonella-Alert@colostate.edu:**
    - **Purpose:** To provide communication and improve awareness regarding patients with Salmonella infections and surveillance at the VTH.
    - **People Sending Emails:** Open to anyone.
    - **People Receiving Emails:** Select personnel from Infection Control, Animal care, Facilities, Small Animal Hospital, Large Animal Hospital, and Diagnostic Laboratory.
• **Orange Sticky Notes (“SPECIAL ATTENTION REQUIRED”):**
  - To ensure that personnel are provided with all necessary information about the potential for contagious disease transmission, the VTH uses specially designed orange sticky notes (i.e., "SPECIAL ATTENTION REQUIRED" sticky notes) to identify rooms, cages, kennels, stalls, or other materials (e.g., laundry or instruments) that may be contaminated, after completely filling out the requested information.
  - Pads of these sticky notes are distributed throughout the VTH, and notably can be adjacent to where the Contagious and Zoonotic Disease Matrix is posted.
  - Veterans managing cases are responsible for ensuring that these fully completed and posted as necessary, with the assistance of Staff that manage patient care areas.
  - Information required on these forms includes the managing veterinarian’s name and phone number, known or suspected infectious condition, route of transmission, whether the disease is zoonotic, the infectiousness of the disease, the seriousness of zoonotic disease, and the potential for persistence of the agent in the environmental.
  - Information needed to complete this form can be obtained from the Contagious and Zoonotic Disease Matrix.

• **Contagious and Zoonotic Disease Matrix:**
  - The “Contagious and Zoonotic Disease Matrix” was developed to assist students and veterinarians in fully considering important contagious and zoonotic diseases when managing patients in the JLV-VTH.
  - This list is organized by clinical syndrome (e.g., gastrointestinal disease, respiratory disease, neurological disease, etc) as an aid in developing differential lists for patients to ensure that all diseases of high concern have been considered.
  - This matrix provides information that should be communicated to VTH personnel, precautions to promote infection control, and susceptible species for all agents of concern in the VTH.
  - The wall-mounted Matrix can be found throughout the VTH, and notably are posted in all rounds and treatment rooms.
• FAQ (Frequently Asked Question) Sheets for VTH Personnel
  ➢ FAQ sheets have been developed to provide a quick reference to clinicians, staff, and students about infection control for management of diseases that commonly give rise to questions in the VTH.
  ➢ Information included on these sheets are excerpts from the Infection Control SOP developed as a quick aid for VTH personnel; The Infection Control SOP is far more encompassing and is always considered the principal source for infection control policies and procedures in the JLV-VTH.
  ➢ These laminated sheets are easily recognized by their red border and are posted in all rounds rooms throughout the VTH.
  ➢ FAQ SHEETS ARE ONLY INTENDED FOR USE IN THE VTH AND ARE NOT FOR DISTRIBUTION TO CLIENTS OR REFERRING VETERINARIANS.

• Client Information Handouts Regarding Patients with Important Contagious Diseases:
  ➢ Information sheets have been developed to aid in effective communication with clients regarding specific conditions that sometimes require specific yet nuanced communication about the contagious and zoonotic disease risks.
  ➢ Conditions for which these handouts are available include MRSA and MRSP in companion animals, and Salmonella in horses and in reptiles.
  ➢ These sheets can be obtained in rounds rooms or from nursing supervisors.

• Additional Tools and Sources of Information Regarding Infectious Diseases:
  ➢ There are many sources of information available via the internet regarding infectious and contagious diseases, but not all of these provide accurate and relevant information.
  ➢ With this in mind, personnel should be aware of two sources that are excellent for providing useful sources of information for veterinarians, staff, students, and clients.
  ➢ The Center for Food Safety and Public Health from Iowa State University has a variety of excellent resources and is exceptional regarding the accuracy and quality of information that is provided. It also provides information at two levels – one for content experts (“technical fact sheets”) and one that is more appropriate for lay people (“fast facts”).

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Information regarding infectious animal diseases is provided at [http://www.cfsph.iastate.edu/DiseaseInfo](http://www.cfsph.iastate.edu/DiseaseInfo)

Information more specifically pertaining to the specific subset of zoonotic diseases is available at [http://www.cfsph.iastate.edu/DiseaseInfo/?transmission[]=006&lang=en](http://www.cfsph.iastate.edu/DiseaseInfo/?transmission[]=006&lang=en)

- The [U.S. Center for Disease Control and Prevention (CDC)](http://www.cdc.gov) provides excellent information via their website regarding infectious diseases affecting people, including zoonotic diseases ([http://www.cdc.gov](http://www.cdc.gov))

### 4.2 Risk Communication - Small Animal Hospital and Livestock Hospital

Cages or stalls (as well as the relevant surrounding environment) must be clearly labeled with the infectious disease hazards associated with patients. At a minimum, this signage should contain the following information:

- Please refer to the “Contagious and Zoonotic Disease Matrix” when developing differential lists for patients to ensure that all diseases of high concern have been considered.
- At their earliest opportunity, the veterinarian responsible for the case must notify all affected personnel about the recognition of the specifics related to this situation. They must also notify personnel regarding changes in the housing (e.g., when moving into isolation units), and at the time of discharge.
- This is most efficiently done by sending an email to the Contagious Disease Alert listserv ([VTH-Contagious-Dz-Alert@colostate.edu](mailto:VTH-Contagious-Dz-Alert@colostate.edu)), which will notify Infection Control Personnel, heads of sections and nursing staff, and cleaning personnel. This email should include the patient signalment, veterinarian assigned to the case, housing area, and the known or suspected contagious disease.
- Additionally, use orange sticky notes (i.e., “SPECIAL ATTENTION REQUIRED” sticky notes) to identify rooms, cages, kennels, stalls, or other materials (e.g., laundry or instruments) that may be contaminated, after completely filling out the requested information.
- Name of the known or suspected condition
- Whether there is any zoonotic health risk
- Barrier nursing and hygiene requirements
- Disinfection procedures that are appropriate for controlling the agent in question.

### 4.3 Risk Communication - Equine Hospital

- Please refer to the “Contagious and Zoonotic Disease Matrix” when developing differential lists for patients to ensure that all diseases of high concern have been considered.
- At their earliest opportunity, the veterinarian responsible for the case must notify all affected personnel about the recognition of the specifics related to this situation. They must also notify personnel regarding changes in the housing (e.g., when moving into isolation units), and at the time of discharge.
- This is most efficiently done by sending an email to the Contagious Disease Alert listserv ([VTH-Contagious-Dz-Alert@colostate.edu](mailto:VTH-Contagious-Dz-Alert@colostate.edu)), which will notify Infection Control Personnel, heads of sections and nursing staff, and cleaning personnel. This email should include the patient signalment, veterinarian assigned to the case, housing area, and the known or suspected contagious disease.
- Additionally, use orange sticky notes (i.e., “SPECIAL ATTENTION REQUIRED” sticky notes) to identify rooms, cages, kennels, stalls, or other materials (e.g., laundry or instruments) that may be contaminated, after completely filling out the requested information.
- Barrier precautions should be visible as adequate notice of special status.
- Personnel responsible for cases must ensure that special considerations and nursing needs have been appropriately communicated to others likely to be working with patients or their environments.

### 4.4 Risk Communication - Protocol for Front Desk Personnel

If a client call indicates that the patient has had vomiting, diarrhea, coughing or sneezing within the past week:

1. The receptionist will schedule the appointment with the appropriate service.
2. The client will be asked to keep their pet outside until they have been checked in and a student has been paged so they can be taken directly to an exam room, Small Animal Isolation, or CCU depending on the circumstances. Transport should preferably be on a gurney to decrease hospital contamination.

3. The presenting complaint will be written on the schedule as “acute diarrhea” “acute vomiting”, “acute coughing” or “acute sneezing”.

4. The letters “PID” for possible infectious disease will be written next to the complaint.

5. The only indicator each service may get is the word “PID” written on the schedule.

6. If the appointment is made and is coming in on the same day, the receptionist will phone the service to let them know they have scheduled an appointment that is a possible infectious disease case.

7. If a patient that has signs or history of acute disease is presented directly to the reception desk, the receptionist should contact the receiving service immediately and coordinate placement of the animal in an examination room or isolation to minimize hospital contamination.

4.5 Risk Communication – Protocol for Students [Return to Top]

The arrival of possible infectious disease cases will be handled as follows:

1. If a client call indicates an acute case (within the past week) of vomiting, diarrhea, coughing or sneezing, the receptionist will schedule the appointment with the appropriate service.

2. The client will be asked to keep their pet outside until they have been checked in and a student has been paged so they can be taken directly to an exam room.

3. Please refer to the “Contagious and Zoonotic Disease Matrix” when developing differential lists for patients to ensure that all diseases of high concern have been considered.

4. At their earliest opportunity, the veterinarian responsible for the case must notify all affected personnel about the recognition of the specifics related to this situation. They must also notify personnel regarding changes in the housing (e.g., when moving into isolation units), and at the time of discharge. **This is most efficiently done by sending an email to the Contagious Disease Alert listserv (VTH-Contagious-Dz-Alert@colostate.edu),** which will notify Infection Control Personnel, heads of sections and nursing staff, and cleaning personnel. This email should include the patient signalment, veterinarian assigned to the case, housing area, and the known or suspected contagious disease.

5. Additionally, use orange sticky notes (i.e., “SPECIAL ATTENTION REQUIRED” sticky notes) to identify rooms, cages, kennels, stalls, or other materials (e.g., laundry or instruments) that may be contaminated, after completely filling out the requested information.

6. The presenting complaint will be written on the schedule as “acute diarrhea” “acute vomiting”, “acute coughing” or “acute sneezing”.

7. The letters “PID” for possible infectious disease will be written next to the complaint.

8. The only indicator each service may get is the word “PID” written on the schedule.

9. If the appointment is made and is coming in on the same day, the receptionist will phone the service to let them know they have scheduled an appointment that is a possible infectious disease case.

10. The animal will be taken directly to an exam room.

11. Every attempt should be made to reduce any direct contact with the patient and any other JLV-VTH patients.

12. After the exam room has been vacated, areas or equipment contaminated by feces, secretions, or blood should be cleaned and disinfected immediately by the personnel in charge of the patient.

13. Appropriate signs should be placed on the door to prevent use of the room until it has been cleaned and disinfected by Animal Care.

5.0 Infection Control Surveillance: [Return to Top]

This program was established to monitor and identify the spread of infectious disease at the JLV-VTH. Environmental and patient samples are cultured to detect specific microorganisms,
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James L. Voss Veterinary Teaching Hospital

In general environmental contamination, and disease syndromes potentially associated with nosocomial infections and complications. In general:

- Please refer to the “Contagious and Zoonotic Disease Matrix” when developing differential lists for patients to ensure that all diseases of high concern have been considered.
- Clinicians should report the occurrence of known or suspected nosocomial events to Infection Control Personnel as soon as possible.
- Infection Control Personnel should also be alerted to any suspected trends in nosocomial events, even if the clinical consequences are not considered severe.
- Infection Control Personnel should be alerted to all known or suspected zoonotic infections that are thought to have arisen through exposure in the JLV-VTH.
- Clinicians are encouraged to use appropriate diagnostic testing in order to determine the etiology of nosocomial events, even if these results may not affect the clinical outcome for that patient. Apparent trends cannot be investigated without appropriate surveillance data.

5.1 Required diagnostic testing in patients with suspected infections: Diagnostic testing to detect certain infectious and/or zoonotic agents provides essential information for appropriate clinical management of infected patients. This testing provides direct benefit to the patient in addition to benefitting clients' by allowing them to appropriately manage their other animals and protect their families. It also benefits the JLV-VTH as this information is essential for appropriate management of disease risk for all JLV-VTH patients and personnel.

- Please refer to the “Contagious and Zoonotic Disease Matrix” which provides information about which agents are subject to required diagnostic testing in patients.
- It is therefore mandatory for all hospitalized patients to undergo diagnostic testing if infection with specific contagious or zoonotic agents is a reasonable consideration. This diagnostic testing is considered essential to case management in the JLV-VTH and therefore is billed to the client.
- It is the responsibility of the senior clinician responsible for a patient’s care to ensure that appropriate client communication occurs regarding infectious and/or zoonotic agents.
- It is the responsibility of the senior clinician responsible for a patient’s care to ensure that appropriate samples are submitted for this testing, and that appropriate Infection Control precautions are taken with these patients.
- Infection Control Personnel should be notified by the veterinarian with primary case responsibility, as soon as reasonably possible, that there is a reasonable index of suspicion that a hospitalized patient may be infected with one of the agents listed below. This notification can be made in person or using the VTH-Contagious-Dz-Alert@colostate.edu listserv.

5.2 Disease differentials for which testing is mandatory: Testing of appropriate samples is mandatory if the following disease or condition is a reasonable differential. A full description of testing, management, diagnosis, and potential treatment information is available in the Specific Contagious Diseases of Concern Section of the Infection Control SOP. Please refer to the “Contagious and Zoonotic Disease Matrix” when developing differential lists for patients to ensure that all diseases of high concern have been considered. This Matrix also provides information about which agents are subject to required diagnostic testing in patients.

- Acute Diarrhea in Dogs and Cats ... see page 111 for more information.
  - Salmonella and Campylobacter
  - Parvovirus
  - Cryptosporidium and Giardia
- Bovine Viral Diarrhea Virus (BVDV) ... see page 111 for more information.
- Canine Distemper Virus ... see page 111 for more information.
- Chlamyphila psittici (Avian, formerly Chlamydia psittici) ... see page 112 for more information.
- Corynebacterium pseudotuberculosis... see page 111 for more information.
• Equine Herpesvirus type 1 ... see page 112 for more information.
• Equine Infectious Anemia
• Influenza (Avian) ... see page 115 for more information.
• Influenza (Canine) ... see page 115 for more information.
• Influenza (Equine) ... see page 115 for more information.
• Leptospirosis ... see page 115 for more information.
• Methicillin-resistant *Staphylococcus* infections (MRSA and MRSP) ... see page 154 for more information.
• Plague ... see page 118 for more information.
• Tularemia ... see page 120 for more information.
• Rabies ... see page 127 for more information.
• *Salmonella* (Large animals) ... see page 137 for more information.
• *Salmonella* (Small animals) ... see page 137 for more information
• *Streptococcus equi equi* ... see page 137 for more information.
• Vesicular Stomatitis Virus ... see page 141 for more information.

5.3 **Management of Patients Infected or Colonized with Bacteria Resistant to Important Antimicrobial Drugs:**
[Return to Top] Patients infected with bacteria resistant to important antimicrobial drugs or to multiple drug classes represent a potential health hazard to VTH Personnel, clients, and to other patients. As such, they are managed with increased Infection Control precautions intended to discourage dissemination in the VTH. See page 142 for details.

5.4 **Reportable Animal Diseases in Colorado:** [Return to Top] It is JLV-VTH policy to investigate and rule-out the potential for any diseases that are reportable to the Colorado State Veterinarian. Contact Infection Control Personnel ASAP when these conditions are diagnosed or suspected. For more information or to report these diseases, contact Colorado Area Office of the USDA (303) 231-5385 or the Colorado State Veterinarian’s Office (303) 869-9130.
• Please refer to the “Contagious and Zoonotic Disease Matrix” when developing differential lists for patients to ensure that all diseases of high concern have been considered.

These reportable diseases include the following:
• Anaplasmosis (clinical disease only)
• Anthrax
• Avian Influenza (both high and low pathogenic)
• Bluetongue (clinical disease only)
• Brucellosis (bovine, porcine, ovine, or canine)
• Bovine Babesiosis
• Bovine Spongiform Encephalopathy (BSE)
• Chronic Wasting Disease (CWD)
• Contagious Equine Metritis (CEM)
• Epizootic Hemorrhagic Disease (EHD) in livestock
• Equine Encephalomyelitis (also reportable to the Colorado Department of Health).
• Equine Infectious Anemia (positive Coggins/ELISA)
• Equine Piroplasmosis
• Equine Viral Arteritis
• Equine Herpes Myeloencephalopathy (EVH-1 & EHV-4)
• Exotic Newcastle Disease
• Johne’s Disease
• Malignant Catarrhal Fever
• Mycoplasma gallisepticum
• Paratuberculosis (Johne's disease)
• Piroplasmosis
• Plague (Yersinia pestis infection - also reportable to the Colorado Department of Health)
• Pseudorabies
• Psittacosis (Chlamydophila psittici - also reportable to the Colorado Department of Health)
• Rabies (also reportable to the Colorado Department of Health).
• Salmonella serotype Pullorum or Enteritidis
• Scabies (Cattle and Sheep)
• Scrapie
• Screwworm
• Swine Enteric Coronavirus – porcine epidemic diarrhea virus (PEDV) & porcine delta coronavirus (PDCoV)
• Trichomoniasis (Cattle)
• Tuberculosis
• Tularemia (also reportable to the Colorado Department of Health)
• Vesicular conditions – any (VS, FMD, swine vesicular disease, etc)
• West Nile Virus

5.5 Salmonella Surveillance in Large Animal Patients: [Return to Top] Because of the risks and consequences associated with nosocomial salmonellosis in our hospital, the JLV-VTH maintains an active surveillance program to detect Salmonella shedding in hospitalized large animal patients. This active surveillance program is intended to supplement the required culture of patients in which infection with Salmonella is a reasonable differential.
• For this program, fecal samples are obtained from all hospitalized large animal patients at the time of admission, and each Tuesday and Friday throughout the time that patients are hospitalized.
• The cost for these surveillance cultures (for patients not suspected of being infected with Salmonella) is borne by the JLV-VTH.
• Personnel responsible for case management are required to ensure that all required fecal samples are obtained and properly submitted to the laboratory for culture as follows:
  1. Obtain ~2-10 gm aliquot of feces, and place in a sterile fecal cup.
  2. Label the container with client name, case #, date, and time collected.
  3. Complete the appropriate information sheet for each patient.
     o For equine patients, the yellow patient information label attached to an Infection Control sample bag.
     o For livestock patients, add your patient’s information to the chart located in the records room.
  4. VTH staff will submit all required information via an on-line submission form and print it out ([http://www.dlab.colostate.edu/biosecurity](http://www.dlab.colostate.edu/biosecurity)).
  5. The printed submission form must accompany each fecal sample in order for that sample to be processed.
  6. Fecal samples are then taken to the diagnostic laboratory.
  7. Efforts should be made to submit all samples before 3 pm.
  8. Positive culture results on individual patients are emailed to the clinician of record and to Infection Control Personnel by the diagnostic laboratory.
  9. These data are routinely summarized by Infection Control Personnel and reported quarterly to the Infection Control Committee.

5.6 Environmental Salmonella Surveillance [Return to Top]
• Stall and cage cultures: Stalls or cages that housed animals which were culture-positive for *Salmonella* must be cultured after routine cleaning and disinfection and before they are released for use by another patient.
  ➢ Technicians responsible for these stalls or cages or the veterinarians primarily responsible for patients should notify the Infection Control House Officer (7-5150) when these stalls or cages are vacated to arrange for samples to be obtained.
  ➢ Samples for these cultures are obtained by the Infection Control House Officer using commercially available electrostatic dust collection wipes (Swiffer®, Proctor & Gamble). Examination gloves are worn when sampling, and changed between each sample.
  ➢ Special care is taken to sample walls, floors, feeders, waterers, stall doors, and door latches. Samples are collected using the commercial sweeper mop, sweeping a majority of the floor surface area. The sweeper mop is disinfected with 70% ethanol between uses and allowed to dry.
  ➢ Electrostatic dust wipes from each stall are placed in a pre-labeled sterile whirl-pak® bag using a gloved hand (for composite culture) and immediately transported to the laboratory for processing.
  ➢ Infection Control Personnel report culture results back to JLV-VTH Staff responsible for the stall or cage as soon as results become available.
  ➢ These data are routinely summarized by Infection Control Personnel and reported quarterly to the Infection Control Committee.

• Routine Environmental surveillance: Electrostatic dust collection wipes are used for routine environmental surveillance on smooth floors and hand-contact surfaces throughout the hospital. Sampling is conducted by Infection Control Personnel using commercially available electrostatic dust collection wipes (Swiffer®, Proctor & Gamble). Sampling is scheduled at about monthly intervals for most areas, and more frequently for areas which are more commonly contaminated with *Salmonella*.
  ➢ Disposable latex gloves are worn when handling wipes, changing gloves between samples.
  ➢ Floor samples are collected using the commercial sweeper mop, sweeping a majority of the floor surface area. The sweeper mop is disinfected with 70% ethanol between uses and allowed to dry.
  ➢ Hand-contact surfaces (door knobs, handles, keyboards, telephones, medical instruments, etc.) are sampled with the wipes using a gloved hand.
  ➢ After sampling, wipes are placed into pre-labeled sterile whirl-pak® bags using a gloved hand.
  ➢ Samples are immediately transported to the laboratory for processing.
  ➢ Infection Control Personnel report any positive culture results back to JLV-VTH Staff responsible for the positive area as soon as results become available.
  ➢ These data are routinely summarized by Infection Control Personnel and reported quarterly to the Infection Control Committee.

5.7 Antimicrobial Resistance and Antimicrobial Drug Use: [Return to Top] Antimicrobial resistance is one of the most important societal issues of the 21st century. Any aggressive infection control program must consider the important impact that antimicrobial resistance can have on the ability to provide quality medical care. The Infection Control Committee is charged with monitoring antimicrobial drug use at the VTH, and promoting conservative use practices that help to preserve the usefulness of antimicrobial drugs.

5.8 Research and Teaching Animals: [Return to Top] Personnel using animals for research and teaching in the JLV-VTH must adhere to all applicable Infection Control procedures. Approval should be obtained from the JLV-VTH Director prior to initiating these activities.
• Teaching and research animals may not be housed in patient housing areas of the JLV-VTH.
• If, because of extraordinary circumstances, investigators or instructors believe there is justifiable reason to house research or teaching animals with the general hospital population, the person responsible for this activity must
prepare an Infection Control protocol to be submitted to the Infection Control Committee one month in advance to allow time for review and approval.

II. Equine Infection Control SOP

It is essential that all students, clinicians and staff be familiar with the basics of hygiene and personal protection. All persons working in the Equine Hospital are responsible for maintaining cleanliness of the facility. Please review the infection control guidelines presented in the general section of the Infection Control SOP.

1.0 Attire for Inpatient and Outpatient Areas of the Equine Hospital

- The JLV-VTH promotes the use of hospital dedicated attire in order to decrease the risk of carrying infectious agents home where people or animals may be exposed.
- All personnel are required to wear clean professional attire, clean protective outer garments, and clean, appropriate footwear at all times when working in outpatient areas of the Equine Hospital.
- Approved section uniforms that are dedicated for hospital use are an acceptable alternative to wearing protective outer garments by staff and faculty.
- This attire should be appropriate to the job at hand (e.g. coveralls and heavy boots or shoes are probably the most appropriate footwear and protective outer garments when working with large animal patients performing tasks which are accompanied by a high-risk of being soiled with infectious materials).
- Footwear: It is recommended that all personnel wear sturdy boots or shoes at all times while working in the Large Animal Hospital or on Field Service. This type of footwear is easier to clean and disinfect compared to footwear constructed of porous materials (e.g. running shoes), and helps to protect against injury when working around large animal patients.
- Personnel must be willing to disinfect footwear while working, which provides a good check regarding suitability (are you willing to fully immerse them in a footbath!). Water-impervious footwear is strongly recommended to limit damage to footwear that will eventually occur after exposure to footbath solutions.

2.0 General Cleanliness and Hygiene

Maintaining hospital cleanliness and appropriate personal hygiene are responsibilities of ALL personnel working in the Equine Hospital.

- Hands must be washed or cleaned with an alcohol-based hand sanitizer prior to, and after examining each patient.
- Clean exam gloves should be worn when handling high-risk patients (i.e. infectious disease suspect or neonatal foals).
- Surfaces or equipment contaminated by feces, secretions, or blood must be cleaned and disinfected immediately by personnel in charge of the patient. This is especially important regarding patients known or suspected of shedding important infectious disease agents.

2.1 Disinfection Protocol for Instruments and Equipment

- All instruments, equipment or other objects, including stomach tubes, floats, mouth speculums, endoscopes, grooming tools, clipper blades, etc. must be sterilized or disinfected between uses on different patients.
- Materials that are sterilized between uses (instruments and equipment such as buckets, stomach tubes, fluid pumps, funnels, and mouth speculums) must be cleaned with soap and water and disinfected with a 0.5% chlorhexidine solution after use on patients. The equipment should then be returned to Central Supply for sterilization.
- Stethoscopes:
  - Stethoscopes owned by personnel may be used on animals in the medicine and surgery aisles, but must be disinfected with alcohol or hand sanitizer solution between patients.
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- JLV-VTH-owned stethoscopes must be used on patients with increased risk of shedding contagious agents; these are stored at patients’ stalls during hospitalization, and disinfected with 90% isopropyl alcohol, 70% ethanyl alcohol, or 0.5% chlorhexidine between uses.
- At the primary clinicians’ discretion, higher quality stethoscopes owned by personnel may be used for special exams, but this should not be routine for all exams and stethoscopes must be thoroughly cleaned and disinfected after each use.

Thermometers:
- Personnel should not carry thermometers for use on multiple equine patients.
- New digital thermometers are assigned for use with individual equine inpatients at the time of hospitalization (charged to clients); these thermometers are stored at the stall during hospitalization. Alternatively, disposable thermometers (Tempa Dots®) are used, especially in common treatment and exam areas.

Hoof picks:
- Personnel should use hoof picks assigned to individual stalls to clean feet, and these should be cleaned and disinfected between patients.
- Individuals may use their own hoof picks but these must be thoroughly cleaned and disinfected between uses on different horses.

Twitches:
- Twitches must be disinfected after every use using 90% isopropyl alcohol, 70% ethanyl alcohol, or 0.5% chlorhexidine.

Other instruments and equipment owned by personnel (e.g., hemostats, scissors, etc) may be carried and used on multiple patients, but they must be cleaned and disinfected between patients using 70% isopropyl alcohol or 0.5% chlorhexidine available in various areas.

Personnel walking horses are responsible for cleaning any fecal material from the ground. Shovels are available in many locations throughout the barn. Forks are available from an area between straw and hay storage areas. When horses with contagious enteric infections are walked, they should be followed by a second person responsible for cleaning and disinfecting fecal material that is voided by the patient while in transit.

The rounds rooms, records rooms, and the Equine Technicians Office must be kept clean and neat at all times, including table tops, counter tops, and floors. Backpacks, etc. should be stored in cubbyholes in room 109. Do not store extra clothing, backpacks, etc. in the breezeway or the staging area.

2.2 Food and Beverages

- Food and beverages may only be stored and consumed in rooms 109 (technicians’ office), 104 (medicine rounds room) and H107 (surgery rounds room) in the Equine Hospital.
- Food and beverages should be sealed in non-spill containers and be stored in backpacks in the cubbyholes. Do not leave food out at any time.
- Refrigerators are not available in the Equine Hospital to store food or beverage intended for human use.
- Disposable cups are available for drinking water in the records room, outpatient, and Isolation.

3.0 Guidelines for Receiving Equine Outpatients

- Equine patients without signs of contagious disease may be unloaded in the equine trailer parking area on the south side of the Large Animal Hospital unless the clinical condition or weather necessitates it be unloaded in the breezeway.
- Outpatients will be stalled in the outpatient stalls (located in the breezeway and the outpatient exam area) or at their trailer.
- Outpatients should not be taken into equine inpatient areas except to be weighed for patient management (e.g., appropriate dosing of drugs, etc).
• Attending personnel are responsible for cleaning outpatient stalls. Specifically, students, interns or residents, and clinicians are responsible for ensuring that fecal material is promptly removed from outpatient stalls and appropriately disposed. If necessary because of urination or defecation, attending personnel should temporarily remove patients from stalls and clean the area with a hose.
• Horses should never be fed or bedded in outpatient stalls. Horses may be watered in outpatient stalls using an owner’s bucket or using a bucket owned by the JLV-VTH. If a bucket owned by the JLV-VTH is used then personnel responsible for the case must clean and disinfect the bucket using appropriately diluted chlorhexidine after each use.

4.0 Guidelines for Receiving and Managing Equine Inpatients in the Main Hospital

Please refer to the “Contagious and Zoonotic Disease Matrix” when developing differential lists for patients to ensure that all diseases of high concern have been considered.

4.1 Stall Assignments: Stalls for housing equine inpatients are assigned by the Equine Nursing Staff. Personnel should check with the Equine Nursing Staff on duty day or night to find out where to put newly admitted inpatients prior to putting the animal into a stall in the hospital. In general:
• The NW aisle is used to house foals and their mares when admitted for medical care.
• The SE aisle is used to house patients admitted for orthopedic surgery.
• SW aisle is used to house other patients admitted for medical care and other surgical patients.
• The NE aisle is used to house colic patients.
• The isolation unit is used for patients with known or suspected contagious or zoonotic infections.

4.2 Tack (e.g. halters, leads, blankets, leg wraps, etc.)
• Tack owned by clients is not to be left with patients at the JLV-VTH.
• The JLV-VTH supplies halters and leads for patients (muzzles and blankets are also available if required).
• JLV-VTH owned tack is stored at the patients’ stalls when not in use.
• All tack supplied by the JLV-VTH is disinfected between patients by soaking in chlorhexidine solution.

4.3 Salmonella Surveillance in Large Animal Patients:
Because of the risks and consequences associated with nosocomial salmonellosis in our hospital, the JLV-VTH maintains an active surveillance program to detect Salmonella shedding in hospitalized large animal patients. This active surveillance program is intended to supplement the required culture of patients in which infection with Salmonella is a reasonable differential. Information about Salmonella surveillance is detailed in the General Section of the Infection Control SOP (See pages 37 and 37 for more information).

4.4 Patient Records and Medications
• Records, medications, and other materials used in the care of cases assigned to surgery service should be stored in the South Records Room (Rm 108).
• Records, medications, and other materials used in the care of cases assigned to medicine service should be stored in the North Records Room (Rm 104).
• Personnel should avoid moving between records rooms unless absolutely necessary (e.g., medicine personnel should avoid using the South Records Room, and surgery personnel should avoid using the North Records Room). This will help to prevent inadvertent movement of infectious agents through foot traffic and other activities.
4.5 Stall Cards, Treatment Orders, and Patient Census Board

- A stall card must be posted at the time that patients are admitted.
- The front of the stall card must list pertinent client and patient identification, names of students and clinicians assigned to the case. The type of forage to be fed should also be listed (grass hay, alfalfa hay, or mixed).
- The back of the stall card must list the admitting complaint or tentative diagnosis especially as they pertain to the infectious disease status (this allows the cleaning crew to better understand the infectious disease hazards and the associated precautions that should be associated with patients).
- The diagnoses on the back of the stall card pertaining to the infectious disease status must be updated as patients’ status change during hospitalization.
- Patient information must also be recorded on the census board located across from the Technicians Office. Anticipated discharge date and time should also be noted on the census board when this becomes available.
- Treatment orders are posted at the stall doors.
- Stall cards, treatment orders, and the patient census board contain confidential patient information. As such, visitors should never be allowed to read this information for animals that they do not own.
- If the animal is suspected of having a contagious disease, it is very important for the veterinarian managing the case to send an email to the Contagious Disease Alert listserv (VTH-Contagious-Dz-Alert@colostate.edu), which will notify Infection Control Personnel, heads of sections and nursing staff, and cleaning personnel. This email should include the patient signalment, veterinarian assigned to the case, housing area, and the known or suspected contagious disease.
  - Place an orange sticky note ("SPECIAL ATTENTION REQUIRED") on the door of any room where the patient has been managed, after completely filling out the requested information.

4.6 Feed and Water

- All grain or other supplements (including that provided by clients) must be stored in plastic containers with tight fitting covers.
- Only minimal amounts of bedding, forage, and concentrate feeds are to be stored in the Large Animal Hospital in order to decrease the likelihood of contamination and to decrease the availability of food and hiding places for wildlife.

4.7 Bedding

- Students, nursing staff, and clinicians are responsible for bedding stalls and feeding patients as they arrive.
- Occupied stalls are cleaned and re-bedded with clean straw in the evenings by the Cleaning and Maintenance personnel.
- Stalls are normally to be picked in the morning and bedding is refreshed as needed.
- Stalls bedded with sand are picked daily and refreshed with new sand on Mondays, Wednesdays, and Fridays.
- If at other times the stalls are noted to be excessively soiled or wet, students, clinicians, and technical staff are responsible for cleaning and re-bedding stalls.
- Only minimal amounts of bedding and forage are to be stored in the Large Animal Hospital in order to decrease the likelihood of contamination and to decrease suitable habitat for rodents and birds.

4.8 Discharge:

Prior to discharge, clients or their agents must be instructed about infectious disease hazards associated with patients and recommendations about control of these hazards on the home premises.
- The anticipated time and date of discharge should be noted on the census board.
- Cleaning and Maintenance personnel should be notified between 4:00 and 4:30 p.m. if patients will be discharged shortly after this time so that unnecessary effort is not expended cleaning these stalls.
- Pick hooves prior to leaving the stall, then scrub feet with chlorhexidine before exiting hospital.
• When a patient is discharged, the stall card should be tossed into the stall to indicate that the animal is no longer hospitalized.

• Stalls used to house patients with known or suspected contagious agents should be marked with a sign (“Do Not Use, Special Cleaning Required”). The known or suspected infectious agent must be marked on a white tape marker placed on the stall door. Also, Infection Control Personnel (x7-5150) and the supervisor for the Cleaning and Maintenance crew should be notified of the stall number and patient ID.

• Students, nursing staff, and clinicians are responsible for breaking down items around stall and ensuring that they are discarded, filed, or cleaned and disinfected (fluids, brushes, barrier gowns, paperwork, etc).

5.0 Visitors at the Equine Hospital: [Return to Top] Visiting hours for the Equine Hospital are from 11:00 am to 12:30 pm and 4:00 pm to 6:30 pm daily. All visitors must check in at the Large Animal Reception desk prior to entering the Large Animal Hospital.

• All visitors must strictly adhere to Infection Control Precautions for managing patients.
  ➢ Clients must adhere to requirements for appropriate clothing. Specifically, for safety, shorts and open-toed shoes are not allowed to be worn in the equine hospital. Coveralls are available for clients to wear if requested.
  ➢ A student, clinician, or equine nurse should escort clients to their animal’s stall.
  ➢ Clients must adhere to all barrier nursing requirements that apply to their animals in order to touch the animals or enter stalls.
  ➢ All visitors should be instructed to thoroughly wash their hands after leaving inpatient areas.

• Clients may visit their animals, but are not allowed to wander in the facility and specifically are not allowed to touch other patients or read their stall cards or treatment orders. Information about other patients is confidential, including diagnoses, and should not be divulged.

• The general public is not allowed to tour inpatient areas of the Large Animal Hospital. Special arrangements can be made to provide tours for visiting scientists by contacting Infection Control Personnel.

• Owners or their designated agents may visit hospitalized inpatients; other interested parties are not allowed to visit inpatients without express permission of the owners.

• Clients are never allowed to visit animals housed in Equine Isolation, and when appropriate should be discouraged from entering the colic aisle. With express permission from Infection Control Personnel, exceptions to this visitation rule may be granted under extraordinary circumstances, such as when patients are to be euthanized.

6.0 Guidelines for Managing Equine Patients with Suspected or Confirmed Contagious Diseases: [Return to Top] Special precautions are required when managing patients known or suspected to be infected with contagious disease agents. Conditions of special concern because of the potential for nosocomial transmission include patients with acute gastrointestinal disorders (e.g. diarrhea), acute respiratory tract infections, or infections with bacteria that are resistant to multiple antimicrobial drugs.

• Please refer to the “Contagious and Zoonotic Disease Matrix” when developing differential lists for patients to ensure that all diseases of high concern have been considered.

• Patients with elevated contagious disease risk will be managed as outpatients or isolated from the general equine hospital population and discharged as soon as possible.

• Owners or their agents are required to complete the “Client Statement Regarding Potentially Contagious Diseases” prior to admission of all equine patients (see below). This includes mares that are accompanying their foals, or vice versa.
  ➢ If the client responds “YES” to any of the questions on the Client Statement form, the clinician on the case will be informed, and the client will be asked to keep their horse(s) outside until they have been checked in.
and a student, nurse, or veterinarian has been paged so they can determine which actions must be taken to minimize the potential for exposure to other patients.

- Clinicians are encouraged to conduct initial physical examinations on these patients outside at the trailer in order to evaluate the contagious disease risk.
- Personnel should consider implementing barrier nursing precautions when handling these patients until evaluations suggest that the risk of contagious disease transmission is negligible.

- Infection Control Personnel should be notified as soon as possible when patients with elevated contagious disease risk are admitted or develop these problems while hospitalized. At their earliest opportunity, the veterinarian responsible for the case must notify all affected personnel about the recognition of the specifics related to this situation. They must also notify personnel regarding changes in the housing (e.g., when moving into isolation units), and at the time of discharge.

- This is most efficiently done by sending an email to the Contagious Disease Alert listserv (VTH-Contagious-Dz-Alert@colostate.edu), which will notify Infection Control Personnel, heads of sections and nursing staff, and cleaning personnel. This email should include the patient signalment, veterinarian assigned to the case, housing area, and the known or suspected contagious disease.

- Additionally, use orange sticky notes (i.e., “SPECIAL ATTENTION REQUIRED” sticky notes) to identify rooms, stalls, or other materials (e.g., laundry or instruments) that may be contaminated, after completely filling out the requested information.

- Only Infection Control Personnel or the Hospital Director can give permission to house equine patients with known or suspected highly contagious diseases in locations other than Equine Isolation Facility.

- Patients with moderate contagious disease risk status may also be required to be housed in isolation, at the discretion of Infection Control Personnel.

- When patients with elevated contagious disease risk status are housed in the main inpatient areas, effort must be made to use appropriate barrier nursing and biocontainment practices with the patient.
  - Barrier nursing precautions must be used at all times.
  - Disinfectant footbaths or footmats may also be required.
  - Stalls housing these patients should be cordoned off with barricades.
  - Empty stalls should be maintained on either side and across the aisle.
  - Using stalls at the end of aisles is preferred to stabling near main traffic corridors.

- The suspected or confirmed disease status must be relayed to the Infection Control Personnel ASAP so that they can assist in communication and evaluating if appropriate precautions are being taken to house the animal.

6.1 Movement of High Risk Patients  

- Patients requiring isolation at the time of admission should ideally be transported directly to the Equine Isolation Facility in the owners’ trailer/transport vehicle.

- If patients are moved from the Main Equine Hospital to the Isolation Facility, they should be moved by a route that minimizes exposure of other patients and contamination to the facility.

- VTH Personnel handling patients while being moved should use barrier nursing precautions.

- Any areas or equipment contaminated with infectious material during transit should be immediately cleaned with soapy water (tide with bleach), rinsed, and disinfected with appropriately diluted Neutral Disinfectant Cleaner.
**CLIENT STATEMENT FOR STRANGLES (STREP EQUI INFECTION) AND OTHER POTENTIALLY CONTAGIOUS DISEASES.**

Date: ___________ 200__

1. In the past 6 months, has this horse had strangles, or have any other horses on the premises had strangles?

(STRANGLES is a contagious respiratory disease of horses caused by a bacteria called Streptococcus equi. Fever and pnuermonia (pus-like) nasal discharge are commonly seen. This disease is often accompanied by lymph node enlargement and/or abscesses in the head and neck region.)

YES ______ NO ______

2. In the past 14 days, has there been a fever in this horse?

YES ______ NO ______

3. In the past 14 days, has there been diarrhea noticed in this horse?

YES ______ NO ______

Signature of Owner/Agent
6.2 Diagnostic and Surgical Procedures on High Risk Patients

- Whenever possible, diagnostic, surgical, or other procedures should be performed wherever high-risk patients are housed, rather than moving the patient to common exam and treatment areas.
- Appropriate barrier nursing precautions must be followed by all personnel at all times during diagnostic or other procedures.
- If the patient requires diagnostics or other procedures which can only be performed in the main hospital facility (e.g., radiology, scintigraphy, surgery), these procedures should be performed at the end of the day whenever possible.
- Infection Control Personnel must be consulted prior to moving any high-risk patient for diagnostic or surgical procedures, except when clinicians judge that this movement is immediately necessary for managing the horse’s critical health care needs.
- The attending clinician is responsible for notifying appropriate VTH Personnel of the suspected infectious agent and methods that are prudent for containment (this includes cleaning and disinfection after procedures).
  - This information should be written on all request forms.
  - In general, all barrier nursing precautions that are required in the patient housing area will be required whenever handling that patient.
  - Instruments, equipment, and the environment should be thoroughly cleaned and disinfected after the procedure, regardless of where the procedure is conducted.
  - Precautions should be taken for surgery on large animal patients with or suspected of having infections that could be contagious diseases (includes all animals in the Isolation Facility and animals in the main hospital).
- The senior clinician must ensure that all services assisting with procedures are informed of the known/suspected agent, and appropriate barrier clothing precautions are being followed.
- If the patient has diarrhea, one person is needed to lead the animal, and another person must follow that is responsible for immediately cleaning and disinfecting fecal material that is voided by the patient while in transit.
- The senior clinician is also responsible for ensuring that the environment and equipment is appropriately cleaned and disinfected after the procedure. This includes induction areas, surgical areas, Recovery Stall, and any other applicable area of the hospital.
- Whenever possible, surgery on these patients will be performed at the end of the day, when surgery on all other elective patients has been completed (emergencies excepted).

6.3 Biological Specimens Obtained From Suspected or Confirmed Contagious Patients

- Please refer to the “Contagious and Zoonotic Disease Matrix” when developing differential lists for patients to ensure that all diseases of high concern have been considered.
- Specimens obtained from high-risk patients should be correctly labeled with appropriate identification, then placed in a Ziplock or Whirlpak bag.
- Use orange sticky notes (i.e., “SPECIAL ATTENTION REQUIRED" sticky notes) to identify rooms, cages, kennels, stalls, or other materials (e.g., laundry or instruments) that may be contaminated, after completely filling out the requested information.
- Care should be taken when placing specimens in bags to prevent contamination of the outside of the bag.
- Suspected conditions or disease agents should be clearly identified on all submission forms.

6.4 Reducing Infection Control Precautions for a Patient

- Only Infection Control Personnel or the VTH Director can give permission to amend precautionary requirements or reduce rigor of Infection Control precautions for patients that have an increased risk of contagious disease.
• Only Infection Control Personnel or the VTH Director can give permission to move patients from Isolation or the Colic Aisle to other areas in the hospital.
• In general, these decisions will be based upon the suspected disease agent, method of transmission, likelihood of persistent shedding or infection, likelihood of exposure to other contagious agents while housed in isolation, etc.

6.5 Required Diagnostic Testing in Patients with Suspected Infections: [Return to Top] Diagnostic testing to detect certain infectious and/or zoonotic agents provides essential information for appropriate clinical management of infected patients. This testing provides direct benefit to the patient in addition to benefiting clients' by allowing them to appropriately manage their other animals and protect their families. It also benefits the JLV-VTH as this information is essential for appropriate management of disease risk for all JLV-VTH patients and personnel.
• It is therefore mandatory for all hospitalized patients to undergo diagnostic testing if infection with specific contagious or zoonotic agents is a reasonable consideration. This diagnostic testing is considered essential to case management in the JLV-VTH and therefore is billed to the client.
• It is the responsibility of the senior clinician responsible for a patient’s care to ensure that appropriate samples are submitted for this testing, and that appropriate Infection Control precautions are taken with these patients.
• Infection Control Personnel should be notified as soon as reasonably possible that there is a reasonable index of suspicion that a hospitalized patient may be infected with one of the agents listed below.

6.6 Disease Differentials for Which Testing is Mandatory in Equine Patients: [Return to Top] Testing of appropriate samples is mandatory if the following disease or condition is a reasonable differential. A full description of testing, management, diagnosis, and potential treatment information is available in the Specific contagious Diseases of Concern Section of the Infection Control SOP.
• Corynebacterium psuedotuberculosis ... see page 111 for additional information.
• Equine Herpesvirus type 1 ... see page 112 for additional information.
• Equine Infectious Anemia Virus
• Influenza ... see page 115 for additional information.
• Rabies ... see page 127 for additional information.
• Salmonella ... see page 137 for additional information.
• Streptococcus equi equi ... see page 137 for additional information.
• Vesicular Stomatitis ... see page 141 for additional information.

6.7 Management of Patients with Known or Suspected Contagious Diseases or Conditions. [Return to Top]
• Please refer to the “Contagious and Zoonotic Disease Matrix” when developing differential lists for patients to ensure that all diseases of high concern have been considered.
• Gastrointestinal Infection: Gastrointestinal agents of greatest concern to equine patients as contagious nosocomial hazards in the VTH include Salmonella and rotavirus for animals less than 30 days-of-age. (See page 139 for more information)
• Respiratory Infection: Respiratory agents of greatest concern as contagious nosocomial hazards in the VTH include Influenza, Streptococcus equi equi (strangles), and Equine Herpesvirus types 1 or 4; Rhodococcus equi is also a concern for animals <30 days-of-age. (See page 140 for more information)  
• Vesicular Stomatitis Virus (VS) (See page 141 for more information) 
• Neurologic Disease: Infectious agents associated with neurologic disease that are of greatest concern as contagious nosocomial hazards in the VTH include rabies virus and Equine Herpesvirus type 1. (See page 140 for more information about EHV1 and page 127 for more information about rabies)
6.8 Management of Patients Infected or Colonized with Bacteria Resistant to Important Antimicrobial Drugs:  
Patients infected with bacteria resistant to important antimicrobial drugs or to multiple drug classes represent a potential health hazard to VTH Personnel, clients, and to other patients. As such, they are managed with increased Infection Control precautions intended to discourage dissemination in the VTH. (see page 142 for more information)

7.0 Equine – Mares, Foals and Neonates  
7.1 Barrier Nursing Precautions for Mares and Foals: Young foals that are hospitalized at the VTH often have an increased risk of acquiring infectious diseases because of existing disease processes including compromise to the innate and acquired immune system. In addition, hospitalized foals and their mares often shed enteric pathogens during the periparturient period. If foals or their dams have signs of contagious disease or are from farms experiencing outbreaks of contagious diseases they must be housed in the Isolation Unit and all isolation protocols followed. For those that do not have signs of contagious disease or are from farms with no known contagious disease outbreaks, they can be housed in the main equine hospital with the following protocols applied.

- Please refer to the “Contagious and Zoonotic Disease Matrix” when developing differential lists for patients to ensure that all diseases of high concern have been considered.
- Barrier nursing precautions are required when handling foals or when entering their stalls.
- For foals ≤ 10 days-of-age, barrier nursing precautions required for personnel when contacting patients or entering stalls include disposable exam gloves, washable yellow barrier gowns (Barrier Front Gowns, Catalog #521, Fashion Seal Inc.), and footbaths or footmats at every entry point to the mare and foal’s stall.
- For foals > 10 days but ≤ 2 months-of-age, barrier nursing precautions required for personnel when contacting patients or entering stalls includes disposable exam gloves.
- For foals ≤ 2 months-of-age with diarrhea, barrier nursing precautions required for personnel when contacting patients or entering stalls include disposable exam gloves, disposable blue barrier gowns (GEB-4250 PolyWear Gowns, PolyConversions Inc), and footbaths or footmats at every stall door.
- Mares of hospitalized foals that are ≤ 10 days-of-age are considered to have an increased risk of shedding *Salmonella*. As such, disposable exam gloves, disposable yellow gowns and disinfectant footbaths are required to be used by all personnel contacting mares or entering their stalls.
- Exam gloves should be discarded every time personnel leave stalls to minimize potential contamination in other areas.
- Barrier gowns are assigned to individual patients and are hung at the stall door. Care should be taken to always use one side of the gowns as the “outside” to minimize contamination of clothing. Care should also be taken to use the mare’s gown with the mare and the foal’s gown with the foal.
- Personnel should not enter stalls unless contact with patients is required. Primary clinicians may at their discretion take students into a stall for teaching purposes, but this should be minimized as much as possible, and all personnel entering stalls must use appropriate barrier nursing precautions.
- This policy also applies to all ancillary services, and section uniforms are not a suitable alternative for this requirement.

8.0 Equine Colic  
Because of documented increased risk of shedding *Salmonella*, colic patients are hospitalized separately from other patients and are managed using more stringent Infection Control precautions. All colic patients are hospitalized in the Colic Aisle (NE aisle), unless they meet criteria for hospitalization in the Isolation Unit or the NE aisle is closed for annual cleaning purposes.
8.1 Attire and Barrier Nursing Precautions

- **To enter the colic aisle:**
  - All personnel entering the colic aisle with the intent to handle patients or enter stalls are required to wear attire dedicated for use in this area. This includes a clean protective outer garment dedicated for use in the colic aisle and clean rubber overboots; both of these items are stored in the colic aisle staging area at the south end of the aisle, near the center of the barn and are not worn in other areas of the VTH. Outer garments and boots are labeled “colic aisle”.
  - The areas located South of the painted red line (staging area, records area, and storage areas) may be entered wearing attire approved for use in other inpatient areas of the hospital, in street attire following disinfectant application to shoes, and when an animal is not present in the standing stocks.
  - Students, staff and doctors’ personal smocks or coveralls are to be left in the staging room and not to be worn down the colic aisle.
  - Barrier nursing precautions are not mandatory while setting-up stalls for colic patients, but it is required that barrier precautions be used as soon as possible after the initial set-up is complete.
  - This policy also applies to all ancillary services, and section uniforms are not a suitable alternative.

- **To enter colic stalls:**
  - In addition to garments described above that are dedicated for use in the colic aisle, barrier nursing precautions that are required when contacting patients or entering stalls include:
    - Disposable exam gloves
    - Disposable blue barrier gowns
    - Footbaths at every stall door
  - Blue barrier gowns are assigned to individual patients and are hung at the stall door. Each colic patient has a set of two blue plastic barrier gowns at each stall.
  - Each person entering a stall needs to wear a blue plastic gown in addition to exam gloves.
  - Care should be taken to always use one side of the gowns as the “outside” to minimize contamination of coveralls or clothing.
  - Step into the foot bath when entering and exiting stall.
  - Personnel should not enter stalls unless contact with patients is required. Primary clinicians may at their discretion take students into a stall for teaching purposes, but this should be minimized as much as possible, and all personnel entering stalls must use barrier nursing precautions.
  - Remove gloves when exiting the stall for any purpose in order to prevent contamination of hand contact surfaces outside of the stall.
    - Do not wear gloves or plastic barrier gowns into feed stall.
    - Discard plastic barrier gowns as they become contaminated with blood, reflux, and manure or ripped.
    - Hands should be washed or hand sanitizer should be used before and after contacting every patient.

- **Special Services Personnel:**
  - Personnel consulting from Special Services (radiology, ophthalmology, etc.) are required to follow the same requirements when entering the colic aisle or handling patients there.
    - Infection Control protocols must be adhered to when entering the equine ward and the colic aisle.
    - All equipment and surfaces that contact horses must be sprayed with appropriately diluted Neutral Disinfectant Cleaner, chlorhexidine or alcohol and wiped down.
    - If the horse is taken to other departments (e.g. CT), Special Services personnel may wear gloves and plastic barrier gowns over their normal protective attire while handling the patient.
Equipment and surfaces must be appropriately cleaned and disinfected in the other areas immediately after the horse is released from that area.

8.2 Guidelines for Managing Equine Colic Patients

- **Case Definition:** All pre-operative and/or post-operative colic cases and chronic colic patients will be stalled in the colic aisle. *Salmonella*-positive and those suspected of being infected with *Salmonella* must be housed in the Isolation Facility. Exceptions to this policy may only be approved by the Directory of Infection Control or the Hospital Director. Please refer to the “Contagious and Zoonotic Disease Matrix” when developing differential lists for patients to ensure that all diseases of high concern have been considered.

- **Foot Traffic:** When entering the colic aisle with a horse, the handler should use the north entrance of the NE aisle only, weather permitting. Exceptions may be considered if the horse is not stable enough to walk that distance or when it is necessary to obtain an accurate body weight using the scale located in the equine ward; in these instances it may be acceptable to enter through the south end of the colic aisle.
  - VTH Personnel should meet the horse at the entrance wearing appropriate colic aisle attire, including a plastic barrier gown and gloves.
  - If the horse needs to exit the colic aisle for any procedures, including walking, surgery, or discharge to the owner, the handler must wear barrier nursing attire.
  - Equine nurses will monitor foot traffic in the colic aisle. If the nurses believe that too many people are in the aisle, they have the authority to request that some of the individuals leave the colic aisle.
  - Video monitors (web cameras) should be used whenever possible to frequently observe and monitor equine colic patients when direct contact is not required (See below).

- **Colic Aisle Cameras:** The colic aisle cameras can be accessed through the internet on the VTH website under the patient cameras: [http://oghmaprod.cvmbs.colostate.edu/cameras.cfm](http://oghmaprod.cvmbs.colostate.edu/cameras.cfm). The cameras have a 60 second time delay but will still allow the ability to frequently monitor these patients while decreasing foot traffic and decrease the potential for dissemination of contagious pathogens. Designated staff can also access this website from outside the VTH using eID and password login. It should be noted that these cameras cannot completely replace direct viewing or examination of patients. For example, it may not be possible to determine from the image whether fluids have become depleted or disconnected. However, cameras should be used whenever possible to frequently observe and monitor equine colic patients when direct contact is not required.

- **Patient Care:** Each case will have an assigned student who will be responsible for SOAPS, flow sheets, pharmacy prescriptions and anything else pertaining to the case. Nursing care is provided by the equine nursing staff around the clock except when high case load or emergency duties necessitate that personnel assigned to care for colic patients must assist with other duties. In these instances, students or other personnel may be required to assist in care of colic patients.

- **Stall Care:** The colic stalls will be cleaned twice daily.
  - Morning cleaning:
    - Performed by the LAEM technician and LAEM students seven days a week prior to 7am.
    - If the technician is not able to change bedding in the morning, then LAEM students are expected to help clean stalls and re-bed before they leave their shift.
    - *Footbaths* should be changed every 2-3 days or more often as needed to ensure they are clean and free of excessive contamination with manure or bedding.
  - Afternoon cleaning:
    - Performed by cleaning crew employees seven days a week.
Any patient in this aisle that has any one or combination of the following signs will have its stall cleaned last:
- Fever
- Leukopenia
- Diarrhea / soft stools

8.3 **Colic Equipment and Materials:** Each stall will have a tote made up with a small supply of materials for each new patient. Using the materials out of the totes first will limit contamination and waste.

- Each colic case should receive a stethoscope and thermometer upon arrival. These should remain with the patient stall side in the colic aisle. If the patient has a naso-gastric tube placed to allow for reflux, all necessary equipment (including pump, tube, bucket and dose syringe if needed) should be brought down to the colic aisle and put stall side with the patient.
- When the patient does not need the equipment anymore, it should be thoroughly cleaned with soap and water, and then placed into the nolvasan disinfecting barrel in the colic aisle where it will be picked up by a technician and taken back to central supply to be re-sterilized. Instead of using the sink, ideally equipment should be cleaned on the floor next to the soaking barrel, and then placed directly into the nolvasan barrel.

8.4 **Walking and Grazing Areas for Colic Horses**

- Walking horses housed in the colic aisle is restricted to the area just outside the colic aisle (north of colic aisle only).
- All appropriate colic attire needs to be worn when walking with the colic horse.
- The horses are not allowed into the sand arena or around the arena nor any of the grassy areas. This includes the grass strip just outside of the isolation barn.
- If the horse needs to have grass to allow for gut motility there is a grass box just east of the Livestock Hospital that is available for horses to graze on during their walk.
- If the horse should defecate while outside on a walk, feces should be picked up and thrown into designated dumpsters outside of colic aisle. The area should then be sprayed down with Neutral Disinfectant Cleaner as soon as possible.

8.5 **Colic Aisle Visitation by Clients:** Client visiting hours for colic patients are the same as visiting hours for other patients: 11am-12:30pm and 4pm-6:30pm, daily.

- Visitors are only permitted into the colic aisle if accompanied the entire time by a technician, PVM student assigned to the service or a clinician.
- All other cases in the aisle need to be stable and/or procedures must be completed before clients can be escorted into the colic aisle.
- Please ensure that clients stay with their horse and do not wander around the aisle observing or contacting other cases.
- The number of visitors per patient should be limited; please ask clients to use discretion.
- No children ten years or younger are allowed in any inpatient areas of the equine hospital, including the colic aisle.
- Exceptions can be granted by Infection Control Personnel or the VTH Director when patients have an extremely poor prognosis.
- Clients must follow all of the colic aisle procedures pertaining to foot traffic and appropriate attire.

9.0 **Equine Isolation**

9.1 **Guidelines for Managing Patients in Equine Isolation:** Strict attention to hygiene and use of barrier nursing precautions in Isolation Units is absolutely critical for appropriate containment of contagious disease agents.
• At their earliest opportunity, the veterinarian responsible for the case must notify all affected personnel about the recognition of the specifics related to this situation. They must also notify personnel regarding changes in the housing (e.g., when moving into isolation units), and at the time of discharge.

• This is most efficiently done by sending an email to the Contagious Disease Alert listserv (VTH-Contagious-Dz-Alert@colostate.edu), which will notify Infection Control Personnel, heads of sections and nursing staff, and cleaning personnel. This email should include the patient signalment, veterinarian assigned to the case, housing area, and the known or suspected contagious disease.

• Additionally, use orange sticky notes (i.e., “SPECIAL ATTENTION REQUIRED” sticky notes) to identify rooms, cages, kennels, stalls, or other materials (e.g., laundry or instruments) that may be contaminated, after completely filling out the requested information.

• Before and after examining each patient, hands must be washed with soap and water or cleaned with alcohol-based hand sanitizer.

• Clean exam gloves must be worn at all times when working in the isolation perimeter (concrete apron), Anterooms, and patient stalls. Gloves must be changed between working in different Anterooms, or stalls.

• Gloves should be changed after handling any doors, equipment, etc., associated with an isolation stall.

• Surfaces or equipment contaminated by feces, other secretions or blood must be cleaned and disinfected immediately by personnel in charge of the patient.

• Special care must be taken to prevent contamination of the isolation environment by dirty hands, gloves, or boots.

• Use all footbaths or footmats encountered.

• Footbaths are changed and the plastic tub cleaned completely twice per week by the barn crew. In addition, foot baths should be changed whenever they are dirty or empty.

• Environmental hygiene is the responsibility of all personnel working in the isolation unit. Do not wait for a technician or other personnel to clean. Avoid contaminating Anterooms with straw or manure, and assist with general cleanup and maintenance whenever possible.

• Students assigned to the isolation case are responsible for routine cleaning and organization of Anterooms when their patients are housed in Equine Isolation. This includes cleaning and disinfecting counters, unicell drawers, door handles, and door knobs, changing footbaths when needed, and emptying trash into the dumpster at the NW end of Equine Isolation enclosure.

• Personnel working in Equine Isolation may keep one covered beverage in the Isolation Office, but beverages are not allowed in other areas of the Isolation Facility.

• Food is not allowed in Equine Isolation because of the risk of exposure to zoonotic agents.

9.2 Minimizing Entry into the Isolation Unit: Entry into the unit should only occur when absolutely necessary.

• Whenever possible and appropriate, personnel should utilize web cameras for general monitoring of patients’ conditions in order to minimize foot traffic into the Isolation Facility, the webcam is available at http://oghmaprod.cvmb.colostate.edu/cameras.cfm. This website can only be accessed from computers in the VTH unless special login and password are obtained.

• When possible, it is optimal to have different people provide care for patients in isolation (i.e., it is best if the same person is not caring for patients in the main hospital as well as those in isolation). If it is necessary to work on patients in multiple housing areas (e.g., main hospital and isolation), personnel should take optimal precautions when moving between areas and handling patients with different infectious disease risks.

• Personnel should not enter stalls unless contact with patients is required. Primary clinicians may at their discretion take students into a stall for teaching purposes, but this should be minimized as much as possible, and all personnel entering stalls must use appropriate barrier nursing precautions.

• Clients are not permitted to enter Equine Isolation without express permission from Infection Control Personnel.
Requests for client visitation in Equine Isolation will only be granted under extreme circumstances (e.g., patient will be euthanized or is not expected to survive, etc).

- In other situations, owners can visit their horses only from the perimeter of the Isolation Facility; they are not permitted to enter the stall or enter within the wire enclosure surrounding the Isolation Facility. The top door of the stall can be temporarily opened and insect screens removed to allow the owner a visual and verbal contact with the patient from outside the wire enclosure.

9.3 Equipment and Materials: In general, any materials taken into the Isolation Facility should not be taken back to the main hospital.

- Any supplies taken into an Isolation Anteroom should be used for that patient or discarded (do not use on multiple patients or return them to the Isolation Office).
- No equipment or supplies (bandages, syringes, disinfectant, etc.) should be taken to Equine Isolation without first checking with personnel responsible for this area.
- Medications used on isolation patients should be billed to the client and sent home at discharge or else discarded. Do not return medications or intravenous fluids from Isolation to the Pharmacy. All medications sent home with clients must be dispensed in appropriate child-proof containers with a complete prescription label.
- Intravenous fluids not assigned to a patient should be stored in the Isolation Office (not in the Isolation Staging Area).
- Additional cleaning supplies and disinfectant are stored in the bathroom at the SW corner of the Isolation Building.
- Additional scrubs, isolation gowns, supplies, etc., are stored in the Isolation Office.
- VTH-owned stethoscopes are used on patients in the Equine Isolation Unit.
- New digital thermometers (dispensed and charged to clients) or disposable thermometers are used in Equine Isolation.
- Samples obtained from isolation patients for laboratory testing should be placed on the red cart just inside the door to the Isolation Office. This will minimize the likelihood of contaminating other surfaces in the Isolation Office. The surface of the red cart should be disinfected after sealing samples in biohazard bags (all fecal samples must be sealed in a biohazard bag prior to leaving the isolation area).

9.4 Procedures for Personnel Entering and Exiting Equine Isolation Areas

- To enter the Equine Isolation Office:
  - All personnel are required to use the disinfectant footbath or footmat as they enter the Isolation Staging Area (prior to entering the office).
  - Street shoes may be worn in the Equine Isolation Office only.
  - Personnel are NOT permitted to exit the office [into the isolation perimeter] in street shoes.
  - Personnel should enter through the northeast door into the Isolation Staging Area and Isolation Office.
  - Leave clinic smocks or coveralls outside the Isolation Unit or hang in the Isolation Staging Area (on NE side).
  - Wash hands or use hand sanitizer before touching any surfaces. Alternatively, gloves can be worn while handling boots and then discarded afterwards.
  - If you will be entering any Isolation Anterooms or Stalls, prior to putting on isolation boots, put on orange scrubs over your street clothes.

- To enter the isolation perimeter (cement apron surrounding the outside of the Isolation Facility):
  - Use footbath or footmat at the Isolation Office door.
  - At a minimum all personnel are required to wear clean yellow overboots, and exam gloves.
  - Students feeding Equine Isolation patients should change gloves between patients.
This policy also applies to all ancillary services, and section uniforms are not a suitable alternative for this requirement.

- **To enter isolation Anterooms:**
  - At a minimum, all personnel are required to wear clean orange scrubs, clean yellow overboots, and exam gloves.
  - Use footbath or footmat in the Anteroom.
  - Wash hands for at least 30 seconds or use hand sanitizer upon entering Anteroom (especially if having come from another Isolation Stall).
  - Wash hands again when exiting the Anteroom.

- **To enter isolation stalls:**
  - At a minimum all personnel are required to wear clean yellow overboots, clean orange scrubs, water impervious gown, bouffant cap, and exam gloves.
  - This policy also applies to all ancillary services, and section uniforms are not a suitable alternative for this requirement.
  - Cleaning Personnel are required to adhere to all relevant policies regarding attire in Equine Isolation.
  - Use footbath when entering the stall.
  - Take all necessary supplies into the stall when entering to minimize traffic in and out of Anterooms.
  - Procedures involving highly contaminated sites should be performed last (e.g., rectal temperature, rectal palpation, manipulation of strangles abscesses, etc.)

- **Exiting occupied isolation stalls:**
  - Footbaths must be used when exiting the stall.
  - Avoid dragging bedding or fecal material into the Anteroom.
  - Appropriately dispose of sharps in sharps container.
  - Clean and disinfect thermometer, stethoscope, and hoof pick by wiping with 70% isopropyl alcohol.
  - Put the previously cleaned hoof pick in chlorhexidine solution to soak until next used.
  - Store grooming tools in a mesh bag that is hung on a hook in the Anteroom.
  - Remove gloves and re-glove. Use the clean gloves to complete flow sheets and process samples.

- **Exiting Anterooms of occupied Isolation Stalls:**
  - Remove gown and hang in Anteroom.
  - Clean counter top and disinfect with Neutral Disinfectant Cleaner available in each Anteroom.
  - Once daily, clean door knobs with disinfectant.
  - Discard cap and gloves in Anteroom. (Do not wear gloves from one stall into another).
  - Clean boots (scrub if needed) in footbath before leaving the Anteroom.
  - Wash hands thoroughly with soap and water or decontaminate with alcohol-based hand sanitizer.
  - Turn off water faucets with the paper towel used to dry hands.

- **Exiting the Isolation Unit:**
  - Use hand sanitizer or wash hands upon re-entering the Isolation Office.
  - Remove orange scrubs and place in dirty laundry. If the laundry bin is full, bag laundry and line bin with new clear bag.
  - Clean isolation overboots in the Isolation Staging Area and hang on pegs near door.
Wash hands thoroughly with soap and water before leaving the Isolation Facility.
Use the footbath or footmat prior to exiting the Isolation Staging Area.

9.5 Procedures for Moving Equine Patients into Isolation

- At the time of admission to the Isolation Unit, it is very important for the veterinarian managing the case to send an email to the Contagious Disease Alert listserv (VTH-Contagious-Dz-Alert@colostate.edu), which will notify Infection Control Personnel, heads of sections and nursing staff, and cleaning personnel. This email should include the patient signalment, veterinarian assigned to the case, housing area, and the known or suspected contagious disease.

- Place an orange sticky note (“SPECIAL ATTENTION REQUIRED”) on the door of any stall or room where the patient has been managed, after completely filling out the requested information.

- Stalls should be prepared for patients prior to moving them into isolation.

- Bed stalls using 1 bale of straw (boots, orange scrubs, and gloves required).

- Check with the resident on the case before turning water on in case consumption is being monitored.

- Stock Anteroom if not already done. A bag with supplies in the Isolation Office is available in the Tupperware container next to the red cart.

- Set up footbaths. See general section of the Infection Control sop for directions on making up a Virkon footbath.

- When possible, patients to be housed in isolation at the time of admission should be transported directly to the Equine Isolation Facility in the owners’ trailer/transport vehicle and unloaded in the driveway west of the Isolation Facility.

- Patients stabled in the inpatient areas of the facility that are to be moved to the Isolation Facility should not be walked through the breezeway; they should be walked on a path that exposes them to the least number of other horses. Horses in the north aisles can exit the overheard doors on the north side and horses in south aisles should be walked around the outside of the main equine hospital facility. This will help reduce the potential for contamination of this high traffic area.

- It is best to have 2 people assist with this effort
  - One person dresses in appropriate Isolation Facility attire, sets up the Isolation Stall, and receives the patient at the gate.
  - The other person moves the patient from the main hospital to the isolation perimeter.

- All personnel handling the patient must use appropriate attire and barrier nursing precautions.
  - If entering isolation with the patient or receiving the horse at the gate, all personnel are required to wear full isolation garb (isolation scrubs, isolation overboots, isolation barrier gown, bouffant caps, and gloves).
  - If handing the patient off to someone already in isolation, disposable barrier gowns and gloves are satisfactory to lead the patient.

- Personnel must pick and scrub the patient’s hooves using 0.5% chlorhexidine solution prior to leaving the stall in the main hospital in order to minimize contamination while walking the horse to Isolation.

- Leave all equipment and supplies in the main hospital, other than medications and records (and thermometer and stethoscope if these were dedicated for use with the patient).

- Upon entering the chain link gate to Isolation, remove hospital halter and lead from the patient and replace them with a halter and lead dedicated for use in Isolation.

- It is critical to clean and disinfect surfaces if fecal material or bodily fluids contaminate surfaces during the process of moving animals.

- Personnel responsible for the case will ensure that the stall has been “broken down”, empty fluid bags have been discarded, (etc.) and all equipment has been placed in a clear bag labeled to denote stall and case number so that this equipment can be properly disinfected.
9.6 **Cleaning and Feeding in Equine Isolation** [Return to Top]

- All personnel are responsible for assisting with cleaning and maintenance of the Isolation Facility! Everyone should help clean when it is noticed that something needs to be done.
- Hospital cleaning and maintenance crews will clean and re-bed stalls once daily, in the evening.
- **Footbaths** are changed on Monday, Wednesday, Friday, and Sunday by hospital cleaning and maintenance crews.
- Additional cleaning should be done throughout the day by other personnel.
- Students assigned to cases are responsible for routine cleaning of Anterooms, cleaning of stall walls if contaminated with diarrhea and changing footbaths as needed in the AM.
- Students are responsible for feeding equine patients housed in isolation. Bring feed through the stall door and not through the Anteroom. Do not enter the feed room with contaminated gloves.
- Nursing staff are responsible for overseeing cleaning and disinfection, and stocking of the Isolation Office and Staging Area.

9.7 **Procedures for Patients Leaving Isolation** (for discharge, diagnostic procedures or walking) [Return to Top]

- Personnel must brush patient and pick hooves in the stall prior to exiting.
- Just prior to exiting the stall, scrub hooves using 0.5% chlorhexidine solution which should be prepared in isolation buckets using 30 mls of chlorhexidine to ½ gallon of water.
- Personnel moving the patient are required to wear all appropriate attire and barrier precautions.
  - Personnel should either transfer handling of the patient to another person dressed in appropriate barrier garments, or they should remove yellow isolation boots at the Isolation Facility Perimeter. It is preferable if personnel handling Isolation Patients outside of the Isolation Facility wear rubber overboots (not yellow boots worn in the Isolation Facility).
  - Personnel handling the patient should avoid contaminating doors, gates, etc. with contaminated gloves or hands in the process of moving patients.
- Patients moving from isolation should not be walked through the breezeway unless absolutely necessary (e.g., to enter surgical facilities). If it is absolutely necessary to move horses through the breezeway, personnel should take appropriate precautions to minimize contact with other patients, clients, and other personnel in the breezeway.
  - Diagnostic and therapeutic procedures that must be performed in the main hospital on Isolation Patients should be scheduled for the end of the day, and all surfaces and floors that are potentially contaminated must be promptly cleaned and disinfected in order to minimize the likelihood of nosocomial transmission.
- Personnel must ensure that instructions given to clients adequately address the infectious disease hazards associated with the patient (to other animals and to humans), and appropriately provide suggestions for mitigating risks to people and animals.
- If the tractor with the yellow tub is used to remove a dead patient, the tub and wheels of the fork lift are cleaned and disinfected with Neutral Disinfectant Cleaner.
- Horses housed in isolation may only be exercised if prior authorization is given by Infection Control Personnel.

9.8 **Use of Ultrasonography, Radiography, or EKG in Equine Isolation** [Return to Top]

- Personnel from ancillary services must wear appropriate clothing and barrier precautions when handling patients from Equine Isolation.
- Personnel from the ancillary service along with their necessary equipment should remain in the Anteroom or in the Isolation Perimeter and not enter the stall unless absolutely essential to completion of the procedure.
- If necessary, horses should be restrained with the shank and twitch available in the Anteroom for that Isolation Stall. This equipment must be cleaned and disinfected after each use.
• After performing an EKG, personnel must clean and disinfect the leads with a gauze sponge soaked in disinfectant (0.5 % chlorhexidine or 70% alcohol) paying particular attention to cleaning and disinfecting the clips and wires that have touched the patient.
• After performing endoscopy, the technician will clean and disinfect the endoscope, light source, etc. according to the recommended procedure attached to the endoscope.
• All radiography equipment and supplies must be cleaned and disinfected with appropriately diluted Virkon-S or Neutral Disinfectant Cleaner after the examination is performed.
• Cassette should be placed inside plastic bags prior to use.
• Before removing the equipment from the Isolation Area, clean any gross contamination from the wheels and cart, and disinfect with appropriately diluted Virkon-S or Neutral Disinfectant Cleaner, allowing 15 minutes contact time.

10.0 Equine Surgery and Anesthesia [Return to Top]

10.1 Attire for the “Clean” Areas of the Equine Surgical Facility (refer to the VTH and VDL Dress Code at http://www.vth.colostate.edu/VTHDressCode.pdf):
• Clean surgical (green) scrubs and head covers, are required for entry into designated “clean” areas of the Surgical Facility, including scrub rooms and surgical theatres. These are the areas located to the West of the red line painted on the floor of the facility.
• Shoe covers or footwear dedicated for use in designated “clean” surgical areas are also required for all personnel.
• Green surgical scrubs are to be worn ONLY in the VTH; scrubs are not to be worn out of the VTH building, even when traveling to and from the VTH.
• Outside of designated “clean” areas of the Surgical Facility, all personnel should wear some type of clean outer garment over scrubs (e.g., white coat, smock, or coveralls). Personnel must also remove shoe covers when exiting “clean” surgical areas (personnel wearing dedicated surgical footwear should put on shoe covers prior to exiting designated “clean” areas).
• All personnel, including cleaning and maintenance personnel, are required to adhere to all relevant policies regarding attire in equine surgery facilities.

10.2 Hygiene for Perioperative Management of Equine Patients: [Return to Top]
• High standards of cleanliness and hygiene must be maintained throughout the Equine Surgery Facility.
• The Surgical team and patient’s surgery site must be aseptically prepared. Aseptic technique must be maintained while in surgery.
• Nonessential personnel are prohibited at all times.
• Movement of anesthesia students, staff, and faculty between the anesthesia preparation area and the Large Animal Hospital will be kept to a minimum.
• Personnel must don clean exam gloves before placing IV catheters or examining mucous membranes.

10.3 Guidelines for Perioperative Management of Equine Patients: [Return to Top] Perioperative management of patients can greatly influence the likelihood of incisional or other nosocomial infections. As such, basic management procedures should always emphasize use of barrier nursing precautions and maximizing separation between patients. Standards for personal, patient, and environmental hygiene in the surgical and perioperative areas should be among the highest in the VTH.
• Hands must be washed or hand sanitizer used between all patient contacts. Hands should also be washed after patient contact to prevent contamination of hand-contact surfaces (e.g., doors, counter tops, equipment, etc).
An alternative is to use exam gloves as a barrier nursing precaution and to discard gloves after each patient contact.
- Clean exam gloves must be worn whenever catheters or endotracheal tubes are being placed.
- Fecal material should be removed immediately from the Anesthesia Prep Area or other areas of the Surgical Facility. If needed the floor should be hosed between patients and disinfected with appropriately diluted Neutral Disinfectant Cleaner.
- Equipment such as belly bands, hobbles, mouth syringe, endotracheal tubes, etc., will be cleaned and disinfected between uses using appropriately diluted chlorhexidine.
- Routine (e.g., daily) environmental cleaning and disinfection should be carried out in a rigorous manner following prescribed protocols.

10.4 **Anesthesia Induction Area:** [Return to Top]
- Activities conducted prior to entering the Anesthesia Induction Area:
  - Anesthesia request forms should be completed the day prior to procedures when possible. All known or suspected contagious diseases should be clearly noted on the request form.
  - Do not clip the surgery site of patients prior to the day that procedures are scheduled. This predisposes to colonization of incisional sites with potentially pathogenic bacteria.
  - Patients should be thoroughly brushed or bathed prior to entering the Anesthesia Induction Area. Students assigned to the case should take primary responsibility for ensuring that this is completed if required.
  - Whenever possible, horses’ shoes should be removed prior to entering the Anesthesia Induction or Standing Surgery Areas. Personnel should wear disposable gloves when handling patients’ feet or thoroughly wash hands after completion. Students’ should take primary responsibility for ensuring that this is completed.
  - All horses’ feet should be picked and scrubbed with chlorhexidine solution prior to entering the Anesthesia Induction or Standing Surgery Areas. Personnel should wear disposable gloves when handling patients’ feet or thoroughly wash hands after completion. Students’ assigned to the case should take primary responsibility for ensuring that this is completed.

- Activities conducted in the Anesthesia Induction Area:
  - Equine surgical patients will be delivered to the Anesthesia Prep Area one hour prior to scheduled procedures (i.e., scheduled table time), and placed in a holding pen in the Anesthesia Prep Area until the time of induction.
  - Rinse the patient’s mouth with water. The metal mouth syringe will be soaked in chlorhexidine solution between cases and should be rinsed prior to using on any patient.
  - Prepare the IV catheter site aseptically and place the catheter using aseptic technique. Clean exam gloves must be worn for this procedure.

10.5 **Postoperative Activities:** [Return to Top]
- Equine patients must be returned to their stabling area as soon as it is safe after recovery to reduce the amount of fecal contamination in the Recovery Stalls, and to provide sufficient time for Recovery Stall cleaning.
- Patient transport tables must be cleaned and disinfected with Neutral Disinfectant Cleaner solution (allowing 15 min contact time), then thoroughly rinsed with water between uses.
- Recovery Stalls must be swept and mopped with Neutral Disinfectant Cleaner solution between cases.
- The oxygen insufflation hose used in recovery must be sprayed with chlorhexidine solution (allowing 15 min contact time). The distal end of the tubing (the end used in the horse) must be cleaned of debris with soap and water, soaked in chlorhexidine solution (allowing 15 min contact time), and rinsed between cases.
- Anesthesia machines must be cleaned and disinfected between cases:
  - Valves and domes will be cleaned with water and dried.
10.6 Other Routine Cleaning and Disinfection Procedures: [Return to Top]

- All induction, surgery, and recovery areas are thoroughly cleaned and disinfected at night by Animal Care personnel.
- Endotracheal tubes (ET):
  - Clean inside and outside of ET tubes with mild soap and water, using a scrub brush.
  - Soak ET tubes in a large barrel of chlorhexidine solution for at least 15 minutes.
  - Thoroughly rinse ET tubes with warm water being careful not to set them down in the sink.
  - Hang ET tubes to dry in designated cabinet in the Anesthesia Induction Area.
  - ET tubes are stored in this cabinet until needed.
  - Any ET tube laid on the ground will require disinfection before use.
- The mouth gag must be soaked in chlorhexidine solution for 15 minutes after each use, then rinsed and placed on the rack to dry to prevent corrosion.
- The belly band and hobbles are scrubbed with soap and water and soaked in chlorhexidine solution as needed.
- Lead ropes and halters used by the Anesthesia Service will be thoroughly rinsed in clean water before use, and scrubbed with soap and water and soaked in chlorhexidine solution as needed.
- All large animal anesthetic machines and ventilators will be broken down and thoroughly cleaned/disinfected on a regular basis.
- Environmental samples will be obtained from the recovery rooms and surgical theatres on a monthly basis and cultured for the presence of pathogenic bacteria and to quantify bacterial counts.

10.7 Management of Surgical Patients with Contagious Diseases: [Return to Top]

- Please refer to the “Contagious and Zoonotic Disease Matrix” when developing differential lists for patients to ensure that all diseases of high concern have been considered.
- Clinicians and students assigned to surgical cases are responsible for identifying and communicating when patients are known or suspected to have contagious diseases (e.g., S. equi infections, etc.)
- Procedures on these cases should be scheduled for the end of the day whenever possible.
- At their earliest opportunity, the veterinarian responsible for the case must notify all affected personnel about the recognition of the specifics related to this situation. They must also notify personnel regarding changes in the housing (e.g., when moving into isolation units), and at the time of discharge.
- This is most efficiently done by sending an email to the Contagious Disease Alert listserv (VTH-Contagious-Dz-Alert@colostate.edu), which will notify Infection Control Personnel, heads of sections and nursing staff, and cleaning personnel. This email should include the patient signalment, veterinarian assigned to the case, housing area, and the known or suspected contagious disease.
- Additionally, use orange sticky notes (i.e., “SPECIAL ATTENTION REQUIRED” sticky notes) to identify rooms, cages, kennels, stalls, or other materials (e.g., laundry or instruments) that may be contaminated, after completely filling out the requested information.
- Clinicians and students assigned to these cases are responsible for ensuring that induction and recovery areas have been appropriately identified as being potentially contaminated with contagious pathogens, as well as ensuring that they have been appropriately decontaminated prior to use with other patients.
• If the Equine Hospital or the individual patient’s risk status for transmission of contagious diseases is elevated, bathing with an antibacterial body wash (e.g., chlorhexidine soap) may be required, at the discretion of the surgeon or Infection Control Personnel.

11.0 Equine Ambulatory

11.1 Attire for the Equine Field Service
• All personnel working on Equine Field Service are required to wear clean professional attire, and clean, appropriate footwear at all times when working in outpatient areas of the Equine Hospital. Approved section uniforms that are dedicated for field service and hospital use are an acceptable alternative to wearing protective outer garments by staff and faculty.

• It is recommended that all personnel wear sturdy leather boots or shoes at all times while working in the Large Animal Hospital or on Field Services. This type of footwear is easier to clean and disinfect compared to footwear constructed of porous materials (e.g., running shoes), and helps to protect against injury when working around large animal patients.

• Footwear should be cleaned and disinfected between farms/clients. Rubber or plastic over boots should be available for use by all personnel in situations when exposure to contagious organisms is likely (e.g., S. equi equi or Salmonella infections).

• Personnel working on Equine Field Services should have spare sets of outer garments available to use in case their clothing becomes contaminated or soiled while on calls.

11.2 Hygiene for Equine Field Service
• Hands should be washed as often as possible, ideally before and after handling each patient but at a minimum when finishing work at a given premises even if no contagious disease issue was encountered.

• Personnel are encouraged to carry alcohol-based hand sanitizing solution in order to optimize hand hygiene when access to water is limited. Gloves should be worn when working with patients suspected of having a contagious disease.

• The waterless surgical scrub (Avgard 3M) can be used to disinfect hands before any invasive procedures.

• All instruments, including stomach tubes, mouth speculums, thermometers, etc., should be cleaned and disinfected after each use.

• Use of disposable Tempa Dots® is encouraged for measuring rectal temperature of patients in order to decrease the potential for spread of infectious agents between patients.

• Eating or drinking will be allowed at the discretion of the clinician in the ambulatory vehicles or in designated rooms on premises being visited, at the discretion of the supervising clinician.

• Trucks should be washed and hand contact surfaces (handles, hoses, etc) should be disinfected at least weekly.

III. Livestock Infection Control SOP

It is essential that all students, clinicians and staff be familiar with the basics of hygiene and personal protection. All persons working in the Livestock Animal Hospital are responsible for maintaining cleanliness of the facility. Please review the infection control guidelines presented in the general section of the Infection Control SOP.

1.0 General Attire for the Agricultural Animal Hospital

1.1 Footwear
• Rubber over-boots are required to be worn over shoes in all patient care areas of the Livestock Hospital including the large animal junior surgery laboratory.

• Over-boots must NOT be worn in the Livestock Classroom.
• Over-boots should have no or minimal tread in order to minimize the potential to track bedding and fecal material through the hospital. It is also preferred that rubber boots NOT have laces or buckles as they make it more difficult to thoroughly clean boots when they become soiled.
• Wellington boots (dairy boots) that require removal of shoes are not an acceptable alternative.
• It is recommend that sturdy, boots or shoes be worn under over boots in order to protect feet from crush injuries.
• Personnel wearing inappropriate footwear or rubber over boots will be asked to leave the service until they can return with proper boots.
• Rubber boots and other footwear should be cleaned and disinfected regularly, and whenever they become obviously soiled or contaminated.

1.2 Outerwear

• Hospital dedicated attire is recommended to be worn by all personnel to minimize the risk of inadvertent transmission of infectious agents to people or animals outside of the VTH.
• Clean coveralls must be worn in all patient care areas of the Livestock Hospital. Coveralls should be changed or cleaned daily or more frequently if they become noticeably contaminated.
• Surgical Attire:
  ➢ Clean surgical scrubs and over-boots are required for surgical procedures.
  ➢ Clean coveralls must be worn over scrubs when handling surgical patients pre- and post-surgery.
  ➢ Head covers and masks must be worn for surgery preparation and during surgery.

2.0 Required clothing for DVM clinical instruction in the Livestock Section (food animal section) of the VTH:

The following clothing requirements are intended to limit the potential for spread of infectious agents among large animal patients in the VTH. These requirements are also intended to protect the veterinary student from contaminating his or her clothing with infectious agents. These requirements are identical to those required for clinical rotations in the third and fourth years of the DVM curriculum.

2.1 Sleeved coveralls

• Sleeved coveralls limit contact of potentially infectious biologic material with underlying street clothes.
• Coveralls with torn sleeves or holes will not be considered of acceptable professional appearance.
• A source for durable coveralls is Pella Veterinary Apparel. The online catalogue is available at: www.pellavet.com; the suggested style is the Professional Poplin Jumpsuit, catalog # 180V. Other, similar brands and styles are acceptable; consider this company’s products as one potential source. Coveralls are typically ordered according to chest size and come in short, regular, and tall leg lengths. It is recommended that you order a chest size that allows you to wear warm clothing underneath; the use of men’s sizing is recommended for this purpose as well.
• Bib coveralls (with suspender straps) are not allowed for student use in the Livestock Section of the VTH as these enable contamination of underlying clothing.

2.2 Rubber overboots

• The overboots accepted for wear in the Livestock Section of the VTH are those that can be pulled on and off over street shoes or boots. Examples include Tingley’s boots or PVC Overboots.
• Both of these should be the 10”-12” height and have one or two snaps or buttons as fasteners.
• The low-profile tread on these overboots results in less tracking of manure and therefore reduces the risk of transfer of infectious agents among patients in the clinic.
• These overboots can be purchased at Jax Farm and Ranch and other local farm and ranch supply stores. These can also be ordered online at [www.gemplers.com](http://www.gemplers.com) (Under the footwear link, then under the overboots link, see Tingley Rubber Overboots 10” or Servus PVC Overboots 12”).
• You may wish to purchase a size of overboot that allows you to wear warm footwear underneath during the winter months.
• “Wellington”-type over-the-calf boots are **not allowed** in the Livestock Section of the VTH because their deep tread facilitates tracking of manure and because shoes cannot be worn underneath these types of boots.
• Boots with buckles are **not allowed**, as these tend to trap manure and are far more difficult to thoroughly disinfect than the recommended 1- or 2-button or snap design.

### 3.0 General Cleanliness and Hygiene

• Persons entering the Livestock Hospital should use the north entrance and not use the walkthrough from Equine. The walkthrough between Livestock and Equine areas should be used only in exceptional circumstances such as night emergency.
• Hands must be washed or cleaned with an alcohol-based hand sanitizer prior to, and after examining each patient.
• Clean exam gloves should be worn when handling high-risk patients (i.e. infectious disease suspect or neonatal foals).
• Surfaces or equipment contaminated by feces, secretions, or blood must be cleaned and disinfected immediately by personnel handling the patient. This is especially important regarding patients known or suspected of shedding important infectious disease agents. Cleanliness is the responsibility of ALL persons involved in the food animal services.
• Personnel are required to use all disinfectant footbaths and footmats that are encountered. Personnel are expected to fully immerse footwear in footbaths. Footwear should be scrubbed with a brush to remove organic debris if necessary.
• All equipment or objects, including stomach tubes, floats, mouth speculums, endoscopes, and thermometers must be sterilized or disinfected before use on any patient.
• Instruments and equipment such as buckets, stomach tubes, fluid pumps, funnels, and mouth speculums must be cleaned and disinfected with 0.5% chlorhexidine after use on the patient. When applicable, return equipment to Central Supply for complete sterilization.
• Equipment wheels or sides soiled with feces must be cleaned and disinfected prior to entering or leaving the facility or moving to another area of the facility.
• The rounds room should be kept clean including table, counter tops and floors.
• Disposable thermometers are used on all livestock animals. For animals with temperatures under 96°F and over 104°F there are digital rectal thermometers in the Livestock Technical Resources room.
• Rectal thermometer, stethoscope, hemostats, and scissors must be cleaned and disinfected between patients using 70% isopropyl alcohol or 0.5% chlorhexidine available in various areas.

### 3.1 Food and Beverages

• No Food or Drink is permitted in the Livestock Hospital except in the Livestock Classroom when supervised by a VTH employee (faculty, resident, intern, or technician). Technical staff may also use their office, room 121. No food or drink is allowed at any of the computer stations unless the computer is turned off and covered. Food and beverage should be sealed in non-spill containers and be stored in the lockers. **Do Not Leave Food Out at Any Time.**
• Disposable cups are available for drinking water in the records room.
4.0 Guidelines for Receiving and Managing Livestock Patients

4.1 Outpatient Receiving
- Livestock should be unloaded into the east holding pens or at the north door. Trailers should not block the road between the Large Animal Hospital and pastures.
- Trailers can be parked temporarily at the north or south ends of the east-side unloading area, or can be parked in the trailer parking lot.

4.2 Routine Management of Inpatients
- Please refer to the “Contagious and Zoonotic Disease Matrix” when developing differential lists for patients to ensure that all diseases of high concern have been considered.
- The clinical staff will assign stalls.
- Any leads or halters that came with the animal should be sent home with the owner.
- A stall card must be prepared and placed on the stall immediately upon occupancy. Include:
  - client/patient information
  - student and clinician names
  - status relative to known or suspected infection with contagious diseases
  - feeding instructions
- Fresh water must be provided to each patient, except when restriction is ordered by the clinician.
- All inpatients require footbaths containing Virkon solution.
- Salt blocks or mix should only be provided if the patient stays in the clinic for an extended period. These must be disposed of when the patient leaves.
- Feeding instructions should be discussed with the clinical staff. The feeding of all patients is the responsibility of the student in charge of the case unless otherwise indicated.
- All additional feeds other than hay (i.e. grains, pellets, etc) must be stored in plastic containers with lids.
- Hospital cleaning staff will clean the stall weekday mornings and add fresh bedding as needed. This will be performed by students or service area staff on weekends.
- Throw the stall card into the stall to indicate the animal is gone after it has been discharged from the hospital.

5.0 Routine Salmonella Surveillance in Large Animal Patients:
Because of the risks and consequences associated with nosocomial salmonellosis in our hospital, the JLV-VTH maintains an active surveillance program to detect Salmonella shedding in hospitalized large animal patients. This active surveillance program is intended to supplement the required culture of patients in which infection with Salmonella is a reasonable differential. Select link for details on sample collection and submission contained in the General Section of the Infection Control SOP. (see page 29 for more information)

6.0 Guidelines for Managing Livestock Patients with Suspected Contagious Disease:
Special precautions are required when managing patients known or suspected to be infected with contagious disease agents. Conditions of special concern because of the potential for nosocomial transmission include patients with acute gastrointestinal disorders (e.g. diarrhea), acute respiratory tract infections, Bovine Viral Diarrhea Virus, or infections with bacteria that are resistant to multiple antimicrobial drugs.
- Please refer to the “Contagious and Zoonotic Disease Matrix” when developing differential lists for patients to ensure that all diseases of high concern have been considered.
- The suspected or confirmed disease status must be relayed to Infection Control Personnel ASAP so that they can assist in communication and evaluating if appropriate precautions are being taken to house the animal.
- AT THE TIME THAT THE SUSPICION OF CONTAGIOUS DISEASE IS RECOGNIZED:
  - It is very important for the veterinarian managing the case to send an email to the Contagious Disease Alert
listserv (VTH-Contagious-Dz-Alert@colostate.edu), which will notify Infection Control Personnel, heads of sections and nursing staff, and cleaning personnel. This email should include the patient signalment, veterinarian assigned to the case, housing area, and the known or suspected contagious disease.

- Place an orange sticky note (“SPECIAL ATTENTION REQUIRED”) on the door of any stall or room where the patient has been managed, after completely filling out the requested information.

- Patients with elevated contagious disease risk will be managed as outpatients or isolated from the general hospital population and discharged as soon as possible.

- Owners of camelids (or their agents) are required to complete the “Client Statement for Persistent BVDV Infections in Camelids” prior to admission of all livestock patients (see below). This includes dams accompanying their crias, or vice versa.

  - If the client responds “YES” to any of the questions on the Client Statement form, the clinician on the case will be informed, and the client will be asked to keep their animal(s) outside until they have been checked in and a student, nurse, or veterinarian has been paged so they can determine which actions must be taken to minimize the potential for exposure to other patients.

  - Clinicians are encouraged to conduct initial physical examinations on these patients outside at the trailer in order to evaluate the contagious disease risk.

  - Personnel should consider implementing barrier nursing precautions when handling these patients until evaluations suggest that the risk of contagious disease transmission is negligible.

- Infection Control Personnel should be notified as soon as possible when patients with elevated contagious disease risk are admitted or develop these problems while hospitalized.

- Only Infection Control Personnel or the Hospital Director can give permission to house livestock patients with known or suspected highly contagious disease in locations other than the Livestock Isolation Unit.

- Patients with moderate contagious disease risk status may also be required to be housed in isolation, at the discretion of Infection Control Personnel.

- All calves and small ruminants with a history or clinical signs suggestive of contagious enteric, respiratory disease, BVD/mucosal disease will be examined and hospitalized in Calf isolation as deemed appropriate by the clinician on duty. Patients should enter through the south door of Calf isolation.

- Large ruminants with a history or clinical signs suggestive of contagious enteric, respiratory disease, or BVD/mucosal disease should be examined on the trailer or in the outpatient chute room. The clinician is responsible for determining the likely diagnosis and will decide whether the animal is admitted for outpatient surgery or inpatient treatment.

- **Any three (3) of the following clinical signs are suggestive of contagious enteric disease:**
  - Diarrhea
  - Septic mucous membranes
  - Fever
  - Inflammatory leukogram
  - Weight loss
  - Hypoproteinemia

- **Any three (3) of the following clinical signs are suggestive of contagious respiratory disease:**
  - Tachypnea
  - Nasal discharge
  - Fever
  - Inflammatory leukogram
  - Cough

- Enhanced Infection Control precautions must be used for patients confirmed with acute or persistent BVDV infection. Testing for BVDV infection status of animals where acute or persistent BVDV infection is a reasonable differential is required. (see page 111)

- AT THE TIME OF DISCHARGING A PATIENT WITH KNOWN OR SUSPECTED CONTAGIOUS DISEASE:
  - It is very important for the veterinarian managing the case to send a follow-up email to the Contagious
Disease Alert listserv (VTH-Contagious-Dz-Alert@colostate.edu), which will notify Infection Control Personnel, heads of sections and nursing staff, and cleaning personnel. This will allow responsible personnel to initiation the decontamination procedures for areas affected by this patient. This email should include the patient signalment, veterinarian assigned to the case, housing area, and the known or suspected contagious disease.

- Place an orange sticky note ("SPECIAL ATTENTION REQUIRED") on the door of any room where the patient has been managed, after completely filling out the requested information.

**Client Statement Regarding BVD Infections in Camelid Patients**

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**CLIENT STATEMENT FOR BVDV PERSISTANT INFECTION (PI) IN CAMELIDS**

Date: ______________ 20__  Time: ______________ am/pm

The BVDV PI test status of this animal is:

- BVDV PCR Negative
- BVDV PCR Positive
- Not Tested or Unknown

BVDV is a contagious viral disease that can infect camels and cause persistent infection and reproductive problems including abortion. Fetal infection during pregnancy can result in Persistent Infections (PI) of the fetus. These animals are born BVDV infected and shed virus for the rest of their life. PI animals can be detected by BVDV PCR test of blood or tissues.

Signature of Owner/Agent

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**6.1 Movement of High Risk Patients**

- Patients requiring isolation at the time of admission should ideally be transported directly to the Large Animal Isolation Facility in the owners’ trailer/transport vehicle.
- If patients are moved from the Main Hospital to the Isolation Facility, they should be moved by a route that minimizes exposure of other patients and contamination to the facility. Bovine patients should be moved using the VTH trailer or cow transporter.
- VTH Personnel handling patients while being moved should use barrier nursing precautions.
- Any areas or equipment contaminated with infectious material during transit should be immediately cleaned with soapy water (tide with bleach), rinsed, and disinfected with appropriately diluted Neutral Disinfectant Cleaner.
6.2 Diagnostic and Surgical Procedures on High Risk Patients

- Whenever possible, diagnostic, surgical, or other procedures should be performed wherever high-risk patients are housed, rather than moving the patient to common exam and treatment areas.
- Appropriate barrier nursing precautions must be followed by all personnel at all times during diagnostic or other procedures.
- If the patient requires diagnostics or other procedures (e.g., radiology, surgery) which can only be performed in the main hospital facility, these procedures should be performed at the end of the day whenever possible.
- Infection Control Personnel must be consulted prior to moving any high-risk patient for diagnostic or surgical procedures, except when clinicians judge that this movement is immediately necessary for managing a patient’s critical health care needs.
- The attending clinician is responsible for notifying appropriate VTH Personnel of the suspected infectious agent and methods that are prudent for containment (this includes cleaning and disinfection after procedures).
  - This information should be written on all request forms.
  - In general, all barrier nursing precautions that are required in the patient housing area will be required whenever handling that patient.
  - Instruments, equipment, and the environment should be thoroughly cleaned and disinfected after the procedure, regardless of where the procedure is conducted.
  - Precautions should be taken for surgery on large animal patients with or suspected of having infections that could be contagious diseases (includes all animals in the Isolation Facility and animals in the main hospital).
- The senior clinician must ensure that all services assisting with procedures are informed of the known/suspected agent, and appropriate barrier clothing precautions are taken.
- If the patient has diarrhea, one person is needed to lead the animal, and another person must follow with a trash bag or bucket to catch any fecal matter, immediately clean/disinfected contaminated areas.
- The senior clinician is also responsible for ensuring that the environment and equipment is appropriately cleaned and disinfected after the procedure. This includes induction areas, surgical areas, Recovery Stall, and any other applicable area of the hospital.
- Whenever possible, surgery on these patients will be performed at the end of the day, when surgery on all other elective patients has been completed (emergencies excepted).

6.3 Biological Specimens Obtained from Suspected or Confirmed Contagious Patients

- Specimens obtained from high risk patients should be correctly labeled with appropriate identification, then placed in a Ziplock or Whirlpak bag.
- Care should be taken when placing specimens in bags to prevent contamination of the outside of the bag.
- Suspected conditions or disease agents should be clearly identified on all submission forms.

6.4 Reducing Infection Control Precautions for a Patient

- Only Infection Control Personnel or the VTH Director can give permission to amend precautionary requirements or reduce rigor of Infection Control precautions for patients that have an increased risk of contagious disease.
- Only Infection Control Personnel or the VTH Director can give permission to move patients from Isolation or the Colic Aisle to other areas in the hospital.
- In general, these decisions will be based upon the suspected disease agent, method of transmission, likelihood of persistent shedding or infection, likelihood of exposure to other contagious agents while housed in isolation, etc.

6.5 Required Diagnostic Testing in Patients with Suspected Infections

Diagnostic testing to detect certain infectious and/or zoonotic agents provides essential information for appropriate clinical management of infected patients. This testing provides direct benefit to the patient in addition to benefiting clients’ by allowing them...
to appropriately manage their other animals and protect their families. It also benefits the JLV-VTH as this information is essential for appropriate management of disease risk for all JLV-VTH patients and personnel.

- It is therefore mandatory for all hospitalized patients to undergo diagnostic testing if infection with specific contagious or zoonotic agents is a reasonable consideration. This diagnostic testing is considered essential to case management in the JLV-VTH and therefore is billed to the client.
- It is the responsibility of the senior clinician responsible for a patient’s care to ensure that appropriate samples are submitted for this testing, and that appropriate Infection Control precautions are taken with these patients.
- Infection Control personnel should be notified as soon as reasonably possible that there is a reasonable index of suspicion that a hospitalized patient may be infected with one of the agents listed below.

- **Diseases Differentials for Which Testing is Mandatory:** Testing of appropriate samples is mandatory if the following disease or condition is a reasonable differential. A full description of testing, management, diagnosis, and potential treatment information is available in the Specific contagious Diseases of Concern Section of the Infection Control SOP.
  - **Bovine Viral Diarrhea Virus (BVDV)** … see page 111 for additional information.
  - **Corynebacterium pseudotuberculosis** … see page 111 for additional information.
  - **Cryptosporidium** … see page 112 for additional information.
  - **Rabies** … see page 127 for additional information.
  - **Salmonella** … see page 137 for additional information.
  - **Vesicular Stomatitis** … see page 141 for additional information.

6.6 **Management of Patients Infected or Colonized with Bacteria Resistant to Important Antimicrobial Drugs:** Patients infected with bacteria resistant to important antimicrobial drugs or to multiple drug classes represent a potential health hazard to VTH Personnel, clients, and to other patients. As such, they are managed with increased Infection Control precautions intended to discourage dissemination in the VTH. Select link to be directed to details. (see page 142 for additional information.)

7.0 **Environmental surveillance for Salmonella** [Return to Top]
- Upon notification that an inpatient is known or suspected to be infected with *Salmonella*, the housing environment will be scheduled for environmental sampling and culture.
- Clinicians are responsible for ensuring that Infection Control Personnel have been informed when these patients are discharged.
- After routine cleaning and disinfection procedures have been completed, a sign will be hung on the stall by Infection Control Personnel. The stall will remain vacant until the culture results are known.
- The Infection Control house officer will obtain environmental samples from the cleaned stall and submit for culture.
- The stall will be released for use with other patients when negative culture results have been confirmed.
- See page 37 for additional information.

8.0 **Livestock Isolation** [Return to Top]
8.1 **Guidelines for Managing Patients in Livestock Isolation:** Students will receive information on general Infection Control and isolation guidelines during the orientation provided by faculty and livestock technical staff on the first day of the rotation. More specific information will be provided on a case by case basis. Strict attention to hygiene and use of barrier nursing precautions in Isolation Units is absolutely critical for appropriate containment of contagious disease agents.
- Before and after examining each patient, hands must be washed with soap and water or cleaned with alcohol-based hand sanitizer.
- Clean exam gloves must be worn at all times when working in the isolation perimeter (concrete apron), Anterooms, and patient stalls. Gloves must be changed between working in different Anterooms, or stalls.
- Gloves should be changed after handling any doors, equipment, etc., associated with an isolation stall.
- Surfaces or equipment contaminated by feces, other secretions or blood must be cleaned and disinfected immediately by personnel in charge of the patient.
- Special care must be taken to prevent contamination of the isolation environment by dirty hands, gloves, or boots.
- Use all footbaths or footmats encountered.
- Footbaths are changed and the plastic tub cleaned completely twice per week by the barn crew. In addition, footbaths should be changed whenever they are dirty or empty.
- Environmental hygiene is the responsibility of all personnel working in the Isolation Unit. Do not wait for a technician or other personnel to clean. Avoid contaminating Anterooms with straw or manure, and assist with general cleanup and maintenance whenever possible.
- Students assigned to the isolation case are responsible for routine cleaning and organization of Anterooms when their patients are housed in Large Animal Isolation. This includes cleaning and disinfecting counters, unicell drawers, door handles, and door knobs, changing footbaths when needed, and emptying trash into the dumpster at the NW end of the Large Animal Isolation enclosure.
- Food is not allowed in Livestock Isolation because of the risk of exposure to zoonotic agents.

8.2 Minimizing Entry into the Livestock Isolation Unit: Entry into the unit should only occur when absolutely necessary. [Return to Top]
- Trafficking between the livestock isolation and the Equine Isolation facilities is prohibited.
- Whenever possible and appropriate, personnel should utilize web cameras for general monitoring of patients’ conditions in order to minimize foot traffic into the Isolation Facility, the webcam images are available at http://oghmaprod.cvmbs.colostate.edu/cameras.cfm. This website can only be accessed from computers in the VTH unless special login and password are obtained.
- When possible, it is optimal to identify and limit the people that provide care for patients in isolation. It is best if people caring for patients in isolation do not also care for patients in the main hospital. If it is necessary to work on patients in multiple housing areas (e.g., main hospital and isolation), personnel should take optimal precautions when moving between areas and handling patients with different infectious disease risks.
- Personnel should not enter stalls unless contact with patients is required. Primary clinicians may at their discretion take students into a stall for teaching purposes, but this should be minimized as much as possible, and all personnel entering stalls must use appropriate barrier nursing precautions.
- Clients are not permitted to enter Livestock Isolation without express permission from Infection Control Personnel.
  
  ➢ Requests for client visitation in Livestock Isolation will only be granted under extreme circumstances (e.g., patient will be euthanized or is not expected to survive, etc).
- In other situations, owners can visit their animals only from the perimeter of the Isolation Facility; they are not permitted to enter the stall or enter within the wire enclosure surrounding the Isolation Facility. The top door of the stall can be temporarily opened and insect screens removed to allow the owner a visual and verbal contact with the patient from outside the wire enclosure.

8.3 Equipment and Materials: In general, any materials taken into the livestock Isolation Unit should not be taken back to the main hospital. [Return to Top]
• FAM Technical staff will be responsible for stocking, set up, maintenance, and breakdown of equipment and supplies for the livestock isolation stall and Anteroom.
• Any supplies taken into the Livestock Isolation Anteroom should be used for that patient or discarded (do not use on multiple patients or return them to the Isolation Office).
• No equipment or supplies (bandages, syringes, disinfectant, etc.) should be taken to Livestock Isolation without first checking with personnel responsible for this area.
• Medications used on isolation patients should be billed to client and sent home at discharge or else discarded. Do not return medications or intravenous fluids from Isolation to the Pharmacy. All medications sent home with clients must be dispensed in appropriate child proof containers with a complete prescription label.
• Surplus medications are stored in the Livestock Hospital and single unit doses are transferred to the livestock isolation stall as needed.
• VTH-owned stethoscopes are used on patients in the Livestock Isolation Unit.
• Disposable thermometers or new digital thermometers (dispensed and charged to clients) are used in Livestock Isolation.
• Samples obtained from livestock isolation patients for laboratory testing should be placed on the counter in the livestock isolation Anteroom or submitted directly to the Diagnostic Laboratory. The surface of the counter should be disinfected after sealing samples in biohazard bags (all fecal samples must be sealed in a biohazard bag prior to leaving the isolation area).

8.4 Procedures for Personnel Entering and Exiting the Livestock Animal Isolation Area

• To enter the Livestock Isolation Anteroom:
  ➢ Boots and coveralls used in the main Livestock Hospital are removed and left back at the main hospital
  ➢ Livestock isolation is entered directly from the dedicated livestock isolation gate on the east side of Large Animal Isolation
  ➢ All personnel are required to use the disinfectant footbath or footmat as they enter the Livestock Isolation Anteroom.
  ➢ Wash hands for at least 30 seconds or use hand sanitizer upon entering Anteroom.
  ➢ Gloves and isolation over-boots should be worn immediately after washing hands.
  ➢ If proceeding to the Livestock Isolation stall, orange isolation coveralls must also be worn over street clothes.

• To enter the livestock isolation perimeter (cement apron surrounding the outside of the livestock Isolation Facility)
  ➢ Use footmat at the Isolation Anteroom door.
  ➢ At a minimum all personnel are required to wear clean isolation over-boots, and exam gloves.
  ➢ Students feeding Livestock Animal Isolation patients should wear clean gloves when obtaining food from the feed shed.
  ➢ This policy also applies to all ancillary services, and section uniforms are not a suitable alternative for this requirement.

• To enter isolation stalls
  ➢ At a minimum all personnel are required to wear clean yellow over-boots, clean orange livestock isolation coveralls, water impervious gown, and a second pair of exam gloves.
  ➢ This policy also applies to all ancillary services, and section uniforms are not a suitable alternative for this requirement.
  ➢ Cleaning personnel are required to adhere to all relevant policies regarding attire in livestock Isolation.
  ➢ Use footbath when entering the stall.
- Take all necessary supplies into the stall when entering to minimize traffic in and out of Anterooms.
- Procedures involving highly contaminated sites should be performed last (e.g., rectal temperature, rectal palpation, etc.)

**Exiting occupied isolation stalls**
- Clean boots (scrub if needed) in footbath before exiting the stall.
- Avoid dragging bedding or fecal material into the Anteroom.
- Appropriately dispose of sharps in sharps container.
- Clean and disinfect thermometer and stethoscope by wiping with 70% isopropyl alcohol.
- Remove outer gown and hang in Anteroom.
- Remove gloves and then re-glove. Use the clean gloves to complete flow sheets and process samples.

**Exiting Anterooms of occupied isolation stalls:**
- Clean counter top surfaces, door knobs, and phone receiver and disinfect with Neutral Disinfectant Cleaner available in the Anteroom twice daily.
- Remove boots and coveralls and then gloves.
- Discard gloves in Anteroom.
- Wash hands thoroughly with soap and water or decontaminate with alcohol-based hand sanitizer.
- Turn off water faucets with the paper towel used to dry hands.
- Use the footmat prior to exiting the livestock isolation Anteroom.
- Exit the Livestock Isolation Facility directly from the dedicated east gate.

### 8.5 Procedures for Moving Livestock Patients into Isolation

- Stalls should be prepared for patients prior to moving them into isolation.
- Bed stalls using 1 bale of straw (boots, orange scrubs, and gloves required).
- Stock Anteroom if not already done. A bag with supplies can be obtained from the livestock service technicians.
- Set up footbaths. [See general section of the Infection Control SOP for directions on making up a Virkon footbath.](#)
- When possible, patients housed in livestock isolation should be transported directly to the livestock Isolation Facility in the owners’ trailer/transport vehicle and unloaded at the time of admission.
- Patients stabled in the inpatient areas of the Livestock Hospital that are to be moved to the Livestock Isolation Facility should be walked or transported with a cow transporter on a path that exposes them to the least number of other patients or transported with the VTH trailer. The trailer and cow transporter must be cleaned and disinfected appropriately after use.
- It is best to have a minimum of 2 people assist with this effort.
  - One person dresses in appropriate Isolation Facility attire, sets up the Isolation stall, and receives the patient at the gate.
  - The other person moves the patient from the main hospital to the isolation perimeter.
- All personnel handling the patient must use appropriate attire and barrier nursing precautions.
  - If entering isolation with the patient or receiving the animal at the gate, all personnel are required to wear full isolation garb (isolation scrubs, isolation over-boots, isolation barrier gown, and gloves).
  - If handing the patient off to someone already in isolation, disposable barrier gowns and gloves are satisfactory to lead/transport the patient to isolation.
- Leave all medications, equipment, medical records, and supplies in the main hospital. The only records taken to the livestock isolation Anteroom are the stall/treatment sheets. It is critical to clean and disinfect surfaces if fecal material or bodily fluids contaminate surfaces during the process of moving animals.
• If the patient came from the main hospital, personnel will place an orange sticky note ("SPECIAL ATTENTION REQUIRED") on the door of the stall after completely filling out the requested information.
• Personnel responsible for the case will ensure that the stall has been “broken down”, and all equipment identified so that this equipment can be properly disinfected.

8.6 Cleaning and Feeding in Livestock Animal Isolation

• All personnel are responsible for assisting with cleaning and maintenance of the Isolation Facility. Everyone should help clean when it is noticed that something needs to be done.
• Hospital cleaning and maintenance crews will clean and re-bed stalls once daily, in the evening.
• Footbaths are changed on Monday, Wednesday, Friday, and Sunday by hospital cleaning and maintenance crews.
• Additional cleaning should be done throughout the day by livestock service students or staff.
• Students assigned to cases are responsible for routine cleaning of Anterooms, cleaning of stall walls if contaminated with diarrhea and changing footbaths as needed.
• Students are responsible for feeding patients housed in livestock isolation. Feed is obtained from the dedicated livestock isolation feed shed. Enter the feed room with new clean gloves. Bring feed through the stall door and not through the Anteroom. Livestock staff are responsible for overseeing cleaning, disinfection, and stocking of the Livestock Isolation Stall Anteroom.

8.7 Procedures for Patients Leaving Isolation

• Personnel must brush the patient in the stall prior to exiting.
• Personnel moving the patient are required to wear all appropriate attire and barrier precautions.
  ➢ Personnel should either transfer handling of the patient to another person dressed in appropriate barrier garments, or they should remove yellow isolation boots at the Isolation Facility Perimeter. It is preferable if personnel handling Isolation Patients outside of the Isolation Facility wear black rubber over-boots (not yellow boots worn in the Isolation Facility).
  ➢ Personnel handling the patient should avoid contaminating doors, gates, etc. with contaminated gloves or hands in the process of moving patients.
• Diagnostic and therapeutic procedures that must be performed in the main hospital on Isolation Patients should be scheduled for the end of the day, and all surfaces and floors that are potentially contaminated must be promptly cleaned and disinfected in order to minimize the likelihood of nosocomial transmission.
• Personnel must ensure that instructions given to clients adequately address the infectious disease hazards associated with the patient (to other animals and to humans), and appropriately provide suggestions for mitigating risks to people and animals.
• Animals that die in the isolation will be removed using the forklift and the yellow tub or another suitable dumpster or wheel barrow. Equipment used to move the animal, including the tub and wheels of the fork lift, must be cleaned and disinfected with Neutral Disinfectant Cleaner after the animal is moved.
• Patients housed in isolation may only be exercised if prior authorization is given by Infection Control Personnel.

8.8 Use of Ultrasonography, Radiography, or EKG in Livestock Animal Isolation

• Personnel from ancillary services must wear appropriate clothing and barrier precautions when handling patients from Large Animal Isolation.
• Personnel from the ancillary service along with their necessary equipment should remain in the Anteroom or in the Isolation Perimeter and not enter the stall unless absolutely essential to completion of the procedure.
• After performing an EKG, personnel must clean and disinfect the leads with a gauze sponge soaked in disinfectant (0.5% chlorhexidine or 70% alcohol) paying particular attention to cleaning and disinfecting the clips and wires that have touched the patient.
• After performing endoscopy, the technician will clean and disinfect the endoscope, light source, etc. according to the recommended procedure attached to the endoscope.
• All radiography equipment and supplies must be cleaned and disinfected with appropriately diluted Virkon-S or Neutral Disinfectant Cleaner after the examination is performed.
• Cassette should be placed inside plastic bags prior to use.
• Before removing the equipment from the isolation area, clean any gross contamination from the wheels and cart, and disinfect with appropriately diluted Virkon-S or Neutral Disinfectant Cleaner, allowing 15 minutes contact time.

9.0 Barrier Nursing and Infection Control Precautions for the Calf Isolation Facility

• Students, technicians, and clinicians are required to remove their regular hospital boots and coveralls prior to entry into the Anteroom.
• Gloves should be worn prior to entering the calf isolation Anteroom.
• Once in the Anteroom, personnel must put on a clean pair of orange coveralls (available in cupboard outside the entry door) and boots labeled "calf isolation."
• Enter calf isolation.
• Prior to handling an animal or entering a stall, personnel must put on a blue barrier gown, and a second set of gloves. A mask should be worn if the patient is suspected or confirmed to be infected with Cryptosporidium, or if personnel are at increased risk of infection with any enteric pathogen.
• The barrier gown should be marked with an X to denote which surface of the gown faces outward if/when it is worn again.
• When patient handling is completed, personnel must first remove the outer pair of gloves (discard), the barrier gown (discard if heavily soiled, otherwise hang on hook by stall), the mask, and then the inner pair of gloves.
• Wash hands at the sink in calf isolation and apply alcohol hand sanitizer.
• Put on a final pair of gloves and proceed to the Anteroom where the orange coveralls and boots are removed. If the orange coveralls are visibly soiled, these should be placed in the laundry bin outside of the Anteroom. Otherwise, orange coveralls can be hung on the hooks in the Anteroom for re-use.
• Remove the gloves and exit the calf isolation Anteroom.
• Personnel should proceed immediately wash their hands at the sink in the milk room or apply alcohol hand sanitizer.
• Once their hands have been sanitized, personnel can don their hospital coveralls and boots and return to work within the main facility.

10.0 Livestock Anesthesia

• The livestock area may be accessed through the North door after transporting the equipment around the outside of the Large Animal Hospital. The livestock facility should not be accessed via the equine barn unless this is absolutely necessary.
• The wheels on the anesthetic machines and carts will be disinfected with Neutral Disinfectant Cleaner or rolled over the Virkon disinfectant mat at the north door before being returned to the anesthesia service area.

11.0 Use of Livestock Procedures Laboratory

• Use of the Livestock Procedures Laboratory is scheduled through the Livestock Technicians.
• Footwear and outerwear requirements are the same as those used for the main Livestock Hospital.
• Students must store backpacks and other materials in their lockers in the main VTH building.
• Food and beverages are not allowed in the Procedures Laboratory and should also not be stored outside of the laboratory due to the risk for contamination with feces and enteric pathogens.
11.1 Requirements for Laboratories and Continuing Education with Animals or Cadaver Parts

- All personnel and attendees must have pullover rubber boots or plastic polyboots, smocks, coveralls and/or disposable aprons.
- If a surgical procedure is in progress, scrubs are acceptable.
- Clean any area contaminated by feces, blood, tissue etc. immediately upon completion of the procedure (aisle-ways, general area outside of the laboratory room, tables, countertops, equipment etc.).
- The laboratory room should be cleaned and disinfected after every use.

11.2 Requirements for Equipment and Supplies Being Brought into the Area

- Equipment from other areas of the hospital or ambulatory trucks must be thoroughly cleaned and disinfected before bringing into the Livestock Hospital and after use, before returning it to another area. Items should be rinsed or soaked in a solution of 0.5% chlorhexidine when appropriate. Alternatively, clean items may be taken to Central Supply for sterilization.
- Supplies for the Livestock Hospital and Junior Laboratories are stored in the Livestock Storage room adjacent to the Procedures Laboratory. The livestock technicians will obtain these items when needed.
- Supplies for Continuing Education programs or Research Studies need to be purchased at Central Supply or the Pharmacy.

12.0 Infection Control Procedures for Food Animal Ambulatory and Field Investigation Trips

- Clean coveralls and rubber over-boots (boots that fit over your shoes) are required attire.
- A clean pair of coveralls is required for each farm to be visited; students must determine how many farms will be visited each day (seldom more than 2) and plan accordingly.
- Students are expected to bring a stethoscope, penlight, hemostat, and bandage scissors. Thermometers will be provided.
- On a given farm, boots are washed as needed after each animal examined. Remove gross contamination of blood, pus, or manure before handling the next case.
- Examination gloves are recommended at all times. Gloves are required when working with adult cows with infectious diseases such as mastitis, pneumonia, or enteritis, and any calves. Change gloves when soiled. Hands will be thoroughly washed when finished working with these patients.
- All instruments, including stomach tubes, mouth speculums, thermometers, and CMT paddles should be cleaned and disinfected after each use.
- Eating or drinking will be allowed at the discretion of the clinician in the ambulatory vehicles or in designated rooms on the farm.
- At the conclusion of the visit, boots will be scrubbed, rinsed clean, and disinfected. If water is unavailable, dirty boots and coveralls may be placed in plastic bags and cleaned at the VTH. Boots and coveralls will be removed and stored on the floor of the truck or under the seat. Boots and coveralls will not be stored in the vet box.
- Clinicians are responsible for ensuring that trucks are washed and the floors and hand contact surfaces are disinfected at least once each week.
IV. Small Animal Infection Control SOP

It is essential that all students, clinicians and staff be familiar with the basics of hygiene and personal protection. All persons working in the small animal hospital are responsible for maintaining cleanliness of the facility. Please review the infection control guidelines presented in the general section of the Infection Control SOP.

1.0 Attire for Inpatient and Outpatient Areas of the Small Animal Hospital

- All personnel are required to wear clean professional attire, clean protective outer garments, and clean, appropriate footwear at all times when working in outpatient areas of the Small Animal Hospital.
- Approved section uniforms that are dedicated for hospital use are an acceptable alternative to wearing protective outer garments by staff and faculty.
- Protective outer garments (smock, lab coat, etc) and shoes should be changed or cleaned and disinfected whenever they become soiled with feces, urine, blood, nasal exudates or other bodily fluid. Thus it is a good idea to have an extra outer garment available for use.
- Personnel must wear closed toe footwear and must be willing to disinfect footwear while working. This provides a good check regarding suitability (are you willing to immerse them on a footmat!!?).
- The JLV-VTH recommends the use of hospital dedicated attire for all personnel in order to decrease the risk of carrying infectious agents home where people or animals may be exposed.

2.0 General Cleanliness and Hygiene:

- Hands must be washed or cleaned with an alcohol-based hand sanitizer prior to, and after examining each patient.
- Clean exam gloves should be worn when handling high-risk patients (i.e. infectious disease suspects).
- Surfaces or equipment contaminated by feces, secretions, or blood must be cleaned and disinfected immediately by personnel in charge of the patient. This is especially important regarding patients known or suspected of shedding important infectious disease agents.
- Clean and disinfect all equipment between patients (muzzles, specula, forceps, etc) using 70% isopropyl alcohol or 0.5% chlorhexidine available in various areas. Alternatively, clean equipment can be returned to Central Supply for sterilization when appropriate.
- Students are expected to carry some of their own equipment (e.g. scissors, clipper blades, thermometers, leash, stethoscope, percussion hammer, penlight and hemostat), and it is critical that these supplies are routinely cleaned and disinfected.
- If fleas or ticks are found on an animal, treat the animal with Frontline spray from pharmacy and bill to the client. Notify Animal Care of the parasite (7-1223) and do not use the room until appropriate cleaning and disinfection occurs.
- Ticks found on any animals should be taken to Parasitology (in the Clinical Pathology office) in a sealed container for immediate identification.

2.1 Food and Beverages

- Food and beverages may only be stored and consumed on the first floor in rounds rooms but specifically are not allowed to be stored or consumed in patient care areas.
- Patients are not allowed in any areas where food and beverages are allowed to be stored or consumed, and specifically are not allowed in any rounds rooms.
- Food and beverages should be sealed in non-spill containers and be stored in backpacks in the cubbyholes. Do not leave food out for long periods as this promotes bacterial growth and the occurrence of foodborne illness.
• Refrigerators used to store food or medications for patients must not be used to store food or beverage intended for human use.

3.0 General Set-up for Inpatients

• Client beds, blankets, collar tags and leash should be returned to the owner (they get lost, soiled and may become contaminated). Laundry service is not available for client blankets.
• Locate a clean cage in the ward designated for the service you are on.
• Prepare a cage card with the client/patient information and the student/clinician names.
• Suspected or confirmed infection status is to be written on the cage card immediately upon occupancy.
• Place pertinent signs on cage with important information for animal care attendants, (i.e. ”Student Will Feed,” ”Blanket at all times,” ”Caution—Will Bite,” etc.)
• Diets containing raw meat or bones are not allowed to be fed or stored in any form at the VTH regardless of diets that are routinely fed in the home environment.
• Provide fresh water, unless otherwise indicated by clinician.
• Do not move animals from cage to cage—clean the cage or run and return the patient to the same cage or run.
• When the patient is discharged, throw cage card into the cage to indicate the animal is gone.
• To save a cage for returning day patients, write ”Save cage until XXXX” on the cage-card and note the last date the cage will be used.

4.0 Managing Small Animal Patients with Suspected Contagious Disease

• Please refer to the “Contagious and Zoonotic Disease Matrix” when developing differential lists for patients to ensure that all diseases of high concern have been considered.
• Any animal with a history of acute vomiting, diarrhea, coughing or upper respiratory signs should be handled as a suspected contagious disease case.
• Animals with suspected contagious infectious disease should be treated as outpatients whenever possible.
• Appointments for possible infectious disease cases will be handled by the receptionists and personnel receiving cases as follows:
  ➢ If a client call indicates an acute case (within the past week) of vomiting, coughing, sneezing or diarrhea.
  ➢ The client will be asked to keep their pet outside until they have been checked in and a student has been paged so they can be taken directly to an exam room, small animal isolation, or CCU depending on the circumstances. Transport should preferably be on a gurney to decrease hospital contamination.
  ➢ The presenting complaint will be written on the schedule as “acute diarrhea” “acute vomiting”, “acute coughing” or “possible infectious disease”.
  ➢ The letters “PID” for “possible infectious disease” will be written next to the complaint.
  ➢ The only indicator each service may get is the word “PID” written on the schedule.
  ➢ If the appointment is made and is coming in on the same day, the receptionist will phone the service to let them know they have scheduled an appointment that is a possible infectious disease case.
  ➢ If the animal is presented directly to the reception desk without prior notification, the receptionist should contact the receiving service immediately and coordinate placement of the animal in an examination room or isolation to minimize hospital contamination.
  ➢ Every attempt should be made to reduce any direct contact with the patient and any other VTH patients.
  ➢ Animals should be transported to the appropriate exam / treatment / housing area by the shortest route possible to lessen the potential for hospital contamination. Consider using a gurney when possible to lessen the potential for hospital contamination.

• AT THE TIME OF ADMISSION:
  ➢ It is very important for the veterinarian managing the case to send an email to the Contagious Disease Alert
listserv (VTH-Contagious-Dz-Alert@colostate.edu), which will notify Infection Control Personnel, heads of sections and nursing staff, and cleaning personnel. This email should include the patient signalment, veterinarian assigned to the case, housing area, and the known or suspected contagious disease.

- Place an orange sticky note ("SPECIAL ATTENTION REQUIRED") on the door of any room where the patient has been managed, after completely filling out the requested information.
- Treatment and diagnostic areas, hospital equipment, and personnel clothing should be cleaned and disinfected immediately after contact with animals with suspected infectious disease regardless of contamination.
- If a contagious infectious disease is suspected based on history, physical examination, or evaluation of previously performed laboratory work:
  - Close off exam room
  - Place an orange sticky note on the door “SPECIAL ATTENTION REQUIRED” on the door after completely filling out the requested information.
  - AT THE TIME OF DISCHARGE, it is important that the veterinarian managing the case to send another email to the Contagious Disease Alert Listserv (VTH-Contagious-Dz-Alert@colostate.edu) to alert responsible personnel that the patient has been discharged, and that necessary cleaning and disinfection should be initiated.
  - Do not use the room until Animal Care has removed the sign, or until other adequate cleaning/disinfection occurs.
- Hospitalized small animal patients with suspected infectious gastrointestinal disease should be considered possible sources of nosocomial or zoonotic infection and should not be walked in common eliminating areas - they should be allowed to eliminate in the Isolation ward - or if needed - be transported on a gurney to the area designated for high-risk patients which is located immediately west of the ACC (see map below). All waste material must be properly disposed and contaminated surfaces in the hospital must be appropriately cleaned and disinfected as soon as possible.
- At discharge, personnel must ensure that instructions given to clients adequately address the infectious disease hazards associated with the patient (to other animals and to humans), and appropriately provide suggestions for mitigating risks to people and animals.
4.1 PID (“Potentially Infectious Disease”) Decision Algorithm

Dog or cat with “PID” flag AND/OR history of acute cough, nasal discharge, fever, vomiting, diarrhea, lymphadenopathy; cat w/ cervical draining tract

Examination room available?

Yes

Place animal in examination room ASAP - Wear gloves

Canine flu or distemper suspect?

Plague, lepto, or tularemia suspect?

If yes, barrier gown; Contact service chief ASAP. Mask if plague suspect.

No

Have owner and animal wait outside (reduces risk to others in waiting room)

Plague, lepto, or tularemia suspect?

GI disease? Other

Determine diagnostic and treatment plan, hospitalize or OP

Magnetic chains to block off exam room door. Contact Animal Care @ 7-1223. Give room number and the infectious disease suspected.

5.0 Reducing Infection Control Precautions for a Patient

- Only Infection Control Personnel or the VTH Director can give permission to amend precautionary requirements or reduce rigor of Infection Control precautions for patients that have an increased risk of contagious disease.
- In general, these decisions will be based upon the suspected disease agent, method of transmission, likelihood of persistent shedding or infection, likelihood of exposure to other contagious agents while housed in isolation, etc.

6.0 Required Diagnostic Testing In Patients with Suspected Infections:

Diagnostic testing to detect certain infectious and/or zoonotic agents provides essential information for appropriate clinical management of infected patients. This testing provides direct benefit to the patient in addition to benefiting clients’ by allowing them to appropriately manage their other animals and protect their families. It also benefits the JLV-VTH as this information is essential for appropriate management of disease risk for all JLV-VTH patients and personnel.

- It is therefore mandatory for all hospitalized patients to undergo diagnostic testing if infection with specific contagious or zoonotic agents is a reasonable consideration. This diagnostic testing is considered essential to case management in the JLV-VTH and therefore is billed to the client.
- It is the responsibility of the senior clinician responsible for a patient’s care to ensure that appropriate samples are submitted for this testing, and that appropriate Infection Control precautions are taken with these patients.
- Infection Control Personnel should be notified as soon as reasonably possible that there is a reasonable index of suspicion that a hospitalized patient may be infected with one of the agents listed below. This notification can be made in person, by phone, or by using the VTH-Contagious-Dz-Alert@colostate.edu listserv.
7.0 Diseases Differentials for which Testing is Mandatory: Testing of appropriate samples is mandatory if the following disease or condition is a reasonable differential. A full description of testing, management, diagnosis, and potential treatment information is available in the Specific Contagious Diseases of Concern Section of the Infection Control SOP.

- Acute Diarrhea in dogs and cats ... see page 111 for more information.
  - *Salmonella* and *Campylobacter*
  - Parvovirus
  - *Cryptosporidium and Giardia*
- *Chlamydophila psittici* (Avian, formerly *Chlamydia psittici*) ... see page 112 for additional information.
- Canine Distemper Virus ... see page 111 for additional information.
- Influenza (avian) ... see page 115 for additional information.
- Influenza (canine) ... see page 115 for more information.
- Methicillin-resistant *Staphylococcus* infections (MRSA and MRSP) ... see page 117 for more information.
- Leptospirosis ... see page 115 for additional information.
- Parvovirus ... see page 118 for additional information.
- Plague ... see page 118 for additional information.
- Rabies ... see page 127 for additional information.
- Tularemia ... see page 120 for additional information.
- *Salmonella* (small animal) ... see page 137 for additional information.

8.0 Management of Patients Infected or Colonized with Bacteria Resistant to Important Antimicrobial Drugs: Patients infected with bacteria resistant to important antimicrobial drugs or to multiple drug classes represent a potential health hazard to VTH Personnel, clients, and to other patients. As such, they are managed with increased Infection Control precautions intended to discourage dissemination in the VTH. (see page 142 for additional information)

9.0 Small Animal Critical Care Unit (CCU) and Urgent Care Infection Control

9.1 Attire for Inpatient and Outpatient Areas of Urgent Care and Critical Care:

- The JLV-VTH promotes the use of hospital-dedicated attire or personal protective equipment (PPE) in order to decrease the risk of carrying infectious agents home where people or animals may be exposed.
- All personnel are required to wear clean professional attire, clean protective outer garments, and clean, appropriate footwear at all times when working in outpatient areas of the Small Animal Hospital.
- Approved section uniforms that are dedicated for hospital use are an acceptable alternative to wearing protective outer garments by staff and faculty.
- This attire should be appropriate to the job at hand (e.g. dedicated PPE [gloves, gowns, etc.] for each individual patient housed in CCU isolation area).
- Footwear: It is recommended that all personnel wear sturdy, closed-toe shoes at all times while working in the Small Animal Hospital.
- Personnel must be willing to disinfect footwear while working, which provides a good check regarding suitability (are you willing to fully immerse them in a footbath!?).

9.2 General Cleanliness and Hygiene: Maintaining hospital cleanliness and appropriate personal hygiene are responsibilities of ALL personnel working in the Small Animal Hospital.

- Hands must be washed or cleaned with an alcohol-based hand sanitizer prior to, and after examining each patient.
• Clean exam gloves and gowns should be worn when handling high-risk patients (i.e. infectious disease suspect or unvaccinated small animals).
• Surfaces or equipment contaminated by feces, secretions, or blood must be cleaned and disinfected immediately by personnel in charge of the patient. This is especially important regarding patients known or suspected of shedding important infectious disease agents.

9.3 Disinfection of Instruments and Equipment

• All instruments, equipment or other objects, including stethoscopes, thermometers, clipper blades, etc. must be sterilized or disinfected between uses on different patients with confirmed or suspected infectious diseases.
• After using materials that are sterilized between uses must be cleaned and sanitized using the dishwasher or cleaned with soap and water and disinfected with a 0.5% chlorhexidine solution prior to returning to Central Supply for sterilization.
• Stethoscopes:
  ➢ Stethoscopes owned by personnel are discouraged from use on animals residing in CCU isolation areas to decrease risk of disease transmission.
  ➢ JLV-VTH-owned stethoscopes must be used on patients with increased risk of shedding contagious agents; these are stored in “isolation packages” or by the patients cage/kennel during hospitalization, and should be disinfected with 90% isopropyl alcohol, 70% ethyl alcohol, or 0.5% chlorhexidine between uses.
  ➢ At the primary clinicians’ discretion, higher quality stethoscopes owned by personnel may be used for special exams, but this should not be routine for all exams and stethoscopes must be thoroughly cleaned and disinfected after each use.
• Thermometers:
  ➢ Personnel whom carry thermometers for use on multiple small animal patients should utilize appropriate sanitary covers for each use.
  ➢ Thermometers should be routinely cleaned with 90% isopropyl alcohol, 70% ethyl alcohol, or 0.5% chlorhexidine between uses.
• Other instruments and equipment owned by personnel (e.g., hemostats, scissors, etc) may be carried and used on multiple patients (non-infectious), but they should be cleaned and disinfected between patients using 70% isopropyl alcohol or 0.5% chlorhexidine available in various areas.
• Personnel walking dogs are responsible for cleaning any fecal material from the ground. When dogs with contagious infections are walked, they should be walked in dedicated areas outside, not within the general walking area for hospitalized patients.
• The rounds rooms and nursing office must be kept clean and neat at all times, including table tops, counter tops, refrigerators, and floors. Backpacks, etc. should be stored in cubbyholes under the CCU rounds room table or in locker rooms. Do not store extra clothing, backpacks, etc. on the rounds room floor or in animal holding areas.

9.4 Food and Beverages within Urgent Care and Critical Care Units

• Food and beverages may only be stored and consumed in the shared CCU and Urgent Care Rounds Room.
• Food and beverages should be sealed in non-spill containers and be stored in backpacks in the cubbyholes or in the rounds room refrigerator. Do not leave food or beverages out at any time.

9.5 Receiving Small Animal Outpatients through Urgent Care or Critical Care

• Small animal patients without signs of contagious disease may be brought into the general areas of Urgent Care or the Critical Care Unit for stabilization and treatment as deemed necessary by the primary clinician.
• Outpatient emergency cases may be housed in Urgent Care, remain in the exam room with the owner, or be left in the front lobby with their owners.
• Outpatients should not be taken into the Critical Care Unit except to be weighed in situations where other scales are unavailable.

• Attending personnel are responsible for cleaning outpatient cages/runs. Specifically, students, interns or residents, and clinicians are responsible for ensuring that fecal material is promptly removed from outpatient cages or runs and appropriately disposed of. If necessary because of urination or defecation, attending personnel should temporarily remove patients from cages and/or runs and clean the area with a hose if possible.

• Please refer to the “Contagious and Zoonotic Disease Matrix” when developing differential lists for patients to ensure that all diseases of high concern have been considered.

• Potentially infectious disease (PID) cases should be identified prior to VTH arrival or upon triage and be escorted to an exam room located near an exterior VTH door. They should remain in this location with the owner until the clinician has assessed the patient and performed preliminary diagnostics regarding contagious diseases (e.g., parvoviral SNAP test, fecal cytology, etc.) have been performed in the exam room.

  ➢ Clinicians are encouraged to conduct initial physical examinations on patients with suspected infectious conditions within an exam room in order to evaluate the contagious disease risk. It is preferable not to bring such patients directly back to the Urgent Care or Critical Care areas unless immediate stabilization or life-saving therapies are immediately warranted.

  ➢ Upon admission, personnel should consider implementing barrier-nursing precautions when handling evaluations suggest that the risk of contagious disease transmission is negligible.

• Once identified or confirmed as infectious, patients should be minimally handled or moved while (while wearing appropriate PPE) until final hospitalization plans are made or until dismissal.

9.6 Managing Small Animal Inpatients in the Urgent Care and Critical Care Units

• Cage or Kennel Assignments: Cages or kennels used to house small animal inpatients are assigned by the Critical Care or Urgent Care Nursing Staff. Personnel should check with the on-duty Nursing Staff to receive an assignment for housing newly admitted inpatients (prior to placing them in an open cage or kennel).

• Client Owned Items (e.g. collars, leashes, toys, garments, etc)  

  ➢ Items owned by clients should not to be left with patients at the JLV-VTH.

• Patient Records and Medications

  ➢ Records, medications, and other materials used in the care of cases assigned to the Critical Care Unit should be stored in appropriate bin.

• Cage Cards, Treatment Orders, and Patient Census Board

  ➢ A cage card and/or treatment or flow sheet must be posted at the time that patients are admitted to the Critical Care or Urgent Care departments.

  ➢ The front of the cage card or flow sheet must list, at a minimum, pertinent client and patient identification, names of students and clinicians assigned to the case.

  ➢ The cage card or flow sheet must also list the admitting complaint or tentative diagnosis especially as they pertain to the infectious disease status (this allows the cleaning crew to better understand the infectious disease hazards and the associated precautions that should be associated with patients).

  ➢ Treatment orders are digitally displayed using Smartflow® or are posted at the cage/kennel doors.

  ➢ Cage cards, flow sheets and treatment orders contain confidential patient information. As such, visitors should never be allowed to read this information for animals that they do not own.
• All dry/canned food or other supplements (including that provided by clients) must be stored in plastic containers with tight fitting covers in the Critical Care Laboratory area.

• Raw diets (raw meat, raw bones, etc.) are not permitted anywhere in the VTH, regardless of the feeding practices in the home environment.

• Only minimal amounts of bedding and food/water are to be housed in the patient’s cage or kennel in order to decrease the likelihood of contamination and to aid in maintaining cleanliness.

**Bedding** [Return to Top]

• Bedding and cleaning of cages and kennels will be performed by the Urgent Care or Critical Care Nursing Staff at the time of admission and as needed thereafter.

• Students and other personnel from the primary/referring service students are not responsible for bedding or cleaning cages and runs for patients as they arrive or depart from the Urgent Care or Critical Care Units.

**Discharge:** [Return to Top]

Prior to discharge, clients or their agents must be instructed about infectious disease hazards associated with patients and recommendations about control of these hazards on the home premises.

• Cleaning and Maintenance personnel should be notified between 4:00 and 4:30 p.m. if patients will be discharged shortly after this time so that unnecessary effort is not expended cleaning these cages or kennels.

• Exam rooms, cages, or kennels used to house patients with known or suspected contagious agents should be marked with an orange sticky note (“SPECIAL ATTENTION REQUIRED”). The known or suspected infectious agent must be marked or identified for cleaning staff. Also, the veterinarian managing the case is responsible notifying Infection Control Personnel and the supervisor for the Cleaning and Maintenance crew of the patient location and patient ID using the contagious disease listserv (VTH-Contagious-Dz-Alert@colostate.edu).

• The Urgent Care or CCU Nursing Staff are responsible for breaking down cages and kennels and ensuring that they are cleaned and disinfected prior to the next use.

**Visitors at the Small Animal Urgent Care and Critical Care Units:** [Return to Top]

• Visiting hours for the Small Animal Hospital are from 8:00am to 9:00pm daily. All visitors must check in at the Small Animal Reception desk prior to entering the Small Animal Hospital.

• All visitors must strictly adhere to all infection control policies and procedures, except in cases where permission has been explicitly received from Infection Control Personnel or the VTH Director.

• Clients must adhere to requirements for appropriate clothing and PPE for infectious inpatients.

• The primary student or clinician should escort clients to their animal’s cage or kennel and remain with the client for the entire duration of the visit.

• Clients must adhere to all barrier-nursing requirements that apply to their animals in order to touch the animals or enter cages or kennels.

• All visitors should be instructed to thoroughly wash their hands after leaving inpatient areas.

• Clients may visit their animals, but are not allowed to wander in the facility and specifically are not allowed to touch other patients or read their cage cards or treatment orders. Information about other patients is confidential, including diagnoses, and should not be divulged.

• The general public is not routinely allowed to tour inpatient areas of the Small Animal Hospital. Special arrangements can be made to provide tours for visitors by contacting the Hospital Director, the supervising ECC Faculty member, or Infection Control Personnel.
• Owners or their designated agents may visit hospitalized inpatients; other interested parties are not allowed to visit inpatients without express permission of the owners.
• **Clients are never allowed to visit animals housed in Small Animal Critical Care Isolation.**

### 9.8 General Patient Management for the Small Animal Urgent Care and Critical Care Units:

- Because of the intensive nature of nursing care provided in CCU, it is critical to strictly adhere to barrier nursing and hand hygiene protocols.
- Stethoscopes and thermometers should be cleaned and disinfected frequently to minimize the risk of nosocomial transmission of infectious agents.
- Minimize the number of personnel handling cases whenever possible.
- When possible, students assigned to infectious disease cases should not have contact with immune suppressed patients elsewhere in the JLV-VTH. Examples would include leukopenic patients, young animals, animals receiving immunosuppressive drugs and patients with diabetes mellitus. When caseload demands contact with infectious disease suspects, treat other patients before handling infectious cases.
- Animals requiring hospitalization in CCU and suspected of having an infectious disease will be placed in cages as far from other patients as caseload will allow.
- A **footbath** will be placed within the perimeter for use by anyone entering the isolation area.
- Disposable barrier gowns, and gloves, dedicated thermometers and a stethoscope will be available within the perimeter for persons coming in contact with the patient.
- Hospitalized small animal patients with confirmed or suspected infectious diseases should be allowed to eliminate in their cages whenever possible. They should NOT be walked in common eliminating areas. If patients need to be taken outside, every effort should be made to prevent urination or defecation within the hospital. Neutral Disinfectant Cleaner disinfectant should be carried and used to clean urine or fecal accidents. Whenever possible patients should be transported via gurney to minimize the potential for contamination of common traffic areas.
- If taken outside, patients with confirmed or suspected infectious diseases should only be taken to the area designated for high-risk patients which is located immediately northwest of the ACC. All waste material must be properly disposed and contaminated surfaces in the hospital must be appropriately cleaned and disinfected as soon as possible.

### 9.9 Cleaning, disinfection and waste:

- Immediately clean and disinfect any hospital equipment, gurneys, and examination tables after contact with infectious disease suspects, and follow general guidelines for hygiene/cleanliness.
- Clean and disinfect scales and examination tables used during the treatment of infectious disease suspects immediately after treatment. Every effort should be made to weigh and treat other animals before using communal equipment for infectious disease suspects.
- Personnel should change any contaminated outerwear after handling infectious disease patients.
- A separate mop and mop bucket will be provided for infectious patients. This bucket should remain within the isolation area and be changed daily by Animal Care.
- After handling the infectious disease patient remove the barrier nursing gown and hang it within the isolation area or discard if soiled. Remove and discard gloves, use the footbath and wash hands.
- Regular trash bags should be used to collect all disposables and laundry coming in contact with infectious disease suspects. Label all laundry with the suspected infectious disease and take to Central Supply. Label disposables with suspected infectious disease to be discarded by Animal Care.
9.10 Managing Suspected or Confirmed Contagious Diseases within the Critical Care Unit:

- Special precautions are required when managing patients known or suspected to be infected with contagious disease agents. Conditions of special concern because of the potential for nosocomial transmission include patients with acute gastrointestinal disorders (e.g., diarrhea), acute respiratory tract infections, or infections with bacteria that are resistant to multiple antimicrobial drugs.

- Please refer to the “Contagious and Zoonotic Disease Matrix” when developing differential lists for patients to ensure that all diseases of high concern have been considered.

- **AT THE TIME THAT THE SUSPICION OF CONTAGIOUS DISEASE IS RECOGNIZED:**
  - It is very important for the veterinarian managing the case to send an email to the Contagious Disease Alert listserv (VTH-Contagious-Dz-Alert@colostate.edu), which will notify Infection Control Personnel, heads of sections and nursing staff, and cleaning personnel. This email should include the patient signalment, veterinarian assigned to the case, housing area, and the known or suspected contagious disease.
  - Place an orange sticky note (“SPECIAL ATTENTION REQUIRED”) on the door of any stall or room where the patient has been managed, after completely filling out the requested information.

- Patients with elevated contagious disease risk will be managed as outpatients or isolated from the general small animal hospital population and discharged as soon as possible.

- All patients requiring hospitalization with suspected contagious respiratory tract infections must be immediately transported to and housed within the Small Animal Internal Medicine Isolation Ward.

- Small animals with suspected contagious disease of gastrointestinal origin or multi-drug resistant infection may be housed within the Critical Care Unit Isolation Ward pending discussion with the supervising ECC Faculty member.

- Only Infection Control Personnel or the Hospital Director can give permission to house small animal patients with known or suspected highly contagious diseases in locations other than the Critical Care Unit Isolation Ward or the Small Animal Internal Medicine Isolation Facility.

- Patients with moderate contagious disease risk status may also be required to be housed in isolation (Small Animal Internal Medicine Isolation Ward or Critical Care Isolation Ward), at the discretion of Infection Control Personnel.

- When patients with elevated contagious disease risk status are housed in the main inpatient areas, effort must be made to use appropriate barrier nursing and biocontainment practices with the patient.
  - Barrier nursing precautions must be used at all times.
  - Disinfectant footbaths or footmats use is required.
  - Cages or runs housing these patients should be cordoned off with barricades.
  - ASAP, information about the suspected or confirmed disease status of these patients must be relayed to the Infection Control Personnel and other responsible personnel (e.g., nursing staff, cleaning staff, etc), using the Contagious Disease Alert listserv (VTH-Contagious-Dz-Alert@colostate.edu) so that they can assist in communication and management.

9.11 Movement of High-Risk Patients to Isolation Facilities:

- It is very important for the veterinarian managing the case to send an email to the Contagious Disease Alert listserv (VTH-Contagious-Dz-Alert@colostate.edu), which will notify Infection Control Personnel, heads of sections and nursing staff, and cleaning personnel. This email should include the patient signalment, veterinarian assigned to the case, housing area, and the known or suspected contagious disease.

- Place an orange sticky note (“SPECIAL ATTENTION REQUIRED”) on the door of any cage or kennel where the patient has been managed, after completely filling out the requested information.

- Patients requiring isolation at the time of admission should ideally be transported directly to the Small Animal Internal Medicine Isolation Facility or Critical Care Isolation Ward via gurney. Gurneys should be draped with plastic to prevent contamination.
• If patients are moved from any area of the Small Animal Hospital to the Small Animal Medicine Isolation Facility or Critical Care Isolation Ward, a route that minimizes exposure of other patients and contamination to the facility should be chosen.
• VTH Personnel handling patients while being moved should use barrier-nursing precautions and appropriate PPE.
• Any areas or equipment contaminated with infectious material during transit should be immediately cleaned with detergent, rinsed, and disinfected with appropriately diluted Neutral Disinfectant Cleaner.

9.12 Diagnostic and Surgical Procedures on High Risk Patients within the Urgent Care and Critical Care Units

• Whenever possible, diagnostic, surgical, or other procedures should be performed wherever high-risk patients are housed, rather than moving the patient to common exam and treatment areas.
• Appropriate barrier-nursing precautions must be followed by all personnel at all times during diagnostic or other procedures.
• If the patient requires diagnostics or other procedures which can only be performed in the main hospital facility (e.g., radiology, scintigraphy, surgery), these procedures should be performed at the end of the day whenever possible.
• Infection Control Personnel must be consulted prior to moving any high-risk patient for diagnostic or surgical procedures, except when clinicians judge that this movement is immediately necessary for managing the patient’s critical health care needs.
• The attending clinician is responsible for notifying appropriate VTH Personnel of the suspected infectious agent and methods that are prudent for containment (this includes cleaning and disinfection after procedures).
  ➢ This information should be written on all request forms.
  ➢ In general, all barrier-nursing precautions that are required in the patient housing area will be required whenever handling that patient.
  ➢ Instruments, equipment, and the environment should be thoroughly cleaned and disinfected after the procedure, regardless of where the procedure is conducted.
  ➢ Precautions should be taken for surgery on small animal patients with or suspected of having infections that could be contagious diseases (includes all animals in the Isolation Facility and animals in the main hospital).
• The senior clinician must ensure that all services assisting with procedures are informed of the known/suspected agent, and appropriate barrier clothing precautions are being followed.
• The senior clinician is also responsible for ensuring that the environment and equipment is appropriately cleaned and disinfected after the procedure.
• Whenever possible, surgery on these patients will be performed at the end of the day, when surgery on all other elective patients has been completed (emergencies excepted).

9.13 Biological Specimens Obtained From Suspected or Confirmed Contagious Patients

• Specimens obtained from high-risk patients should be correctly labeled with appropriate identification, then placed in a Ziplock or Whirlpak bag.
• Place an orange sticky note (“SPECIAL ATTENTION REQUIRED”) on the outside of the bag, after completely filling out the requested information.
• Care should be taken when placing specimens in bags to prevent contamination of the outside of the bag.
• Suspected conditions or disease agents should be clearly identified on all submission forms.

9.14 Reducing Infection Control Precautions for a Patient

• Only Infection Control Personnel or the VTH Director can give permission to amend precautionary requirements or reduce rigor of Infection Control precautions for patients that have an increased risk of contagious disease.
• In general, these decisions will be based upon the suspected disease agent, method of transmission, likelihood of persistent shedding or infection, likelihood of exposure to other contagious agents while housed in isolation, etc.

9.15 Required Diagnostic Testing in Patients with Suspected Infections: Diagnostic testing to detect certain infectious and/or zoonotic agents provides essential information for appropriate clinical management of infected patients. This testing provides direct benefit to the patient in addition to benefiting clients’ by allowing them to appropriately manage their other animals and protect their families. It also benefits the JLV-VTH as this information is essential for appropriate management of disease risk for all JLV-VTH patients and personnel.
• It is therefore mandatory for all hospitalized patients to undergo diagnostic testing if infection with specific contagious or zoonotic agents is a reasonable consideration. This diagnostic testing is considered essential to case management in the JLV-VTH and therefore is billed to the client.
• It is the responsibility of the senior clinician responsible for a patient’s care to ensure that appropriate samples are submitted for this testing, and that appropriate Infection Control precautions are taken with these patients.
• Infection Control Personnel should be notified as soon as reasonably possible that there is a reasonable index of suspicion that a hospitalized patient may be infected with one of the agents listed below.

Disease Differentials for Which Testing is Mandatory in Small Animal Patients: Testing of appropriate samples is mandatory if the following disease or condition is a reasonable differential. A full description of testing, management, diagnosis, and potential treatment information is available in the Specific contagious Diseases of Concern Section of the Infection Control SOP.
• Acute Diarrhea in dogs and cats ... see page 111 for more information.
  ➢ Salmonella and Campylobacter
  ➢ Parvovirus
  ➢ Cryptosporidium and Giardia
• Chlamydophila psittici (Avian, formerly Chlamydia psittici) ... see page 112 for additional information.
• Canine Distemper Virus ... see page 111 for additional information.
• Influenza ... see page 115 for more information.
• Methicillin-resistant Staphylococcus infections (MRSA and MRSP) ... see page 117 for more information.
• Leptospirosis ... see page 115 for additional information.
• Parvovirus ... see page 118 for additional information.
• Plague ... see page 118 for additional information.
• Rabies ... see page 127 for additional information.
• Salmonella (small animal) ... see page 137 for additional information.
• Tularemia ... see page 120 for additional information.

9.16 Patients with Known or Suspected Contagious Diseases or Conditions. Please refer to the “Contagious and Zoonotic Disease Matrix” when developing differential lists for patients to ensure that all diseases of high concern have been considered.
• Gastrointestinal Disease: Gastrointestinal agents of greatest concern to small animal patients as contagious nosocomial hazards in the VTH include Salmonella, Parvovirus, Campylobacter, Cryptosporidium, and Giardia.
• Respiratory Disease: Respiratory agents of greatest concern as contagious nosocomial hazards in the VTH include Influenza, Distemper, and Feline Upper Respiratory Infections (e.g., calicivirus)
• Neurologic Disease: Infectious agents associated with neurologic disease that are of greatest concern as contagious nosocomial hazards in the VTH include rabies virus and Distemper Virus.
• Management of Patients Infected or Colonized with Bacteria Resistant to Important Antimicrobial Drugs: Patients infected with bacteria resistant to important antimicrobial drugs or to multiple drug classes represent a
potential health hazard to VTH Personnel, clients, and to other patients. As such, they are managed with increased Infection Control precautions intended to discourage dissemination in the VTH. (see page 129 for more information)

9.17 Management of patients with known or suspected contagious or zoonotic diseases in CCU

- It is very important for the veterinarian managing the case to send an email to the Contagious Disease Alert listserv (VTH-Contagious-Dz-Alert@colostate.edu), which will notify Infection Control Personnel, heads of sections and nursing staff, and cleaning personnel. This email should include the patient signalment, veterinarian assigned to the case, housing area, and the known or suspected contagious disease.
- Place an orange sticky note (“SPECIAL ATTENTION REQUIRED”) on the door of any cage or room where the patient has been managed, after completely filling out the requested information.
- The Small Animal Internal Medicine Isolation Facility and the Critical Care Unit Isolation Ward are the two areas used for the housing of most infectious disease cases. Infection Control Personnel MUST be contacted to request any exceptions to this policy. Animals weighing less than 25 kg and not requiring intensive care should be housed in the cages in the Critical Care Isolation Ward.
- Selected small animal infectious disease (non-respiratory, non-zoonotic) patients requiring intensive care may be housed in the Small Animal Critical Care (CCU) Isolation Ward with prior approval of the ECC faculty clinician on duty.
- Patients with known gastrointestinal or respiratory tract disease should be identified upon admission and brought to the attention of attending nurses and clinicians in Urgent Care and CCU (see Urgent Care PID patient receiving).
- Patients with known or suspected *Salmonella* infection, suspected rabies virus infection, clinical signs of rabies, suspected or confirmed feline plague, suspected or confirmed canine distemper, suspected or confirmed tularemia, feline upper respiratory disease complex, or canine infectious tracheobronchitis (kennel cough) including canine influenza should always be housed in the Small Animal Internal Medicine Isolation Facility.
- For patients that have an increased risk of contagious disease, only Infection Control Personnel or the VTH Director can give permission to amend precautionary requirements, reduce rigor of Infection Control precautions for patients, or give permission to house outside of isolation units.
- In general, these decisions will be based upon the suspected disease agent, method of transmission, likelihood of persistent shedding or infection, likelihood of exposure to other contagious agents while housed in isolation, etc.

9.18 Communication Requirements for Small Animal Urgent Care and Critical Care: [Return to Top]

- Infection Control Personnel must be notified ASAP whenever patients with contagious diseases are admitted through the Urgent Care or Critical Care services. This notification can be made in person, by phone, or by using the VTH-Contagious-Dz-Alert@colostate.edu listserv, and should be performed by the veterinarian or student with primary responsibility for the patient.
- Infection Control Personnel must be notified ASAP whenever patients with contagious diseases are admitted to CCU or to Small Animal Isolation and when they are discharged or moved. This notification can be made in person, by phone, or by using the VTH-Contagious-Dz-Alert@colostate.edu listserv, and should be performed by the veterinarian or student with primary responsibility for the patient. Thorough, indepth cleaning is required of exam rooms and areas where potentially infectious cases have been held or housed. This notification can be made in person, by phone, or by using the VTH-Contagious-Dz-Alert@colostate.edu listserv, and should be performed by the veterinarian or student with primary responsibility for the patient.
- Cages and or exam rooms must be visibly labeled to identify infectious agents of concern, along with the required Infection Control precautions. *It is very important to communicate the agent(s) of concern for these patients so that all personnel can take appropriate precautions for protecting human exposure and to ensure that appropriate cleaning and disinfection procedures are used.*
9.19 Disease Specific Information: [Return to Top]

- It is mandatory for all hospitalized patients to undergo diagnostic testing if infection with specific contagious or zoonotic agents is a reasonable consideration. Disease for which testing is mandatory include Avian Psittacosis, Canine Distemper Virus, Canine Influenza Virus, Cryptosporidium, Giardia, Leptospirosis, Parvovirus, Plague, Rabies, Tularemia, *Salmonella* (See Small Animal General SOP for details). This diagnostic testing is considered essential to case management in the JLV-VTH and therefore is billed to the client. For more information on diagnostic testing see page 67.

- **Feline Leukemia Virus and Panleukopenia**
  - Feline patients with suspected or confirmed FeLV infection or feline panleukopenia will be housed as far from other feline patients as caseload will allow. There will always be at least 1 cage and (minimum of 1 meter distance) between FeLV and panleukopenia suspects and other cats. Signs should be placed on the cage identifying the suspected pathogen.
  - Students and nurses assigned to the case should not handle other sick felines within CCU. When caseload does not permit segregation of cases, other feline cases should be handled before handling the FeLV or panleukopenia case.

- **Canine parvovirus**
  - Dogs less than 1.5 years of age with vomiting, diarrhea, and/or leukopenia will be considered parvovirus suspects. They will be isolated within CCU and walked as described in the general housing rules above. Signs should be placed identifying the patient as a “parvo suspect”.
  - A diarrhea screening test (available through the diagnostic laboratory) is required to evaluate the cases for possible viral pathogens, parasites, and fecal culture. If parvovirus is confirmed, the signage should be changed to “Parvo”.
  - When possible, students and nurses assigned to care for parvovirus patients will not have contact with other at-risk dogs (under 1.5 years).

- **Leptospirosis**
  - Patients identified as suspected or confirmed Leptospirosis cases should be segregated and isolated within CCU as described in the general housing rules above.
  - See page 91 for Leptospirosis suspect patients (below).

- **Patients Infected or Colonized with Bacteria Resistant to Important Antimicrobial Drugs**
  - *Infection Control Personnel* should be notified ASAP of any patients infected with bacteria with resistance patterns of concern to antimicrobial drugs. This includes incisional or catheter related infections as well as gastrointestinal related infections.
  - CCU patients with multiple-drug resistant bacteria will be separated as much as possible from other patients, and will be moved to Isolation or discharged when sufficient recovery warrants.
  - All patients infected with bacteria with important resistance patterns must be managed with strict barrier nursing precautions.
  - See page 142 for more information on managing patients infected or colonized with resistant bacteria.

9.20 Critical Care Isolation [Return to Top]

- **General Management of Patients in Critical Care Isolation:**
  - Strict attention to hygiene and use of barrier nursing precautions in Isolation Units is absolutely critical for appropriate containment of contagious disease agents.
  - Before and after examining each patient, hands must be washed with soap and water or cleaned with alcohol-based hand sanitizer.
  - Clean exam gloves must be worn at all times when working in the isolation perimeter, anterooms, and patient cages or runs. Gloves must be changed between working in different anterooms or kennels.
  - Gloves should be changed after handling any doors, equipment, etc., associated with an isolation area.
Surfaces or equipment contaminated by feces, other secretions or blood must be cleaned and disinfected immediately by personnel in charge of the patient.

Special care must be taken to prevent contamination of the isolation environment by dirty hands, gloves, or shoes.

Use all footmats encountered.

Footbaths are changed and the plastic tub cleaned completely for each nursing shift.

Environmental hygiene is the responsibility of all personnel working in the isolation unit. Do not wait for a technician or other personnel to clean. Avoid contaminating anterooms with patient garments or materials, and assist with general cleanup and maintenance whenever possible.

Students assigned to the isolation case are responsible for routine cleaning and organization of anterooms when their patients are housed in Critical Care Isolation.

Food and drink is not allowed in Critical Care Isolation because of the risk of exposure to zoonotic agents.

Minimizing Entry into the Critical Care Isolation Unit: Entry into the unit should only occur when absolutely necessary.

Whenever possible and appropriate, personnel should utilize web cameras for general monitoring of patients’ conditions in order to minimize foot traffic into the Critical Care Isolation Facility, the webcam is available at http://oghmaprod.cvmbs.colostate.edu/cameras.cfm. This website can only be accessed from computers in the VTH unless special login and password are obtained.

When possible, it is optimal to have different people provide care for patients in isolation (i.e., it is best if the same person is not caring for patients in the main hospital as well as those in isolation). If it is necessary to work on patients in multiple housing areas (e.g., main hospital and isolation), personnel should take optimal precautions when moving between areas and handling patients with different infectious disease risks.

Clients are not permitted to enter the Critical Care Isolation Ward.

Equipment and Materials: In general, any materials taken into the Critical Care Isolation Facility should not be taken back to the main Critical Care Unit.

Any supplies taken into an Isolation Anteroom should be used for that patient or discarded.

No equipment or supplies (bandages, syringes, disinfectant, etc.) should be taken to Critical Care Isolation without first checking with personnel responsible for this area.

Medications used on isolation patients should be billed to the client and sent home at discharge or else discarded. Do not return medications or intravenous fluids from Isolation to the Pharmacy. All medications sent home with clients must be dispensed in appropriate childproof containers with a complete prescription label.

Additional cleaning supplies, disinfectant, scrubs, isolation gowns, supplies, etc., are stored in the CCU Isolation Anteroom.

VTH-owned stethoscopes are used on patients in the Critical Care Isolation Unit.

New digital thermometers or disposable thermometers are used in Critical Care Isolation.

Samples obtained from isolation patients for laboratory testing should be placed in appropriate containers and identified according to the disease or suspected infectious agent.

9.21 Procedures for Moving Small Animal Patients into Critical Care Isolation

It is very important for the veterinarian managing the case to send an email to the Contagious Disease Alert listserv (VTH-Contagious-Dz-Alert@colostate.edu), which will notify Infection Control Personnel, heads of
sections and nursing staff, and cleaning personnel. This email should include the patient signalment, veterinarian assigned to the case, housing area, and the known or suspected contagious disease.

- Place an orange sticky note ("SPECIAL ATTENTION REQUIRED") on the door of any room where the patient has been managed, after completely filling out the requested information.
- Kennels should be prepared for patients prior to moving them into isolation.
- Bed kennels using mats or garments within the Critical Care Unit, however such materials should not exit isolation once they have entered unless they are contained in appropriate laundry bags.
- Stock Anteroom/Kennel if not already done. Supplies are available in Tupperware containers for individual patients.
- Set up a disinfectant footmat.
- When possible, patients to be housed in isolation at the time of admission should be transported directly to the Critical Care Isolation Facility via gurney.
- Patients housed in the hospital inpatient areas of the facility that are to be moved to the Isolation Facility should not be walked but should be moved by gurney to help reduce the potential for contamination of this high traffic area.
- It is best to have 2 people assist with this effort:
  - One person dresses in appropriate Isolation Facility attire, sets up the isolation kennel, and receives the patient.
  - The other person, also gowned in Isolation attire, moves the patient from the main hospital to the isolation perimeter.
- All personnel handling the patient must use appropriate attire and barrier nursing precautions.
  - If entering isolation with the patient or receiving the patient, all personnel are required to wear full isolation gear.
  - If handing the patient off to someone already in isolation, disposable barrier gowns and gloves are satisfactory to transport the patient.

9.22 Procedures for Personnel Entering and Exiting Small Animal Critical Care Isolation Areas

- Clients are not permitted to enter the Critical Care Isolation Ward.

- To enter isolation Anterooms:
  - At a minimum, all personnel are required to wear appropriate PPE (gowns, etc.) and exam gloves.
  - Use footbath or footmat in the Anteroom.
  - Wash hands for at least 30 seconds or use hand sanitizer upon entering Anteroom (especially if having come from another Isolation Stall).
  - Wash hands again when exiting the Anteroom.

- To enter isolation kennels or cages:
  - At a minimum all personnel are required to wear gowns and exam gloves.
  - This policy also applies to all ancillary services, and section uniforms are not a suitable alternative for this requirement.
  - Cleaning Personnel are required to adhere to all relevant policies regarding attire in Critical Care Isolation.
  - Use footbath when entering the kennel or cage.
  - Take all necessary supplies into the kennel or run when entering to minimize traffic in and out of Anterooms.
  - Procedures involving highly contaminated sites should be performed last (e.g., rectal temperature).
• **Exiting occupied isolation kennels or cages:**
  - Footbaths must be used when exiting Critical Care Isolation.
  - Avoid dragging bedding or fecal material into the Anteroom.
  - Appropriately dispose of sharps in sharps container.
  - Clean and disinfect thermometer, stethoscope, and any other materials by wiping with 70% isopropyl alcohol.
  - Remove gloves and re-glove as necessary.

• **Exiting kennels of Isolation patients:**
  - Remove gown and hang beside kennel or cage.
  - Clean any contaminated area and disinfect with Neutral Disinfectant Cleaner.
  - Once daily, clean door knobs with disinfectant.
  - Discard cap and gloves in Anteroom. (Do not wear gloves from one kennel into another).
  - Wash hands thoroughly with soap and water or decontaminate with alcohol-based hand sanitizer.
  - Turn off water faucets with the paper towel used to dry hands.

• **Exiting the Critical Care Isolation Unit:**
  - Use hand sanitizer or wash hands upon re-entering the anteroom.
  - Wash hands thoroughly with soap and water before leaving the Isolation Facility.
  - Use the footbath or footmat prior to exiting the Isolation Area.

**9.23 Care and Cleaning and for Patients Housed in Critical Care Isolation**

• **All personnel are responsible for assisting with cleaning and maintenance of the Isolation Facility! Everyone should help clean when it is noticed that needs to be done.**
  - Hospital cleaning and maintenance crews will clean isolation areas once daily in the evening. This area is also cleaned and restocked by Critical Care Nursing Staff at each shift change.
  - Additional cleaning should be done throughout the day by other personnel.

• **Procedures for Removing Patients from Critical Care Isolation** (for diagnostic procedures or walking)
  - Personnel moving the patient are required to wear all appropriate attire and barrier precautions.
  - Personnel should either transfer handling of the patient to another person dressed in appropriate barrier garments.
  - Personnel handling the patient should avoid contaminating doors, etc. with contaminated gloves or hands in the process of moving patients.

• **Diagnostic and therapeutic procedures** that must be performed in the main hospital on Isolation Patients should preferably be scheduled for the end of the day, and all surfaces and floors that are potentially contaminated must be promptly cleaned and disinfected in order to minimize the likelihood of nosocomial transmission.

• **Disposal of Infectious Waste**
  - Waste should be bagged in the area where it was generated and re-bagged once outside of the contaminated area.
  - If an infectious disease (excluding rabies or plague/tularemia) is suspected, trash must be sealed in trash bags for waste disposal. Seal the bag with tape then double bag and seal with tape, spray the surface of the bag with Neutral Disinfectant Cleaner or Accel, and discard in dumpster.
If a known zoonotic agent is suspected or involved, consult your primary clinician. Seal the trash bag with tape then double bag and seal, spray the surface of the bag with Neutral Disinfectant Cleaner or Accel, and transport to the disposal area. Materials from Small Animal Isolation will be placed into clear, autoclavable biohazard bags, clearly labeled with the department and disease, and delivered to the diagnostic laboratory (Room 233, DMC 2nd Floor) during regular business hours (8 am – 5 pm). The diagnostic lab must be notified prior to delivering the bag (970-297-5204). When materials are dropped off for autoclaving, material should be placed in a large, red biohazard bag available which will be made available by diagnostic laboratory personnel. A request form will be provided by the diagnostic lab and should be filled out, using account number HO#8032. Under no circumstances are materials to be delivered to the diagnostic lab without first calling and receiving approval from diagnostic lab personnel.

Biological samples collected from patients with elevated contagious disease risk should be sealed in plastic bags and labeled with the appropriate information prior to submission to diagnostic laboratories. Care should be taken to avoid contaminating the outside of plastic bags.

Cleaning and bandaging of wounds known to be infected with infectious agents of concern (e.g., MRSA or other highly resistant bacteria) should not be conducted in high traffic areas and should occur in areas that can be easily cleaned and disinfected. Barrier precautions should be used to prevent contamination of hands and attire, and care should be taken to avoid environmental dissemination through drainage of flush solutions or careless handling of bandage materials. Please follow procedures in this document for environmental disinfection and disposal of these materials.

Use of Ultrasonography or EKG in Critical Care Isolation

Personnel from ancillary services must wear appropriate clothing and barrier precautions when handling patients from Critical Care Isolation.

Personnel from the ancillary service along with their necessary equipment should remain in the Anteroom or in the Isolation Perimeter and not enter the kennel unless absolutely essential to completion of the procedure.

After performing an EKG, personnel must clean and disinfect the leads with a gauze sponge soaked in disinfectant (0.5% chlorhexidine or 70% alcohol) paying particular attention to cleaning and disinfecting the clips and wires that have touched the patient.

Before removing the equipment from the Isolation Area, clean any gross contamination from the wheels and cart, and disinfect with appropriately diluted Virkon-S or Neutral Disinfectant Cleaner, allowing 15 minutes contact time.

Discharge of Patients from Critical Care Isolation

It is important that the veterinarian managing the case to send an email to the Contagious Disease Alert Listserv (VTH-Contagious-Dz-Alert@colostate.edu) to alert responsible personnel that the patient has been discharged, and that necessary cleaning and disinfection should be initiated.

Do not use the cage or kennel until Animal Care has removed the sign, or until other adequate cleaning/disinfection occurs.

Personnel must ensure that instructions are given to clients adequately address the infectious disease hazards associated with the patient (to other animals and to humans), and appropriately provide suggestions for mitigating risks to people and animals.

Cleaning of the Critical Care Isolation Ward Cleaning After Patient Discharge:

For breaking down cages or runs, put all laundry in a designated laundry bag; this includes mop heads, towels, rags, blankets (even if not used), and footbath towels.

- Tie off the laundry bag, wipe or spray down the entire bag with Accel, and let air dry for at least 5 minutes. Then, double-bag in the Anteroom
- Label the bag using and orange sticky note (“SPECIAL ATTENTION REQUIRED” sticky note), after completely filling out the form.
Throw away everything disposable, even if unused. This includes paper towels, gloves, syringes, etc.

Laundry goes to the isolation laundry bin (red tub) at central supply, and trash goes to the dumpster behind the hospital.

The only items remaining in the isolation area should be washable: mats, footbath containers, blood pressure cuffs, food bowls, stethoscopes, thermometers, goggles, mop buckets, patient cleaning bucket, sharps container, IV fluid pumps, etc.

- Most of these items should be wiped off with a sponge or towel and not be submerged.
- Use the dishwasher located in the shared CCU/UC kitchen to decontaminate objects, as appropriate.

Disinfection of Surfaces in Critical Care Isolation Ward:

- Because of the potential for contagious agents such as parvovirus and calicivirus to persist in the environment, the primary disinfectant used in the Critical Care Isolation Ward is Accel.
- In a bucket: mix 8 oz. of Accel in one gallon of water
- Clean all surfaces and supplies, including floors, adjacent cages, door handles, and counter tops.
- Clean everything and anything that personnel working in the isolation room may have touched.
- Allow a minimum of 20 min of contact time with Accel
- Spray everything again with Neutral disinfectant – allowing a minimum of 20 min contact time.
- Squeegee the floor and wipe down any excess liquid in cages or kennels or on other surfaces.
- Allow all surfaces to dry completely before there is any animal contact.

### 9.24 Protocols for Managing Specific Infectious Diseases within Critical Care Isolation:

- **Salmonella**
  - Any patient with diarrhea (blood-tinged or not), vomiting, fever, depression, inappetence, injected mucous membranes, tachycardia, weak pulses, or neutropenia +/- left shift, thrombocytopenia, anemia, electrolyte imbalances or leukocytes on fecal cytology should be suspected.
  - Diagnostic testing is required for any patient in which *Salmonella* infection is a differential diagnosis.
  - Immediately clean and disinfect (Neutral Disinfectant) any hospital equipment, gurneys, and examination tables after contact with infectious disease suspects, follow general guidelines for hygiene and cleanliness. Personnel should remove any contaminated outerwear.
  - The isolation area around the kennel or housing area will be identified with 2.0-inch white tape placed on the floor creating a 1 meter perimeter around the cage
  - Disposable gowns, gloves, thermometer, and stethoscope will be available within this perimeter for personnel in contact with the patient
  - These patients should be gurneayed outside, not walked within the VTH.
  - A separate, isolation labeled mop and mop bucket will be provided, which will remain in the Isolation area and changed daily by Animal Care.
  - After handling the patient, remove the gown and hang it within the isolation area (pay attention to the inner/outer surfaces, marking inside with white tape), remove and discard gloves, use footbath, and wash hands when exiting
  - Clean and disinfect (Neutral Disinfectant) scales and examination tables during the treatment of such patients immediately. Every effort should be made to weigh and treat other animals before using communal equipment for these patients.
  - Double bag and label all laundry and trash bags, tie off and spray with Neutral Disinfectant Cleaner. Place in second clean bag and label with disease suspect. Take laundry to Central Supply and trash to dumpster outside.
  - Nurses (only) will restock depleted supplies at the start of their shift
  - Bedding should not be stock-piled in Critical Care Isolation

- **Leptospirosis:**
  - Any patient with any combination of the following: fever, muscle soreness, stiffness, weakness, anorexia, depression, vomiting, diarrhea, jaundice, rapid dehydration, polydipsia, polyuria, azotemia (or AKI), leukocytosis, thrombocytopenia, elevated liver enzymes, proteinuria, isothenuria (or even hyposthenuria) or hematuria should be considered be a Leptospirosis suspect
Diagnostic testing is required for any patient in which Leptospirosis is a differential diagnosis.

Immediately clean and disinfect (Neutral Disinfectant) any hospital equipment, gurneys, and examination tables after contact with infectious disease suspects, follow general guidelines for hygiene and cleanliness. Personnel should remove any contaminated outerwear.

For patients in which urine cannot be controlled or contained, indwelling urinary catheter placement is mandatory.

While managing the urinary catheter, a face mask and goggles should be worn when disposing of urine in designated bucket with appropriate amount of disinfectant added.

The urine bucket will be emptied by a nurse every 24 hours.

If submitting urine samples to Clinical Pathology, inform the laboratory staff that the specimen is from a Leptospirosis suspect.

These patients (indwelling urinary catheter) should not be walked, but transported on a gurney whenever possible.

Disposable gowns, gloves, thermometer, and stethoscope will be available within this perimeter for personnel in contact with the patient

A separate, isolation labeled mop and mop bucket will be provided, which will remain in the Isolation area and changed daily by Animal Care.

After handling the patient, remove the gown and hang it within the isolation area (pay attention to the inner/outer surfaces, marking inside with white tape), remove and discard gloves, use footbath, and wash hands when exiting.

Clean and disinfect (Neutral Disinfectant) scales and examination tables during the treatment of such patients immediately. Every effort should be made to weigh and treat other animals before using communal equipment for these patients.

Double bag and label all laundry and trash bags, tie off and spray with Neutral Disinfectant Cleaner. Place in second clean bag and label with disease suspect. Take laundry to Central Supply and trash to dumpster outside.

Nurses (only) will restock depleted supplies at the start of their shift.

Bedding should not be stock-piled in Critical Care Isolation.

Pending negative PCR, negative serology, and 48 hours of appropriate antimicrobial therapy, Leptospirosis suspects may exit the Critical Care Isolation Ward following discussion with the supervising ECC Faculty and Infection Control Personnel.

- Methicillin-Resistant Staphylococcus aureus (MRSA) or Methicillin-Resistant Staph. pseudintermedius (MRSP):
  - Any patient with an active MRSA or MRSP infection, previous positive culture, or known colonization should be handled with caution and isolated during hospitalization.
  - Diagnostic testing is required for any patient in which MRSA or MRSP infection is a differential diagnosis.
  - Two negative cultures one week apart are required for patients with previous MRSA or MRSP infections to reduce infection control requirements.
  - Actively draining tracts, open wounds, and dermatologic lesions should be covered if possible during hospitalization.
  - Immediately clean and disinfect (Neutral Disinfectant) any hospital equipment, gurneys, and examination tables after contact with infectious disease suspects, follow general guidelines for hygiene and cleanliness. Personnel should remove any contaminated outerwear.
  - The isolation area around the kennel or housing area will be identified with 2.0-inch white tape placed on the floor creating a 1 meter perimeter around the cage
  - Disposable gowns, gloves, thermometer, and stethoscope will be available within this perimeter for personnel in contact with the patient.
  - These patients should be moved outside by gurney, not walked within the VTH.
A separate, isolation labeled mop and mop bucket will be provided, which will remain in the Isolation area and changed daily by Animal Care.

After handling the patient, remove the gown and hang it within the isolation area (pay attention to the inner/outer surfaces, marking inside with white tape), remove and discard gloves, use footbath, and wash hands when exiting.

Clean and disinfect (Neutral Disinfectant) scales and examination tables during the treatment of such patients immediately. Every effort should be made to weigh and treat other animals before using communal equipment for these patients.

Double bag and label all laundry and trash bags, tie off and spray with Neutral Disinfectant Cleaner. Place in second clean bag and label with disease suspect. Take laundry to Central Supply and trash to dumpster outside.

Nurses (only) will restock depleted supplies at the start of their shift.

Bedding should not be stock-piled in Critical Care Isolation.

- **Parvovirus:**
  - Diagnostic testing is required for any patient in which *Salmonella* infection is a differential diagnosis.
  - Remember that Parvovirus is a non-enveloped virus, and as such is highly stable in the environment resistant to many disinfectants. Cleaning with soapy water is very important in decontamination and the primary disinfectant that should be used for surface decontamination and footmats is Accel or Virkon.
  - House officers, staff, and students that are managing confirmed cases of paroviral enteritis should refrain from involvement with other canine cases that are unvaccinated or less than 1.5 years of age.
  - Immediately clean and disinfect any hospital equipment, gurneys, and examination tables after contact with infectious disease suspects, follow general guidelines for hygiene and cleanliness. Personnel should remove any contaminated outerwear.
  - Disposable gowns, gloves, thermometer, and stethoscope will be available within this perimeter for personnel in contact with the patient.
  - These patients should be moved outside by gurney, not walked within the VTH.
  - A separate mop and bucket labeled “ISOLATION” will be provided, which will remain in the Isolation area and changed daily by Animal Care.
  - After handling the patient, remove the gown and hang it within the isolation area (pay attention to the inner/outer surfaces, marking inside with white tape), remove and discard gloves, use footbath, and wash hands when exiting.
  - Clean and disinfect scales and examination tables during the treatment of such patients immediately. Every effort should be made to weigh and treat other animals before using communal equipment for these patients.
  - Double bag and label all laundry and trash bags, tie off and spray with Neutral Disinfectant Cleaner. Place in second clean bag and label with disease suspect. Take laundry to Central Supply and trash to dumpster outside.
  - Nurses (only) will restock depleted supplies at the start of their shift.
  - Bedding should not be stock-piled in Critical Care Isolation.
  - **Confirmed cases of parvoviral enteritis should be dismissed from the VTH by staff wearing appropriate barrier nursing garments and gloves. The patient should be moved by gurney or carried to prevent environmental contamination.**
  - Recheck examinations for such patients should be conducted with appropriate precaution and follow infection control protocols based upon the likelihood of viral shedding by the patient.
10.0 Small Animal Medicine Isolation

10.1 Managing Patients in Small Animal Isolation: Strict attention to hygiene and use of barrier nursing precautions in Isolation Units is absolutely critical for appropriate containment of contagious disease agents.

PLEASE NOTE: the Small Animal Medicine Isolation Unit [SAM Isolation Unit] is segregated into the Nurses’ Station and three separate Isolation Wards. Please read carefully, some instructions and policies given below apply to the entire SAM Isolation Unit and others only apply to the Isolation Wards.

- Please refer to the “Contagious and Zoonotic Disease Matrix” when developing differential lists for patients to ensure that all diseases of high concern have been considered.
- At the time that patients are admitted to the SAM Isolation Unit, it is very important for the veterinarian managing the case to send an email to the Contagious Disease Alert listserv (VTH-Contagious-Dz-Alert@colostate.edu), which will notify Infection Control Personnel, heads of sections and nursing staff, and cleaning personnel. This email should include the patient signalment, veterinarian assigned to the case, housing area, and the known or suspected contagious disease.
- Please use the orange sticky notes (“SPECIAL ATTENTION REQUIRED” sticky notes) to identify rooms, cages, and runs where the patient has been managed, after completely filling out the requested information. These forms should also be used to label potentially contaminated materials that are removed from the facility (e.g., diagnostic specimens, laundry, items returned to central supply, etc).
- Strict attention must be paid to hand hygiene at all times. Specifically, hands should be washed with soap and water or cleaned with alcohol-based hand sanitizer at the following times:
  - Before entering the Isolation Wards for the purpose of contacting patients.
  - When leaving the Isolation Wards.
  - When leaving the SAM Isolation Unit.
- Special care must be taken to prevent contamination of the isolation environment by dirty hands, gloves, or shoes.
- Environmental hygiene is the responsibility of all personnel working in the Isolation Unit. Do not wait for a technician or other personnel to clean. Assist with general cleanup and maintenance whenever possible.
- Students assigned to the isolation case are responsible for routine cleaning and organization of Anterooms when their patients are housed in the SAM Isolation Unit. This includes cleaning and disinfecting counters, unicell drawers, door handles, and door knobs, and emptying trash when full.
- Food and drink are not allowed in any part of the SAM Isolation Unit because of risk of exposure to zoonotic agents.

The Small Animal Isolation Unit and the Critical Care Unit are the two areas used for housing infectious disease cases.

- Patients known or suspected of the following infectious diseases MUST ALWAYS BE HOUSED IN THE SAM Isolation UNIT regardless of other patient care considerations:
  - Rabies
  - Plague (Yersinia pestis)
  - Tularemia (Francisella tularensis)
  - Psitticosis (Clamydophila psittaci)

- Patients known or suspected to have other infectious diseases must also be housed in the SAM Isolation Unit, except when it is deemed that they require intensive care (see below). These include patients with:
  - Diarrhea +/- vomiting (e.g., Salmonella, Campylobacter, Clostridial agents, Giardia, etc.)
  - Respiratory disease (e.g., influenza, calicivirus, FHV, etc)
- MRSA, MRSP and other multidrug resistant infections
- Leptospirosis
- Other diseases and agents identified as requiring isolation in the Infection Control SOP

- Patients that would typically be housed in the SAM Isolation Unit may be housed in the Small Animal Critical Care Unit (CCU) if they require intensive care and prior approval is received from the senior CCU clinician.

**Client-Patient Visitation:**

- Clients are never allowed to visit animals housed in Small Animal Isolation, and when appropriate should be discouraged from entering CCU. With express permission from Infection Control Personnel or the VTH Director, exceptions to this visitation rule may be granted under extraordinary circumstances, such as when patients are to be euthanized.

**Communication Requirements for Small Animal Isolation**

- The primary clinician caring for the patient is responsible for ensuring that people are appropriately notified about admission of patients to the Small Animal Isolation Facility
- Infection Control Personnel must be notified ASAP whenever patients are placed in the SAM Isolation Unit and when they are discharged or moved. This notification should be made by using the VTH-Contagious-Dz-Alert@colostate.edu listserv, and should be performed by the veterinarian or student with primary responsibility for the patient.
- Animal Care must be notified when patients are placed in the SAM Isolation Unit and when they are discharged or moved (including if the patient was evaluated in an exam room before being moved to isolation). This notification should be made by using the VTH-Contagious-Dz-Alert@colostate.edu listserv, and should be performed by the veterinarian or student with primary responsibility for the patient. It is very important to communicate the agent(s) of concern for these patients so that animal care personnel may take appropriate precautions for protecting human exposure and to ensure that appropriate cleaning and disinfection procedures are used.
- Please use the orange sticky notes (“SPECIAL ATTENTION REQUIRED” sticky notes) to identify rooms, cages, and runs where the patient has been managed, after completely filling out the requested information. These forms should also be used to label potentially contaminated materials that are removed from the facility (e.g., diagnostic specimens, laundry, items returned to central supply, etc).
- Personnel must ensure that instructions are given to clients adequately address the infectious disease hazards associated with the patient (to other animals and to humans), and appropriately provide suggestions for mitigating risks to people and animals.

**Reducing Infection Control Precautions for a Patient Housed in the SAM Isolation Unit**

- Only Infection Control Personnel or the VTH Director can give permission to amend precautionary requirements or reduce rigor of Infection Control precautions for patients that have an increased risk of contagious disease.
- Only Infection Control Personnel or the VTH Director can give permission to move patients from the SAM Isolation Unit to other areas in the hospital (i.e. radiology, ultrasound, surgery)
- In general, these decisions will be based upon the suspected disease agent, method of transmission, likelihood of persistent shedding or infection, likelihood of exposure to other contagious agents while housed in the SAM Isolation Unit, etc.
Patient exercise

- Patients housed in isolation are to be exercised in runs located within the three Isolation Wards, or in the adjacent run located outside the SAM Isolation Unit. Personnel managing individual patients are required to collect solid waste and hose the concrete pad immediately after each use.
- Isolation patients are not to be taken outside of the isolation run or taken to common use elimination areas.
- Small animal patients hospitalized in CCU with suspected infectious gastrointestinal disease should not be walked in common elimination areas. They should be transported via gurney to the area designated for high-risk patients which is located immediately Northwest of the ACC. All waste material must be properly disposed and contaminated surfaces in the hospital must be appropriately cleaned and disinfected as soon as possible.

10.2 Procedures for Personnel Entering and Exiting Small Animal Isolation Unit

- **Entering the SAM Isolation Nurses Station**
  - No personal items are to be taken into isolation.
  - Leave clinic outerwear (e.g., smock) on hooks and any personal belongings on the shelf outside of the SAM Isolation Unit.
  - Enter facility and don a blue lab coat that is to be worn at all times within the Isolation Facility.

- **Entering the Isolation Ward Anteroom**
  - In the Anteroom, don required barrier clothing (blue disposable gown over the blue lab coat, gloves, and shoe covers). Use of bouffant caps is optional.
  - Blue barrier gowns and gloves must be changed when managing different animals in isolation, even when they are housed in the same Isolation Ward.
  - An N-95 filtering mask should be worn when attending plague and tularemia cases. **NOTE** – only personnel that have received training are authorized to use N-95 masks at the JLV-VTH.

- **Exiting the Isolation Ward Anteroom**
  - With a gloved hand, remove shoe covers, mask, and bouffant cap and discard.
  - Remove disposable gown and hang on hook, or discard if soiled or ripped. You should still be wearing a blue smock.
  - Remove gloves and discard.
  - Wash hands with soap and water.
  - Disinfect any surfaces (doorknobs, etc.) that were contaminated.
  - Apply hand sanitizer. Exit the Anteroom.
  - **NEVER WEAR GLOVES INTO THE NURSE’S STATION WHEN EXITING THE ISOLATION ANTEROOM**

10.3 Admitting a Patient to the Small Animal Isolation Unit

- **Admission and Barrier Precautions**
  - Whenever possible, patients should be admitted to the SAM Isolation Unit directly through an outside (East) entrance. This is especially important if patients are diarrheic or are coughing.
  - If VTH in-patients are being transferred to the SAM Isolation Unit from within the VTH (e.g., from an exam room or from CCU) they should be transported on a gurney or carried to limit hospital contamination.
  - Referred infectious disease cases should be admitted directly to the Isolation Unit from the outside entrance.
  - Use Small Animal Isolation checklists (located in the wall pocket in the Nurses’ Station) as a reminder for required activities and to document that procedures have been completed as required.
At the time that patients are admitted to the SAM Isolation Unit, it is very important for the veterinarian managing the case to send an email to the Contagious Disease Alert listserv (VTH-Contagious-Dz-Alert@colostate.edu), which will notify Infection Control Personnel, heads of sections and nursing staff, and cleaning personnel. This email should include the patient signalment, veterinarian assigned to the case, housing area, and the known or suspected contagious disease.

Barrier nursing precautions:
- Hang smock and leave all personal items outside SAM Isolation Unit.
- Put on blue lab coats dedicated for use in the SAM Isolation Unit upon entering the facility and appropriate barrier protection (gloves, gown, mask, respirator, and/or shoe covers) in the Anteroom before entering the Isolation Ward.
- The specific requirements for barrier precautions will depend on the disease suspected or known to be involved in this case.
- If you have a question as to what type of barrier precaution to wear with a particular patient consult the Infection Control SOP, the primary clinician, a member of the Infection Control committee or Infection Control Personnel.

- During weekdays from 8am to 5pm notify a medicine nurse (pager 875) so that they can provide assistance.
- Record the client name, the clinician and clinician’s telephone number, the suspected infectious agent, the required Infection Control precautions and barrier precautions on the white board in the Nurses Station.
- Direct the SAM Isolation Ward camera on the patient so that patients can be monitored without entering the SAM Isolation Unit or the Isolation Ward. The SAM Isolation Unit cameras can be accessed through the internet on the VTH website under the patient cameras: <http://oghmaprod.cvmbs.colostate.edu/cameras.cfm>

**Small Animal Isolation Admission Checklist**

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Use appropriate barrier nursing precautions.</td>
</tr>
<tr>
<td>2.</td>
<td>Notify Animal Care (7-123) of patient admission to isolation and the nature of the infectious agent.</td>
</tr>
<tr>
<td>3.</td>
<td>Send an email to <a href="mailto:VTH-Contagious-Dz-Alert@colostate.edu">VTH-Contagious-Dz-Alert@colostate.edu</a> to inform Infection Control personnel of the suspected infectious agent.</td>
</tr>
<tr>
<td>4.</td>
<td>Isolation ward clean? Yes, proceed to 6. If no, complete (a) through (d).</td>
</tr>
<tr>
<td>5.</td>
<td>Small animal isolation admission checklist.</td>
</tr>
<tr>
<td>6.</td>
<td>Direct SAI nurse to follow for contact monitoring.</td>
</tr>
<tr>
<td>7.</td>
<td>Record the date and patient name; clinician and clinician’s telephone number; the suspected infectious agent and required barrier precautions on the patient’s chart in the Nurses Station.</td>
</tr>
<tr>
<td>8.</td>
<td>Post check list for admission, daily care and discharge outside of SAI ISO Ward.</td>
</tr>
</tbody>
</table>
Small Animal Isolation Discharge Check List

Patient: __________________________

Ward: __________________________

Date: __________________________

1. Contact Animal Care (7-1223) IMMEDIATELY upon discharge so the
Ward can be cleaned and disinfected before use by another patient. Inform
them of the suspected or confirmed infectious agent.
2. From 8:30 am to 5:00 pm, contact the Medicine Nurse for their assistance
with rooms break-down.
3. Throw away ALL disposables (including fluid pump plastic), placing sharps
in the sharps container.
4. If case is known or suspected to be Plague, Tularemia, or Rabies, seal the
sharps container and place it in the trash.
5. Seal all laundry and garbage bags with white tape, disinfect the outside, label
with known or suspected agent and leave in isolation for Animal Care to
remove.
6. Disinfect all counters and equipment.
7. Disinfect all bowls and place in the dishwasher located in the Nurses’ Station.
8. Fluid Pump: Thaw plastic away and disinfect the pump.
9. Vaporizer: Empty water out of reservoir. Disinfect the vaporizer. Place
plastic bottle and blue corrugated tubing in the sink with disinfectant for
appropriate time. Rinse and dry. Put vaporizer back together and hang blue
corrugated tubing on the wall.
10. Oxygen Cage: Disconnect the bubbler, empty water and disinfect bottle.
Suck the tubing in disinfectant, rinse, dry and put back together.
11. Stethoscope: Place in a biohazard bag, seal with white tape, disinfect the
outside, and label with known or suspected agent. Return to Central Supply.
12. If another patient is being admitted and Animal Care is unavailable to clean
and disinfect the Ward, it must be disinfected by the student, house officer or
attending clinician prior to the admission of another patient.

Small Animal Isolation Daily Duties Check List

Patient: __________________________

Ward: __________________________

Date: __________________________

1. Environmental hygiene is the responsibility of all personnel working in the
SA ISO Unit.
2. Daily cleaning is the responsibility of the student, house officer and attending
clinician.
3. Use appropriate barrier nursing precautions.
4. Direct SA ISO camera on patient to allow for remote monitoring
(http://cvmbs.colostate.edu/cameras.cfm).
5. Ward: Disinfect the patient’s cage or run.
6. Ward: Disinfect equipment as needed.
7. Anteroom: Disinfect hand contact surfaces including doors, door knobs, sink
fixtures, sink, and light switches.
8. Exercise areas (outside and inside run): Pick up solid waste and hose after
each use, prior to another patient using the area. Isolation patient are not to
be taken outside of the isolation run or taken to common use elimination
areas.
9. Common use areas: Disinfect after each use, prior to being used by another
patient.
10. When laundry or trash bags are full, seal the bag with white tape, spray the
outside with disinfectant and label with the infectious agent (suspected or
confirmed). Notify Animal Care (7-1223) that the laundry and/or trash are
available for pick-up.
11. Animal Care will remove laundry, garbage and non-disposables.
10.4 General Cleaning and Trash

- Please use the orange sticky notes ("SPECIAL ATTENTION REQUIRED" sticky notes) to identify rooms, cages, and runs where the patient has been managed, after completely filling out the requested information. These forms should also be used to label potentially contaminated materials that are removed from the facility (e.g., diagnostic specimens, laundry, items returned to central supply, etc).

- Cleanliness of common use areas (Nurses Station and Outside Run) is the responsibility of those using the area.
  - Common use areas must be cleaned prior to use by another animal.
  - Cleaning is the responsibility of the student, house officer, and attending clinician managing the case.

- Use Small Animal Isolation checklists (located in the wall pocket in the Nurses’ Station) as a reminder for required activities and to document that procedures have been completed as required.

- If Animal Care has been notified (use the contagious disease listserv <VTH-Contagious-Dz-Alert@colostate.edu>) that a patient is being housed in the SAM Isolation Unit, they will perform the following duties every day that the Unit is in use, including holidays and weekends:
  - Clean the SAM Isolation Unit Nurses’ Station and any Isolation Ward in use
  - Clean the outside SAM Isolation exercise run
  - Remove laundry
  - Remove disposables and non-disposables

- If Animal Care has not been notified and do not feel comfortable entering the Isolation Unit to clean
  - They will call the primary clinician (at home if necessary) to obtain complete patient information. If the primary clinician is unavailable, they will contact the House Officer on emergency.
  - They will send an inquiry via the contagious disease listserv <VTH-Contagious-Dz-Alert@colostate.edu> and the Small Animal Medicine Nurses will obtain this information for Animal Care as soon as possible.

- If Animal Care discovers a patient in a soiled cage or run after hours, they will either clean the cage/run or contact the Ward’s Student on duty if they do not feel comfortable cleaning the cage/run by themselves.

- If the Isolation Ward has not been cleaned from previous use and Animal Care cannot be contacted to disinfect and prepare the ward, contaminated counters, equipment, and cages must be cleaned by a student, nurse or house officer before the new patient is admitted.
  - Soiled laundry and garbage bags from the previous patient must be sealed with tape and the outside of the bags sprayed with Neutral Disinfectant Cleaner disinfectant. Label the outside of the bags with the suspected infectious agent from the previous patient and the responsible house officer and leave them in the Isolation Ward, to be removed by Animal Care.
  - Animal Care personnel can also be consulted to clarify questions about the cleaning status of rooms or about procedures using contact information provided on the Animal Care web page.
  - Put a clean, clear plastic garbage bag in the garbage bin, (located in Isolation Ward)
  - Put a clean, autoclavable Bio-hazard bag in the laundry bin, (located in Isolation Ward)
  - For Zoonotic diseases, use Bio-hazard bags for both the garbage and the laundry bins so that both the laundry and garbage can be autoclaved.

- Disposal of Infectious Waste
  - Waste should be bagged in the area where it was generated and re-bagged once outside of the contaminated area.
  - If an infectious disease (excluding rabies or plague/tularemia) is suspected, trash must be sealed in trash bags for waste disposal. Seal the bag with tape then double bag and seal with tape, spray the surface of the bag with Neutral Disinfectant Cleaner or Accel, and discard in dumpster.
  - If a known zoonotic agent is suspected or involved, consult your primary clinician. Seal the trash bag with tape then double bag and seal, spray the surface of the bag with Neutral Disinfectant Cleaner or Accel, and transport to the disposal area. Materials from Small Animal Isolation will be placed into clear, autoclavable
biohazard bags, clearly labeled with the department and disease, and delivered to the diagnostic laboratory (Room 233, DMC 2nd Floor) during regular business hours (8 am – 5 pm). The diagnostic lab must be notified prior to delivering the bag (970-297-5204). When materials are dropped off for autoclaving, material should be placed in a large, red biohazard bag available which will be made available by diagnostic laboratory personnel. A request form will be provided by the diagnostic lab and should be filled out, using account number HO#8032. Under no circumstances are materials to be delivered to the diagnostic lab without first calling and receiving approval from diagnostic lab personnel.

- Biological samples collected from patients with elevated contagious disease risk should be sealed in plastic bags and labeled with the appropriate information prior to submission to diagnostic laboratories. Care should be taken to avoid contaminating the outside of plastic bags.
- Cleaning and bandaging of wounds known to be infected with infectious agents of concern (e.g., MRSA or other highly resistant bacteria) should not be conducted in high traffic areas and should occur in areas that can be easily cleaned and disinfected. Barrier precautions should be used to prevent contamination of hands and attire, and care should be taken to avoid environmental dissemination through drainage of flush solutions or careless handling of bandage materials. Please follow procedures in this document for environmental disinfection and disposal of these materials.

10.5 Care for Patients in the SAM Isolation Unit [Return to Top]

- In order to minimize the number of personnel handling cases in isolation, the primary clinician and student should be prepared to perform all physical examinations and treatments themselves. If necessary, the primary clinician may assign additional students and staff to help.
- Students are not allowed to participate in management of Plague, Tularemia or Rabies cases. Also, only the primary clinician, one nurse if necessary, and one assigned animal care personnel should have contact with the patient.
- The appropriate barrier precautions (gloves, gown, mask, respirator, and/or foot covers) must be worn. The specific requirements for barrier precautions will depend on the disease suspected or known to be involved in this case. Required barrier precautions will be posted on the board in the Nurses’ Station under the infectious agent. If you have a question as to what type of barrier precaution to wear with a particular patient consult the Infection Control SOP, the primary clinician, a member of the Infection Control committee or Infection Control Personnel.
- The primary student on an isolation case will be assigned from the same service as the primary clinician.
- The primary clinician is responsible at all times for ensuring that patients are receiving appropriate care. Students may be asked to assist with this effort (as can the Internal Medicine Nurses between 8am and 5pm on weekdays) but the ultimate responsibility for patient care lies with the primary clinician assigned to the case.

- After hours patient care
  - The primary clinician is responsible to ensure proper care of an isolation patient overnight, on weekends, and holidays.
  - Direct the SAM Isolation Ward camera toward the patient so that patients can be monitored without entering the SAM Isolation Unit or the Isolation Ward. The SAM Isolation Unit cameras can be accessed through the internet on the VTH website under the patient cameras: <http://oghmaprod.cvms.colostate.edu>
  - In case of emergency intervention, the house officer on emergency duty should be contacted, or the primary clinician on the case can be contacted, if the emergency clinician is unavailable. Contact CCU nurses for assistance as needed (eg. IV catheter placement, emergency assistance).
10.6 Minimizing Entry into the Isolation Unit

- Entry into the unit should only occur when absolutely necessary.
- Minimize the number of personnel handling cases in isolation. Only the student and staff members directly responsible for the patient should enter isolation. Clients are not permitted to visit patients in isolation.
- Whenever possible and appropriate, personnel should utilize web cameras for general monitoring of patients’ conditions in order to minimize foot traffic into the Isolation Facility, the webcam images is available at http://oghmaprod.cvmbs.colostate.edu/cameras.cfm. This website can only be accessed from computers in the VTH unless special login and password are obtained.
- When possible, students assigned to infectious disease cases should not have contact with immune suppressed patients elsewhere in the JLV-VTH. Examples would include leukopenic patients, young animals, animals receiving immunosuppressive drugs and patients with diabetes mellitus. When caseload demands contact with infectious disease suspects, treat other patients before handling infectious cases.
- Clients are never allowed to visit animals housed in Small Animal Isolation, and when appropriate should be discouraged from entering CCU. With express permission from Infection Control Personnel or the VTH Director, exceptions to this visitation rule may be granted under extraordinary circumstances, such as when patients are to be euthanized.

10.7 Equipment and Materials:

- In general, any materials taken into the SAM Isolation Unit should not be taken back to the main hospital, and materials taken into the Isolation Ward or Anteroom should not be returned to the Nurse’s Station.
- General stock in Nurses Station
  - A designated technician will be responsible for maintaining general stock.
  - To access general stock, remove gloves and apply alcohol based hand sanitizer.
- Any supplies taken into an Isolation Ward Anteroom should be used for that patient or discarded (do not use on multiple patients or return them to the general stock).
- No equipment or supplies (bandages, syringes, disinfectant, etc.) should be taken to the SAM Isolation Unit without first checking with personnel responsible for this area.
- Medications used on isolation patients should be billed to client and sent home at discharge or else discarded. Do not return medications or intravenous fluids from isolation to the Pharmacy. All medications sent home with clients must be dispensed in appropriate child proof containers with a complete prescription label.
- Intravenous fluids not assigned to a patient should be stored in the general stock area of the Nurses’ Station.
- Additional cleaning supplies and disinfectant are stored in the Animal Care storage closet located on the north end of the Nurses’ Station.
- Additional scrubs, isolation gowns, supplies, etc., are stored in the ante room with surplus stock stored in the black file cabinet in the Nurses’ Station.
- VTH-owned stethoscopes are used on patients in the SAM Isolation Unit. Do not bring your own stethoscope or any other equipment into isolation.
- New digital thermometers (dispensed and charged to clients) or disposable thermometers are used in the SAM Isolation Unit.
- Individual kits with syringes, needles, thermometer, etc. are available in the Isolation Ward Anteroom – 1 kit per patient.
- Samples obtained from isolation patients should be disinfected and sealed in a biohazard bag for transport to the laboratory. This will minimize the likelihood of contaminating other surfaces.
10.8 Discharge of Isolation Patients and Breakdown of the Room Prior to Disinfection:

- Whenever possible try to discharge isolation patients prior to 4:30 pm Monday through Friday, so that medicine nurses can help with the breakdown of the room.
- From 8:30 am to 5:00 pm Monday through Friday contact a medicine nurse to enlist their help in breaking down the room and to assure it is done properly.
- Contact Animal Care at 7-1223, IMMEDIATELY upon discharge so that they can clean and disinfect the Isolation Ward before another patient is admitted.
- This is most efficiently done by sending an email to the Contagious Disease Alert listserv (VTH-Contagious-Dz-Alert@colostate.edu), which will notify cleaning personnel, Infection Control Personnel, heads of sections and nursing staff. This email should include the patient signalment, veterinarian assigned to the case, housing area, and the known or suspected contagious disease.
- Additionally, use orange sticky notes (i.e., “SPECIAL ATTENTION REQUIRED" sticky notes) to identify rooms, cages, kennels, stalls, or other materials (e.g., laundry or instruments) that may be contaminated, after completely filling out the requested information.
- The primary clinician and student on the case are responsible for the following breakdown procedures of the room so that Animal Care can fully clean and disinfect the room. The room will not be disinfected unless Animal Care is notified of the specific agent that was known or suspected to be associated with the case.
- Use Small Animal Isolation checklists (located in the wall pocket in the Nurses’ Station) as a reminder for required activities and to document that procedures have been completed as required.
  - See page 16 regarding infectious waste disposal.
  - Use orange sticky notes (i.e., “SPECIAL ATTENTION REQUIRED" sticky notes) to identify rooms, cages, kennels, stalls, or other materials (e.g., laundry or instruments) that may be contaminated, after completely filling out the requested information.
  - Throw away ALL disposables, using sharps contains for the disposable sharps.
  - For Plague, Tularemia or Rabies cases (known or suspected) seal the sharps container and place it in a biohazard bag.
  - Seal all laundry and garbage with tape, spray the outside with Neutral Disinfectant Cleaner disinfectant and leave in isolation to be removed by Animal Care.
    - Double bag and spray autoclavable bags for Zoonotic diseases.
  - Clean all counters with Neutral Disinfectant. See Infection Control SOP for instructions regarding appropriate disinfection procedures (pages 20 and 158).
  - Disinfect all bowls and place them in the dishwasher.
  - Disinfectant all medical equipment.
  - Fluid Pump: throw plastic away and spray and wipe down the fluid pump with Neutral Disinfectant Cleaner.
  - Vaporizer: Empty water out of the vaporizer holding reservoir, spray and wipe down the vaporizer, soak the plastic bottle and blue corrugated tubing in the sink with disinfectant. Rinse everything off, wipe dry, put the unit back together and hang tubing on the wall.
  - Oxygen cage: Disconnect the bubbler, empty water and disinfect the bottle, soak tubing in disinfectant, rinse and dry the bottle and put the unit back together.
  - Place the stethoscopes in a separate Bio-hazard bag and return them to Central Supply.
    - For Zoonotic diseases double bag the stethoscopes and spray the outside of the bag, label the bag with the infectious disease.
- If another patient is being admitted before Animal Care is able to disinfect the ward, the ward must be disinfected by the student, house officer, or primary clinician, (or medicine nurse if they are available).
10.9 Small Animal Surgery/Anesthesia Cases with Suspect Contagious Disease:

- Surgery on animals with suspected infectious diseases should be avoided when possible. Bandage changes, minor procedures and minor surgeries may be performed in the Isolation Ward of the Nurses’ Station at the discretion of the attending clinician. When absolutely necessary, surgery will be performed on animals suspected of having contagious diseases at the end of the day to minimize exposure to other patients.
- It is the primary clinician’s responsibility to notify anesthesia and small animal surgery about impending surgery on animals with potential infectious diseases (particularly respiratory, gastrointestinal, and multiple-antibiotic resistant bacterial infections).
- The animal should be pre-medicated in the SAM Isolation Unit.
- Transport to anesthesia prep should occur just prior to induction. A gurney or transport cage should be used to minimize hospital contamination.
- A remote induction and prep table should be used.
- An operating room with minimal cross traffic should be selected.
- After surgery, contaminated outerwear should be placed in plastic bags, marked with the suspected infectious disease agent, and returned to Central Supply.
- All contaminated areas must be cleaned and disinfected immediately following the procedure.
- All contaminated instruments and equipment must be cleaned and disinfected, and placed in a plastic bag marked with the suspected agent prior to returning to Central Supply for sterilization.
- Patients shall recover from anesthesia in Isolation when possible.
- The surgical suite must be immediately cleaned and disinfected.
- All individuals contacting the animal must wash hands carefully and remove contaminated clothing prior to handling other animals.

11.0 Infection Control for Patients Originating from Animal Shelters:

Dogs and cats originating from animal shelters have an increased risk of infection with contagious diseases, and the potential for nosocomial transmission of respiratory and enteric pathogens is of particular concern. As such, animal shelter patients are segregated from other hospitalized patients and are managed using more stringent Infection Control precautions. All patients originating from Animal Shelters are housed in the ward dedicated for use with these patients which is located at the North end of the JLV-VTH.

11.1 General Attire for Shelter Animal Ward:

- Students, staff and doctors’ personal smocks are NOT to be worn into Shelter Animal Ward. Upon entry into Shelter Animal Ward, smocks are to be left in the induction room.
- All personnel entering the Shelter Animal Ward with the intent to handle patients or contact their housing environment are required to wear cloth barrier gowns dedicated for use in this area. It is important that patient contact with arms and lower legs of handlers is minimized. As such, barrier gowns must be closed in front when worn; this can be achieved either by tying the gown closed or by wearing the gown open in the back.
- A clean barrier gown will be assigned to each animal shelter patient (dogs or cats) at the time of admission and are hung adjacent to the animal's cage or run.
- Care should be taken to always use one side of gowns as the “outside” to minimize contamination of clothing. Gowns should be replaced whenever they become soiled during the animal's stay.
- Clean gowns are stored in the kitchen. Dirty gowns should be placed in laundry bins located in the housing areas.

11.2 Exercising Animal Shelter Patients:

- Barrier gowns are to be worn when exercising these patients outside the VTH, but must not be worn in other areas of the VTH.
Personnel exercising dogs must only enter and exit the building using the exterior door connected to the Shelter Animal Ward on the north side of the building.

Care must be taken to prevent direct contact between animals. Personnel must also take appropriate precautions to minimize indirect contact with infectious materials, such as through contact with feces.

Dogs should be taken directly to the grass area specifically designated for use with Shelter patients which is located at the Northwest corner of the VTH, north of the chain link fence separating personnel parking areas or the area north of the fenced dog pad on the west side of the JLV-VTH building.

11.3 Precautions for High Risk Animal Shelter Patients:

- Patients with clinical evidence of contagious disease must be managed with increased Infection Control precautions in order to decrease the likelihood of nosocomial infections.
- Animals managed as high-risk patients will include, but are not limited to, those exhibiting clinical signs consistent with an upper respiratory illness, GI related illness, or fever of unknown origin. These animals must be managed with increased precautions.
- Infection Control Personnel must be notified in the event that illness in Shelter Animal Ward patients is believed to be clustered or if it is believed to be nosocomial in nature.
- High risk animal shelter patients must be separated from other patients by at least one empty cage or run. If possible they should be moved to a separate room if it is empty.
- If personnel are handling more than one animal shelter patient or are contacting the housing environment of more than one animal shelter patient, high-risk patients must be handled AFTER completing tasks related to lower risk patients.
- All personnel handling high-risk canine patients or contacting their housing environment are required to wear coveralls dedicated for use in this area. Clean coveralls will be assigned to each high-risk canine patient at the time of admission or initial recognition of clinical signs and are hung adjacent to the animal's cage or run.
- Clean exam gloves must be worn when handling high-risk patients.
- Shelter managers responsible for high-risk patients must be contacted to collect these animals as soon as possible.

11.4 Hand and Footwear Hygiene for Animal Shelter Patients:

- Maintaining hospital cleanliness and appropriate personal hygiene are responsibilities of ALL personnel working in the JLV-VTH.
- Hands must be washed or cleaned with an alcohol-based hand sanitizer prior to, and after handling each patient. Hands should also be washed or cleaned with an alcohol-based hand sanitizer when exiting the Animal shelter ward prior to working in other areas of the VTH.
- Clean exam gloves should be worn when handling high-risk animal shelter patients (i.e. infectious disease suspects).
- Footmats containing Neutral Disinfectant Cleaner are maintained at the main entrances to Animal shelter ward. Personnel working in the JLV-VTH are required to use footmats and footbaths appropriately whenever they are encountered. Footmats do not require full immersion of feet, as the mat is designed to place solution on the soles and sides of the soles of shoes. However, splash contact with the tops and sides of shoes occurs commonly, and impervious footwear is strongly recommended for personnel working in areas where footmats are used.
11.5 Cleaning of Instruments and Other Patient Care Materials: [Return to Top]

- Surfaces or equipment contaminated by feces, secretions, or blood must be cleaned and disinfected immediately by personnel in charge of the patient. This is especially important regarding patients known or suspected of shedding important infectious disease agents.
- Leashes dedicated for use with canine animal shelter patients will be assigned to a patient at the time of admission; leashes used with other patient populations must NOT be used when walking canine shelter patients. These leashes are disinfected after each use by soaking in chlorhexidine solution.
- Stethoscopes used with animal shelter patients must be cleaned using alcohol or chlorhexidine prior to use with other patients in the hospital.
- Thermometers should only be used with animal shelter patients using a thermometer cover.
- Other instruments and materials used in the Shelter Animal Ward should not be used with other JLV-VTH patients without appropriate cleaning and disinfection.

12.0 Exotic and Zoological Medicine Infection Control [Return to Top]

12.1 General Cleanliness and Hygiene:

- Maintaining hospital cleanliness and appropriate personal hygiene are responsibilities of ALL personnel working in the JLV-VTH.
- The hallway to Exotic/Zoological Medicine should only be entered when going to Small Animal Isolation or the Exotic/Zoological Medicine ward.
- Hands must be washed or cleaned with an alcohol-based hand sanitizer prior to, and after examining each patient.
- Clean exam gloves should be worn when handling high-risk patients (i.e. infectious disease suspects).
- Surfaces or equipment contaminated by feces, secretions, or blood must be cleaned and disinfected immediately by personnel in charge of the patient. This is especially important regarding patients known or suspected of shedding important infectious disease agents.
- Clean and disinfect all equipment between patients (muzzles, specula, forceps, etc) using 70% isopropyl alcohol or 0.5% chlorhexidine available in various areas. Alternatively, clean equipment can be returned to central supply for sterilization when appropriate.
- Students are expected carry some of their own equipment (e.g. scissors, clipper blades, thermometers, leash, stethoscope, percussion hammer, penlight and hemostat), and it is critical that these supplies are routinely cleaned and disinfected.
- If fleas or ticks are found on an animal, treat the animal with Frontline spray from pharmacy and bill to the client. Notify Animal Care of the parasite (7-1223) and do not use the room until appropriate cleaning and disinfection occurs.
- Ticks found on any animals should be taken to Parasitology (in the Clinical Pathology office) in a sealed container for immediate identification.

12.2 Patient Receiving: [Return to Top]

- Please refer to the “Contagious and Zoonotic Disease Matrix” when developing differential lists for patients to ensure that all diseases of high concern have been considered.
- At their earliest opportunity, the veterinarian responsible for the case must notify all affected personnel about the recognition of the specifics related to this situation. They must also notify personnel regarding changes in the housing (e.g. when moving into isolation units), and at the time of discharge.
- This is most efficiently done by sending an email to the Contagious Disease Alert listserv (VTH-Contagious-Dz-Alert@colostate.edu), which will notify Infection Control Personnel, heads of sections and nursing staff, and cleaning personnel. This email should include the patient signalment, veterinarian assigned to the case, housing area, and the known or suspected contagious disease.
• Additionally, use orange sticky notes (i.e., “SPECIAL ATTENTION REQUIRED” sticky notes) to identify rooms, cages, kennels, stalls, or other materials (e.g., laundry or instruments) that may be contaminated, after completely filling out the requested information.

• Wild mammals, especially rodents and lagomorphs, may have fleas that can be sources of plague or tularemia, and appropriate precautions should be taken to control potential exposures. See Plague Control Procedures.
  ➢ Wild rodent and lagomorphs admitted to the hospital should be sprayed with flea and tick spray and placed in Isolation.
  ➢ See Plague Control Procedures for more information. (page 118)

• Reptiles should be handled with caution because of the potential for exposure to *Salmonella*. Careful attention should be paid to hand hygiene and use of barrier nursing precautions for all species of reptile patient. Optimal reptile temperatures, diet and care must be maintained to reduce pathogen shedding. These animals are to be kept in the herpetarium.

• Bats, foxes, raccoons (wild animal reservoirs for rabies) that are brought to the JLV-VTH for care are to be placed in a cage in their original container in Small Animal Isolation and the clinician on call notified of their presence. Students and technicians should not do any examinations or direct handling of these patients without first consulting with the clinician on call. See Rabies Control Procedures for more information. (page 127)

• Ferrets with GI disease should be housed in Small Animal Isolation and the primary care giver will be restricted from care of other ferret patients to minimize the risk of nosocomial transmission.

• Nonhuman primates may not be admitted without prior permission of the Zoological Medicine clinician on duty. See nonhuman primate infection control policies (page 108).

• Large and/or dangerous non-domestic patients should not be handled by students, interns, or residents without training or assistance from Zoological Medicine technicians or clinicians. This includes large raptors such as eagles, cranes, swans, herons, macaws, non-domestic feline and canine patient, cervids, snakes or crocodilians > 3 feet in length, and snapping turtles > 15 pounds.

12.3 Guidelines for Exotic/Zoological Patients with Suspected Contagious Disease: [Return to Top]

• Please refer to the “Contagious and Zoonotic Disease Matrix” when developing differential lists for patients to ensure that all diseases of high concern have been considered.

• At their earliest opportunity, the veterinarian responsible for the case must notify all affected personnel about the recognition of the specifics related to this situation. They must also notify personnel regarding changes in the housing (e.g. when moving into isolation units), and at the time of discharge.

• This is most efficiently done by sending an email to the Contagious Disease Alert listserv (VTH-Contagious-Dz-Alert@colostate.edu), which will notify Infection Control Personnel, heads of sections and nursing staff, and cleaning personnel. This email should include the patient signalment, veterinarian assigned to the case, housing area, and the known or suspected contagious disease.

• Additionally, use orange sticky notes (i.e., “SPECIAL ATTENTION REQUIRED” sticky notes) to identify rooms, cages, kennels, stalls, or other materials (e.g., laundry or instruments) that may be contaminated, after completely filling out the requested information.

• Suspected respiratory, feather, neurological, or gastrointestinal tract infectious disease cases should be triaged in the parking lot before admission when possible.

• Animals with suspected infectious diseases should be treated as outpatients when possible. If hospitalization is required, transport the animal to the appropriate housing area by the shortest route possible, using an O2 cage or gurney to decrease hospital contamination.

• Patients admitted with a suspected infectious disease should be taken to Isolation immediately per approval of the clinician in charge.

• Immediately clean and disinfect the gurney and any hospital area/equipment potentially contaminated by personnel (including examination tables and doorknobs).
If an infectious disease is suspected based on history, physical examination, and/or evaluation of previously performed laboratory work:

- At their earliest opportunity, the veterinarian responsible for the case must notify all affected personnel about the recognition of the specifics related to this situation. They must also notify personnel regarding changes in the housing (e.g., when moving into isolation units), and at the time of discharge.
- This is most efficiently done by sending an email to the Contagious Disease Alert listserv (VTH-Contagious-Dz-Alert@colostate.edu), which will notify Infection Control Personnel, heads of sections and nursing staff, and cleaning personnel. This email should include the patient signalment, veterinarian assigned to the case, housing area, and the known or suspected contagious disease.
- Additionally, Close off exam room used in managing the patient and use orange sticky notes (i.e., “SPECIAL ATTENTION REQUIRED” sticky notes) to identify rooms, cages, kennels, stalls, or other materials (e.g., laundry or instruments) that may be contaminated, after completely filling out the requested information.
- Do not use the room until Animal Care has removed the sign, or until other adequate cleaning/disinfection occurs.

- Ungulates with suspected wasting disease, TB, or other infectious diseases should be destroyed or taken directly to Large Animal Isolation upon approval from Infection Control Personnel, large animal nurse or clinician on duty.
- Required diagnostic testing policies for other patients also apply to Zoological Medicine patients.

12.4 Isolation for Exotic/Zoological Medicine Patients: [Return to Top]

- Use heated isolation cages when possible, adjust heating and oxygen as needed; these cages can be transported to critical care if needed.
- If patients need care in CCU, they should be contained within isolation cages and moved on a cart to CCU.
- CCU clinician approval is required before cases are moved into the CCU.
- See Small Animal Medicine Isolation (page 95) and Critical Care Isolation protocols (page 87)

12.5 Non-Human Primate Infection Control: [Return to Top]

- Information and circumstances related to the health history and veterinary needs of non-human primates will be unique. For this reason, a Zoological Medicine faculty member must be involved in every non-human primate case at least as a consultant or coordinator of activities.
- Zoological Medicine faculty must be involved in determining whether it is appropriate to bring the animal to the JLV-VTH, and if this is approved, preferably prior to admission, they must assist in determining the most appropriate procedures regarding the care and handling of animals or biological samples.
- Obtaining correct species identification of patient, health history including disease history and prophylaxis measures, and specimen type is required prior to making this determination.
- Zoological Medicine Faculty will inform the Director of Infection Control when non-human primates are being cared for at the JLV-VTH, preferably prior to admission.
- Non-human primates can be a source of exposure to several zoonotic pathogens. Of these, Mycobacterium tuberculosis, Herpes B Virus (principal in macaques), hepatitis viruses, immunodeficiency viruses, and enteric agents are the most important potential hazards to note. In addition, primates are extremely susceptible to common human pathogens. Special precautions must therefore be enforced when treating, caring for, or examining non-human primates or biological specimens from these animals.
- Involvement of JLV-VTH Personnel and students with the care and treatment of non-human primates, including handling and examination of biological specimens, is completely voluntary. All personnel must be made aware that they have the right to defer involvement in these cases at any time simply by notifying the clinician responsible for the case. Current TB tests (q 6-12 months) are required to handle non-human primates.
In addition to barrier gowns and gloves, protective masks, and eye protection may be necessary barrier precautions in some cases, dependent on the suspected or known primate disease.

- Students or staff that are pregnant or possibly pregnant should not work with primates, as the risk of cross-species transmission to the fetus is high (e.g. measles).
- Bite wounds will be managed via CDC recommendations, particularly for the genus *Macaca* (http://www.cdc.gov/herpesbvirus/index.html).
- Equipment and instruments used on primates should be cleaned and disinfected immediately, and returned to Central Supply in plastic bags (available in the custodial closet of Ward 2) when applicable.
- Primates with suspected retroviral disease, poliovirus disease, amoebiasis, balantidiasis, and enteric bacterial diseases should be handled only VTH staff or faculty.
- Primates used for research will not be admitted or examined in the JLV-VTH unless approved by the Hospital Director or the Director of Infection Control. Similarly, biological specimens obtained from humans or non-human primates used for research will not be accepted in the diagnostic laboratories unless they are formalin fixed.

**Clinical Cases:** Approval must be received from the Zoological Medicine faculty member on duty prior to admitting any non-human primates as patients at the JLV-VTH. It is the responsibility of this faculty member to screen the cases prior to admission and consider the Infection Control hazard to VTH Personnel and students.

- Macaque species will not generally be admitted as patients to the JLV-VTH except under extraordinary circumstances. This includes Rhesus Monkeys (Rhesus Macaques; *Macaca mulatta*), Pig-tailed Macaques (*M. nemestrina*), Long-tailed or Crab-eating Macaques (*M. fascicularis*), Stump-tailed Macaques (*M. arctoides*), Japanese Macaques (*M. fuscata*), Bonnet Macaques (*M. radiata*), Toque Macaques (*M. sinica*) and other members of the *Macaca* genus. The decision to waive this policy and admit macaques must be made in consultation with the JLV-VTH Hospital Director and the Director of Infection Control.
- Transport: Non-human primate patients must be enclosed in a travel carrier when brought into the JLV-VTH, and the west side entrance to the Zoological Medicine Section should be used when possible.
- Handling and medical procedures: Only qualified personnel, as considered by the Zoological Medicine faculty, will be allowed to handle non-human primates. Students will only be allowed to handle or otherwise physically contact non-human primates when a member of the Zoological Medicine faculty is present. When possible and appropriate, medical procedures will be performed under general anesthesia or chemical immobilization to reduce risk to VTH Personnel and students. A restraint board will be used under the supervision of the Zoological Medicine faculty to facilitate handling of patients requiring critical care. Special precautions must be taken to avoid human exposure to biological materials during medical procedures (dental procedures, phlebotomy, aspiration, etc.).
- Non-human primates will be housed in an area identified by the Zoological Medicine faculty in consultation with the Hospital Director. Housing enclosures must be secured with a double-lock system.
- In order to decrease the Infection Control hazard to support staff, cleaning and disinfecting of housing and handling areas will be the primary responsibility of the Zoological Medicine faculty and staff. Follow-up or secondary cleaning and disinfecting by support staff will only be permitted after this initial cleaning/disinfecting

**Biological Specimens:** Specimens obtained from non-human primates will only be accepted for examination/analysis after the Zoological Medicine Faculty have reviewed pertinent health history and received approval from the head of the pertinent diagnostic service(s).

- Viral culture: Biological specimens will not be processed for viral culture at the CSU diagnostic laboratory
- Bacterial culture: At the discretion of the laboratory director, biological specimens may be processed for bacterial culture.
• Pathology specimens: Specimens submitted for histopathology will only be accepted at the discretion of the laboratory director.

• Biological specimens obtained from humans, macaque and ape species, or any non-human primates used for research will not generally be examined/analyzed by diagnostic services at the JLV-VTH except under extraordinary circumstances, unless they are formalin fixed. The decision to waive this policy and accept biological specimens from these species must be made in consultation with the head of the pertinent diagnostic service(s) and the Director of Infection Control.

• A submission form that outlines pertinent medical information, including the patient’s species, pertinent health history, and known or suspected infection status for zoonotic pathogens, must accompany all biological specimens obtained from non-human primates that are submitted for analysis. Zoological Medicine faculty will provide this form to clients wishing to submit biological specimens collected from animals that are not JLV-VTH patients. A copy of this submission form will remain attached to the specimen at all times.

• All specimens must be double-bagged, and the outside container should be clearly labeled with the patient’s species and pertinent information about advisable biosafety precautions to be used when handling the specimen.

• All personnel involved in handling of biological specimens obtained from non-human primates must be made aware of their reasonable potential health risks and advisable precautions for handling specimens. All personnel have the right to defer involvement in these cases at any time simply by notifying the head of the diagnostic service. Veterinary students will not be included in the processing, analysis, or examination of these specimens.

• Laboratory coats and disposable gloves are required whenever handling biological specimens obtained from non-human primates. Eye protection is always recommended when handling these specimens, and face and eye protection may be required at the discretion of the head of the diagnostic service.

• Good laboratory/microbiological practices should be adhered to whenever handling biological specimens from non-human primates.

• All biological specimens (except those that are formalin fixed) will be handled using a minimum of Biosafety Level 2 (BL-2) precautions. This includes the use of Class I or II biosafety cabinets or other physical containment devices when specimens are being manipulated in such a way that might cause splashes or aerosols of materials. Aerosol containment devices must always be used when centrifuging specimens obtained from non-human primates. Special attention should be paid to handling of sharps when examining or processing these specimens.

• Biological specimens (except those that are formalin fixed) obtained from patients known or suspected to be infected with Herpes-B virus (Herpesvirus simiae), hepatitis viruses, Mycobacterium tuberculosis, or immunodeficiency viruses will not be examined or processed by diagnostic services as NIH guidelines recommend use of Biosafety Level 3 (BL-3) precautions.

• Formalin fixed biological specimens obtained from non-human primates may be examined by diagnostic services using standard laboratory protocols. Specimens that are received without being formalin treated may be fixed at the discretion of the senior diagnostician and the Zoological Medicine Faculty member in charge of the case.

• Particular attention should be paid to appropriate handling and disposal of shipping materials from these specimens.

• Special care should be taken to clean and disinfect instruments, equipment, contact surfaces, and floors after handling biological specimens obtained from nonhuman primates. Avoid cleaning methods that produce aerosols. Refer to cleaning and disinfection guidelines for more specific instructions (pages 20, 154, and 158).
V. Specific Contagious Diseases of Concern

In addition to required testing, Infection Control Personnel must be notified immediately if patients are suspected of having any of the following conditions. This notification can be made in person, by phone, or by using the VTH-Contagious-Dz-Alert@colostate.edu listserv, and should be performed by the veterinarian or student with primary responsibility for the patient.

1.0 Acute Diarrhea (small animal):  
- *Salmonella* and *Campylobacter*: A one gram fecal sample must be submitted for culture of *Salmonella* and *Campylobacter*, especially if, 1) the animal is febrile, 2) if neutrophils are seen on rectal cytology, 3) there is a history of feeding a raw food diet, or 4) if more than one animal in the household / population has been affected with a similar condition.
- *Parvovirus*: Parvovirus antigen ELISA performed on feces is mandatory for any hospitalized canine patient in which parvovirus infection is a reasonable differential. Clinicians should consider the effects of recent vaccination when interpreting test results.
- *Cryptosporidium* and *Giardia*: An acid fast stain of a thin fecal smear, direct fecal examination, and wet mount examination is required for all diarrheic calves, dogs and cats admitted to the JLV-VTH.

2.0 Bovine Viral Diarrhea Virus (BVDV): Testing of appropriate samples is mandatory if acute or persistent BVDV is considered a reasonable differential. The responsible clinician will determine which test is appropriate.

3.0 Canine Distemper Virus: If Canine Distemper Virus is considered a reasonable differential, at least one of the following tests should be performed:
- Fluorescent antibody testing of conjunctival swabs is the preferred screening test
- PCR testing of blood, nasal discharge, or conjunctival swabs.
- Clinicians should consider the effects of recent vaccination on these test results.

4.0 *Campylobacter*: A one gram fecal sample must be submitted for culture of *Salmonella* and *Campylobacter*, especially if, 1) the animal is febrile, 2) if neutrophils are seen on rectal cytology, 3) there is a history of feeding a raw food diet, or 4) if more than one animal in the household / population has been affected with a similar condition.

5.0 *Corynebacterium pseudotuberculosis*: Testing of appropriate samples is mandatory for any hospitalized equine/caprine/ovine/bovine patient in which *C. pseudotuberculosis* is a reasonable differential (swab for bacterial culture).

5.1 General Information: *C. pseudotuberculosis* is a soil-borne organism which can survive in the environment for months to years, even in direct sunlight. Transmission of *C. pseudotuberculosis* occurs by direct contact (animal to animal), by mechanical vectors (flies), as well as by contaminated equipment. The bacterium can gain entry via abrasions, wounds, and mucous membranes. There is reportedly no cross-species transmission.

5.2 Clinical Presentation: Characteristic clinical presentations of *C. pseudotuberculosis* infection in the horse includes ulcerative lymphadenitis and external or internal abscessation. Most commonly in horses there is external abscessation of the pectoral region or ventrum. Sheep and goats will typically have caseous lymphadenitis with internal or external abscessation. In cattle, there are multiple clinical forms including cutaneous exoriated...
granulomas, mastitis, a visceral form or mixed infections. New World camelids typically develop lymphadenitis and subcutaneous abscession in the submandibular or cervical regions.

5.3 Testing: Diagnosis is based on bacterial culture of exudate.

5.4 Management:
- Upon admission, barrier nursing precautions including gloves, gowns and plastic shoe covers should be utilized when handling these patients. Additionally, these patients must be strictly segregated from other patients. Ensuring that these precautions are uniformly being applied can be best assured by housing patients in Large Animal Isolation, and therefore should be considered as a management option for all known or suspected cases.
- Abscesses associated with *C. pseudotuberculosis* infections can contain very large quantities of suppurative material (liters rather than milliliters). Clinicians must plan for strict containment and appropriate disposal of these infectious materials prior to intervening.
- Animals with known or suspected *C. pseudotuberculosis* infections must be housed in Large Animal Isolation if there is a chronic exudative wound.
- A *C. pseudotuberculosis* suspect/case should not be removed from its stall, unless procedures must be conducted at another location (e.g., surgery, radiography). To limit environmental dissemination of the organism, the wound must be bandaged and the feet must be cleaned prior to removal from the stall. It is the primary clinician’s responsibility to ensure that all necessary Infection Control measures are being followed and that any environmental contamination is appropriately cleaned prior to the area being used by another patient.
- A *C. pseudotuberculosis* suspect/case should not be treated in general use areas (e.g., stocks, wash rack).
- Aggressive fly control should be instituted throughout hospitalization (e.g., fly spray).
- Any exudate/discharge should be disposed of carefully as there is a very high potential for environmental contamination.

5.5 Zoonotic potential - Human infection with *C. pseudotuberculosis* has been occasionally to rarely reported in association with contact of affected small ruminants. In general, close, repeated contact with an infected animal, contaminated equipment, or exposure of open wounds to exudate is needed for infection. *C. pseudotuberculosis* infection in humans causes a subacute to chronic lymphadenitis and possibly pneumonia.

6.0 *Cryptosporidium and Giardia*: An acid fast stain of a thin fecal smear, direct fecal examination, and wet mount examination is required for all dogs, and cats admitted to the JLV-VTH.

7.0 *Chlamydophila psittici* (Avian, formerly *Chlamydia psittici*): Testing of appropriate samples is mandatory for any hospitalized avian patient in which infection with *Chlamydophila psittici* is a reasonable differential.
- Cloacal swabs should be submitted for testing by PCR. If a bird dies during hospitalization and chlamydiosis is a reasonable differential, liver tissue should be submitted for fluorescent antibody testing through the pathology service.

8.0 *Equine Herpesvirus type 1 (EHV-1)*: Testing is mandatory for horses that have acute onset of ascending paresis, paralysis, ataxia, or weakness if EHV-1 infection is a reasonable differential.
- This is especially important if horses have been febrile or if more than one animal in the resident/contact population has been affected with a similar condition.
- Dacron swabs should be used to collect nasal secretions and immediately tested for EHV-1 using PCR.
- Strict barrier precautions should be used when managing patients suspected of being acutely infected with EHV-1. See page 143 for more information about management of these patients.

8.1 Background:
- EHV-1 is an alpha herpesvirus that is ubiquitous in the domestic horse population.
- EHV-1 has a restricted host range affecting principally domestic horses however it can also affect New World Camelids.
• The incubation period for EHV-1 is 1-10 days.
• Viral shedding generally occurs for 7-10 days from disease onset.

8.2 Transmission:
• Directly through horse-to-horse contact or aborted fetuses, fetal membranes and placental fluids.
• Indirectly via fomites and personnel
• Aerosolization of respiratory secretions

8.3 Clinical Presentations:
• Respiratory Disease – Mild, self-limiting respiratory disease accompanied by a biphasic fever, peaking at 1-2 days and again at 6-7 days post infection. Clinical signs may include nasal discharge, conjunctivitis, mild cough, submandibular and retropharyngeal lymphadenopathy.
• Equine Herpesvirus Myeloencephalopathy (EHM) – Affected horses have signs of ascending paralysis including hind limb ataxia, loss of tail tone and urinary incontinence which occurs 6-10 days after initial infection. Clinical signs typically reach a peak in 2 to 3 days with the hind limbs being most seriously affected.
• Abortion – Third trimester abortion
• Neonatal Foal Disease – Affected foals are born live, but weak; typically becoming ill within 1-2 days of birth. Clinically there is a rapidly progressive lower respiratory tract disease (viral pneumonitis) resulting in respiratory distress, hypoxia and death.

8.4 Managing EHV-1 suspect or confirmed cases:
• Diagnostic testing is mandatory for horses that have acute onset of ascending paresis, paralysis, ataxia, or weakness if EHV-1 infection is a reasonable differential. This is especially important if horses have been febrile or if more than one animal in the resident/contact population has been affected with a similar condition. The responsible clinician must notify Infection Control Personnel ASAP upon admission of a suspect case.
• Strict barrier nursing precautions (gloves, gowns, and plastic shoe covers) and footmats or footbaths should be used with patients considered to have a risk of clinical infection or significant recent exposure to EHV-1 or confirmed cases of EHV-1. This includes mares that abort in the hospital or are admitted with a history of abortion within seven days of admission. If possible, diagnostic testing to detect possible contagious causes of abortion such as EHV-1, EVA, and leptospira infection should be performed (e.g., evaluation of fetal tissues, serology, etc).
• EHV-1 suspect cases meeting the following criteria must be housed in Equine Isolation
  1) febrile without showing neurological signs
  2) confirmed nasal shedding of EHV-1
  3) coming from a premises with an on-going EHM outbreak
  4) mild, but stable, neurological disease (to be determined at admission)
• If a case is moderately to severely affected it should be housed in a stall equipped to manage a down animal (eg. equine neuro stall or “down cow” stalls)
  ➢ Equine neuro stall can be used provided that the adjacent stall and 2 stalls across the aisle can remain vacant.
  ➢ Down cow stalls (northwest section of the FA facility) can be used with permission from the food animal clinician on clinics.
  ➢ The maximum number of EHM suspect horses that CSU can accommodate is 3: One in the equine neuro stall and 2 in the food animal facility (“down cow” stalls), provided that those stalls are available for use. Keep this in mind when contacted about referral of such cases.
• Environmental persistence of EHV-1 is limited with it being easily inactivated by heat and disinfectants.

8.5 Diagnosis:
8.6 Considerations for New World Camelids (NWC):
- NWC with natural and experimental infections have demonstrated clinical signs associated with EHV-1 infection.
- Clinical signs included ocular lesions such as retinal detachment, optic disc necrosis, hemorrhage and blindness.
- Neurological signs included dysphagia, head pressing, opithotonos, blindness, staggering, ear fasciculations, head tremors, splayed forelimbs and hyperexcitability/nervousness.

9.0 Equine Infectious Anemia Virus (EIAV): EIAV is the causative agent of Equine Infectious Anemia (EIA), also known as “swamp fever”, characterized by recurrent episodes of fever, lethargy, inappetence, thrombocytopenia and anemia. **EIA is a reportable disease in the United States.** Contact the State Veterinarians Office at 303-239-4162 with questions and for reporting. Testing of appropriate samples is mandatory for patients at the CSU-VTH in which EIA is a reasonable differential.

9.1 General Information: Equine Infectious Anemia Virus (EIAV) is a lentivirus in the family *Retroviridae*. Susceptible species include horses, ponies, donkeys, mules, zebras. Acute infection may result in clinical signs between 5 to 30 days. Infected animals are persistently infected as this virus is never cleared by the host.

9.2 Transmission: Transmission occurs through contaminated blood and blood products. This occurs most commonly from those acutely infected, but inapparent carriers may also serve as a reservoir for infection.
- **Mechanical Vectors:** Insects, such as horse flies and deer flies, mechanically transmit disease when their feeding from an infected horse is interrupted and they move on to an uninfected horse.
- **Vertical Transmission:** In utero (rare), at parturition, or ingestion of infected colostrum or milk.
- **Iatrogenic:** Via blood contaminated needles, tattooing equipment, dental equipment, and surgical equipment or via contaminated blood products.

9.3 Clinical presentation: The clinical course of this disease varies based on dose, virulence of the infecting strain, and immune status of the animal.
- **Acute Phase:** Initial signs occur 5-30 days after exposure and include fever, thrombocytopenia, lethargy, and inappetence. This phase usually lasts a few days and is typically very mild, often being overlooked.
- **Recurrent Disease:** Recurrent episodes of fever, lethargy, inappetence, thrombocytopenia and anemia. These episodes last 3-5 days with a between episode interval being weeks to months. These animals are persistently infected and eventually become carriers.
- **Chronic EIA (a “swamper”):** These animals experience frequent, severe episodes including anemia, thrombocytopenia, weight loss, and dependent edema.
• **Carriers:** Typically, within a year, clinical episodes subside resulting in a clinically inapparent carrier status which serves as a reservoir of infection.

9.4 **Suspect Case Management:**
• All EIA suspects must be placed in isolation with strict insect control including fly spray and screened windows. All suspects must be tested.

9.5 **Diagnosis:**
• Positive serology is definitive indication of infection as this is a persistent infection which is not cleared by the host. Both tests, the agar gel immunodiffusion (AGID) assay also called “Coggins Test” and the competitive enzyme-linked immunosorbent assay (cELISA), detect antibodies to the p26 core protein. Serologic tests can be negative 10 to 14 days after acute infection making early diagnosis difficult.

10.0 **Feline Leukemia Virus or Feline Immunodeficiency Virus:**
• Do not house FIV- or FeLV-positive cats next to or above FeLV- or FIV- negative cats within the wards. Mark the cage with a sign denoting “FeLV / FIV-infected cat,” and cages surrounding that cage with “No cats” signs.
• Because of their immune compromised status, avoid housing FeLV- or FIV-positive cats in Small Animal Isolation when possible.

11.0 **Influenza Virus (Canine):**
• Infection Control Personnel should be notified immediately if canine patients are admitted for acute cough, particularly if the animal has been in contact with other dogs, and if there is nasal discharge or fever. These are hallmark signs of infection with influenza virus and other respiratory pathogens.
• Barrier precautions should be instituted immediately for canine patients that are systemically ill and have signs consistent with influenza virus infection (coughing, nasal discharge, malaise).
• Canine patients admitted with fever and acute onset coughing must be immediately tested for influenza using either rapid ELISA tests or PCR. Samples of nasal secretions should be collected with a dacron tipped swab in order to obtain optimal results from these tests. Note: ELISA tests are of low sensitivity and a negative result should not be used to justify removal from isolation.
• Canine patients known or suspected to be infected with influenza virus must be immediately moved to Small Animal Isolation unless otherwise approved by Infection Control Personnel.

12.0 **Influenza Virus (Equine):**
If Influenza Virus is considered a reasonable differential diagnosis at least one of the following tests should be performed:
• Directigen testing of nasal discharge or oropharyngeal swabs.
• PCR testing of nasal discharge or oropharyngeal swabs.
• Clinicians should consider the recent use of modified live intranasal vaccination when interpreting test results.
• See page 140 in this section for more information about managing equine patients with a known or suspected contagious respiratory infection.

13.0 **Influenza (Avian):** Testing of appropriate samples is mandatory for any hospitalized avian patient in which infection with avian influenza is a reasonable differential.
• Cloacal swabs should be submitted for testing by PCR.

14.0 **Leptospirosis:** Testing of appropriate samples is mandatory for any hospitalized dog for leptospirosis if they have unexplained renal azotemia or evidence of hepatic inflammation using PCR performed on urine. Because of requisite time delay, use of acute and convalescent serum titers is less desirable, but may be used if stored serum is available for the acute sample.
14.1. Management considerations for Leptospirosis suspects

- Not all dogs with leptospirosis have acute renal failure. Other common clinical presentations include hepatic failure, uveitis, pulmonary hemorrhage, acute febrile illness, or abortion.
- Negative titers do not completely rule out leptospirosis as a diagnosis.
- Shedding of leptospires in urine of infected dogs is thought to stop within 2-3 days of initiating appropriate antimicrobial treatment. Untreated or inappropriately treated animals can shed infective organisms for months.
- Regardless of antimicrobial therapy, animals known to be infected must be managed with full barrier precautions and contact restriction. Care must always be taken when cleaning the housing environment of infected animals or when handling urine.
- Immunity to leptospires is serogroup specific.

14.2. Key control measures for Leptospirosis suspects

- Transmission almost always occurs through contact with urine of infected animals. Thus, patient and personnel contact must be controlled in patients suspected of having leptospirosis.
- If urine can be contained or controlled, risk is minimized:
  - Dogs should be allowed to void in the Isolation Unit, or if needed, they should be transported via gurney to a remote area of grass north of the fence dividing the parking area.
  - Patients should have a urinary catheter placed if they have renal failure or if urine containment is otherwise problematic.
  - Prompt clean-up of urine spills
  - Protect eyes, mouth, and skin when cleaning cages or handling soiled bedding
- Transmission via contact with other body fluids is possible, but less likely.
- Shedding will likely decreases once treatment with antimicrobial drugs is initiated.
- Leptospires are very sensitive to drying, sunshine, detergents and disinfectants.
- Negative titers do not completely rule out leptospirosis as a diagnosis.
14.3 Special precautions for cleaning

• Protect eyes, mouth, and skin when cleaning cages or handling soiled bedding.
• Do NOT use high-pressure washing as this may result in aerosolization of the organism.

15.0 Methicillin-Resistant Staphylococcus spp. (MRSA and MRSP):

• The purpose of this policy is to facilitate detection and control of nosocomial Methicillin-Resistant Staphylococcus aureus (MRSA) and Methicillin-Resistant Staphylococcus pseudintermedius (MRSP) infections in the JLV-VTH. Major epidemics of nosocomial MRSA infection have been documented in Veterinary Teaching Hospitals throughout North America in which both animal patients and hospital personnel have become colonized and clinically infected after nosocomial exposure. MRSP has similarly caused epidemics of nosocomial infections among canine patients. As such, the JLV-VTH considers MRSA and MRSP to be important potential threats to patients, JLV-VTH Personnel, and normal hospital operations.

• Clinicians and Infection Control Personnel are required to notify each other via email and personal communication whenever their patients are identified as being colonized or infected with MRSA or MRSP.
  ➢ Colonization: Patient has no active infection attributed to MRSA or MRSP, but harbors MRSA or MRSP in the nares or perineal region.
  ➢ Infection: Patient has an active infection attributed to MRSA or MRSP and may or may not have discharge from the site.

• Additional Infection Control precautions will be required when managing these patients or working in their environments. Typically, this will include segregation (patient that is colonized without any active infection) or isolation (patient that with an active infection with discharge that is not easily contained) of hospitalized patients, use of disposable barrier nursing gowns, gloves, disinfectant footbaths or footmats, and enforced hand washing after completing care of affected patients. Masks are generally not required, other than to reduce the potential for hand-to-face contact while handling patients. Bandages and drainage from infected sites must also be contained and disposed of appropriately to minimize environmental contamination and personnel exposure.

• Clinicians must also notify personnel responsible for cleaning areas that might be contaminated as to the presence of hospitalized patients colonized or infected with MRSA or MRSP. Standard cleaning and disinfection protocols should provide adequate decontamination, but extra care should be taken to ensure that cleaning is rigorous and protocols are carefully adhered to.

• Infection Control Personnel will consult with JLV-VTH clinicians responsible for patient care to determine if treatment or other control measures are warranted.

• Because of the potential consequences of zoonotic infections with MRSA, clients and referring veterinarians must be notified by clinicians about isolation of MRSA from patients. Infection Control Personnel will be available for consultation if requested.

• Passive surveillance in VTH Patients - All S. aureus isolates obtained from JLV-VTH patients that are considered to be of clinical significance are routinely screened for susceptibility to oxacillin/cefoxitin (as a marker for methicillin and extended-spectrum beta lactam resistance). Isolates that are found to be resistant are reported to Infection Control Personnel and to clinicians. Appropriate treatment, barrier precautions, and isolation procedures are determined through consultation between Infection Control Personnel and clinicians responsible for these patients.

• Environmental surveillance - Environmental samples are collected when nosocomial infections are suspected in the VTH using Swiffer® electrostatic wipes are cultured for MRSA using enrichment procedures and media containing breakpoint-concentrations of oxacillin.

• Active surveillance in VTH Patients – JLV-VTH patients may be sampled periodically at the discretion of the Director of Infection Control to detect asymptomatic colonization by MRSA or MRSP. This will principally be conducted if passive or environmental surveillance suggest that there is an increased likelihood of colonization.
• **Surveillance in VTH Personnel:** Information collected from other veterinary hospitals that have experienced MRSA epidemics suggests that colonization of personnel and subsequent transmission to patients is a major factor influencing the spread of infection and colonization. Further, colonization of personnel represents a potential health hazard for themselves and their family members. As such, in situations where information suggests that there has been nosocomial transmission of MRSA in the JLV-VTH, personnel that may have been exposed to infected patients will be required to undergo diagnostic testing to detect MRSA colonization. This testing will be paid for by the JLV-VTH. Infection Control Personnel will facilitate sampling in other situations when contacted by personnel.

- Personnel affected by this policy will be contacted in private by Infection Control Personnel and notified that MRSA testing is required. These persons will be required to visit Hartshorn Health Services on the CSU campus to initiate this testing within one business day of notification. A complete list of names will be given to a representative from Hartshorn Health Services and they will notify the Director of Infection Control when sampling is completed.

- All records regarding testing of JLV-VTH Personnel will be held in strictest confidence. However, it is essential that a limited number of persons at the JLV-VTH know about these results in order to properly investigate and control further spread of the agent.

- Typically, diagnostic testing for MRSA will involve aerobic culture of nasal swabs, but may also involve culture of additional sites. Appropriate sampling methodology will be determined for each patient by personnel from Hartshorn Health Services.

- After sampling, JLV-VTH Personnel will resume normal duties pending results of the cultures, using increased infection control precautions.

- Personnel not complying with this sampling policy will be removed from patient care responsibilities by the JLV-VTH Director until culturing has been completed.

- Results for negative cultures will be delivered to the Director of Infection Control, who will notify these people of the results in private as soon as possible. Generally no further action will need to be taken by these people.

- Results for positive cultures will be delivered to the JLV-VTH Director of Human Resources who will notify these people of the results in private.

- JLV-VTH Personnel that are found to be culture-positive for MRSA will be required to initiate treatment under the supervision of a physician of that person’s choice. Although insurance or workman’s compensation (for CSU employees) will typically pay for this treatment, the JLV-VTH will not be responsible for paying for this treatment. Personnel will be temporarily removed from patient contact until this treatment is initiated, and must submit documentation in order to return to patient care duties. Personnel will also be required to undergo additional testing during or after treatment in order to ensure that the risk of transmission has been minimized.

### 16.0 Parvovirus

Parvovirus antigen ELISA performed on feces is mandatory for any hospitalized canine patient in which parvovirus infection is a reasonable differential. Clinicians should consider the effects of recent vaccination on these test results.

### 17.0 Plague and Tularemia

If a case of plague or tularemia is suspected, the primary clinician must contact Infection Control Personnel ASAP, protocols for isolation and limiting contact must be initiated immediately, further contact with the patient MUST only be made when wearing appropriate PPE (including N95 respirator and protective eyewear or splash shield), and sampling for diagnosis must be initiated immediately.
17.1 Management and Control of Plague (Yersinia pestis) [Return to Top]

Background

- Plague is a serious, life-threatening zoonotic disease caused by infection with the bacteria Yersinia pestis.
- Plague is enzootic throughout Colorado, sustained in a rodent-flea transmission cycle involving numerous wild rodent species. Cats are highly susceptible to infection and are the most common source of exposure to people working in veterinary practices; while disease can be seen in any mammal, infections in dogs are much less common.
- In enzootic areas plague should be considered in the differential diagnosis of any cat presenting with fever of unknown origin.
- A plague-infected cat will generally have a history of roaming freely in a rural or semi-rural enzootic area, or be a known hunter.
- Plague is most common in the summer months, but can be seen at any time of the year.
- Plague is relatively more common than Tularemia in Fort Collins, but the clinical presentations can be indistinguishable.

Transmission [Return to Top]

- Although the most common route of infection in cats is via consumption of infected rodents, transmission can occur through flea bites.
- Transmission from cats to humans has occurred by mechanical transportation of infected fleas into a home environment, bites, scratches, contact with infectious tissues and fluids and via aerosol droplet spread.
- The incubation period is 2-5 days.

Clinical Presentation: [Return to Top] Cats can present with 3 clinical manifestations of plague: bubonic, septicemic and pneumonic.

- **Bubonic:** The “bubonic” form of plague is the mostly commonly observed. Cats with bubonic plague usually present with fever, lethargy, anorexia and regional lymphadenopathy ("bubos"). Among cats with the bubonic form, 75% have unilateral or bilateral submandibular and/or retropharyngeal lymphadenitis. Abscessed lymph nodes may be clinically indistinguishable from abscesses due to other causes, e.g. bite wounds. Fever (>39.2°C or >102.6°F) is a consistent finding, although moribund cats may be hypothermic. Oral lesions are often present.
- **Septicemic:** Cats with primary septicemic plague will have no obviously enlarged lymph nodes, but will present with fever, lethargy, and anorexia, progressing to overt signs of Gram-negative bacterial sepsis, including vomiting, diarrhea, tachycardia, prolonged capillary refill time, cold extremities, pale mucous membranes, disseminated intravascular coagulopathy (DIC), multi-organ failure and acute respiratory distress syndrome (ARDS).
- **Pneumonic:** Of particular concern for cat owners and veterinary clinical staff is the pneumonic form of feline plague which poses a potential for respiratory droplet spread to humans. Pneumonic plague may develop secondary to bubonic or septicemic plague and is characterized by fever, dyspnea, oral/nasal discharge and coughing or sneezing. Pneumonic involvement was present in 10% of infected cats in a New Mexico study. In all suspected plague cases, auscultation of the chest and thoracic x-rays should be done to assess pulmonary involvement. Typical radiographic findings include changes suggestive of diffuse interstitial pneumonia or coalescing areas of necrosis forming an abscess.
Diagnosis: Confirmation of feline plague is obtained by isolation of the causative agent, *Yersinia pestis*, a Gram-negative, aerobic, bi-polar staining rod, from blood, bubo aspirates or tissue specimens, or by a four-fold rise in plague antibody titers on paired acute and convalescent serum, collected two weeks apart. A presumptive diagnosis can be based on a single elevated antibody titer or on a positive fluorescent antibody (FA) stain of a lymph node aspirate or tissue impression smear in a clinically compatible case. The WBC count is generally elevated with a marked neutrophilia.

Diagnostic specimens: Appropriate diagnostic specimens and procedures for submitting them are listed below in order of preference. Collection of specimens should be done using protective equipment including N95 respirators, protective eyewear or splash shields, gloves and gowns and procedures to prevent human exposure. Samples should be collected prior to initiation of antimicrobial therapy; however, samples should still be taken and submitted for testing even if antibiotics have been given.

- **SEE SPECIFIC INFORMATION ABOUT DIAGNOSIS AND MANAGEMENT OF VTH PATIENTS BELOW**
- **Bubo aspirates:** Abscess exudates or pus from an enlarged lymph node or abscess should be collected via fine-needle aspiration and placed in a sterile specimen tube without preservatives, such as a 5ml red-top blood tube. If insufficient material can be aspirated, a small amount of physiological (i.e. non-bacteriostatic) saline can be injected into the affected node and re-aspirated. Small quantities of exudate or pus can also be collected on a sterile swab and placed in a bacterial transport medium or used to make fluorescent antibody (FA) impression smears. The FA test is the most sensitive and specific test that can be done rapidly.
- **Tissue samples:** Fresh tissues (lymph node, liver, spleen, and lung) from biopsy or post-mortem exam should be kept moist with sterile, non-bacteriostatic saline solution (i.e. a wet cotton ball in the collection tube with the tissue sample). If transit time will exceed 24 hours the specimens can be frozen. DO NOT use formalin or other preservatives. The whole carcass can also be submitted.
- **Blood cultures:** In septicemic animals, *Y. pestis* can be isolated from blood on standard blood, chocolate, or MacConkey agars. Blood should be collected in a tube with anti-coagulant (purple-top EDTA collection tube) and plated or placed in liquid culture media as quickly after collection as possible. Gram-stain studies on a blood smear can also be performed.
- **Impression smears for FA exam:** When growing in a host animal or incubated in culture at 38° C, *Y. pestis* produces an F1 antigen that can be detected with a FA test. Bubo aspirate, lymph node, liver, spleen or lung tissue and sputum (in pneumonic cases) are acceptable specimens for FA testing. For aspirates and sputum use a swab to make a thin smear on a clean glass slide. For tissue samples, slice the specimen with a scalpel to expose a fresh surface and gently touch the slides to the tissue. Slides should be allowed to air dry, then fixed with absolute methanol for five minutes or gently heat-fixed. Two slides should be prepared for each sample. Additional slides can be prepared for examination with Gram, Giemsa’s or Wayson’s stains.
- **Serum specimens:** Cats develop humoral antibodies following plague infection, usually detectable within 10-14 days of challenge. Thus, early in the course of disease, results of serologic tests are often negative because animals have not yet seroconverted. In suspect animals, paired sera should be collected during the acute illness and approximately 2 to 3 weeks after illness onset. Serum should be separated from the clot to prevent contamination due to cellular lysis.
- **Diagnostic specimen handling:** Specimens should be collected, bagged, clearly labeled as “plague suspect,” and transported to the Diagnostic Laboratory.

### 17.2 Tularemia (*Francisella tularensis*)

**Background**

- Tularemia is a serious zoonotic disease caused by infection with the bacteria *Francisella tularensis*.
- Tularemia is endemic in the Northern Hemisphere (between 30 and 70 degrees N latitude). Rabbits, rodents and cats are very susceptible to infection, dogs in general are not very susceptible however may carry infected ticks.
• Tularemia is most common in the late summer and early fall.
• Plague is relatively more common than Tularemia in Fort Collins, but the clinical presentations can be indistinguishable.
• *F. tularensis* has 2 main biovars, Type A and Type B. Type A is associated with a tick-rabbit infection cycle and occurs only in North America. Type B has a more complex infection cycle involving rodents, ticks, mosquitoes, and water, and occurs throughout the Northern Hemisphere. Type A biovars typically cause more severe illness in humans.

### Transmission [Return to Top]

*Francisell tularensis* can be transmitted by ticks, biting flies, water, food, aerosols, scratches and bites.

• Four species of ticks including *Dermacentor andersonii* (wood tick found in the Rocky Mountain region), *D. variabilis* (American dog tick found in the Eastern two-thirds of the U.S. and Pacific Coast of the U.S.), *D. occidentalis* (Pacific Coast tick found in CA and OR) and *Ambylomma americanum* (Lone Star tick found in the SE and S. central U.S.) are recognized vectors and reservoirs for *F. tularensis*

• Cats are most frequently infected by tick bites or consumption of infected rabbits or rodents.

• Transmission can occur due to handling or ingestion of infected tissues, contaminated water on mucous membranes or breaks in the skin, inhalation, or mechanical transmission by biting arthropods (eg. mosquito, deer flies).

• Transmission to humans is most commonly due to tick bites or direct contact resulting in papule formation at the inoculation site which may develop into an ulcer and localized lymphadenopathy. Cat scratches have been reported as the mode of transmission in 50 human cases.

• *F. tularensis* has an extremely low infectious dose with <50 colony forming units resulting in disease.

• The incubation period is 3-6 days.

### Clinical Presentation: [Return to Top]

• In general, cases of tularemia may present as a non-specific febrile illness with lymphadenopathy.

• Infected cats present most commonly with generalized lymphadenopathy and ulceration of the oropharynx. Additionally, cats may present with fever, anorexia and icterus secondary to abscess formation within internal organs (eg. liver, spleen). Infected cats will generally have a history of hunting or wild animal exposure.

• Dogs are relatively resistant to infection but may bring infected ticks, rabbits or rodents into the household. Clinical signs are generally non-specific including anorexia, listlessness, and low grade fever.

• Plague is relatively more common than Tularemia in Fort Collins, but the clinical presentations can be indistinguishable.

### Diagnosis: [Return to Top]

• Definitive diagnosis is based on PCR or isolation of *F. tularensis*, a facultative intracellular bacterium, from exudates or tissues. *F. tularensis* is fastidious, requiring special growth media for culture. Biosafety level 3 is required for infected tissue handling. Appropriate specimens depend on the form of disease and may include swabs, lymph node aspirates, pharyngeal wash, or sputum specimens. Blood cultures are often negative.

• Microscopic agglutination (MA) antibody titer – In dogs, titers from 1:140 to 1:160 suggest recent infection. In cats, titers > 1:20 suggest recent infection.

• Indirect fluorescent antibody titer – A single titer ≥ 1:160 suggests active disease; a fourfold increase in titer is also indicative of active disease.

### 17.3 Managing Known or Suspected Plague & Tularemia Cases: [Return to Top]

• Criteria for labeling a case as “High Risk” for Plague/Tularemia: Patients must have all 4 criteria present:
Geography [Overlap and access to prairie dogs (Plague) or rabbits (Tularemia)]
Opportunity or evidence for active interaction: free-roaming, hunter, carcasses, etc.
Febrile
Enlarged lymph nodes

- A thorough history, physical examination and DVM Student Case Presentation should be conducted to assess the 4 criteria for plague. The House Officer will identify the patient as High Risk for Plague/Tularemia prior to any exposure of additional personnel or pets based on this information.

- Having determined that a patient is a High Risk Plague/Tularemia suspect, the House Officer shall notify the appropriate Attending/Back-up Resident (who shall, in turn, notify the appropriate Faculty member) prior to any additional intervention of any kind.

- The responsible clinician should immediately contact Infection Control Personnel and other necessary personnel as soon as patients are identified as a plague/tularemia suspect. Please phone Infection Control Personnel on their cell phones and notify other personnel by sending an alert notification to the Contagious Disease Alert Listserv: VTH-Contagious-Dz-Alert@colostate.edu.

- It is the responsibility of the clinician to coordinate notification of Clinical Pathology and Microbiology personnel regarding the incoming samples. The responsible clinician will submit samples in accordance with the instructions provided by Clinical Pathology and Microbiology.

- At the time that a patient is identified as plague or tularemia:
  - Protocols for isolation and limiting contact must be initiated immediately
  - Further contact with the patient MUST only be made when wearing appropriate PPE (including N95 respirator and protective eyewear or splash shield).
  - Only personnel that are enrolled in the CSU Environmental Health Services Respiratory Protection Program are allowed to work with the patient or the patient’s environment.
  - Students and volunteers are NOT allowed further contact until diagnoses of Plague/Tularemia are ruled out.
  - A contact log should be initiated immediately. Contact logs are available on the CSU Infection Control Website [http://goo.gl/57M200](http://goo.gl/57M200).
  - Sampling for diagnosis must be initiated immediately.

- Following that Notification/Discussion, and with the help of the Attending/Back-up Resident if necessary, the owners will be asked to leave the examination room.

- Fine needle aspirates of enlarged lymph node(s) will be performed in the exam room with appropriate barrier precautions (including N95 mask, eye protection, gowns and gloves). Fine needle aspirates for cytology will be collected according to established Clinical Pathology protocols.
  - Slides must be labeled before applying tissue.
  - Slides should be placed on disposable paper towels or something similar to catch any errant spray.
  - Aspirates should be conducted and preps made by the attending clinician.
  - Slides should be placed in plastic slide boxes. The slide box can be labeled if the slides were not. The box and submission form should also be attached to orange “SPECIAL ATTENTION REQUIRED” sticky note indicating the potential biohazard. Alternatively or additionally, the box could be placed in a biohazard bag. The bags contain a pouch in which the request form can be placed.
  - Slides will be processed once completely dry.

- The responsible clinician will also obtain the following samples for plague and tularemia PCR.
  - Nasal swab: Nasal swabs can be taken with culturette swabs. Swabs should be placed in a specimen tube without preservatives (5 mL red-top blood tube) and a small amount (1 mL) of sterile, physiologic saline (i.e. non-bacteriostatic), should be injected into the tube.
Blood sample: Blood should be collected in a tube with anti-coagulant (purple-top EDTA collection tube).

Bubo aspirates: Abscess exudates or pus from an enlarged lymph node or abscess should be collected via fine-needle aspiration and placed in a sterile specimen tube without preservatives, such as a 5ml red-top blood tube. A small amount of physiological (i.e. non-bacteriostatic) saline can be injected into the affected node and re-aspirated. Once in tube, a small amount of physiologic saline (1 mL) should be placed in the tube with the sample.

- Slides will be allowed to dry completely before removal from the examination room.
- At this point, the owners may return to the exam room to be with their pet.
- Cytological evaluation of case status.
  - Clear cytological evidence of Neoplasia removes the label of High Risk Plague/Tularemia suspect and the patient will begin the standard evaluation.
  - The absence of cytological evidence of Plague in a Plague suspect removes the label of High Risk Plague suspect and the patient will begin standard evaluation.
  - The presence of intracellular coccobacillus organisms is a clear indication that the patient remains a High Risk Tularemia suspect. This is rare, however, and the absence of intracellular bacteria, or the appearance of a reactive node, does not remove the label High Risk Tularemia suspect, and samples should be submitted to Clinical Pathology for cytology and to D-lab for Tularemia PCR.

- Once identified as a High Risk Plague/Tularemia suspect and if the owner’s elect hospitalization, the pet will be transported to the Small Animal Isolation Unit.

- In the event of a plague/tularemia positive suspect, the responsible clinician and Infection Control Personnel are required to ensure that the state or the Larimer County public health offices have been contacted (it is the primary clinician’s responsibility to ensure that Infection Control Personnel have been notified, and also to clarify who will notify appropriate public health officers):
  - Dr. Jennifer House, State Public health Veterinarian, Colorado Department of Public Health and Environment: (303)692-2628
  - Larimer County Department of Health and Environment, (970)498-6775 or x6700/x6776/x6786 M-F 8am - 4:30pm. (970)416-1985 Sheriff’s dispatch, weekends & after hours.
  - Animal Control Division of the Humane Society for Larimer County (970)226-3647
  - Dr. Robert Ellis, CSU Biosafety Officer (970)567-6607, (970)491-6729

- If all or some number of the diagnostic criteria (i.e., portions of the case definition) are absent, barrier nursing precautions (gloves, gowns & mask) may still be appropriate for some portion of the work-up, at the discretion of the Senior Clinician and the Infection Control Personnel.
  - Cats that are plague or tularemia suspects and that have a cough that require transoral or transtracheal aspiration should be handled as plague suspects and the procedures completed while wearing gloves, N95 respiratory, eye protection, and gown.
  - Rodents or lagomorphs with clinical signs of bacteremia or bleeding diathesis should be routinely euthanized, treated for fleas, placed in a plastic bag labeled “plague/tularemia suspect” and transported to the necropsy area. Write “plague/tularemia suspect” on the necropsy request form.
  - It is strongly suggested that euthanasia be considered for rodents or lagomorphs that are presented by good-Samaritans. Regardless, these animals must be placed in isolation and treated for fleas. If the animals are normal after a 48-hour isolation period, clinicians can contact the Colorado Dept of Wildlife about the possibility of release. The JLV-VTH has a cage that allows euthanasia with CO2, which may be the most appropriate method of euthanasia of these wild animals.
Exposed People

- JLV-VTH Personnel who have been exposed to zoonotic agents should report the incident to their supervisor and the Director or Administrator of the JLV-VTH and seek treatment by a physician.
  - See information about Occupational Safety in the General Information section of the Infection Control SOP.
  - Group exposures to zoonotic agents -- In the event of a group exposure, Infection Control Personnel will contact the appropriate university offices. The CSU Worker’s Compensation Office will submit a multi-person notification that will list the nature of your exposure. This notification will serve as documentation in the event that you have complications as a result of your exposure.
  - Zoonotic disease exposures or injury to individuals -- Individual employees will need to fill out a Worker’s Compensation First Report of Injury Report. This report is located at http://www.ehs.colostate.edu/WWorkComp/Home.aspx. This notification will serve as documentation in the unlikely event that you have complications as a result of your exposure.
    - You will be provided with a fact sheet related to your exposure in order to give you more information. Please monitor your health carefully.
    - If you have any signs of illness, please seek medical attention and advise your caregiver of this exposure history.
- Illness, zoonotic disease exposure, or Injury to CSU EMPLOYEES -- Please adhere to the following process if you have symptoms or concerns for your health related to occupation incidents and wish to seek medical evaluation through Worker’s Compensation:
  - During standard business hours (M-F, 8:00 am to 5:30 pm): Medical evaluations are performed through one of our Worker’s Compensation, Authorized Treating Physicians (ATP). A list of these providers is available online at: http://www.ehs.colostate.edu/WWorkComp/HealthContPrint.aspx. Please contact Pony Davis at 491-2135 or Kenda Weigang at 491-4832 if you have questions.
  - After standard business hours (weekends and M-F 4:30 pm to 8:00 am): If you experience symptoms outside of standard business hours, seek evaluation through Urgent Care or Emergency Room. You will need to see and coordinate additional care through one of CSU’s Authorized Treating Physicians.
  - SEEK MEDICAL ATTENTION FROM A CSU-AUTHORIZED TREATING PHYSICIAN WHENEVER POSSIBLE as initial visit costs will be covered through Worker’s Compensation even if it is determined that your illness is not work related. If you must go to the ER or an Urgent Care provider for the specific reasons listed above, you and/or your insurance carrier will be responsible for all health care costs for illnesses/injuries that are NOT related to your employment.
- Illness, zoonotic disease exposure, or Injury to CSU STUDENTS – If students are exposed or injured in the course of activities that relate to their educational assignments, they need to seek treatment from either Hartshorn Health Services or your personal physician. This is not a situation where worker’s compensation applies and treatment and expenses are NOT covered by CSU.

General Considerations for Case Management

- Minimize number of personnel in contact with case:
  - Only personnel that are enrolled in the CSU Environmental Health Services Respiratory Protection Program are allowed to work with the patient or the patient’s environment.
  - Students and volunteers are NOT allowed further contact until diagnoses of Plague/Tularemia are ruled out.
  - A contact log should be initiated immediately. Contact logs are available on the CSU Infection Control Website <http://goo.gl/57M200>
• Attending personnel MUST use standard barrier precautions including gloves, N95 respirator, eye protection (glasses or splash shield), and gowns while examining and treating suspect animals.
• Surgical masks do not provide protection small particle aerosols and a well-fitted N95 rated mask is recommended for pneumonic cases. NOTE – only personnel that have received training and have been fit tested are authorized to use N95 masks at the JLV-VTH.
• All plague/tularemia-suspect animals must be housed in Small Animal Isolation.
• Y. pestis and F. tularensis are very sensitive to light and drying and respiratory droplets do not remain suspended so special air handling systems are not required to prevent spread.
• Respiratory isolation should continue until thoracic x-rays have ruled-out pneumonia or until the completion of 48 hours of antibiotic therapy.
• Bubo exudates, respiratory secretions, blood and sputum should be considered infectious and any materials used during treatment should be disinfected, autoclaved, or incinerated.

Hygiene  

• At their earliest opportunity, the veterinarian responsible for the case must notify all affected personnel about the recognition of the specifics related to this situation. They must also notify personnel regarding changes in the housing (e.g. when moving into isolation units), and at the time of discharge.
• This is most efficiently done by sending an email to the Contagious Disease Alert listserv (VTH-Contagious-Dz-Alert@colostate.edu), which will notify Infection Control Personnel, heads of sections and nursing staff, and cleaning personnel. This email should include the patient signalment, veterinarian assigned to the case, housing area, and the known or suspected contagious disease.
• Additionally, use orange sticky notes (i.e., “SPECIAL ATTENTION REQUIRED” sticky notes) to identify rooms, cages, kennels, stalls, or other materials (e.g., laundry or instruments) that may be contaminated, after completely filling out the requested information.
• After exam, treat animal for fleas (Frontline spray available at front desk).
• Clean exam table with Neutral Disinfectant Cleaner (available in room).
• Treat exam room and/or Isolation for fleas (flea and tick spray available at front desk).
• Use orange sticky notes (i.e., “SPECIAL ATTENTION REQUIRED” sticky notes) to identify rooms, cages, and kennels that may be contaminated, after completely filling out the requested information.
  ➢ Notify Animal Care using the Contagious Disease Alert listserv (VTH-Contagious-Dz-Alert@colostate.edu) of plague or tularemia suspect.
  ➢ Bag disposables in a clear biohazard bag (available in Isolation and in the cupboard outside Isolation)
  ➢ Seal sharps and place in biohazard bag – call Animal Care for pick up.
• During the animal’s stay, assuming that Animal Care personnel have been appropriately notified of the suspected disease condition and the appropriate requirements for prevention of zoonotic infection, personnel from Animal Care will be responsible for cleaning/disinfection in Small Animal Isolation.
• Use clear biohazard bags (available in Isolation or in the cupboard outside Isolation) for all disposable items.

Treatment:  

• Antimicrobial treatment is recommended for 10-21 days, or until 3 days after the patient has become afebrile and recovered clinically. Clinical response is generally rapid, except in moribund cases, and animals are considered non-infectious following 48 hours of antibiotic therapy. Patients receiving parenteral antibiotics may be switched to oral therapy upon clinical improvement. Penicillin analogs are not efficacious.
• While hospitalized, treat the affected animal with enrofloxacin at 5 mg/kg, IM or SQ daily for the first 3 days to avoid placing hands in the cat’s mouth.
• Many cats can be successfully treated with doxycycline at 10 mg/kg, PO, daily for 14 days after discharge.
• Companion animals potentially exposed with *Yersinia pestis* or *F. tularensis* should be treated with doxycycline (10 mg/kg, PO, daily) or enrofloxacin (5.0 mg/kg daily) for 7 days.

• Recommended antibiotic protocols for cats with clinical plague or tularemia (from the Colorado Department of Public Health and Environment)

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Dosage</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gentamicin*</td>
<td>2-3 mg/kg tid, IM or SQ</td>
<td>Bactericidal</td>
</tr>
<tr>
<td>Enrofloxacin*</td>
<td>5 mg/kg, IM or SQ, daily</td>
<td>Bactericidal</td>
</tr>
<tr>
<td>Doxycycline</td>
<td>10 mg/kg, PO, daily</td>
<td>Bacteriostatic</td>
</tr>
<tr>
<td>Tetracycline</td>
<td>22 mg/kg tid, PO</td>
<td>Bacteriostatic</td>
</tr>
<tr>
<td>Chloramphenicol</td>
<td>50 mg/kg bid, PO</td>
<td>Bacteriostatic</td>
</tr>
</tbody>
</table>

*Injectable antibiotics may be preferred during the acute stage of infection to avoid contact with oral cavity secretions and reduce the risk of bites.

**When Patient is Discharged**  [Return to Top]

• Notify Animal Care that animal is gone. This notification can be made in person, by phone, or by using the VTH-Contagious-Dz-Alert@colostate.edu listserv, and should be performed by the veterinarian or student with primary responsibility for the patient.

• Use clear biohazard bags (available in Isolation or in the cupboard outside Isolation) for all disposable items. Seal the trash bag with tape then double bag and seal for transport to the disposal area. Spray outer bag with disinfectant. Clearly label with the department and disease, and deliver to the diagnostic laboratory (Room 233, DMC 2nd Floor). When materials are dropped off for autoclaving, a request form should be filled out (these are outside Small Animal Isolation), using account number HO#8032.

• Clean and disinfect any instruments, double-bag in clear autoclave bags, label appropriately, spray outer bag with disinfectant, and return to Central Supply.

• Double-bag laundry in clear autoclave bags for sterilization, label appropriately, spray outer bag with disinfectant and return to Central Supply.

**Considerations for Dogs and Other Species**  [Return to Top]

• Dogs are frequently infected with *Y. pestis*, but highly resistant to plague, thus most infections are asymptomatic.

• Transient fever and anorexia of short duration (<72 hours) may be noted, accompanied rarely by lymphadenitis. Antibiotic therapy is usually not indicated except in severely ill animals.

• Dogs cannot directly transmit plague to humans; however, numerous human cases have resulted from the transport of infected fleas or rodent/rabbit carcasses into the residential environment.

• Exposed dogs should be treated to eliminate flea infestation.

• Domestic livestock have rarely been identified as infected with *Y. pestis*. Clinical plague has been reported in wildlife species including felids (bobcat, lynx), deer and antelope. Wild canids (coyote, fox) are generally resistant to illness. Diagnostic specimens are the same, however, the lack of enlarged lymph nodes and short duration of bacteremia, usually limits testing to the demonstration of plague antibody titers.

**Zoonotic Considerations for Veterinary Staff and Owners**  [Return to Top]

• Every case of cat plague or tularemia represents a potential risk for human exposure and illness. Acquiring primary pneumonic plague from cats is a particular risk for veterinarians, their assistants and pet owners. The usual incubation period for bubonic plague in humans is 2 to 6 days. The incubation period for primary pneumonic plague is considerably shorter, only 1 to 3 days. Most fatalities are a result of a delay in appropriate antimicrobial therapy.
• Veterinary clinic personnel and owners should be advised of these risks. In the event of known exposure (bite, scratch, fluid contact) to *Y. pestis* or *F. tularensis* or the abrupt onset of a febrile illness, medical attention must be obtained immediately and it should be emphasized that they may have been exposed to plague. The local or state health department should be notified of any potential exposures to an infected cat and can assist with evaluating the risk of transmission. Persons potentially exposed will either be recommended to start antibiotic prophylaxis or to initiate a 7 day active fever watch, depending on the type and timing of the exposure to the infected animal.

• Animal owners in plague/tularemia endemic areas should be advised to confine pets and to apply a flea and tick control products to pets which go outside. This is especially important during the most common periods of plague transmission (March through October). Clients should be warned that pets should not share sleeping areas with family members. Reports of rapid die-offs of rodents or rabbits should be forwarded to the local health department. People should avoid handling injured or dead rodents or rabbits or should wear gloves if handling cannot be avoided.

• Because of the risk of disease transmission to cat owners, cats should remain hospitalized until afebrile or a negative test result for plague is obtained.

• For further information regarding Plague, see the Colorado Department of Public Health and Environment website: www.colorado.gov/pacific/cdphe/plague or the Centers for Disease Control website: www.cdc.gov/plague.

• For additional information regarding Tularemia, see the Colorado Department of Public Health and Environment website: www.colorado.gov/pacific/cdphe/tularemia or the Centers for Disease Control website: www.cdc.gov/Tularemia.

18.0 **Rabies:** [Return to Top]

If a case of rabies is suspected, the primary clinician must contact Infection Control Personnel ASAP, for a risk category determination. The primary clinician, Infection Control Personnel or another representative from the JLV-VTH will also contact public health officials as soon as possible.

All incidents involving the potential exposure to rabies must be handled in accordance with the procedures outlined herein. This includes incidents involving client-owned animals, research animals, stray animals presented by good Samaritans, and any other animals present on the grounds of the CSU Veterinary Medical Center. The Colorado Department of Public Health and Environment (CDPHE) is available for consultation 24 hours a day at 303-692-2700 (or 303-370-9395 after business hours).

- The Colorado Department of Public Health and Environment (CDPHE) is available for consultation 24 hours a day at 303-692-2700 (or 303-370-9395 after business hours).
- Dr. Jennifer House, State Public Health Veterinarian, Colorado Department of Public Health and Environment: (303)692-2628
- Larimer County Department of Health and Environment, (970)498-6775 or x6700/x6776/x6786 M-F 8am - 4:30pm. (970)416-1985 Sheriff's dispatch, weekends & after hours.
- Animal Control Division of the Humane Society for Larimer County (970)226-3647

**See page 133** for information about rabies exposure in humans.

Much of the information regarding rabies that is included in this document was obtained from the CDC and the CDPHE. The following web sites provide more extensive information about rabies and exposures in animals and humans:

- www.cdc.gov/Rabies
- www.colorado.gov/pacific/cdphe/rabies
18.1 General Concepts regarding management of patients suspected of being infected or exposed to rabies virus: [Return to Top]

There are several competing concerns regarding management of animals that are suspected of being infected with rabies: 1) early identification and euthanasia of animals that are truly infected with rabies, 2) minimizing human exposures to animals that are infected with rabies, and 3) providing appropriate care for animals that are NOT infected with rabies. Human exposures to rabid animals are a very serious event and extreme care must be taken to minimize the risk of this occurring. On the other hand, hysterical reactions should not be allowed to overwhelm good judgment and lead to the euthanasia of animals with a very low risk of infection. Balancing these priorities can be challenging, especially in cases where it is not clear that an exposure to a rabid animal has occurred or when the signs exhibited by patients are not clearly characteristic of rabies infections. Because of the severity of consequences associated with human exposure it is wise to remember the clinical adage that rabies cases are “typically atypical.” It is also wise to rely on the expertise and third-party perspective of the Colorado Department of Public Health and Environment to aid in management decisions that impact people because of public health concerns.

Case Definition and Management: Patients with a high-risk of rabies infection:

- Patients with a known exposure to infected animals (e.g., those with bite wounds obtained during an unprovoked attack by a wild carnivore) or unvaccinated animals with suspected exposures are considered to have a high-risk of rabies infection.
- Ancillary testing and evaluation (e.g., endoscopy, radiography, spinal tap, oral examinations) is strongly discouraged in these patients because of the potential for unnecessary human exposures.
- Personnel involved in management of the case must consult with the Colorado Department of Public Health and Environment in order to ensure that the management plan is appropriate. If there have been high-risk human exposures associated with a high-risk rabies patient, (e.g. through bite wounds) euthanasia and subsequent testing should be strongly considered as part of the management plan.
- See page 130 for policies regarding confinement and contact with high-risk rabies suspects.

Case Definition and Management: Patients with a low risk of rabies infection:

- If a patient is deemed to have a low risk of rabies infection but the responsible clinician believes it is reasonable to include rabies on the differential list because of the history and clinical signs, it is still important to inform Infection Control Personnel, restrict contact and to contact the Colorado Department of Public Health and Environment for advice in management.
- Unfortunately, the only definitive tests for rabies are 1) histological evaluation of the brain tissues, and 2) survival beyond the known incubation period.
- Marked improvement in the patient’s condition that occurs during the 10 day confinement and observation period (described below) is NOT consistent with a diagnosis of rabies. If patients show clinical improvement, consultation with the Colorado Department of Public Health and Environment may allow abbreviation of precautionary procedures.
- Ancillary testing and evaluation in these patients (e.g., endoscopy, radiography, spinal tap, oral examinations) should be restricted to those things that are necessary for patient stabilization.
- The senior clinician should consult with the Colorado Department of Public Health and Environment prior to euthanasia of these low risk patients in order to ensure that this extreme management step is required.
- See page 129 for policies regarding confinement and contact with low-risk rabies suspects.

18.2 Management considerations for rabies suspects: [Return to Top]

- See page 133 for information about rabies exposure in humans.
If rabies infection or exposure is suspected in a patient, the primary clinician must contact Infection Control Personnel. The primary clinician, Infection Control Personnel or another representative from the JLV-VTH will also contact public health officials as soon as possible.

- The Colorado Department of Public Health and Environment (CDPHE) is available for consultation 24 hours a day at 303-692-2700 (or 303-370-9395 after business hours).
- Dr. Jennifer House, State Public health Veterinarian, Colorado Department of Public Health and Environment: (303)692-2628
- Larimer County Department of Health and Environment, (970)498-6775 or x6700/x6776/x6786 M-F 8am - 4:30pm. (970)416-1985 Sheriff’s dispatch, weekends & after hours.
- Animal Control Division of the Humane Society for Larimer County (970)226-3647
- See the following website for further information about regulations in Colorado: https://www.colorado.gov/pacific/cdphe/rabies

See the Decision Algorithm on Page 133 regarding management of domestic pets exposed to wildlife.

A healthy domestic dog, cat, or ferret that bites a person should be managed in consultation with the CDPHE by confinement and observation for a minimum of 10 days. If signs suggestive of rabies develop, it may be required that the animal is euthanized and examined for rabies.

If the biting animal is a stray or unwanted, it should be confined and observed for 10 days or the director’s office should be contacted for permission to euthanize the animal. The euthanized animal must be submitted for rabies examination.

- The 10 day observation period applies only to domestic dogs, cats and ferrets that have bitten a human. It does not apply to any animal exposed to rabies such as pets attacked by a wild animal or found with a bat. Pet animals or livestock potentially exposed or known to be exposed to an animal suspected of rabies infection must be immediately reported to the Colorado Department of Public Health and Environment (CDPHE).

- Skunks, raccoons, foxes and bats that bite humans should be euthanized (if possible) and tested for rabies as soon as possible. Caution should be used when considering methods for capture, restraint, and euthanasia of wild animals to minimize the potential for human exposure. The length of time between rabies virus appearing in the saliva and onset of symptoms is not well characterized for these animals and holding them for observation is not advised.

- Prophylaxis (vaccination) is usually recommended for domestic animals that have been exposed to wildlife in which rabies is suspected. Because the period of rabies virus shedding in wild animals and hybrids (eg. wolf hybrids) is unknown, these animals should be euthanized and tested rather than confined and observed when they bite humans.

18.3 Protocols for Confinement of Small and Large Animal Rabies Suspects

Clinicians must consult with Infection Control Personnel and the CDPHE regarding management of all animals considered to be Rabies Suspects (low-risk or high-risk).

Protocols regarding Low-Risk Rabies Suspects (see page 128 for case definition):

- Consultation with CDPHE will often result in the recommendation of a 10-day confinement and observation period which should be followed.
- It is very important that the clinician in charge of the case maintain a list of all VTH-personnel that have contact with the animal, and that this list is maintained with the medical record.
- Patients that are confined for observation as rabies suspects should be observed and evaluated during this period, but contact with personnel and use of ancillary testing procedure should be minimized.
- Barrier nursing precautions must be used when working with the suspect patient or working in the patients’ environment, including use of gloves, barrier gowns, face shield (including eye protection), or masks and eye protection.
Animals should be housed in isolation if possible. Housing in other environments should only be carried out with permission of Infection Control Personnel.

Conspicuously label the cage or stall with a sign – “RABIES SUSPECT, DO NOT HANDLE.”

Minimize treatments and personnel handling the patient.

The student or clinician assigned to the case will perform feeding, watering, and cage or stall cleaning.

Rubber gloves should be worn when cleaning housing areas.

All rabies suspects that die or are euthanized must be tested at the CSU-VDL to confirm or rule-out rabies infection.

**Protocols regarding High-Risk Rabies Suspects (see page 128 for case definition):**

It is critical that Infection Control Personnel and the CDPHE are contacted as soon as a high-risk rabies suspect is identified.

It is also very important that the clinician in charge of the case maintain a list of all VTH-personnel that have contact with the animal, and that this list is maintained with the medical record.

Barrier nursing precautions must be used when working with the suspect patient or working in the patient’s environment, including use of gloves, barrier gowns, face shield (including eye protection) or masks and eye protection.

Strict isolation procedures should be adhered to in all cases; barrier clothing is required and includes masks, eye protection, gloves and gowns.

Owners and JLV-VTH Personnel should not handle the animal unless a faculty member is present and proper restraint and safety precautions have been taken.

Small animals should be placed in the isolation ward and large animals in Large Animal Isolation (when possible) until euthanasia can be performed.

The cage or stall should be conspicuously labeled "RABIES SUSPECT, DO NOT HANDLE."

See page 16 for instructions regarding the disposal of contaminated materials (including sharps in appropriate containers)

All rabies suspects that die or are euthanized must be tested at the CSU-VDL to confirm or rule-out rabies infection.

### 18.4 Rabies suspects that are dead at presentation to the hospital  [Return to Top]

Dead animals, domestic or wild, considered suspect for rabies or that are suspected or known to have bitten a person within the past 10 days, are to be submitted to the CSU Veterinary Diagnostic Laboratory (CSU-VDL) for rabies testing.

Ideally, clients should be directed to take these animals directly to the CSU-VDL for submission whenever possible.

During regular hours (8:00 a.m.-5:00 p.m., Monday-Friday) immediately notify the Diagnostic Laboratory 297-1281 that a rabies suspect has been presented.

During nights, weekends or holidays, notify the Diagnostic Laboratory pathologist on call by phoning 7-1288 (necropsy lab) or by leaving a message at 7-0354. The name of the on-duty pathologist can be found at [http://www.dlab.colostate.edu/security2/weekend_contact.cfm](http://www.dlab.colostate.edu/security2/weekend_contact.cfm).
Submit a Veterinary Diagnostic Laboratory request form with the carcass and check the "Rabies Exam" block. If a necropsy is desired, write "necropsy" in the misc. tests and special requests section. Include on the form:
- Names of the owner, responsible clinician and student.
- Name, address and phone number of the person delivering the carcass.
- Names of any person(s) bitten or suspected to have been bitten including the circumstances of the exposure (including time, date and place).
- Any clinical signs that the animal may have exhibited.

Barrier nursing precautions should be used when handling the carcass, (gloves and plastic apron or gown); do not handle the mouth.

Place the carcass in a plastic bag for delivery to the Diagnostic Laboratory. Disinfect the outer surface of the container prior to transport.

Properly identify the carcass and attach the form to the plastic bag.

Be certain that the plastic bag is conspicuously labeled "Rabies Suspect" and disinfect the outer surface of the container prior to transport.

Clean and disinfect any areas contacted by the animal.

### 18.5 Determining vaccination status of suspect animals: [Return to Top]

The Colorado Department of Public Health and Environment defines the vaccination status of domestic animals as follows:

- **Currently vaccinated** -- An animal will be considered currently vaccinated if the primary vaccination was administered at least 30 days previously and the animal is currently vaccinated in accordance with the Compendium of Animal Rabies and Prevention.

- **For the purposes of this policy an animal’s vaccination status is based on the duration of the vaccine used and date administered, not on whether the animal is current under the local rabies vaccination ordinances.**

- **Not vaccinated** -- An animal that has never been vaccinated or an adult animal (>18 months of age) that was vaccinated only once and is overdue for booster doses will be considered not vaccinated and susceptible to rabies infection.

- **Expired vaccination** -- An animal that has had two or more documented vaccinations in its life but is currently overdue for a booster will be considered previously immunized with an expired vaccination. Although antibody levels may have declined, booster doses would be expected to result in a rapid rise in antibody titers and protect the animal.
Decision Algorithm for Managing Cat, Dog and Ferret Bites in Colorado

Algorithm for Managing Cat, Dog and Ferret Bites in Colorado

Bite by cat, dog or ferret
Skin was broken

Report bite to local health department, animal control, or sheriff department

Location of biting animal known?

Yes

Did the bite occur in Colorado?

No

Confirm rabies vaccination status

Animal alive and healthy?

Yes

Animal dead?

No

Animal ill with neurobehavioral signs consistent with rabies?

Yes

Did the bite occur in the U.S.?

No

10-day observation period (recommended) OR Animal sacrificed and tested ($50 for test + vet costs to owner)

No

Submit for rabies testing

Test result

Positive

Administer rabies prophylaxis*

Negative

No rabies prophylaxis

Yes

Yes

Did the bite occur in an area with skunk rabies?

No

Delay treatment and consult with the local or state health department

Yes

Did the bite occur in Mexico or other developing country?

No

Yes

Bite unprovoked? Did animal appear ill? Unusual or extenuating circumstances?

No

Yes

Yes

*Although not required, the state health department requests reports of persons given rabies prophylaxis.
18.6 Responses for human exposure to Rabies Virus

- If rabies infection or exposure is suspected in a patient, the primary clinician must contact Infection Control Personnel. The primary clinician, Infection Control Personnel or another representative from the JLV-VTH will also contact public health officials as soon as possible.
  - The Colorado Department of Public Health and Environment (CDPHE) is available for consultation 24 hours a day at 303-692-2700 (or 303-370-9395 after business hours).
  - Dr. Jennifer House, State Public health Veterinarian, Colorado Department of Public Health and Environment: (303)692-2628
  - Larimer County Department of Health and Environment, (970)498-6775 or x6700/x6776/x6786 M-F 8am - 4:30pm. (970)416-1985 Sheriff’s dispatch, weekends & after hours.
- It is very important that the clinician in charge of a patient suspected of rabies infection maintains a list of all VTH-personnel that have contact with the animal, and that this list is maintained with the medical record.
- Rabies exposure in people is NOT considered a medical emergency; rather it is a medical urgency.
• All bite wounds inflicted on JLV-VTH Personnel should immediately be cleansed with an iodophor or chlorhexidine scrub and water. Bites should be irrigated using copious amounts of dilute iodophor or chlorhexidine solution (<1% concentration). For deep wounds consideration can be given to irrigation with pressure using a syringe without a needle. Seek further medical attention ASAP.

• Animal owners that have been bitten should be advised to immediately consult their physician relative to further treatment.

• All bite injuries inflicted by rabies suspects should be reported to Infection Control Personnel and the CDPHE.

• JLV-VTH Personnel who have been bitten or otherwise exposed should report the incident to their supervisor and the Director or Administrator of the JLV-VTH and seek treatment by a physician.

  ➢ See information about Occupational Safety in the General Information section of the Infection Control SOP.

  ➢ Group exposures to zoonotic agents -- In the event of a group exposure, Infection Control Personnel will contact the appropriate university offices. The CSU Worker’s Compensation Office will submit a multi-person notification that will list the nature of your exposure. This notification will serve as documentation in the event that you have complications as a result of your exposure.

  ➢ Zoonotic disease exposures or injury to individuals – Individual employees will need to fill out a Worker’s Compensation First Report of Injury Report. This report is located at http://www.ehs.colostate.edu/WWorkComp/Home.aspx. This notification will serve as documentation in the unlikely event that you have complications as a result of your exposure.

  o You will be provided with a factsheet related to your exposure in order to give you more information. Please monitor your health carefully.

  o If you have any signs of illness, please seek medical attention and advise your caregiver of this exposure history.

• Illness, zoonotic disease exposure, or Injury to CSU EMPLOYEES -- Please adhere to the following process if you have symptoms or concerns for your health related to occupation incidents and wish to seek medical evaluation through Worker’s Compensation:

  ➢ During standard business hours (M-F, 8:00 am to 5:30 pm): Medical evaluations are performed through one of our Worker’s Compensation, Authorized Treating Physicians (ATP). A list of these providers is available on line at: http://www.ehs.colostate.edu/WWorkComp/HealthContPrint.aspx. Please contact Pony Davis at 491-2135 or Kenda Weigang at 491-4832 if you have questions.

  ➢ After standard business hours (weekends and M-F 4:30 pm to 8:00 am): If you experience symptoms outside of standard business hours, seek evaluation through Urgent Care or Emergency Room. You will need to see and coordinate additional care through one of CSU’s Authorized Treating Physicians.

  ➢ SEEK MEDICAL ATTENTION FROM A CSU-AUTHORIZED TREATING PHYSICIAN WHenever POSSIBLE as initial visit costs will be covered through Worker’s Compensation even if it is determined that your illness is not work related. If you must go to the ER or an Urgent Care provider for the specific reasons listed above, you and/or your insurance carrier will be responsible for all health care costs for illnesses/injuries that are NOT related to your employment.

• Illness, zoonotic disease exposure, or Injury to CSU STUDENTS – If students are exposed or injured in the course of activities that relate to their educational assignments, they need to seek treatment from either Hartshorn Health Services or your personal physician. This is not a situation where worker’s compensation applies and treatment and expenses are NOT covered by CSU.

• All cases in which a person has been bitten by an animal or has otherwise potentially been exposed to rabies must complete the Animal Bite/Rabies Suspect Form (MR 183) as soon as possible. These forms are available at the small animal reception area and are turned into the Director’s office.

• In addition, all bite wound incidents must be reported to the following agency as soon as possible so that quarantine of the animal can be properly enforced and/or other appropriate action can be taken.
Animal Control Division of the Humane Society for Larimer County 970-226-3647, if the bite occurred in Larimer County (including Fort Collins).

Colorado Department of Public Health and Environment (CDPHE) at 303-692-2700 (or 303-370-9395 after business hours).

The appropriate state, county or city official if the bite occurred outside of Larimer County.

18.7 Determining what constitutes a human rabies exposure

- Rabies exposure is not a medical emergency; rather it is a medical urgency.
- All bite wounds inflicted on a person should be immediately cleansed with an iodophor or chlorhexidine scrub and water. Bites should be irrigated using a dilute iodophor or chlorhexidine solution (<1% concentration). For deep wounds consideration can be given to irrigation using a syringe without a needle. Seek further medical attention ASAP.

What were you exposed to?

- Rabies virus is transmitted through saliva and brain/nervous tissue. Therefore these are considered infectious. If contact with either of these has occurred the type of exposure should be evaluated to determine if post-exposure prophylaxis is necessary.
- Contact such as petting or handling an animal, or contact with blood, urine or feces does not constitute an exposure.
- Rabies virus becomes noninfectious by desiccation and ultraviolet irradiation. Different environmental conditions affect the rate at which the virus becomes inactive, but in general, if the material containing the virus is dry, the virus can be considered noninfectious.

What type of exposure occurred?

- Rabies is only transmitted when the virus is introduced into a bite wound, open cuts in skin, or onto mucous membranes (such as the mouth or eyes). The likelihood of rabies infection varies with the nature of the exposure. In general, there are two categories of exposure, bite and non-bite.
- Bite - Any penetration of the skin by teeth constitutes a bite exposure. All bites, regardless of body site, represent a potential risk of rabies transmission, but that risk varies with the species of biting animal, the anatomic site of the bite, and the severity of the wound.
- Non-bite – A non-bite exposure from terrestrial animals rarely causes rabies. However, occasional reports of rabies transmission by non-bite exposures suggest that these should be evaluated for possible post-exposure prophylaxis. A non-bite exposure includes the contamination of open wounds, abrasions, mucous membranes, or scratches with infectious material.
- Contact, by itself, such as petting a rabid animal, or contact with blood, urine, or feces from a rabid animal, does not constitute an exposure.

Vaccination status of the rabies suspect animal?

- An unprovoked attack by an animal is more likely to indicate a rabid animal as opposed to a provoked attack. Bites secondary to attempting to feed or handle an apparently healthy animal should be regarded as a provoked attack.
- Other factors to consider when evaluating a potential rabies exposure include the local rabies epidemiology in the area, the biting animal’s history and current health status (e.g., abnormal behavior, signs of illness), and the potential for the animal to be exposed to rabies (e.g., presence of an unexplained wound or history of exposure to a rabid animal).
- A currently vaccinated dog, cat, ferret or horse is unlikely to become infected with rabies.
• What type of animal did you have contact with? [Return to Top]
  ➢ Rabies surveillance in wild animal populations tells us that the type of animal you are exposed to affects your risk of rabies. Knowing the species of animal you were exposed to will affect decisions regarding your treatment.
  ➢ Domestic Dogs, Cats, and Ferrets - The likelihood of rabies in a domestic animal varies by region; hence, the need for post-exposure prophylaxis also varies. A currently vaccinated dog, cat, or ferret is unlikely to become infected with rabies.
  ➢ Other Domestic Animals - In all instances of exposure to other domestic animal species, the local or state health department should be consulted before a decision is made to euthanize and test the animal or initiate post-exposure prophylaxis. Previously vaccinated adult horses have a decreased risk for infection and are considered a low-risk contact.
  ➢ Other Exotic Pet Species - Other exotic mammalian species kept as pets are considered wildlife species. Consultation should be sought from local or state health departments regarding decisions on post-exposure prophylaxis. Efficacy of rabies vaccines have not been demonstrated in any exotic pet species, they are not licensed for these animals, and as such, constitutes an off-label usage. Vaccination may reduce the risk of rabies in these species, but does not eliminate the risk. In addition, observation periods are not recommended with these species since virus shedding periods before onset of clinical signs are unknown. Considerations should be made to the housing of the animal, its potential to be exposed to and acquire rabies, and the circumstances of the potential exposure to a human or domestic animal. In situations where rabies is suspected in an exotic pet species (to which a human or domestic animal exposure has occurred) it is recommended to euthanize and test the animal for rabies.
  ➢ Bats - Rabid bats have been documented in all 49 continental states (Hawaii is rabies free), and bats are increasingly implicated as important wildlife reservoirs for variants of rabies virus transmitted to humans. Recent data suggest that transmission of rabies virus can occur from minor, seemingly unimportant, or unrecognized bites from bats. Human and domestic animal contact with bats should be minimized, and bats should never be handled by untrained and unvaccinated persons or be kept as pets. In all instances of potential human exposures involving bats, the bat in question should be safely collected, if possible, and submitted for rabies diagnosis. Rabies post-exposure prophylaxis is recommended for all persons with bite, scratch, or mucous membrane exposure to a bat, unless the bat is available for testing and is negative for evidence of rabies.
  ➢ Wild Terrestrial Carnivores (Raccoons, Skunks and Foxes) -- Raccoons, skunks, foxes, and coyotes are the terrestrial animals most often infected with rabies in the United States. All bites by such wildlife must be considered a possible exposure to the rabies virus. Post-exposure prophylaxis should be initiated as soon as possible following exposure to such wildlife unless the animal has already been tested and determined not to be rabid. Signs of rabies among wildlife cannot be interpreted reliably; therefore, any such animal that exposes a person should be euthanized as soon as possible (without unnecessary damage to the head) and the brain should be submitted for rabies testing.
  ➢ Other Wild Animals - Small rodents (e.g., squirrels, hamsters, guinea pigs, gerbils, chipmunks, rats, and mice) and lagomorphs (including rabbits and hares) are almost never found to be infected with rabies and have not been known to transmit rabies to humans. In all cases involving rodents, the state or local health department should be consulted before a decision is made to initiate post-exposure prophylaxis. The offspring of wild animals crossbred to domestic dogs and cats (wild animal hybrids) are considered wild animals by the National Association of State and Public Health Veterinarians (NASPHV) and the Council of State and Territorial Epidemiologists (CSTE). Wild animals and wild animal hybrids should not be kept as pets. In instances where wild or hybrid animals are suspected of rabies they should be euthanized and tested for rabies. Human exposure situations involving animals maintained in United States Department of Agriculture-licensed research facilities or accredited zoological parks should be evaluated on a case-by-case basis.
### CDC Prophylaxis Recommendations for People Exposed to Rabies Suspects

<table>
<thead>
<tr>
<th>Animal Type</th>
<th>Evaluation and Disposition of Animal</th>
<th>Post-exposure Prophylaxis Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dogs, cats, and ferrets</td>
<td>Healthy and available for 10 day observation</td>
<td>Persons should not begin vaccination unless animal develops clinical signs of rabies</td>
</tr>
<tr>
<td>Rabid or suspected rabid</td>
<td></td>
<td>Immediately vaccinate</td>
</tr>
<tr>
<td>Unknown (Unavailable for evaluation)</td>
<td></td>
<td>Consult public health officials</td>
</tr>
<tr>
<td>Bats, raccoons, skunks, foxes, and most other carnivores</td>
<td>Regarded as rabid unless animal is proven negative by laboratory test.</td>
<td>Consider immediate vaccination</td>
</tr>
<tr>
<td>Livestock, horses, rodents, rabbits and hares, and other mammals</td>
<td>Consider individually</td>
<td>Consult public health officials. Note: bites of squirrels, hamsters, guinea pigs, gerbils, chipmunks, rats, mice, other small rodents, rabbits, and hares almost never require rabies post-exposure prophylaxis.</td>
</tr>
</tbody>
</table>

The following link to the CDC website provides more extensive information about human rabies exposures:

## 19.0 Salmonella (Small animals):

A one gram fecal sample must be submitted for culture of Salmonella and *Campylobacter*, especially if, 1) the animal is febrile, 2) if neutrophils are seen on rectal cytology, 3) there is a history of feeding a raw food diet, or 4) if more than one animal in the household / population has been affected with a similar condition.

## 20.0 Salmonella (Large animals):

- All large animal inpatients will have a fecal culture obtained at admission for *Salmonella* culture. Further fecal cultures will be submitted on Tuesday and Friday for all large animal inpatients. These cultures will be submitted for the JLV-VTH *Salmonella* surveillance program. Patient samples submitted for *Salmonella* culture must be accompanied by a submission form that is completed online [http://www.dlab.colostate.edu/biosecurity](http://www.dlab.colostate.edu/biosecurity).

- If *Salmonella* is a reasonable differential diagnosis for the animal’s condition, 5 fecal cultures (submitted q 24 hr) should be submitted (at the owners’ expense). Submission of at least 1 g samples is required; rectal swabs are not an acceptable alternative. Patient samples submitted for *Salmonella* culture must be accompanied by a submission form that is completed online.

## 21.0 Streptococcus equi equi (Strangles):

Culture or PCR of respiratory secretions is mandatory for any hospitalized equine patient in which infection with *Strep. equi equi* is a reasonable differential. See also page 77 under this section for Management of Equine Patients with known or suspected contagious respiratory infection.

- Questions concerning a patients’ status regarding *S. equi* exposure or infection should be incorporated into the medical history for all equine admissions.

- Owners will be requested to sign a form that reads: “In the past 6 months, has this horse had strangles, or have any other horses on the premises had strangles? Strangles is a contagious bacterial respiratory disease of horses caused by *Strep equi*. Fever and purulent (pus-like) nasal discharge are commonly seen. This disease is often but not always accompanied by lymph node enlargement and/or abscesses in the head and neck region.”
**Decision Algorithm for S. equi equi (Strangles) cases:**

1. **Owner / agent completes strangles admission form**
   - "In the past 6 months, has this horse had strangles, or have any other horses on the premises had strangles? Strangles is a contagious respiratory disease of horses caused by a bacteria called Strep equi. Fever and purulent (pus-like) nasal discharge are commonly seen. This disease is often accompanied by enlargement of the lymph nodes and/or abscesses in the head and neck region."

2. Physical Exam: Does horse have clinical signs consistent with strangles, GP empyema, and/or chondroids?
   - Yes → Inpatient or outpatient?
   - No → No further precautions necessary

3. Inpatient or outpatient?
   - Yes → Inpatient: House in isolation; Culture mandatory (GP wash or 3 nasal washes 24 h apart)
   - No → Outpatient: Barrier precautions, hand disinfectant, footbaths, area disinfection; culture recommended

4. Strep equi positive?
   - Yes → Maintain in isolation; consider viral dz diagnostics. Consult w/biosecurity personnel if patient housing change desired
   - No → Barrier precautions, hand disinfectant, footbaths.

- Inpatient horses with clinical signs consistent with strangles (fever, catarrhal or purulent nasal discharge, and submandibular and/or retropharyngeal lymphadenopathy, +/- purulent drainage) must be housed in Equine Isolation.
- Inpatient horses with guttural pouch empyema or chondroids must be housed in Equine Isolation. If these horses are moved to radiology or surgery approved protocols must be followed for moving patients from isolation to these areas.
- If horses with overt strangles or chondroids or guttural pouch empyema are to be treated as outpatients (e.g. for endoscopy), barrier precautions must be used at all times, and the horse should be kept either under direct supervision of the admitting clinician or in its trailer to avoid contact with other outpatients and contamination of the hospital environment. This means the admitting clinician needs to be present when the horse is unloaded from the trailer and be with it during the entire time it is on the JLV-VTH property.
- These cases should ideally be examined and treated in the equine standing procedures room and not taken to other areas of the hospital. The room must be thoroughly disinfected upon completion of procedures, after the animal leaves. The disinfection procedure will include standard endoscope disinfection practices, Neutral Disinfectant Cleaner wipe-down of all table and cabinet surfaces, and application of Neutral Disinfectant Cleaner to the floor and stocks. The Neutral Disinfectant Cleaner should be rinsed away after being allowed to contact the floor and stocks for 15 minutes. Ideally this room would be closed off from further use and a “special attention required” sticky note placed on the door to denote closure. This procedure also ensures that animal care knows a high-risk case was admitted to the room. Standing Surgery/Endoscopy and outpatient rooms have signs outside doors for this use.
- Infection Control Personnel should be notified as soon as possible when patients with elevated contagious disease risk are admitted or develop these problems while hospitalized. At their earliest opportunity, the veterinarian responsible for the case must notify all affected personnel about the recognition of the specifics related to this
situation. They must also notify personnel regarding changes in the housing (e.g., when moving into isolation units), and at the time of discharge.

- **This is most efficiently done by sending an email to the Contagious Disease Alert listserv (VTH-Contagious-Dz-Alert@colostate.edu)**, which will notify Infection Control Personnel, heads of sections and nursing staff, and cleaning personnel. This email should include the patient signalment, veterinarian assigned to the case, housing area, and the known or suspected contagious disease.

- Special attention should be given to the cleaning and disinfection of the endoscope and any other equipment that comes into contact with these patients or the secretions from these patients. To facilitate protecting and cleaning endoscopy equipment, it may be prudent to cover the cart, light source, etc with plastic prior to use.

- The admitting clinician is ultimately responsible for being certain that Infection Control procedures are implemented. If deemed necessary, further cleaning and disinfection can be requested from cleaning staff, but regardless the clinician must ensure that the room has been appropriately decontaminated immediately after completion.

- Environmental surveillance for *Streptococcus equi*.
  - Upon notification that an inpatient is known or suspected to be infected with *S. equi*, the housing environment will be scheduled for environmental sampling and culture.
  - Clinicians are responsible for ensuring that Infection Control Personnel have been informed when these patients are discharged.
  - After routine cleaning and disinfection procedures have been completed, a sign will be hung on the stall by Infection Control Personnel. The stall will remain vacant until the culture results are known.
  - The Infection Control house officer will obtain environmental samples from the cleaned stall and submit them for culture.
  - The stall will be released for use with other patients when negative culture results have been confirmed.

### 22.0 Management of Equine Patients with Known or Suspected Contagious Gastrointestinal Infection:

Gastrointestinal agents of greatest concern to equine patients as contagious nosocomial hazards in the VTH include *Salmonella*, and rotavirus for animals less than 30 days-of-age.

### 22.1 Clinical Definitions for High Contagious Disease Risk Patients and Housing Requirements for These Patients:

- Infection Control Personnel should be notified ASAP of any patients meeting the following definitions:
  - Equine patients >30 days-of-age that have **diarrhea** not associated with treatment (e.g., mineral oil therapy). These patients are required to be housed in Equine Isolation.
  - Clinicians and other hospital personnel are responsible for recognizing any patients that pose an increased potential risk of transmitting infectious disease and immediately moving them to Equine Isolation.
  - Post-operative colic patients sometimes develop soft stools that may not be associated with contagious disease agents. As such, at the discretion of Infection Control Personnel, these patients may not be required to be moved to isolation. Clinical factors affecting this decision include:
    - Evidence of mild to severe systemic illness. These patients have been shown to have an increased risk of shedding *Salmonella*.
    - Patients with **fever** and either **leukopenia** or **neutropenia** should be considered to have an elevated risk of contagious disease.
    - All patients that are found to be culture-positive for *Salmonella* must be hospitalized in Equine Isolation. Exceptions may be made at the discretion of Infection Control Personnel if patients are to be discharged in less than a day. Barrier precautions are to be initiated immediately upon discovery of positive status for *Salmonella*.
23.0  Management of Equine Patients with Known or Suspected Contagious Respiratory Infection:  

Respiratory agents of greatest concern as contagious nosocomial hazards in the VTH include Influenza, Streptococcus equi equi (strangles), and Equine Herpesvirus types 1 or 4; Rhodococcus equi is also a concern for animals <30 days-of-age.

23.1 Clinical Definitions for High Risk Patients and Housing Requirements:  

Infection Control Personnel should be notified ASAP of any patients known or suspected of being infected with the following conditions:

- **Equine influenza virus**
  - The Infection Control Personnel should be notified immediately if equine patients that cough repeatedly, particularly if coughing is paroxysmal, or if the patient has a fever. These are hallmark signs of infection with influenza virus and other respiratory pathogens.
  - Barrier precautions should be instituted immediately for equine patients > 30 days of age that have fever and acute onset of coughing.
  - Equine patients that have fever and acute onset coughing must be immediately tested for equine influenza using rapid ELISA tests on nasal secretions collected with a Dacron tipped swab.
  - Equine patients known or suspected to be infected with influenza virus must be immediately moved to Equine Isolation.

- **Equine herpesvirus**
  - Horses infected with herpesvirus can exhibit clinical signs of fever, depression, nasal discharge, coughing, abortion, or neurologic disease. The potential for infection with EHV-1 or EHV-4 should be considered for equine patients exhibiting these signs. If this is a logical differential diagnosis, patients should be considered to have an elevated contagious disease risk.
  - Patients considered to have a risk of clinical infection or significant recent exposure to EHV-1 or EHV-4 must be managed with barrier nursing precautions. This includes mares that abort in the hospital or are admitted with a history of abortion within seven days of admission.
  - If possible, diagnostic testing to detect possible contagious causes of abortion such as EHV-1, EVA, and leptospira infection should be performed (e.g., evaluation of fetal tissues, serology, etc).
  - Horses with neurologic disease for which EHV-1 myeloencephalopathy is a possible diagnosis:
    - These horses can be housed in the neuro stall provided that the adjacent stall and 2 stalls across the aisle can remain vacant.
    - If preferred, suspect horses can be housed in the sand stalls of the food animal clinic area (northwest section of the FA facility with permission from the food animal clinician on clinics).
    - The number of EHV-1 myeloencephalopathy suspect horses that CSU can accommodate is a maximum of 3: One in the neuro stall and two in each of the food animal sand stalls, provided that those stalls are available for use. Keep this in mind when contacted about referral of such cases.
    - It may be possible under certain circumstances to house EHV-1 patients in Equine Isolation.

24.0 Management of Patients with Other Contagious Respiratory Syndromes:  

- Patients admitted with a history suggesting that multiple horses from their source population (home or equine event venue) have recently had acute respiratory infections should be considered an elevated disease risk status animal and appropriate diagnostic testing must be performed.
- Any patients that acutely develop a persistent cough while hospitalized should be considered an elevated disease risk status animal and Infection Control Personnel should be notified immediately. Rectal temperatures should be monitored frequently (at least twice daily) and clinicians are encouraged to submit blood for hematology. They may be housed in the main inpatient area if approved by Infection Control Personnel.
• Any patients that develop fever for unknown reason must be considered an elevated disease risk animal and Infection Control Personnel should be notified immediately. Clinicians are encouraged to submit blood for hematology. They may be housed in the main inpatient area if approved by Infection Control Personnel.
• Clinicians and other hospital personnel are responsible for recognizing any patients that might be considered high-risk of infectious or contagious disease and are responsible for immediately moving them to isolation. These patients should be reported to the Infection Control Personnel ASAP.
• Only Infection Control Personnel or the Hospital Director can give permission to house patients with high-risk of infectious or contagious disease in locations other than Equine Isolation.

25.0 Vancomycin Resistant Enterococcus spp. (VRE): [Return to Top] VRE are an important nosocomial problem in human care facilities. At the discretion of the Director of Infection Control, periodic cultures of patients and the hospital environment may be used to evaluate risks associated with VRE.

26.0 Vesicular Stomatitis Virus (VS): [Return to Top]
• Vesicular stomatitis is a contagious viral disease that is difficult to distinguish from Foot – and – mouth disease (FMD).
• In affected livestock, VS causes blister-like lesions to form in the mouth and on the dental pad, tongue, lips, nostrils, hooves, and teats. These blisters swell and break, leaving raw tissue that is so painful that infected animals generally refuse to eat or drink. If the hooves are affected, the animal may show signs of lameness. Severe weight loss usually follows, and in dairy cows, a severe drop in milk production commonly occurs. Lesions in horses may also be expressed as crusting scabs on the muzzle, lips, or ventral abdomen.
• Infected animals may spread the virus by direct contact or by mechanical transmission; the virus is thought to be harbored over long periods by a yet unidentified insect vector. Other insects (e.g. flies) aid in mechanical transmission of the virus among animals.
• Any large animal originating from, or stabled for more than 12 hours in a state with confirmed cases of vesicular stomatitis, must be examined by a veterinarian prior to entering the JLV-VTH (i.e., in the parking lot).

26.1 Arrival Procedures for VS: [Return to Top]
• Upon arriving at JLV-VTH, owners of these animals (or authorized agents) will sign a declaration stating that according to their knowledge, their animal has not been in a vesicular stomatitis quarantined area within 30 days prior to presentation at the VTH.
• Owners of large animals will be instructed to not unload their animal(s) from their trailer until the animal(s) is/are examined by an available faculty clinician, resident, intern, senior student, or technician.
• VTH Personnel should attempt to examine these animals as promptly as possible, particularly during hot days, to limit the amount of time that the animals and their owners spend waiting outside.
• For safety purposes, animals can be unloaded from the trailer and examined in the parking lot.
• Gloves are required for examination of these animals.
• Fractious animals should be examined in the most appropriate place for adequate restraint and VTH Personnel / owner safety, even if that means bringing the animal into the VTH before examination for VS.

26.2 Suspect VS Lesions: [Return to Top] If an animal is found to have suspect lesions, and the animal’s medical condition is not considered by the attending clinician to be an emergency, then the animal should not be brought into the VTH. Pyrethrin fly spray will be applied immediately to the animal and the trailer.
• On hot days, at the clinician’s discretion, the animal may be unloaded and provided with shade outside of the VTH facility. Pyrethrin fly spray application is mandatory.
• The senior clinician on duty and the Director of Infection Control or the Infection Control house officer will be contacted immediately. If deemed a suspect by Infection Control Personnel, the animal will remain in the trailer OR moved into isolation until examined by a Foreign Animal Disease (FADD) diagnostian from the State of Colorado and appropriate samples collected for laboratory diagnostic work-up (see below for contact information).

• Whether the horse is admitted or sent home, the State of Colorado Veterinary Office should be notified by the clinician in charge of the case. This report should include the examination findings and location of the horse with suspect VS lesions.
  ➢ Dr. Keith Roehr, Colorado State Veterinarian, (303) 239-4161

• While test results for VS are pending, suspect cases may either return to the point of origin in their trailer which may be sealed by the State Veterinarian of Colorado if the animal is from out of state or be housed at CSU-VTH Large Animal Isolation Facility.

• Owners will assume the additional expenses associated with housing their animals in the isolation facility.

26.3 Emergency Large Animal Cases [Return to Top]

• VS precautions will be applied to emergency cases; however, VS precautions should not interfere with the appropriate level of care needed to limit animal suffering and remedy emergency conditions.

• Emergency large animal admissions should be examined for lesions of VS.

• Suspects requiring emergency treatment: Following application of fly spray, suspect animals requiring emergency treatment can then enter the VTH. During emergency medical workup, these animals should be housed alone in holding areas, well away from patient stalls and out of contact with other animals. These animals may be moved into radiology or surgery as needed; however, precautions to minimize contact with other animals must be taken, and these animals must be moved to the Large Animal Isolation Facility as soon as possible.

• Whether the horse is admitted or sent home the State of Colorado Veterinary Office should be notified by the clinician in charge of the case. This report should include the examination findings and location of the horse with suspect VS lesions.

• Animals from quarantined premises in VS positive states may be admitted to the VTH only for emergency treatment and handled as described above. The Colorado State Veterinarian should be contacted in such instances.
  ➢ Dr. Keith Roehr, Colorado State Veterinarian, (303) 239-4161

26.4 Large Animals in the VTH Teaching Herds [Return to Top]

• All VTH-owned and research animals will be examined for the presence of lesions every 2 weeks.

26.5 Contact Information for Reporting of Suspect Cases [Return to Top]

• USDA area office: (303) 231-5385, this is the number for reporting suspect cases.

• Dr. Keith Roehr, State Veterinarian, (303) 239-4161

• Within 24 hours the Infection Control Personnel of the VTH should be notified by the clinician of record of the case of any horses admitted with VS suspect lesions

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27.0 Management of Patients Infected or Colonized with Bacteria Resistant to Important Antimicrobial Drugs: [Return to Top] Patients infected with bacteria resistant to important antimicrobial drugs or to multiple drug classes represent a potential health hazard to JLV-VTH Personnel, clients, and to other patients. As such, they are managed with increased Infection Control precautions intended to discourage dissemination in the JLV-VTH.
Infection Control Personnel should be notified ASAP of any patients infected with bacteria with resistance patterns of concern to antimicrobial drugs. This includes incisional or catheter related infections as well as gastrointestinal related infections.

Some important resistance patterns include:
- Methicillin or oxacillin/cefoxitin resistant *Staphylococcus aureus* (MRSA).
- Methicillin or oxacillin resistant *Staphylococcus pseudintermedius* (MRSP).
- Vancomycin resistant Enterococcus (VRE).
- Bacteria resistant to extended-spectrum beta-lactam antibiotics.
- Bacteria resistant to multiple antimicrobial drugs such as trimethoprim-sulfa, fluoroquinolones, gentocin or ceftiofur.

All patients housed in medical or surgical wards with multiple drug resistant bacterial infections should be moved to the Isolation Facility, discharged immediately, or may remain in wards following approval of Infection Control Personnel.

CCU patients with multiple drug resistant bacteria will be separated as much as possible from other patients, and will be moved to Isolation or discharged when sufficient recovery warrants.

All patients infected with bacteria with important resistance patterns must be managed with strict barrier nursing precautions.

### 28.0 Management of Patients with Neurologic Disease Known or Suspected to be Associated with Contagious and/or Zoonotic Disease Agents:

Infectious agents associated with neurologic disease that are of greatest concern as contagious nosocomial hazards in the VTH include rabies virus and Equine Herpesvirus type 1.

#### 28.1 Patients known or suspected of being infected with Rabies Virus:
- [See page 127 for additional details regarding managing rabies suspects and human exposures.](#)
- Rabies suspects must be housed in isolation facilities.
- Rabies is a very important zoonosis that can be easily confused with other conditions including colic or lameness.
- Although the incubation period can be variable and in some cases extended, generally there is a rapid progression of disease with death occurring within 2 weeks of onset of signs.
- All patients with neurologic disease should be assessed to determine if rabies is a reasonable differential diagnosis.
- If rabies is suspected then appropriate signage should be employed to notify all personnel handling the animal and its bodily secretions as well as the pathology department if the animal is to have a postmortem examination. ([See page 127](#) for details regarding appropriate precautions)
- The number of personnel involved in the care of suspect rabies cases should be minimized as much as possible and all personnel working with rabies suspects must have been vaccinated for rabies. ([See page 127](#) for details regarding appropriate precautions)

#### 28.2 Equine or Camelid patients known or suspected of being infected with Equine Herpesvirus Type 1 (EHV-1)
- If a case of EHV-1 is suspected, the primary clinician must contact Infection Control Personnel ASAP, and sampling to confirm or rule-out this diagnosis must be initiated immediately.
- [See page 112 for additional details regarding management of EHV-1 in equine and camelid patients.](#)
- If possible, patients suspected with active EHV-1 infections should be housed in isolation
- At an absolute minimum, patients suspected of having EHV-1 infections must be managed with strict barrier precautions and should be segregated from other susceptible animals.
If horses are housed in the neuro stall, the adjacent stall and 2 stalls across the aisle must remain vacant.

It may be possible to house suspect horses in the sand stalls of the food animal clinic area (northwest section of the FA facility) with permission from the FA faculty clinician on service. However, strict precautions must be taken to prevent exposure to camelid patients.

The maximum number of EHV-1 myeloencephalopathy suspect horses that CSU can accommodate is 3: One in the neuro stall and two in each of the food animal sand stalls, provided that those stalls are available for use. Keep this in mind when contacted about referral of such cases.

28.3 Patients known or suspected of being infected with West Nile Virus (WNV):

- WNV is a common cause of neurologic disease in horses and camelids, but direct contact with infected animals are not considered to pose a risk of infection for humans or other animals.
- As such, isolation of VTH patients is not required.
- However, care should be exercised during any invasive diagnostic procedures, and samples should be labeled appropriately in order to alert laboratory personnel of potential zoonotic risks.
- Horses known to be infected with WNV do not require special Infection Control handling procedures unless other confirmed or possible differential diagnosis places them at higher risk category such as rabies or EHV-1.

VI. Ancillary Services  

1.0 Diagnostic Imaging Infection Control SOP

1.1 General Guidelines: Radiological procedures or examinations should not be performed on animals with suspected infectious diseases unless required, and when possible should be scheduled at the end of the day. It is the primary clinician’s responsibility to notify Radiology and to state procedures to be used to prevent spread of infectious disease for animals with potential infectious diseases (particularly respiratory, gastrointestinal, and multiple-antibiotic resistant bacterial infections).

- Ensuring that personnel involved in diagnostic imaging of patients with increased contagious disease risks is ultimately the responsibility of the clinicians responsible for patient care. Hazards should be clearly marked on the request form for radiographic, ultrasound, scintigraphy, or CT consultation.
- It is the responsibility of the primary clinician to coordinate transport of the animal to Radiology and indicate barrier clothing (gowns, gloves) and procedures to be followed.
- The facility and equipment must be cleaned and disinfected as soon as possible. Radiology staff will supervise or perform cleaning and disinfection of radiology equipment.
- Wash hands between cases regardless of infectious status of the patient.
- Contaminated outerwear should be placed in bags, marked with the suspected infectious disease agent, and returned to Central Supply for laundering.
- All individuals contacting the animal must wash hands carefully when the procedure is complete.
- Following imaging evaluation of cases with known or suspected infectious disease, the radiograph exam room should be closed and a sign placed for special disinfection by Animal Care (7-1223).
- The number of people involved in radiographic examinations using portable machines should be limited.
- All personnel working in Radiology must wear radiation badges and have proper training (see Radiation Safety Manual at www.ehs.colostate.edu/WRad/PDF/Rad%20Control%20Man.pdf or call 7-4439).

1.2 Large Animal Patients  

- The portable radiograph machine should be used when possible on large animals with known or suspected infectious diseases.
• Transport small ruminants to Radiology on gurneys or in carts when possible.
• Radiology personnel entering the Large Animal Hospital should follow the clothing protocol appropriate for the area.
• See pages 51 and 56 for information on examination of horses housed in Equine Isolation.

1.3 Small Animal Cases [Return to Top]
• If a contagious disease is known or suspected, the patient should remain in its housing area until ready to image.
• A gurney or transport cage should be used to minimize hospital contamination.

1.4 Imaging Rooms and Equipment [Return to Top]
• Spray or mop floor with Neutral Disinfectant Cleaner after a known or suspected infectious disease case.
• Lead aprons/gloves should be sprayed with Neutral Disinfectant Cleaner solution after use on a known or suspected infectious disease case.
• Clean and disinfect lead ropes/head ropes weekly with chlorhexidine solution.
• Clean and disinfect all equipment with chlorhexidine solution daily.
• Magnetic resonance imaging (MRI) rooms should be cleaned under the direct supervision of an MRI technician in order to assure that proper safety precautions are followed.

2.0 Pharmacy Infection Control SOP [Return to Top]
2.1 Return of Medications
• Pharmacy will accept the return of whole tablets, unopened injectables and medications in syringes (oral or injectable) for credit or relabeling.
  ➢ Containers should be wiped down with chlorhexidine solution, dried, and placed in ziplock bags for return to Pharmacy.
• Clinician in charge of a case should consider infectious status of his/her patient when returning any unused medication.
• Carboys may be returned to the Pharmacy for reuse after thorough soap and water cleaning and steam cleaning.
• Autoclaving of carboys is required if they have been used on patients in isolation facilities. Carboys must be emptied of all contents prior to returning to the Pharmacy.
• Discontinued or unneeded medications that should be returned to the Pharmacy for appropriate disposal. Medications MUST NOT be disposed of in trash or by flushing down drains.

2.2 Return of Medications from Known or Suspected Infectious Animals [Return to Top]
• Medications or parenteral fluids from animals with known or suspected infectious diseases or from the Isolation Units (small animal, calf, or large animal) may not be returned to the Pharmacy for credit at any time. With Pharmacy approval obtained in advance, expensive items under unique circumstances may be considered for relabeling purposes only.
• At times of increased risk of dissemination of infectious agents, it may be deemed necessary to restrict return of products for credit. Thus, it may only be deemed possible to re-label them or it may not be possible to return them at all. The decision to implement these precautions lies with the Pharmacy staff and the Director of Infection Control.
3.0 Diagnostic Laboratory Biosecurity SOP

3.1 Necropsy Area Biosecurity SOP

- **Barrier Precautions and General Considerations**: Areas requiring barrier clothing include the necropsy room (DMC 180) and adjacent contiguous rooms (DMC 182-184), biosecurity necropsy (DMC 196) and adjacent contiguous rooms (DMC 197) the walk-in cooler (DMC 185, 188, 195) except for small animal drop-off clean area in DMC 188 accessed through the necropsy amphitheater (DMC171), general tissue trimming and routing room (DMC 163), necropsy amphitheater (DMC 171), digester room (DMC 186) and the dedicated prion laboratory area. Students, faculty and staff assigned for duties in the necropsy area must wear appropriate barrier clothing at all times.

- The boundaries beyond which necropsy clothing (coveralls and lab coats) is excluded are the hallway north of the necropsy laboratory area (DMC N190), rooms DMC 151 and 153, and the south perimeter of the dock area.

- General entry for observation only – For activities involving observation only, disposable shoe covers, poly apron or lab coat are required in all areas except DMC 163.

- Handling necropsy equipment – Foot covers, lab coat and examination gloves are required for handling necropsy laboratory equipment (instruments, hoists, cooler door handles etc).

- Individuals entering the walk-in cooler for any reason must be wearing at least disposable boots and gloves. Aprons are available if necessary or requested.

- Necropsy of small animals – Foot covers, laboratory coat or poly apron and latex examination gloves are required for handling specimens or necropsies of small animals requiring little physical effort.

- Routine necropsies – For involvement in routine necropsies rubber boots that can be disinfected, coveralls and heavy rubber gloves extending above the wrists are required.

- Necropsy with potential zoonotic hazard – Necropsy or handling specimens with potential zoonotic hazard, including prion suspect material - cleanable rubber boots, coveralls, and heavy rubber gloves extending above wrist are required.
  - When aerosols or splashing is expected, disposable, impermeable (Tyvek) coveralls, arm covers, bouffant caps, eye protection, respirators (high efficiency particulate filtering equivalent to 3M 8233, adjustable strap, conformable face seal) and face shields may be used as necessary.

- Students will provide their own heavy rubber gloves, knives, coveralls, and rubber boots. Boots and coveralls should not be worn in the clinical areas. Rubber boots should be thoroughly cleaned, scrubbed, and disinfected after each use. Soiled coveralls should be cleaned and replaced by the following day.

- Disposable boots, gloves, aprons and footbaths are available at the entryways to the walk-in coolers, necropsy Anteroom, necropsy amphitheater, main necropsy and biosecurity necropsy floors. Boots should be rinsed with hot water from a hose in the Necropsy Laboratory to remove any debris from the boot uppers and bottoms before entering the foot bath.

- Leaving the necropsy floor – When leaving the necropsy floor, clean boots, walk through the foot bath and change into street shoes in DMC N193. Keep door knobs and clean equipment clean. Protective clothing used on the necropsy floor should not be worn outside of the necropsy laboratory area; this includes hats used in the necropsy laboratory. Disposable bouffant caps are available for those who need hair/head protection.

- Soiled clothing used in the necropsy laboratory should be placed in a plastic bag for transport to Central Supply. Spray the outside of the bag with Neutral Disinfectant Cleaner.

- When leaving the necropsy laboratory wash gloves with germicidal soap, remove the gloves and then wash hands with germicidal soap. After washing hands, turn off the water with the paper towel used to dry the hands.
Avoid bringing carts or wheelbarrows into the necropsy laboratory or cooler. If this is unavoidable, the wheels and handles of the equipment should be disinfected with Neutral Disinfectant Cleaner from spray bottles located at the access points.

Specimen removal – Specimens to be used for laboratories, demonstrations and practice dissections will be surface-disinfected with A464 solution and placed in new plastic bags.

- **Necropsy Laboratory Cleaning:** [Return to Top] Students are responsible for helping maintain cleanliness and order during duty hours in the necropsy area and should leave the necropsy floor, tables, etc. in a sanitary condition. Instruments, tools, etc. should be cleaned and properly stored.
  - All specimen containers leaving the necropsy laboratory must be wiped clean.
  - Between necropsies the floor will be hosed clean with hot water.
  - Daily, after the last necropsy, the floor will be hosed clean with hot water, and sink and counter areas should be cleaned and disinfected with Nolvasan solution.
  - Animals from isolation facilities, all wildlife, and case with a known or perceived risk of zoonotic disease will be examined in biosecurity necropsy (DMC 196). Personnel will be minimized when handling these cases. The area of contact on the dock, in the Necropsy Laboratory and in the cooler will be cleaned and disinfected with A464 after the completion of the necropsy. Handles and faucets will be cleaned with Nolvasan solution.
  - After the animal waste is picked up (3 times per week) the entire area, including the whole loading dock will be cleaned and disinfected with A464.

- **Zoonotic Hazards:** [Return to Top] In general, PVM students assigned to the postmortem investigation practicum are not expected to perform necropsy on carcasses that represent a zoonotic hazard. Students that are at increased risk for infection or that have special medical concerns should discuss these concerns with the faculty pathologist on duty. As the presence or absence of zoonotic disease agents is typically not known prior to necropsy examination, strict attention to routine barrier clothing and procedures is required for each case.
  - If the history or findings during a post-mortem examination indicate the potential presence of a zoonotic agent, participation will be limited to diagnostic laboratory personnel. Students, guests, interns, externs or visitors will be not be allowed to participate in these necropsies, unless they have been informed of the risks and have completed and signed a release of liability form.
  - For necropsies of small animals or fetuses that entail potential zoonotic aerosol hazards will be conducted in biological safety cabinets. Examples of these types of cases include psittacosis, coxiellosis, West Nile virus, Q fever, tuberculosis, tularemia and plague, among others. Plague suspects, and especially prairie dogs, should be treated with flea spray in a plastic bag prior to handling. The external surface of birds should be wetted with detergent solution to contain feathers and dust.
  - Before performing the necropsies of animals that are suspected of having rabies, plague, tuberculosis or anthrax or other suspected zoonotic disease agents, it is necessary to obtain initial samples to confirm or rule out the zoonotic hazard.
    - For rabies suspects, carefully remove the brain and submit part for the FA test.
    - For plague, tuberculosis or anthrax submit a smear of abscess/cellulitis, granuloma, or peripheral blood for gram or acid fast stain.
    - Bag and label the carcass as a hazard, and place in the cooler.
    - If initial test confirms that the animal was infected with a zoonotic disease necropsy should not be performed unless there are special circumstances.
    - The carcass should be disposed of by waste reduction digestion.
  - Necropsies of large animals that represent a potential zoonotic hazard require the use of coveralls, gloves, arm covers, respirators (high efficiency particulate filtering equivalent to 3M 8233, adjustable straps,
conformable face seal) and face shields as necessary. A464N solution will be used to disinfect instruments and the necropsy area after completion.

- Potential prion disease cases should be treated as zoonotic hazards even though such status has not been demonstrated for transmissible spongiform encephalopathies in North America.

- **Special Procedures for Animals/Tissues Suspected of Being Infected with Prions**
  - Lab area floors, sinks, and counters where necropsies on prion suspect cervids or sheep were performed should be decontaminated by wetting with 5% Environ LpH with a contact time of 30 minutes. Drying of the surfaces must be avoided during the contact period. This should be done at the end of the necropsy session.
  - Environ LpH as mixed with Ecolab, AirKem, Quick Fill Workstation (dual use with A464)
    - Largest aperture meters 6 oz per gallon = 5%
    - Without aperture meters 10 oz per gallon = 7.8%
  - Dedicated instruments should be used for all procedures involving prion suspect animals/tissues. These instruments should be kept in the biosecurity necropsy room (DMC 196). These instruments should be decontaminated with 10% Environ LpH with 30 minutes contact time after each day's use.
  - Trimming of prion suspect tissue is done in the biosecurity necropsy room (DMC 196). The hoods must be free of obstructions so the air movement is adequate. Surfaces should be decontaminated with 10% Environ LpH with 30 minute contact time after each use.

- **Policy on Sample Submissions from Primates:**
  - No samples will be accepted from humans without prior arrangement with appropriate section heads and the laboratory director.
  - No samples will be accepted from old world primates unless formalin- fixed.
  - Samples from new world primates may be accepted at the discretion of the duty pathologist and/or diagnostic section heads.

3.2 **Microbiology Laboratory & Clinical Pathology Biosecurity SOP**

- **Sample Submission:** All biological materials submitted to the Clinical Pathology Laboratory or Diagnostic Laboratory from animals with known or suspected infectious diseases are required to be conspicuously marked with the infectious agent(s) of concern. Accompanying paperwork must also be similarly labeled.

- **Fecal Samples:**
  - Fecal material should be placed in a plastic, screw-capped cup (available in pharmacy) using a tongue depressor or while wearing gloves. Clearly label the cup (not the lid) with client name, case number, date and time collected.
  - Place the cup in a clean area and place the lid with a clean, gloved hand. Remove used gloves and place cup in a bag.
  - Bagged samples from isolation areas should be disinfected with 0.5% chlorhexidine or 70% alcohol prior to transport.
  - The Diagnostic Laboratory will not accept bags or gloves containing fecal material.

- **Urine Samples:**
  - Urine samples must be submitted in an enclosed container with a screw top lid or a syringe with an appropriate syringe cap (NOT a capped needle as this represents a sharps hazard). Clearly label the specimen with the client name, case number, date and time collected. If submitting urine specimens in a cup: clearly label cup and not the cap.
Clinical pathology will not accept samples placed in formalin.

**Policy on Sample Submissions from Primates:**
- No samples will be accepted from humans without prior arrangement with appropriate section heads and the laboratory director.
- No samples will be accepted from old world primates unless formalin-fixed.
- Samples from new world primates may be accepted at the discretion of the duty pathologist and/or diagnostic section heads.

**Bio-safety Policies for Staff and Students Working In Microbiology or Clinical Pathology Laboratories:**
- Lab coats or other protective clothing are worn when processing samples. Feet are protected from sharp objects by wearing closed shoes. Contaminated lab coats or other protective clothing should be removed when eating or entering eating areas.
- Food and drinks are not permitted to be stored or consumed in areas where samples are handled or processed, nor are they to be stored in refrigerators which are used to store samples or testing reagents.
- Gloves are worn while handling any specimen labeled with an infective agent or when the outside of the tube is contaminated, or whenever infectivity of sample is in question. Gloves are recommended for the handling of any cerebrospinal fluid (CSF) and any human based material.
- Before centrifuging tubes, inspect them for cracks. Inspect the inside of the trunnion cups for signs of erosion or adhering matter. Be sure that rubber cushions are free from all bits of glass.
- Never perform mouth pipetting and never blow out pipets that contain potentially infectious material.
- Do not mix potentially infectious material by bubbling air through the liquid.

**4.0 Central Supply Infection Control SOP**

**4.1 General Considerations**
- Dispose of sharps in sharps containers before returning laundry, equipment, or instruments to Central Supply.
- Do not put hangers, trash, hay or bedding, sharps, or animal body parts in with bagged dirty laundry.
- Remove all animal tissue samples or body parts before turning in surgical instruments or equipment to Central Supply.
- Equine buckets, pumps, and tubing need to be cleansed or rinsed. Any traces of oil must be removed before turning these items into Central Supply.
- Laundry will not wash any client owned items. They are often lost or damaged.
- Laundry will not wash any personal items. This includes horse blankets, student scrubs or student smocks.

**4.2 Procedures for Return of Non Infectious Material**
- **Non Surgical Laundry Bin:** Dirty fleeces, dog blankets, dog towels, coveralls, foal blankets, etc. Items are bagged before being placed in the bin.
- **Rag Bin:** Dirty cleaning rags, mop heads, and push broom heads.
- **Tall Grey Bin:** Dirty white lab coats (after all personal items are removed from pockets).
- **Surgical Laundry Bin:** Dirty scrubs, blue smocks, surgical gowns, surgical drapes, surgical towels, and surgical wraps. Items are bagged before placement in the bin.
4.3 Procedures for Return of Material from Known/Suspected Cases of Infectious Disease

- Whenever an infectious agent is suspected or known, all laundry, instruments, and equipment must be bagged and clearly labeled with the department, contents and suspected/known infectious agent. The outside of the bag should be cleaned with Neutral Disinfectant Cleaner.

- All instruments and equipment from cases of suspected or known infectious disease must be cleaned and disinfected with chlorhexidine solution at the point of origin before being bagged and transported to Central Supply. The outside of the bag should be cleaned with Neutral Disinfectant Cleaner.

**Red Isolation/Necropsy Bin**
- Isolation scrubs and laundry. Items are bagged before placement in the bin.
- Surgical laundry used for any invasive procedure on primates.
- PVM student necropsy coveralls
- All other items that need special washing for contaminates. Items are to be bagged before placement in the bin.

**Red Contaminated Articles Bin**
- PVM student necropsy coveralls
- All other items that need special washing for contaminates. Items are to be bagged before placement in the bin.

**Waste/Trash Bags**
- See page 16 for instructions regarding disposal of infectious/contaminated waste.
- Trash from known or suspected infectious cases must be double bagged, sprayed with Neutral Disinfectant Cleaner and disposed of in any of the dumpsters.
- See specific sections regarding plague (page 118) or rabies (page 127) infected animals.
- Biohazard bagged trash items are not handled by Central Supply. These materials should be clearly labeled with the department and disease, and delivered to the diagnostic laboratory (Room 233, DMC 2nd Floor). When materials are dropped off for autoclaving, a request form should be filled out (these are outside small animal isolation), using account number HO#8032
- Central Supply does not handle instruments or equipment used on suspected chronic wasting disease (CWD) cases.

**VII. Other Information**

1.0 Definitions

**Antiseptic:** A chemical can be applied to epithelial surfaces that cause the destruction or inhibition of microorganisms, preventing their growth or multiplication, without injuring the animal.

**Barrier Nursing Precautions:** Materials and practices employed as a barrier between patients and personnel in order to prevent cross contamination of the body, clothing, and footwear, which, in turn, decreases the risk of nosocomial transmission to other patients. As a minimum, Barrier Nursing Precautions used in the VTH include the use of disposable exam gloves, water impervious barrier nursing gowns, water impervious footwear, and disinfectant footbaths or footmats. They can also include bouffant caps, mask or respirators. Barrier nursing precautions are used in all isolation areas and for patients with special needs (animals considered to have an increased risk of shedding contagious agents, young or naive animals, immuno-compromised patients, etc). NOTE: Care must be used with barrier garments in order to prevent contamination of materials and hand contact surfaces.

**Parameters Used in Defining Clinical Status:**
<table>
<thead>
<tr>
<th>Species</th>
<th>Fever (rectal temperature)</th>
<th>Leukopenia (cells x 10^3/mL)</th>
<th>Neutropenia (cells x 10^3/mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bovine</td>
<td>&gt; 103.0°F</td>
<td>&lt; 5.0</td>
<td>&lt; 0.6</td>
</tr>
<tr>
<td>Canine</td>
<td>&gt; 102.5°F</td>
<td>&lt; 4.5</td>
<td>&lt; 2.6</td>
</tr>
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<td>Caprine</td>
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<td>&lt; 4.0</td>
<td>&lt; 1.2</td>
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<tr>
<td>Equine</td>
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<td>&lt; 5.0</td>
<td>&lt; 2.5</td>
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<tr>
<td>Feline</td>
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<td>&lt; 2.0</td>
</tr>
<tr>
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<tr>
<td>Ovine</td>
<td>&gt; 103.0°F</td>
<td>&lt; 4.0</td>
<td>&lt; 0.7</td>
</tr>
</tbody>
</table>

**Contagious disease:** A disease that is capable of being transmitted from one animal to another.

**Disinfectant:** A chemical agent that kills or prevents growth of microorganisms on inanimate objects (surgical equipment, floors, tables, patient care equipment)

**Disinfection:** A process that is used to reduce the number of microorganisms to a level that is not harmful to health.

**Hospital Dedicated Attire:** Clothing, footwear, and outer garments that are worn only when working at the VTH or while on field service duty.

**JLV-VTH:** James L. Voss Veterinary Teaching Hospital

**Multiple Drug Resistance:** Bacteria that have developed the ability to survive in the presences of several antibiotics. Antimicrobial drug resistance occurs when bacteria change in some way that reduces or eliminates the effectiveness of drugs, chemicals, or other agents designed to cure or prevent infections. Often the antibiotics that can kill these bacteria may be toxic to the animal and there are limited choices of antibiotics that can successfully kill the organism. Examples of multiple drug resistant bacteria include some strains of *Salmonella enterica*, Methicillin Resistant *Staphylococcus aureus* and Vancomycin Resistant *Enterococci*.

**Nosocomial Infection:** A localized or systemic condition that results from an adverse reaction to the presence of an infectious agent or toxin and that was not present or incubating at the time of admission.

**Personal Protective Equipment:** Barriers that a person can put on himself or herself to protect them against acquiring or transmitting a microorganism or disease, or to prevent exposure to potentially noxious chemicals (such as some disinfectants). Examples: gloves, gowns, masks, protective eyewear, booties, caps, etc.

**Sanitizer:** A chemical that reduces the number of microorganisms to a “safe” level, without completely eliminating all microorganisms.

**Systemic Illness Classifications used at the JLV-VTH:**

- **Healthy or Minimal Systemic Illness** – This includes patients admitted for non-infectious disease problems, those with very minor or localized lacerations or infectious disease problems, or those accompanying other animals during hospitalization. Examples: Patients admitted for minor lameness, skin problems, arthroscopy, allergic airway disease, reproductive problems, dams admitted with ill offspring.

- **Minor to Moderate Systemic Illness** - This includes patients admitted for moderately severe physical injuries, those with moderately severe or locally extensive infectious disease problems, and those recovering from severe...
illness. Examples: Patients admitted with significant lacerations, recovering fractures, fever of unknown origin, mild respiratory infections, mild GI disturbances, animals recovering from a more severe illness such as colic, etc.

• **Major Systemic Illness** - This includes patients admitted for severe physical or infectious disease problems. Examples: major organ problems (e.g., renal failure, liver failure), cancer, severe fractures, colic, GDV, major trauma, severe strangles, pleuritis, pneumonia, colitis or enteritis, peritonitis, etc.

**Sterilization**: The removal of all microorganisms including bacterial spores from an inanimate object.

**Subclinical infection**: A disease that is caused by the invasion of the body by a microorganism(s) that does not present signs and symptoms. A subclinical infection may be an early stage or very mild form of an infection in which signs and symptoms are not apparent or detectable by clinical examination or laboratory tests.

**VTH Personnel**: Refers to all people working in the VTH environment in any capacity, regardless of whether they are CSU employees, CSU students, visiting veterinarians or scientists, visiting students, or volunteers.

**Zoonoses**: Diseases that can be transferred between animals and humans, or vice versa.

### 2.0 Large Animal Hospital Cleaning Protocols  
[Return to Top]

#### 2.1 Facilities-Equine

**Equine Trailer/Parking Area**

- The Large Animal day-shift crew will clean the area twice daily on regular workdays.
- Facilities should clean the area with street sweepers quarterly.
- Ambulatory garage will be cleaned weekly by the Large Animal day-shift crew.

**Equine Outpatient Examination Areas and Breezeway**

- Outpatient stalls must be cleaned between outpatients by attending personnel. Do not feed or bed animals housed in outpatient stalls.
- The outpatient examination rooms and stalls are thoroughly cleaned and disinfected nightly by the in-hospital cleaning crew.
- The breezeway is cleaned (e.g. swept and hosed) twice weekly and disinfected weekly by the Large Animal night crew.

**Equine Main Hospital Facility**

- Monday through Friday the day-shift crew cleans stalls in the morning and adds fresh bedding as needed, except for stalls in colic aisle, isolation or barricaded stalls in the main barn.
- On weekends, students/clinicians in charge of the case clean stalls in the morning and add fresh bedding as needed.
- Stalls in colic aisle and isolation are picked in the morning.
- Occupied stalls are thoroughly cleaned and fresh bedding added nightly by the Large Animal night crew.
- If at other times the stalls are noted to be excessively soiled or wet, students, clinicians, and technical staff are responsible for cleaning and re-bedding stalls.
- The Large Animal day crew feeds hay in the morning unless otherwise specified on the stall card, and sweeps the aisle-ways after the morning feeding. The night-crew feeds hay in the evening.
- All grain should be stored in plastic garbage cans with lids. Supplemental feeds (including that provided by clients) are not allowed in the facility unless stored in a plastic container with a lid.
2.2 Facilities-Food Animal  [Return to Top]

Food Animal Trailer/Parking Area

- Unload food animals into the east holding pens or at the north gate.
- Do not block the road between the Large Animal Hospital and pastures.
- Trailers can be parked temporarily at the north or south ends of the east-side unloading area, or can be parked in the trailer parking lot.

Food Animal Examination Areas  [Return to Top]

- Areas soiled by feces, discharges, urine, or blood must be cleaned and disinfected by attending personnel immediately. Cleanliness is ultimately the responsibility of the clinicians on the service.
- The outpatient examination rooms and chutes will be thoroughly cleaned and disinfected nightly by the hospital cleaning crew.

Food Animal Main Hospital Facility  [Return to Top]

- Monday through Friday the day crew cleans stalls in the morning and add fresh bedding as needed.
- On the weekends student/clinician in charge of the case clean stalls in the morning and add fresh bedding as needed.
- The Large Animal day crew feeds hay in the morning unless otherwise specified on the stall card, and sweeps the aisle-ways after the morning feeding. The night crew feeds hay in the evening.
- The rounds/treatment room should be maintained in a clean and orderly fashion.
- Occupied stalls are thoroughly cleaned and re-bedded nightly by the Large Animal night crew.
- All grains/concentrates are to be stored in plastic garbage cans with lids.
- Equipment wheels or sides soiled with feces must be cleaned and disinfected prior to entering or leaving the facility or moving to another area of the facility.

2.3 Routine Stall Cleaning:  [Return to Top] General principles of cleaning: It is imperative to remember that with disinfectants, more does not mean better! Using the proper dilutions of disinfectants provides optimum disinfecting action. Overuse of disinfectants may encourage resistance in microorganisms and may contribute to the formation of biofilms. For disinfectants (especially foam) to be effective, they must be used on CLEAN surfaces. Biofilm formation occurs in areas of standing water, and where disinfectant is allowed to sit on dirty surfaces. Use care when working in high-risk areas—avoid contamination of equipment or other areas (e.g. when cleaning stalls into dumpsters, take care not to drop feces outside of the dumpster). The vacuum must not be used in the NE (“colic”) aisle or around suspect or known infectious cases to prevent aerosolization of pathogens.

General Procedures for Cleaning a Vacated Equine Stall  [Return to Top]

- Remove all bedding into a dumpster.
- Sweep floor to remove small chafe and debris.
- Rinse floor and walls with hose to remove gross debris, scrub soiled areas using detergent and a brush.
- Steam entire stall with water.
- Foam the stall with Neutral Disinfectant Cleaner (1:256, preset dilution from foamer).
- Allow to dry.
- Steam and disinfect adjacent aisle-way as above.
- Cleaning tools must be steamed and disinfected nightly (including handles).
Cleaning Procedures for Any Vacated FA Stall, Stalls in Colic Aisle and Any Barricaded Stall in the Main Barn

- Must wear barrier clothing where provided at the stall, wear gloves and use footbath
- Remove all bedding into a dumpster marked for this aisle.
- Sweep to remove small chafe and debris (do not use vacuum in these areas).
- Use foamer to apply bleach (1:12 preset dilution from foamer).
- Allow disinfectant to remain in contact for at least 10 minutes.
- Rinse floor and walls with hose to remove gross contamination, scrub the entire stall using tide (1/2 cup per 2 gallons of water) with bleach (1:32 or 1 cup per 2 gallons of water) and a brush. Rinse thoroughly.
- Foam with Neutral Disinfectant Cleaner (1:256, preset dilution from foamer).
- Allow to dry.
- Cleaning tools must be steamed and disinfected (including handles) prior to cleaning the next stall.
- Aisle-way must be hosed and disinfected nightly.

Cleaning Procedures for Vacated Stalls that Housed Known Salmonella Cases or Other Known, Infectious Cases Anywhere in Equine, Food Animal, or Large Animal Isolation.

- Clean last if in main hospital.
- If in Large Animal Isolation, remove bedding into dumpsters with a lid; if in the main hospital, the stall should be cleaned last into a marked dumpster.
- Sweep to remove small chafe and debris (do not use vacuum in these areas).
- Foam floor and walls with bleach (1:12 dilution in water).
- Allow disinfectant to remain in contact for at least 10 minutes.
- Rinse floor and walls with hose to remove gross contamination.
- Scrub the floor and walls with a large deck brush using detergent (Tide, ½ cup per 2 gallon) and bleach (1:32 or 1 cup per 2 gallons).
- Rinse thoroughly with water.
- Foam floor and walls with Neutral Disinfectant Cleaner (1:256, preset dilution from foamer).
- Allow disinfectant to remain in contact for at least 10 minutes.
- Allow to dry.
- All cleaning tools must be steamed and disinfected in the stall.
- If in the Isolation Facility, scrub and disinfect the adjacent Anteroom, and the concrete apron outside the stall.
- Scrub and disinfect adjacent aisle-way if stall is in the main hospital.

Cleaning Procedures for Vacated Stalls in Calf Isolation or Large Animal Isolation

- Remove all bedding.
- Sweep to remove small chafe and debris (do not use vacuum in these areas).
- Rinse with hose to remove gross contamination
- Scrub the floor and up walls with a large broom using bleach with detergent (Tide).
- Allow disinfectant to remain in contact for at least 10 minutes.
- Thoroughly rinse with hose.
- It is critical to rinse and remove all residues from previous disinfectants as bleach will react with Neutral Disinfectant Cleaner to produce a noxious gas.
- Foam with Neutral Disinfectant Cleaner (1:256, preset dilution from foamer).
- Allow to dry.
- Scrub and disinfect all the adjacent treatment areas and walk areas.
• Cleaning tools should be disinfected prior to cleaning the next stall.
• Occasionally, stalls in the Food Animal hospital, calf isolation and equine colic will be steamed. However, steaming is not a routine procedure for these stalls.

Cleaning procedures for Occupied Stalls in the Main Hospital

• Use appropriate clothing (barrier clothing where required).
• Use appropriate dumpster for the area—care should be taken to avoid dropping manure/straw outside the dumpster.
• Patients must not be allowed contact with the dumpsters at any time, especially those in the NE ICU aisle and the Isolation Facility.
• Clean and disinfect cleaning tools between stalls when required.
• When changing sand in a stall, patient must be restrained.
• Dumpsters used in the Food Animal facility should not be moved into the Equine facility or vice versa.

Nightly Routines

• Walkways at the entrances for the LAH are hosed nightly (staging area and entry for Food Animal near the lockers) and disinfected as needed.

Weekly Routines

• Sinks in aisle-ways and in the general treatment area should be cleaned and disinfected with dilute disinfectant (Neutral Disinfectant Cleaner [1:256] or dilute bleach [¼ cup per gallon of water]) by technicians or barn day-crew.
• Empty stalls should be hosed with water if not used within one month in order to remove accumulating dust.

Monthly Routines

• Areas that are not used on a daily basis (i.e. tops of walls, areas not used often — scales, wash rack, etc.) should be hosed on a monthly basis in order to prevent accumulation of dust.
• Sweeper should be cleaned and maintained.

Semi-annual Routines

• All floors should be stripped, steamed and disinfected with Neutral Disinfectant Cleaner.
• Calf Isolation should be thoroughly cleaned, scrubbed, and disinfected top to bottom.
• Drains in Calf Isolation and Large Animal Isolation should be scrubbed with detergent (Tide)—brush will be provided—rinsed, then filled with dilute bleach (1 cup per gallon)—Do not fill a drain with any disinfectant without cleaning it first.

Annual Routines

• The entire Large Animal Hospital is thoroughly cleaned, scrubbed and disinfected from top to bottom, including all equipment (annual intensive cleaning).

General Cleaning

• The tires of any tractor or forklift that enters the Large Animal Hospital must be scrubbed and disinfected with Neutral Disinfectant Cleaner prior to leaving the facility.
• When the forklift is used to take animals to necropsy, it must be cleaned and disinfected before it can be used for other tasks.
• Storage of feed (hay) and bedding should be minimized and the feed storage area will be cleaned weekly to avoid rodent infestation. Rodent traps will be maintained in these areas and in the main feed storage areas by the Day Crew.

3.0 Small Animal Veterinary Teaching Hospital Cleaning Protocols

General Considerations

• Animal Care areas include client wards, CCU, junior surgery wards, isolation ward and exotics ward. These areas are cleaned and stocked twice per day (CCU, once per day), seven days per week.
• Custodial areas include exam and treatment rooms, SAS, LAS, Radiology, Clinical Path, Pharmacy, Necropsy, Diagnostic lab, administrative offices, reception areas, hallways, classroom and offices on the first floor of the hospital. These areas are cleaned once per day after 5 pm, Sunday through Thursday.
• Day time custodian maintains public areas of the hospital Monday through Friday, 10 am – 2 pm. Duties include disinfecting restrooms, dusting floors in the reception areas, scooping poop from the lawn area, emptying ashtrays and, when requested, disinfecting exam rooms labeled “special disinfection required”. Exam rooms after routine appointments should be cleaned by the students and/or clinicians after the patient leaves the room.
• Neutral Disinfectant Cleaner is used for routine disinfection throughout the hospital. It is available in room B113D, the bathtub room in the client area. Additionally, individual gallons are available in custodial closets, surgery and lab areas and in automatic dispenser units. The proper dilution of Neutral Disinfectant Cleaner is 1/2 oz per gallon of water (one pump = 1 oz).
• Glass and appliance cleaner is used to clean windows, door handles and surfaces that leave fingerprints
• Special attention should be paid in the cleaning and disinfection of areas used in care of animals with suspected and confirmed infectious diseases:
  ➢ Clean every surface potentially contaminated during the exam including cabinetry, counters, sinks, chairs, etc., as well as the floor with Neutral Disinfectant Cleaner to remove any gross debris.
  ➢ Double bag any trash or laundry present within the room, sealing with tape and labeling with the suspected/confirmed infectious agent, spray the outside of the bag with Neutral Disinfectant Cleaner before removing.
  ➢ Wet the entire room including surfaces, floor and the wall from the floor up to 3.5 to 4 feet (disinfectant).
  ➢ Cleaning personnel will then return to the exam room to complete a final clean of the room as per the general cleaning protocol.
• Animal kennels, exam and treatment rooms, labs, and various other areas are provided with disinfectant spray bottles, paper towels, and mop buckets for staff use. Derm Alley has a mop bucket dedicated for use in the exam areas and in the reception areas. A laundry bin is located in the South West stairwell for disposal of comfort mat covers.
• Lawn areas are provided with white trash cans, rakes, and pans for feces removal. Poop picking bags are also available in dispensers at the North and South lawn areas.
• Odor control products are available by request by calling the Animal Care office at 71223.

3.1 Routine Cleaning and Disinfection

General Protocol for Disinfection

• For routine disinfection, debulk all hard and porous surfaces by removing hair, blood, feces, urine, and other debris by wiping with paper towels, or by hosing with plain water.
• Apply disinfectant using a spray bottle set on a coarse spray, and flood all surfaces. Dog runs and floors are flooded with disinfectant solution using an automatic dispenser and cold water.
• Porous surfaces are scrubbed with brushes or hand pads.
• Disinfectant is left on surfaces for 15 minutes.
• Hard, non porous surfaces are wiped and polished using clean rags or paper towels. Porous surfaces are rinsed with cold water, and floors are squeegeed.

**Daily Duties**  [Return to Top]

• Main hallways: dry mop floors, machine scrub with disinfectant and burnish floors (polisher), clean corners, clean chalk boards, wipe trays with disinfectants, change any burned out ceiling lights.
• Rooms used for animal housing, examination, treatment or teaching: wipe off furniture and instruments with disinfectant (depending on a room these will include counter tops, waterblankets, carts, inside of storage shelves, doors, cabinets, surgery lamps, stainless steel tables, containers on the surface of tables (betadine, alcohol), stools and chairs, cushions, gurneys, incubators, paper towel dispensers and all machines and hoses), dry mop and mop floors, vacuum, dustex, clean corners, clean the sinks and glass windows, take dirty laundry to central supply, empty trash containers and replace liners.
• Rooms without animal access (offices, restrooms, locker rooms...etc): dustex and mop floors with disinfectant, wipe off cabinets, paper towel dispensers, soap dispensers and refrigerators with disinfectant, dust TV/video equipment, desks, phones, pictures and other furniture, empty trash and replace liners, clean corners, clean glass windows with Old Smokey.

**Weekly Duties**  [Return to Top]

• Main hallways: wipe controls on walls with disinfectant clean water fountains, and clean X-ray viewer areas.
• Locker rooms and restrooms: clean vents with feather duster or cloth, vacuum grate vents, scrub sinks with ajax cleanser, wipe off inside of storage shelves with disinfectant, clean door jambs and scour shower floors with “grout safe”.
• Offices: scrub sink with cleanser, vacuum inaccessible areas, mop carpet protectors under desks in carpeted offices.
• Central supply: vacuum behind dryers.
• Small animal surgery: scrub sinks with ajax cleanser, wipe off radio with disinfectant, wipe off inside of storage shelves with disinfectant, clean door jambs, record holders and the underside of tables and scrub cage doors with disinfectant and vacuum inaccessible areas.
• Treatment rooms and exam rooms: in all rooms scrub sinks with ajax cleanser, disinfect the underside of tables. Additionally, in selected rooms clean off records holders, clean and empty vacuum, vacuum inaccessible areas, and wipe off X-ray viewer boxes.
• Necropsy: Dustex and mop floors with disinfectant, empty trash, refill paper towel and soap dispensers.
• Diagnostic laboratory: Dustex and mop floors with disinfectant, empty trash, refill paper towel and soap dispensers.

**Monthly Duties**  [Return to Top]

• Main hallways: clean vents with feather duster or cloth, vacuum grate vents, clean and disinfect door jambs, horizontal surfaces, partitions and door hardware.
• Locker rooms and rest rooms: clean vents with disinfectant, hose out trash containers and clean with disinfectant.
• Offices: clean vents with feather duster or cloth, vacuum grate vents, clean door jambs, clean horizontal surfaces, partitions and door hardware with disinfectant.
• Central supply: clean vents with feather duster or cloth, vacuum grate vents, clean door jambs.
• Small animal surgery: clean vents with feather duster or cloth, vacuum grate vents, clean and disinfect door jambs, clean horizontal surfaces, partitions and door hardware.
Treatment rooms and exam rooms: clean vents with feather duster or cloth, vacuum grate vents, clean door jambs, clean horizontal surfaces, partitions and door hardware.

Necropsy: Dust chalkboard ledges with sponge and disinfectant, hose out trash containers and clean with disinfectant.

Diagnostic laboratory: clean vents with feather duster or cloth, vacuum grate vents.

**Additional Cleaning as Needed**

- Main hallways: polish door handles with Old Smokey, clean glass windows, wipe off window ledges, walls and doors with disinfectant, dust walls, service machines.
- Locker rooms and rest rooms: wipe off lockers, benches and furniture with disinfectant. Hose out trash containers, wipe off and refill soap dispensers, clean corners.
- Offices: polish door handles with A456N, wipe off doors and walls with disinfectant, hose out trash containers, dust walls and equipment hanging on walls (e.g. pictures, fire extinguisher. etc), spray carpets with disinfectant then hose off with water and hang to dry (in carpeted areas), clean glass windows, polish window ledges with disinfectant, wipe down tables and desks.
- Central supply: none
- Small animal surgery: wipe off walls, controls on walls, doors, window ledges, stools and chairs with disinfectant, hose out dust containers, dust walls.
- Treatment rooms and exam rooms: Polish door handles with Old Smokey, wipe doors and walls with disinfectant, hose out trash containers, dust walls including articles hanging on walls (pictures, fire extinguishers, etc).
- Necropsy: hose out trash containers, clean door jambs and wipe with sponge, wipe off metal railing with disinfectant, wipe necropsy office door, wipe off desk and phone, clean cabinet fronts and drawer handles with disinfectant, clean classroom chairs and other furniture with disinfectant.
- Diagnostic laboratory: clean vents with feather duster or cloth, vacuum grate vents, wipe off counter tops, cabinets, doors, walls, autoclaves, vacuums, refrigerators, freezers, centrifuges and other equipment with disinfectant, scrub walls with disinfectant, hose off trash containers.

### 3.2 Special Disinfection of Areas Occupied by Animals Known or Suspected to have Contagious Diseases

**Exam Rooms Occupied by Animals Known or Suspected to have Contagious Diseases**

- These rooms should be closed and clearly marked with “Do not use – special disinfection required” sign. One sign should be placed so that it blocks the door, and another on a window frame of the door. Animal care should be notified (7-1223) and provided with information regarding the location of the room and an infectious agent involved.
- Prior to leaving the room, students or clinicians should perform routing surface disinfection. Dog bowls and laundry may be left for Animals Care to remove.
- Animal Care will disinfect these areas last, in order to prevent spread of disease to other areas.
- General cleaning protocol
  - Clean every surface potentially contaminated during the exam including cabinetry, counters, sinks, chairs, etc., as well as the floor with Neutral Disinfectant Cleaner to remove any gross debris.
  - Double bag any trash or laundry present within the room, sealing with tape and labeling with the suspected/confirmed infectious agent, spray the outside of the bag with A456N before removing.
  - Wet the entire room including surfaces, floor and the wall from the floor up to 3.5 to 4 feet (approximate dog height) with Neutral Disinfectant Cleaner. Allow this to air dry for a minimum of 15-20 minutes (the contact time for this disinfectant).
  - Cleaning personnel will then return to the exam room to complete a final clean of the room as per the general cleaning protocol.
• Signs are removed by Animal Care after all the surfaces are completely dry.

**Treatment of Rooms for External Parasites (flies, lice or ticks)**

• Rooms suspected of being infested with flies, lice or ticks should be closed as described above and Animal Care notified.
• Before leaving the room, student or clinician should spray the perimeter of room at baseboards and the table with a pyrethrum spray "Durvet". It can be found in Derm Alley or in B113D, the client bathtub room.
• The room should remain closed until cleaned by Animal Care. Animal care will perform in-depth cleaning and disinfection with Tide with Bleach and disinfectant.
• Animal Care will remove the warning signs.

### 4.0 Culture Methods

#### 4.1 Fecal *Salmonella* Cultures

• Fecal samples (1g) are added to Tetrathionate broth (9 ml) and incubated overnight at 43° C.
• Samples are then vortexed, struck for isolation on XLT-4 agar and incubated overnight at 43° C.
• Suspect colonies are subcultured onto trypticase soy agar plates containing 5% sheep blood and incubated again at 43°C overnight.
• Colonies exhibiting appropriate characteristics of *Salmonella* are tested for agglutination using commercial polyvalent and O group-specific antisera.
• Antimicrobial susceptibility is evaluated for all *Salmonella* isolates using agar disk diffusion assays.
• All Salmonella isolates are submitted for serotyping at the USDA National Veterinary Services Laboratory (Ames, IA).
• Epidemiological and phenotypic information regarding all *Salmonella* isolates is maintained in an Infection Control database.

#### 4.2 Environmental *Salmonella* Cultures Using Sponges

• Thioglycollate broth is added to each bag (10 ml per sponge, e.g., 20 ml is typically used for two sponges) and incubated for 48 hrs at 43°C.
• This enrichment broth is plated onto XLT4 and incubated at 43°C overnight.
• Suspect colonies are subcultured onto trypticase soy agar plates containing 5% sheep blood and incubated again at 35°C overnight.
• Colonies exhibiting appropriate characteristics of *Salmonella* are then tested for agglutination using commercial polyvalent and O group-specific antisera.
• Antimicrobial susceptibility is evaluated for all *Salmonella* isolates using agar disk diffusion assays.
• All *Salmonella* isolates are submitted for serotyping at the USDA National Veterinary Services Laboratory (Ames, IA).
• Epidemiological and phenotypic information regarding all *Salmonella* isolates is maintained in an Infection Control database.

#### 4.3 Environmental *Salmonella* Cultures Using Electrostatic Wipes (Swiffer® wipes)

• Electrostatic wipes are supplemented in bags with 90 ml buffered peptone water and incubated for 24 h at 43°C.
• Enriched samples (1 ml) are passed to tetrathionate broth (9 ml) and incubated overnight at 43° C.
• Samples are vortexed, passed to Rappaport-Vassiliadis R10 Broth (0.1 ml to 10 ml), and incubated overnight at 43° C.
• Tubes are vortexed again, and samples of Rappaport-Vassiliadis R10 are struck for isolation on XLT-4 agar and incubated overnight at 35°C.
• Suspect colonies are subcultured onto trypticase soy agar plates containing 5% sheep blood and incubated again at 35°C overnight.
• Colonies exhibiting appropriate characteristics of *Salmonella* are then tested for agglutination using commercial polyvalent and O group-specific antisera.
• Antimicrobial susceptibility is evaluated for all *Salmonella* isolates using agar diffusion assays.
• All *Salmonella* isolates are submitted for serotyping at the USDA National Veterinary Services Laboratory (Ames, IA).
• Epidemiological and phenotypic information regarding all *Salmonella* isolates is maintained in an Infection Control database.

### 4.4 Culture of Swabs for Methicillin Resistant *Staphylococcus aureus* (MRSA) Screening

- MRSA enrichment broth with TSB and 7.5% NaCl (75g NaCl) in 1 liter of distilled water.
- Swabs are placed into 2 ml of MRSA enrichment broth and incubated for 18-24 hours at 35°C.
- Following incubation, samples are streaked onto CHROMagar MRSA plates and incubated for 18-24 hours at 35°C.
- Colonies identified as suspected MRSA, based on the morphologic features (round raised yellow colonies) and mannitol fermentation, are subcultured onto Trypticase Soy Agar (TSA) plates containing 5% sheep’s blood and incubated for 18-24 hours at 35°C.
- CHROMagar MRSA plates that lack suspect colonies are incubated for an additional 24 hours before being discarded.
- Colonies on TSA plates are identified as MRSA based on gram staining, catalase reaction, coagulase test, hyaluronidase test, S. aureus latex agglutination test (LAT) and growth on oxacillin screen agar.
- Confirmed MRSA isolates are typed by pulsed field gel electrophoresis (PFGE) of bacterial DNA digested with Sma1.

### 4.5 Environmental Cultures for MRSA Using Electrostatic Wipes (Swiffer® wipes)

- Electrostatic wipes are supplemented in bags with 90 ml buffered peptone water and incubated for 24 h at 35°C.
- Following incubation, 1 mL of buffered peptone water was transferred to 9 mL of MRSA enrichment broth and incubated at 35 °C for further 18-24 hours.
- Following incubation, samples are streaked onto CHROMagar MRSA plates and incubated for 18-24 hours at 35°C.
- Colonies identified as suspected MRSA, based on the morphologic features (round raised yellow colonies) and mannitol fermentation, are subcultured onto Trypticase Soy Agar (TSA) plates containing 5% sheep’s blood and incubated for 18-24 hours at 35 °C.
- CHROMagar MRSA plates that lack suspect colonies are incubated for an additional 24 hours before being discarded.
- Colonies on TSA plates are identified as MRSA based on gram staining, catalase reaction, coagulase test, hyaluronidase test, *S. aureus* latex agglutination test (LAT) and growth on oxacillin screen agar.
- Confirmed MRSA isolates are typed by pulsed field gel electrophoresis (PFGE) of bacterial DNA digested with Sma1.

### 4.6 Environmental Cultures for *Strep. equi* Using Electrostatic Wipes (Swiffer® wipes)

- Electrostatic wipes are supplemented in bags with 90 ml buffered peptone water and agitated using a paddle mixer.
- Following agitation, 1 ml of the BPW is streaked for isolation on a Columbia Agar Plate (CAP) and incubated at 37°C in 10% CO2 from 18-24 hours.
- Following incubation, colonies considered *Streptococcus equi* suspects are subcultured and identified by standard biochemical and morphological means.

### 5.0 Brief Summaries of Zoonotic Diseases [Return to Top]

The following is a summary of some zoonotic diseases which personnel could potentially be exposed to through contact with animals. This list is not exhaustive, and is only intended to provide very basic information. It is in no way meant to replace advice and discussion with your physician. If you suspect you may have been exposed to a zoonotic disease please alert Infection Control Personnel and consult your health care provider as soon as possible.  

**NOTE: More detailed information is provided in other parts of this document for some diseases such as Rabies**

**Anthrax (*Bacillus anthracis*):** [Return to Top] Anthrax is a bacteria that forms spores. Outbreaks of anthrax occur naturally in certain areas of the United States.

- **Susceptible species:** Cattle, swine, horses, sheep, goats, dogs, cats, wildlife and humans.
- **Incubation period:** 2 to 5 days.
- **Transmission:** There are three clinical forms of anthrax in humans – cutaneous, pulmonary and gastrointestinal. Cutaneous transmission occurs from contact with infected animals (usually carcasses) or contaminated wool, hides and fur. Bacteria enter through a break in the skin. Pulmonary transmission occurs with the inhalation of bacterial spores. Gastrointestinal anthrax is contracted from eating undercooked contaminated meat.
- **Clinical signs:** The majority of cases (95%) are the cutaneous form which manifest as a skin papule that becomes a vesicle which evolves into a black eschar (scab). Extensive swelling and cellulites can occur. Pulmonary - Initially resembles upper respiratory infection which can evolve into severe respiratory compromise and death. The gastrointestinal form results in a gastroenteritis which may be violent with vomiting and bloody stools.
- **Disinfection:** Anthrax spores are resistant to heat, sunlight, drying and many disinfectants. Spores can be killed with 2% glutaraldehyde, formaldehyde or 5% formalin; soaking overnight is recommended. A 10 % NaOH or 5 % formaldehyde solution can be used for stockyards, pens and other equipment.
- **Personal protection:** Barrier precautions including gloves, eye protection and respiratory protection (minimum of an N95 respiratory) should be used when handling affected animals or working in their environments. Blood and secretions from suspect cases should not be allowed to touch the skin. Necropsy should not be performed on animals that have died from anthrax. An unopened carcass decomposes rapidly and the spores are destroyed in a short time.

**Bartonella henselae** – see “Cat Scratch Fever”

**Bordetellosis (**Bordetella bronchiseptica**):** [Return to Top] *Bordetella* is also known as kennel cough in dogs.

- **Susceptible species:** dog, cat, rabbit, swine, and humans.
- **Incubation period:** Unknown
- **Transmission:** Direct contact with infectious droplets or aerosols.
- **Clinical signs:** This disease is rare in humans and occurs almost exclusively in immune compromised individuals causing pneumonia and mild upper respiratory tract infections.
- **Disinfection:** The organism does not survive well outside the host and is sensitive to many disinfectants including bleach.
- **Personal protection:** Avoiding contact with mucous membranes and nasal discharges of infected animals and good hand washing can prevent transmission of the disease.
Blastomycosis (Blastomyces dermatitidis): [Return to Top] Blastomycosis is a granulomatous fungal infection. It is a common infection among dogs in endemic areas. Blastomycosis is not generally considered a zoonotic disease. Both human and dogs acquire the disease from the same environmental source. If a pet is diagnosed with this infection, it indicates that an owner may be at risk for contracting the disease through a common environmental source such as contaminated soil near a waterway.

- Susceptible species: dog, cat, bat, lion and humans.
- Incubation period: 30-45 days
- Transmission: Infection occurs by inhalation of aerosolized fungus from its natural soil habitat. The skin is the most common site of infection and is involved in about 20-40% of the cases. Other areas affected, in order of frequency, are the bones (10-25%), prostate and other genitourinary organs (5-15%), and the meninges and brain (~5%).
- Clinical signs: Symptomatic infection (50% of cases) usually presents as a flu-like illness with fever, chills, productive cough, myalgia, arthralgia and pleuritic chest pain. Some patients fail to recover and develop chronic pulmonary infection or widespread disseminated infection (affecting the skin, bones, and genitourinary tract). Occasionally affects the meninges.
- Personal protection: If you live in an endemic area be aware of disease signs and symptoms in animals and humans.

Brucellosis (Brucella melitensis, B. arboortus, B. suis, and B. canis): [Return to Top]

- Susceptible species: Brucellosis can affect sheep, goats, cattle, pigs, horses, dogs and humans. Brucellosis can also affect rats and wild animals including deer, bison, elk, moose, camels, water buffalo and marine mammals.
- Incubation period: Five days to several months, usually 2-4 weeks.
- Transmission: Most common human transmission is through ingestion (raw milk or unpasteurized cheese) or through contact with infected fetuses or fetal membranes with the mucous membranes and breaks in the skin. During animal slaughter or in the laboratory Brucella can probably be transmitted by aerosols. Brucella melitensis, B. suis, and B. arboortus occur most commonly in cows, swine, goats and sheep. B. canis occurs more commonly in dogs but only occasionally will cause disease in humans, and only after frequent close contact. Cats are resistant to Brucella. Brucella can also be spread on fomites. In conditions of high humidity, low temperatures and no sunlight, these organisms can remain viable for several months in water, aborted fetuses, manure, wool, hay, equipment and clothes.
- Clinical signs: Asymptomatic infections in humans are common. In symptomatic cases, the disease is extremely variable and the clinical signs may appear insidiously or abruptly. Flu-like symptoms of fever, headache, generalized weakness, malaise, sweating, fatigue and severe limb or back pains are common. Gastrointestinal signs including anorexia, nausea, vomiting, diarrhea and constipation occur frequently in adults but less often in children. Irritability, insomnia, mental depression and emotional instability sometimes develop. Undulating (up and down) fever can occur in the chronic form as well as chronic fatigue, arthritis, cardiac and other complications.
- Disinfection: This organism is susceptible to bleach, 70% ethanol, iodine/alcohol solutions, glutaraldehyde and formaldehyde. Brucella is destroyed by several hours of exposure to direct sunlight.
- Personal protection: Avoiding direct contact with fluid or tissues from an infected animal can prevent brucellosis. Frequent hand washing and use of gloves, protective clothing, and eyewear are recommended when working with animals or tissues suspected or known positive.
Campylobacteriosis (Campylobacter jejuni or Campylobacter coli): Campylobacteriosis is a bacterial disease that usually causes a mild to severe infection of the gastrointestinal system. A rare complication of Campylobacter infection is Guillain-Barre syndrome, a nervous system disease that occurs approximately 2 weeks after the initial illness.

- Susceptible species: dog, cat, cattle, sheep, goats, chickens, turkeys, mink, ferrets, pigs, non-human primates, humans and other species.
- Incubation period: 1-10 days; usually 2-5 days.
- Transmission: Contaminated food or water, or fecal-oral transmission. Humans can become infected after ingesting undercooked poultry and other meats, raw milk, raw clams, contaminated foodstuffs or un-chlorinated water, and after contact with infected pets or livestock. Houseflies can be mechanical vectors. Asymptomatic carriers are seen in many species of domestic animals; humans do not usually become carriers. Campylobacter may survive up to nine days outside the host.
- Clinical signs: Disease varies from mild gastrointestinal distress that resolves within 24 hours to a fulminating or relapsing colitis. Clinical signs may include watery diarrhea, fever, nausea, vomiting, abdominal pain, headache and muscle pain. Feces may contain frank blood. The acute symptoms usually diminish in 2-3 days and resolve in 7-10 days. Complications are uncommon.
- Disinfection: Campylobacter species are susceptible to many disinfectants, including 1% sodium hypochlorite (bleach), 70% ethanol, gluteraldehyde, iodine-based disinfectants, phenolic disinfectants and formaldehyde.
- Personal protection: Campylobacter infection can be avoided by using disposable gloves when handling feces from animals suspected or known to be infected, handling suspect cases or the environment. Since some animals may not show clinical signs of the disease good hand hygiene and protective outer garments or dedicated attire is recommended. Items soiled by an infected animal should be handled with gloves and should be disinfected, laundered, or discarded.

Cat-Scratch Fever (Bartonella henselae): Preventing the disease is limited to avoiding cat scratches and bites. Cutting the cat’s nails, washing and disinfecting any scratch or bite, and washing hands after petting or handling a cat are also recommended.

- Susceptible species: wild or domestic cats and humans
- Incubation period: 3-10 days
- Transmission: Scratch or bite from an infected cat. Transmission to man can be reduced by controlling fleas on cats, including bathing cats to remove flea feces. Kittens are more likely to be infected and to pass the bacterium to people. Cats that carry B. henselae do not show any signs of illness.
- Clinical signs: Most cases of bartonellosis are mild self-limiting infections at the point of injury. Lymph nodes, especially those around the head, neck, and upper limbs, may become swollen. Fever, headache, fatigue, and anorexia can also occur. Rare complications are bacillary angiomatosis and Parinaud's oculoglandular syndrome. Infection can be more severe in immune compromised individuals.
- Control: Prevention is limited to avoiding cat scratches and bites. Cutting the cat’s nails, washing and disinfecting any scratch or bite, and washing hands after petting or handling a cat are also recommended.
- Personal protection: This disease can be difficult to prevent because very minor scratches may transmit it. Cats should be handled in a manner that reduces the risk of scratches and bites. It is recommended to thoroughly wash bites, scratches, or wounds acquired from cats. Cats should not be allowed to lick an open wound and hands should be washed before touching your eyes or any other mucous membrane. Cats may harbor chronic infections and not show any clinical signs with Bartonella.

Clostridium difficile: Gram-positive, spore-forming, anaerobic bacterium

- Susceptible species: Pigs, horses, cattle, dogs, cats, humans and other species
- Incubation period: 1 to 10 days
- Transmission: Oral-fecal exposure through contact or droplet exposure, exposure to infected animals or their environment.
Clinical Signs: Colitis leading to fever, abdominal cramps, and diarrhea or dysentery, dehydration, and electrolyte imbalances. Rarely, severe colitis can lead to life threatening complications such as megacolon, peritonitis, and colonic perforation.

Disinfection: Quaternary ammonium compounds and phenols are not sporicidal and are only effective against *C. difficile* in the vegetative state. Since some strains of *C. difficile* may display increased levels of spore production when exposed to non-chlorine-based cleaning agents and spores are more resistant than vegetative cells to surface disinfectants, the recommendation for cleaning environmental surfaces is the use of appropriately diluted hypochlorite (bleach) solutions. However, some studies have shown persistent contamination by *C. difficile* in hospital environments despite “routine” cleaning and disinfection.

Prevention: Routine use of protective outer garments or dedicated attire when working with animals or their environments. Strict adherence to good hand-hygiene protocols, and appropriate cleaning and management of wounds.

*Clostridium perfringens*: [Return to Top]
- Gram-positive, spore-forming, anaerobic bacterium
- Susceptible species: All mammalian species, including humans
- Incubation period: 1 to 10 days
- Transmission: Wound contamination through contact or droplet exposure, ingestion of food contaminated with large numbers of bacteria, potentially oral-fecal exposure through contact or droplet exposure, or exposure to infected animals or their environment.
- Clinical Signs: Wound infections can result in gas gangrene with accompanying fever, swelling and erythema of affected area, systemic signs as disease progresses. Oral exposure is associated with abdominal cramps, diarrhea, and in rare cases necrotic enteritis and septicemia.
- Disinfection: Quaternary ammonium compounds and phenols are not sporicidal and are only effective against Clostridial organisms in the vegetative state. Since some strains of Clostridial organisms may display increased levels of spore production when exposed to non-chlorine-based cleaning agents and spores are more resistant than vegetative cells to surface disinfectants, the recommendation for cleaning environmental surfaces is the use of appropriately diluted hypochlorite (bleach) solutions. However, some studies have shown persistent contamination by Clostridial organisms in hospital environments despite “routine” cleaning and disinfection.
- Prevention: Routine use of protective outer garments or dedicated attire when working with animals or their environments. Strict adherence to good hand-hygiene protocols, and appropriate cleaning and management of wounds.

*Coccidioidomycosis* (*Coccidioides immitis*): [Return to Top] Coccidioidomycosis is a fungal disease, endemic in the southwestern United States (parts of New Mexico and Texas, the central valley of California and Arizona), parts of Mexico and South America.
- Susceptible species: Dogs are most significantly infected. Infections have also been reported in horses, ruminants, pigs, nonhuman primates, cats and humans.
- Incubation period: Seven to 21 days.
- Transmission: Inhalation of fungal spores carried on dust particles or present in contaminated soil.
- Clinical signs: In the less severe form the disease is usually subclinical. Symptoms can include fever, cough, chest pain, chills, sore throat, non specific signs of acute bronchitis or influenza may occur. Progressive disease may occur weeks, months or years after the primary infection in certain individuals. The disease can be fatal in the elderly or immune compromised.
- Disinfection: Bleach, phenolics and quaternary ammonium compounds (QAC’s) have proven effective for disinfection.
- Personal protection: If you live in an endemic area be aware of signs and symptoms in humans and animals.
**Coxiella burnetii** – see “Q Fever”

**Cryptosporidiosis (“Crypto” - Cryptosporidium parvum)** [Return to Top]
- **Susceptible species:** Ruminants, cats, dogs, horses, swine, primates, chickens, turkeys, caged birds, guinea pigs, reptiles, and humans.
- **Incubation period:** 3-7 days.
- **Transmission:** Transmission is primarily by fecal-oral route but it can also occur by aerosols.
- **Clinical signs:** Abdominal pain, nausea, anorexia, profuse watery diarrhea lasting 3-4 days. Asymptomatic infections can also be seen. The disease is usually self-limiting in healthy people but may be chronic, debilitating and severe in immune compromised individuals.
- **Disinfection:** Cryptosporidia are difficult to eliminate from the environment because oocysts may survive 2-6 months and are resistant to most disinfectants including a 3% hypochlorite solution. Heating to 65 degrees C for 30 minutes, or an 18 hour exposure to 5% ammonia or 3% hydrogen peroxide can reduce infectivity. In the environment, oocysts may be killed with a 5% ammonia solution or by desiccation. Prompt removal of all fecal material and bedding contaminated by infected animals is important.
- **Personal protection:** To prevent infection, practice good personal hygiene including frequent hand washing and using gloves when handling feces. The routine use of dedicated attire or protective outer garments when working with animals or their environments is recommended. Consider respiratory protection when cleaning practices may result in droplet exposure. Avoid eating and drinking around animals and their environments.

**Dermatophilus congolensis** (“Rain rot” or “rain scald”) [Return to Top]
- **Gram-negative, actinomycete bacterium**
- **Susceptible species:** Cattle, sheep, goats, camelds, horses, rarely pigs, dogs, and cats, humans and other species.
- **Incubation period:** usually < 4 days, but can be up to 7 days
- **Clinical signs:** Pustular desquamative dermatitis.
- **Transmission:** Direct contact with lesions on affected animals.
- **Prevention:** Use gloves when handling affected animals; strict adherence to good hand-hygiene protocols

**Erysipelothrix rhusiopathiae** (Erysipelas in pigs, erysipeloid in humans) [Return to Top]
- **Gram-negative, facultative anaerobic bacterium**
- **Susceptible species:** Pigs, humans and other species.
- **Clinical signs:** Characteristic cellulitis with raised red lesions, and edema, intense pruritis. Skin infections can progress to involve other cutaneous sites and also rarely to systemic infections with flu-like illness, septicemia, and arthritis.
- **Transmission:** Primarily via direct contact with infected animals, contamination of skin wounds. There are rare reports of transmission through ingestion of under-cooked pork.
- **Prevention:** Strict adherence to good hand-hygiene protocols, and routine use of protective outer garments or dedicated attire when working with animals or their environments. Gloves should be used when working with clinically affected animals. Avoid eating or drinking near animals or their environments.

**Escherichia coli** O157:H7 [Return to Top]
- **Gram-negative bacterium**
- **Susceptible species:** Cattle and humans.
- **Clinical signs:** Cattle are asymptomatic carriers. In people, signs include fever, enteritis, diarrhea or dysentery. In children under 5 and the elderly infections can cause hemolytic uremic syndrome (hemolysis and kidney failure).
• Transmission: Oral-fecal transmission via contact or droplet exposure through exposure to cattle or their environment or through ingestion of contaminated water and food.

• Prevention: Strict adherence to good hand-hygiene protocols, and routine use of protective outer garments or dedicated attire when working with animals or their environments. Avoid eating or drinking near animals or their environments.

Francisella tularensis – see “Tularemia”

Giardiasis: [Return to Top] Giardiasis is caused by Giardia lamblia (synonymous with Giardia intestinalis) a one-celled, microscopic parasite. When a person or animal becomes infected with Giardia lamblia, the parasite lives in the intestine and is passed in the stool. Giardiasis occurs worldwide and is particularly common in warm climates.

• Susceptible species: Giardiasis infection has occurred in a wide variety of domestic and wild mammal species including dogs, cats, ruminants, horses, pigs, beavers, coyote, non-human primates, rats, rodents, raccoons, and humans.

• Incubation period: 1-25 days.

• Transmission: Giardia are found in soil, food, water or surfaces that have been contaminated with the feces from infected humans or animals. Infection occurs after accidentally ingestion of the parasite.

• Clinical signs: Some people with giardiasis have no symptoms at all; others may experience diarrhea, intestinal gas, stomach cramps, and nausea. The illness usually last 1 to 2 weeks but chronic infections can last months to years. 20-40 percent of patients develop lactose intolerance during the infection and up to six months afterward.

• Disinfection: Because the parasite is protected by an outer shell, it can survive outside the body and in the environment for long periods of time. Giardia cysts and trophozoites are susceptible to 1% bleach, 2% gluteraldehyde or quaternary ammonium disinfectants. They can also be killed by boiling for at least one minute. The amount of chlorine in drinking water is not sufficient to kill G. intestinalis.

• Personal protection: Cleaning and prompt removal of feces can limit environmental contamination. Good hygiene, such as hand washing, can help prevent infection and help prevent spreading giardiasis to other people. Routine use of dedicated attire or protective outer garments is recommended when working with animals or their environments. Avoid eating and drinking near animals or their environments.

Hantavirus: [Return to Top] Hantaviruses are a group of over 25 distinct viruses carried in rodents and are found worldwide. They can cause hemorrhagic fever with renal syndrome (Eurasia) or a pulmonary syndrome (North, Central and South America) in humans. Sin Nombre virus causes the majority of hantavirus in the United States.

• Susceptible species: Hantavirus is not zoonotic in the sense that humans as well as rare infections in dogs and cats both occur from the same source, exposure to rodent excreta. The deer mouse (Peromyscus maniculatus) is the principle rodent involved in hantavirus in the United States.

• Incubation period: 14 to 30 days.

• Transmission: Rodents are the reservoir host and infection is spread between them by aerosols and bites. Humans are infected when they come into contact with infected rodents or their excretions. Often rodent urine, droppings or nests are disturbed in enclosed areas and the viruses are inhaled with aerosolized dust. The virus can also be transmitted through broken skin, mucous membranes, by rodent bites and possibly by ingestion.

• Clinical signs: Clinical signs of pulmonary syndrome include fever, myalgia, headache, chills, dizziness, malaise, lightheadedness, nausea, vomiting and sometimes diarrhea. Arthralgia, back pain and abdominal pain can occur. Respiratory distress and hypotension appear rapidly. Asymptomatic or mild infections in humans appear to be rare.

• Disinfection: Hantaviruses are susceptible to 1% bleach, 2% gluteraldehyde and 70% ethanol.

• Personal protection: Take precautions before and while cleaning rodent-infested areas.

Influenza Virus: [Return to Top]
• Enveloped RNA virus
• Susceptible species: Influenza viruses are generally host restricted, but people have been infected after exposure to infected pigs, poultry, and aquatic fowl.
• Incubation period: 12-48 hrs.
• Transmission: Close contact with infected pigs leading to respiratory exposure through contact, droplet, and aerosol routes.
• Clinical signs: Cross-species infection with influenza strains is extremely unusual under normal circumstances, but has been rarely documented with swine and avian influenza viruses resulting in fever, malaise, upper respiratory illness, pneumonia.
• Disinfection: Influenza viruses are susceptible to appropriately diluted bleach, ethanol, and quaternary ammonium solutions.
• Prevention: Strict adherence to good hand-hygiene protocols, and routine use of protective outer garments or dedicated attire when working with animals or their environments. When working with infected animals use enhanced barrier precautions, gloves, eye protection, a minimum of N95 respiratory protection, and strict adherence to good hand-hygiene protocols.

Larva Migrans—cutaneous, visceral, and ocular: [Return to Top] Cutaneous, visceral and ocular larva migrans occur when parasitic larvae (Toxocara canis, Toxocara cati, Ancelostema hookworms, Baylisascaris procyonis) migrate through the skin, internal organs or the eye of humans.
• Susceptible species: Many species of domestic and wild animals, birds and humans can become infected by ingestion of parasitic larvae.
• Incubation period: Weeks to months.
• Transmission: Cutaneous larva migrans is caused by skin contact with infected feces. Visceral or ocular larva migrans occur by ingestion of infected feces, contaminated soil, and water and by fomites.
• Clinical signs: The migrating larvae may be found in many different tissues including the skin, liver, heart, lungs, central nervous system and eyes. Clinical signs vary greatly. Signs can include fever, nausea and lethargy, hepatomegaly, pneumonitis, and encephalitis. Cutaneous: Papules are present at site of entry. Lesions are highly pruritic, erythematous, and serpentine (wavy or indented). Secondary bacterial infection often occurs resulting from scratching. Visceral: Individuals with mild infections may have no symptoms. More serious infections are marked by fever, irritability, abdominal pain, and occasionally itchy skin lesions such as hives. Pulmonary symptoms are common and include cough, shortness of breath, and wheezing. Ocular: If the eyes are infected, loss of vision and crossed eyes (strabismus) may occur.
• Disinfection: The eggs are relatively resistant to disinfectants and environmental conditions. Heat can be used to decontaminate fomites.
• Personal protection: Human infection is rare but when it occurs is usually severe. Fresh feces are not infective; eggs must develop for 2 to 4 weeks before they are infective. Most infections occur in children who are exploring their environment with hands and mouth. Prompt removal of feces from the environment will reduce exposure.

Leptospirosis  [Return to Top]
• Susceptible species: All mammals appear to be susceptible to at least one species of Leptospira. Disease is rare in cats, and less common in sheep than cattle. Wildlife reservoirs exist and complicate prevention of human infections, particularly in urban areas.
• Incubation period: 2-30 days, usually 7-12 days.
• Transmission: Leptospirosis is usually transmitted to humans by contact with urine of infected animals that are actively shedding leptospires (or less commonly, blood and tissues). Note that shedding in urine of infected dogs is thought to stop within 2-3 days of initiating appropriate antimicrobial treatment. Organisms may enter the
body through ingestion of contaminated food or water, or through direct contact with abraded skin or mucous membranes in the eye, nose, or mouth.

- Clinical signs: Infections in humans range from asymptomatic to severe. Symptoms begin abruptly, last approximately a week and are characterized by nonspecific signs including fever, chills, headache and severe myalgia. Aseptic meningitis can occur and 5-10% of cases may be associated with multi-organ failure most commonly involving the liver, kidneys and central nervous system.

- Disinfection: Leptospira species can be inactivated by 1% sodium hypochlorite, 70% ethanol, and detergents.

- Personal protection: This organism has the ability to survive for long periods of time in moist environments. To avoid infection routinely use proper hygienic precautions when handling known or suspected patients and their secretions. This includes frequent hand washing and wearing gloves, boots, and eye protection and face shields. When performing necropsy on animals that have potential leptospirosis wear gloves and eye protection. If droplet exposure to urine is likely, respiratory protection (minimum of N95 respirator) is recommended. Risk of human exposure is decreased with rodent control and vaccination of dogs and livestock.

**Listeriosis (Listeria monocytogenes)**

- Gram-positive bacterium
- Susceptible species: All mammalian species including humans
- Incubation period: median of 21 days, but up to 70 days.
- Clinical signs: Cattle and other animals are often asymptomatic shedders. Contact can result in papular lesions on hands and arms. Most commonly flu-like illness and gastroenteritis. Less commonly infections can result in a mononucleosis-like syndrome (glandular listeriosis) or in fetal infection, abortion, still birth, neonatal septicemia or meningoencephalitis. Meningoencephalitis is also noted in elderly and immunocompromised.

- Transmission: Immunosupression greatly increases the risk of infection. Direct contact of skin or mucus membranes with infectious material, feces, or contaminated soil. Respiratory exposure to secretions from infected animals via droplet or aerosol routes. Oral-fecal exposures through contact, droplet or aerosols, or ingestion of contaminated foods.

- Prevention: Strict adherence to good hand-hygiene protocols, and routine use of protective outer garments or dedicated attire when working with animals or their environments, especially among immunocompromised people. Avoid eating or drinking near animals or their environments. Enhanced barrier precautions, gloves, eye protection a minimum of N95 respiratory protection, and strict adherence to good hand-hygiene protocols are warranted when performing obstetrical procedures on high-risk animals or when handling aborted fetuses, or tissues and fluids of infected animals.

**Lyme disease (Borellia burgdorferi):** Lyme disease in the United States results from infection with the spirochete Borellia burgdorferi.

- Susceptible species: Naturally occurring infections have occurred in dogs, horses and cattle, white-tailed deer, white-footed mice, eastern chipmunks, gray squirrels, opossums, raccoons, and humans.
- Incubation period: Usually 7-14 days, can vary from 3 to 36 days.
- Transmission: B. burgdorferi is transmitted by ticks in the genus Ixodes. Domestic animals and humans become infected when they are bitten by infected ticks. Transmission is unlikely to occur before the tick has been attached for at least 24 hours. Lyme disease is not generally considered a zoonotic disease; there is no evidence that it is communicable to other animals or humans under natural conditions. Both humans and animals generally acquire the disease from the same source-infected ticks.

- Clinical signs: The first symptom is a bulls-eye rash with central clearing which may be accompanied by malaise, fatigue, fever, headache, stiff neck, myalgia, arthralgia or lymphadenopathy. A second stage may occur weeks or months later with joint pain, swelling. Severe, disabling disease is infrequent but does occur. Asymptomatic infections can also occur.
• Disinfection: *B. burgdorferi* can be inactivated by 1% bleach and 70% ethanol. It is also sensitive to heat and ultraviolet light.

• Personal protection: Reduce exposure to ticks by avoiding wooded and bushy areas with high grass and leaf litter. Limit exposed skin by wearing long sleeves and long pants. Use insect repellent with 20-30% DEET. Perform daily “tick checks” (including scalp, armpit, and groin) after being outdoors. Remove any ticks with fine-tipped tweezers. Ticks which transmit *B. burgdorferi* are most active May through July.

**Monkeypox:** [Return to Top] Monkeypox results from infection by an Orthopoxvirus related to smallpox

- Susceptible species: monkeys and humans
- Incubation period: 4-20 days, usually symptomatic after 12 days.
- Transmission: The Monkeypox virus can be transmitted to humans in bites from animals, aerosols or by direct contact with lesions, blood, or body fluids from an infected person or animal. The virus can also be spread by fomites.
- Clinical signs: Initial symptoms are flu-like and may include fever, chills, headache, sore throat, myalgia, backache, fatigue, lymphadenopathy, non-productive cough and in severe cases dyspnea. A rash develops 1 to 10 days later. Skin lesions usually occur on the extremities. Illness generally lasts 2-4 weeks.
- Disinfection: Surface disinfection with 0.5% bleach.
- Miscellaneous: The human smallpox vaccine is thought to help prevent monkeypox infections, as well as decrease the severity of the symptoms. Post-exposure vaccination may also be helpful. Monkeypox is endemic in Central and West Africa. In 2003 an outbreak occurred in the U.S. in people exposed to sick pet prairie dogs.
- Personal protection: Good hand-hygiene practices and barrier nursing precautions including gloves, gowns, eye protection (if splash of bodily fluids is likely) and respiratory protection (N95 respirator) are recommended when handling infected patients or their environment. Use caution when handling soiled laundry; do not shake or handle in a manner that may result in aerosolization of infectious particles.

**Plague (Yersinia pestis):** [Return to Top]

- Susceptible species: wild and domestic cats, (dogs and other canids are less susceptible) rabbits, ground squirrel, prairie dogs, rock squirrel.
- Incubation period: 2-6 days for bubonic plague, 1 to 3 days for pneumonic plague.
- Transmission: Infection occurs primarily in rodents, but is transmitted to humans and other animals by the bite of an infected rodent flea or contact with infectious exudates. Fleas become infected by feeding on rodents such as chipmunks, prairie dogs, ground squirrels, mice and other mammals that are infected with the bacteria *Yersinia pestis*. Transmission from cats to humans has occurred by mechanical transportation of infected fleas into a home environment, bites, scratches, contact with infectious tissues and fluids and via aerosol droplet spread.
- Clinical signs: Bubonic plague - fever, headache, malaise, myalgia and swollen lymph node in the inguinal or femoral area. Bubonic plague can develop into septicemic plague which includes symptoms of high fever, chills, nausea, vomiting, abdominal pain and rarely meningitis. Pneumonic plague – occurs after inhalation of bacteria or after blood-borne spread to the lungs. Signs include high fever, chills, headache, myalgia and malaise. Within 24 hours a cough with bloody sputum develops. Pneumonic plague is rapidly fatal with dyspnea, stridor and cyanosis ending in respiratory failure and circulatory collapse.
- Disinfection: *Y. pestis* is susceptible to a number of disinfectants including 1% sodium hypochlorite, 70% ethanol, iodine-based and phenolic disinfectants.
- Miscellaneous: If untreated the case fatality rate for bubonic plague is 60%, untreated pneumonic-septicemic plague case fatality rate is 95%. See Plague Control Procedures (page 118) for details on treating animals suspected of having plague.
- Personal protection: Good hand-hygiene procedures and barrier precautions including gloves, gowns, and respiratory protection (N95 respirator) are recommended for handling suspect or confirmed cases. Treat suspect
cases for fleas prior to handling. Eliminate food sources and nesting places for wild rodents and do not handle wild rodents. Implement a flea control program for dogs and cats.

**Q Fever (Coxiella burnetii):**

- Susceptible species: Sheep, goats and cattle are most likely to carry Q fever. Other kinds of animals can also have this disease including dogs, cats, rabbits, horses, pigs, camels, buffalo, rodents, humans, and some birds. Antibodies to *C. burnetii* have been found in badgers, coyotes, raccoons, opossums, jackrabbits, feral pigs, black bears and musk ox. Ticks and wild birds can also harbor the organism.
- Incubation period: 2 – 40 days, usually 2 to 5 weeks.
- Transmission: Humans are very susceptible and can be infected by very few bacteria. *C. burnetii* is spread by aerosols, direct contact or ingestion (unpasteurized milk). Humans usually get Q fever by breathing in contaminated barnyard dust. Occasionally people can get Q fever from drinking contaminated milk or from tick bites. Organisms can be found in urine, feces, and milk.
- Clinical signs: Symptoms of Q fever include fever, chills, headache, fatigue and chest pains. Pneumonia and hepatitis can occur in serious cases. In pregnant women, infections can cause premature delivery, abortion and infection of the placenta. In people with pre-existing heart valve disease, endocarditis may occur.
- Disinfection: The organism is highly resistant to physical and chemical agents. A 0.05% hypochlorite, 5% peroxide or 1:100 solution of Lysol may be effective. *C. burnetii* is susceptible to gluteraldehyde.
- Miscellaneous: Q fever is usually a self-limiting disease and approximately 50-60% of infections are thought to be asymptomatic. Only 2% develop severe disease and require hospitalization.
- Personal protection: Strict adherence to good hand-hygiene protocols and the routine use of dedicated attire or protective outer garments is recommended when working with suspect cases or their environments. Use caution when handling tissues or fluids from affected animals or aborted fetuses. If performing obstetrical procedures on high-risk cases, eye protection is recommended. Barrier nursing precautions including gloves and respiratory protection (minimum of an N95 respirator) are recommended when working with infected animals.

**Parapox viruses (Orf and Bovine Papular Stomatitis viruses):**

- Enveloped, double-stranded DNA viruses
- Susceptible species: Sheep and goats (Orf virus), Cattle (BPSV), and humans
- Incubation period: 2 to 4 days
- Transmission: Contact with lesions on animals, scabs, or contaminated objects.
- Clinical signs: Papular lesions at areas of contact (usually hands or arms). Lesions can be 1 cm in diameter, and surrounding tissues often become swollen and painful.
- Prevention: Strict adherence to good hand-hygiene protocols, and routine use of protective outer garments or dedicated attire when working with animals or their environments. Gloves should be worn when examining mouths of animals suspected of being infected.

**Rabies:**

- Susceptible species: All warm blooded animals are susceptible but mammals are the only known vectors and reservoirs in nature.
- Incubation period: A few days to several years. Most cases become apparent after 1 to 3 months.
- Transmission: Most warm-blooded animals can harbor rabies. Transmission is usually the result of a bite from an infected animal or contact of an open wound with saliva from an infected animal. Aerosol transmission has been documented in special circumstances such as in laboratories and bat caves with a high density of aerosolized virus particles. Rabies viruses have been transmitted by ingestion in laboratory animals.
• Clinical signs: Early prodromal signs include malaise, fever or headache, pain, or pruritis at the site of virus entry. After several days, anxiety, confusion and agitation can occur and progress to insomnia, abnormal behavior, hypersensitivity to light and sound, delirium, hallucinations, slight or partial paralysis, hypersalivation, difficulty swallowing, pharyngeal spasms upon exposure to liquids and convulsions. Either an encephalitic (furious) form with hyperexcitability, autonomic dysfunction and hydrophobia, or a paralytic (dumb) form characterized by generalized paralysis may predominate. Death usually occurs within 2 to 10 days.

• Disinfection: Rabies virus is inactivated by lipid solvents (soap solutions, acetone) 1% bleach, 2% gluteraldehyde, 45-75% ethanol, iodine preparations, quaternary ammonium compounds, formaldehyde or a low pH. It is inactivated in sunlight and does not survive for long periods in the environment except in a cool dark area.

• Miscellaneous: See Rabies Information and Control Procedures (page 127) for additional information about rabies.

• Personal protection: Limit personnel contact with suspected cases. Barrier nursing precautions must be used when working with a suspect case or in its environment, including use of gloves, barrier gowns, face shield (including eye protection) or masks and eye protection. Strict isolation procedures should be adhered to in all cases. Do not handle wild rodents.

**Rhodococcus equi:** [Return to Top]

• Susceptible species: Horses, immunocompromised people. Also found in feces of sheep and cattle.

• Incubation period: variable, but extended.

• Transmission: Regular contact with horses is a documented risk factor for infection, presumably through oral-fecal exposure via direct contact or droplets, although there is often no documented direct exposure to horses.

• Clinical signs: A problem with growing recognition, infections in immunocompromised people commonly lead to life-threatening chronic, progressive, granulomatous pneumonia. In contrast, infections are very rare in immunocompetent people and are typically less severe.

• Disinfection: Nonporous surfaces can be disinfected using appropriately diluted bleach or quaternary ammonium solutions.

• Prevention: Immunocompromised people working with horses should adhere to good hand-hygiene protocols, and routinely use protective outer garments or dedicated attire when working with animals or their environments. Avoid eating or drinking near animals or their environments.

**Ringworm (Dermatophytosis):** [Return to Top]

• Cutaneous fungal infections *(Microsporum* and *Trichophyton* spp.)*

• Susceptible species: Dogs, cats, cattle, sheep, goats, horses, swine (rarely zoonotic) rodents, rabbits, birds, and humans.

• Incubation period: 4-14 days.

• Transmission: Ringworm is transmitted to humans by direct physical contact with an infected (symptomatic or asymptomatic) animal and by direct or airborne contact with its hairs or skin scales. The fungal spores can remain viable for several months to years in the environment and can also be spread on clothing, blankets, combs, and other fomites.

• Clinical signs: Clinical signs can vary depending on the region affected. Pruritis is the most common symptom. The skin lesions are usually characterized by inflammation that is most severe at the edges with erythema, scaling and occasionally blister formation. Central clearing is sometimes seen giving the classic “ringworm” lesion. On the scalp and facial hair, there may be hair loss. In immunocompetent people, infection is limited to the keratinized layers of the skin and hairs. However, in immunocompromised people, infections may extend to deep tissues or become systemic.
- Disinfection: Dermatophyte spores are susceptible to benzalkonium chloride or dilute (1:10) bleach solution. Mechanical removal of any material containing keratin such as shed skin and hairs, will aid in disinfection. Vacuming is considered to be the best method in many cases.
- Prevention: Strict adherence to good hand-hygiene protocols, and routine use of protective outer garments or dedicated attire when working with animals or their environments. Gloves should be worn whenever working with animals known to have dermatophytosis.

**Salmonellosis (Salmonella enterica):**
- Susceptible species: Dog, cat, cattle, equine, sheep, goat, pig, fowl, and humans.
- Incubation period: 12-72 hours.
- Transmission: Salmonellosis is one of the most common zoonotic diseases afflicting man. Transmission from animal to human usually occurs through contact with feces from an infected animal. Transmission can occur through ingestion (or less commonly, inhalation or skin contact) of animal fecal material with the microorganism. Reptiles are a primary carrier of Salmonella. Fomites and mechanical vectors can transmit Salmonella.
- Clinical signs: In humans, Salmonellosis can vary from asymptomatic infection to self-limiting gastroenteritis to septicemia. Illness is characterized by nausea, vomiting, cramping abdominal pain and diarrhea which may be bloody. Headache, fever, chills and myalgia may also be seen. Severe dehydration can occur in infants and the elderly. In many cases, the symptoms resolve spontaneously in 1 to 7 days. Death is rare except in the very young, very old, debilitated or immune compromised. Most infections are subclinical.
- Disinfection: 1% bleach, 70% ethanol, 2% gluteraldehyde, iodine-based disinfectants, phenolics and formaldehyde.
- Personal protection: Strict hygiene is important in preventing Salmonellosis. Prompt cleaning and disinfection of footwear, clothing, and all areas contaminated with feces is vital in controlling hospital outbreaks of Salmonellosis. Use gloves when handling animals with diarrhea and when disposing of their feces. Dedicated attire or protective outer garments are recommended when working with animals or their environments. Avoid eating and drinking near animals or their environments. Salmonella can remain viable in fecal material for several years. Some animals may not show clinical signs of disease.

**Scabies (Zoonotic):**
Zoonotic scabies is an infestation of the skin caused by a variety of mites including Sarcoptes, Notoedres, Otodectes, and Cheyletiella. Infestation with these mites is known by many different names including acariasis, zoonotic acariasis, scabies, sarcoptes, sarcoptic mange and mange. The human type of mite causes a disease that is specific to humans but humans can also become temporarily infected with mites of other animals and this is called zoonotic scabies.
- Susceptible animal species: Different types of mites infest different species of animals. Acariasis can cause disease in more than a 100 species of mammals and marsupials including dogs, pigs, goats, sheep, horses, ferrets, water buffalo, llamas, camels and some wild or zoo animals (e.g. the Australian wombat).
- Incubation period: One to two weeks after infestation.
- Transmission: Scabies mites are highly contagious under conditions of close contact with infected animals. Contaminated objects (fomites) may also transmit the mites. The parasite can survive for several days off an animal’s body on clothes, towels, bedclothes, animal bedding, harnesses and horse blankets so these objects can be a source of infestation. Zoonotic scabies resolves spontaneously and is not transmitted between humans.
- Clinical signs: The disease causes vesicles (small blisters), red papules, raised wheals, crusts, and intense itchiness over affected areas. The mite dies in a couple of days and does not reproduce. Re-infection may occur if in-contact animal are not treated.
- Disinfection: Treating animals with acaricides is the most means of controlling disease.
- Miscellaneous: In general, human scabies mites do not survive greater than 2-3 days away from human skin.
• Personal protection: Zoonotic scabies can be prevented by treating infested pets, livestock, or fowl. Gloves, boots and protective clothing can decrease the risk of transmission when handling affected animals. Bedding and other objects used by the infected animal should be discarded or disinfected. Avoid direct skin-to-skin contact with an infected person or contaminated articles (e.g. clothing, bedding).

Sporotrichosis (*Sporothrix schenckii*): [Return to Top]
- Susceptible species: Dog, cat, and humans
- Incubation period: 7 days to 6 months.
- Transmission: Sporotrichosis is most commonly diagnosed in the cat, although it has been reported in dogs, horses, other domestic animals, and wildlife. The disease can be transmitted to humans directly from handling infected tissues, fur, or articles contaminated with pus. The organism can invade intact skin.
- Clinical signs: A hard, painless nodule forms at the site of skin injury. The nodule may change color from pink to purple to black. Often, multiple nodules appear in the subcutaneous tissue along the course of lymphatics that drain the lesion. The nodules ulcerate and release gray or yellow pus. Occasionally, the disease may extend to mucous membranes or disseminated throughout the body.
- Personal protection: Immunocompromised people are at greatest risk to develop serious disease. Wear gloves and gowns when handling cats and other animals suspected to be infected with this organism. Eye infections have been reported following splashing culture material into the eyes. Disinfection with organic iodine is effective in eliminating the organism.

*Staphylococcus aureus* (MRSA, methicillin-resistant *S. aureus*): [Return to Top]
- Susceptible species: Horses, pigs, dogs, cats, humans and other species.
- Incubation period: Asymptomatic carriage is most common. Clinical signs can develop within a few hours after exposure in wounds.
- Transmission: Direct contact with colonized or affected animals, droplet or aerosol exposure to discharge from infected sites.
- Clinical signs: *Staphylococcus aureus* commonly colonizes the anterior nares and other sites without causing clinical signs. Infections most commonly involve skin and soft tissues, either as a primary infection or by infecting cuts or other skin injuries, including sites of intravenous injection or catheterization. Infections of the respiratory tract and urinary tract are also noted. The risk of infection may be increased in immunocompromised people. Skin infections most commonly result in swollen, painful, erythematous lesions that can often be purulent
- Prevention: Strict adherence to good hand-hygiene protocols, and routine use of protective outer garments or dedicated attire when working with horses or pigs. Enhanced barrier nursing precautions and gloves should be required when working with animals known to be colonized or infected. Cuts and abrasions should be kept bandaged and disinfected regularly

Toxoplasmosis (*Toxoplasma gondii*) [Return to Top]
- Susceptible species: Domestic cats, other felidae, and humans
- Incubation period: 10 to 23 days after ingesting contaminated meat and 5 to 20 days after exposure to infected cats.
- Transmission: Humans can become infected when they eat raw or undercooked tissues containing tissue cysts or by ingesting mature oocysts that may be in food or water, inhale them in aerosols or come into contact with contaminated soil. *T. gondii* can cross the placenta in some species including humans producing severe disease and/or death. Flies and cockroaches can act as mechanical vectors. Cats may excrete the oocysts in their feces.
- Clinical signs: In immunocompetent non-pregnant individuals infection is usually asymptomatic. Infection can produce fever, lymphadenopathy, and flu like symptoms. Infection during pregnancy can lead to congenital
toxoplasmosis in the infant. Symptoms in the infant can range from mild to severe and are usually due to infection of the developing brain and/or retina.

- **Disinfection**: Oocysts are highly resistant to environmental conditions and can remain infectious for as long as 18 months in water or warm, moist soils. They do not survive well in arid, cool climates. *T. gondii* oocysts can be inactivated by iodine, formalin and ammonia. *T. gondii* tachyzoites and tissue cysts are susceptible to most disinfectants including 1% bleach and 70% ethanol.

- **Personal protection**: Tissue cysts can remain infectious in meat for as long as the meat is edible and uncooked. Cook all meat thoroughly to an internal temperature of 170 degree F and wash cutting boards, utensils or other items that may have touched the raw meat. Wash all fruits and vegetables thoroughly. Wear gloves and wash hands thoroughly when handling any items that could be contaminated with cat feces and when performing a necropsy. Because this organism may cause abortion or may be passed to the fetus in pregnancy, pregnant women should avoid contact with cat feces or wear gloves and wash hands. Cats excrete oocysts for about 10 days when first infected. You can avoid contact with infective oocysts by disposing of cat feces within 24 hours, before sporulation can occur. Immersing in scalding water for 5 minutes and using ammonia have been suggested as effective ways of removing oocysts from soiled areas.

### Tuberculosis (*Mycobacterium tuberculosis, M. bovis, M. avium avium*)

There are several different types of mycobacterium species that can infect humans and animals to different degrees. The main cause of tuberculosis in humans is *M. tuberculosis* which humans’ contract from other humans; other animals and can only be transiently infected with *M. tuberculosis*. Permanent infections do not usually persist as cattle seem to be very resistant to infections by *M. tuberculosis*. The principle cause of avian tuberculosis is *M. avium* and the principle cause of tuberculosis in cattle is *M. bovis*. Both *M. avium* and *M. bovis* can cause disease in other species including humans.

- **Susceptible species**: Humans, cattle, goats, pigs, (sheep, horses, dogs and cats – rare infection) and wildlife including Cape buffalo, lions, elk, deer, opossum, and badgers.
- **Incubation period**: Clinical signs usually take months to develop. Infection can remain dormant for years and reactivate during periods of stress or in old age.
- **Transmission**: Inhalation and oral exposure through respiratory droplet and aerosol transmission from infected animals, oral or cutaneous exposure through contact with infected tissues or contaminated surfaces, ingestion of raw or unpasteurized milk and milk products.
- **Clinical signs**: Depend on the organ system involvement and can be asymptomatic -- General signs of infections include anorexia, weight loss, fatigue, fever, chills. Signs of pulmonary infection include coughing and hemoptysis. Skin lesions are characterized by ulcers, papular lesions, and suppurative lesions. Signs of other organ involvement relate to the specific system.
- **Disinfection**: *M. bovis* is relatively resistant to disinfectants and can survive for several months in the environment, particularly in cold, dark and moist conditions. Effective disinfectants include 5% phenol, iodine solutions with a high concentration of available iodine, gluteraldehyde and formaldehyde. In environments with low concentrations of organic material, 1% bleach with a long contact time is also effective. This organism is also susceptible to moist heat.
- **Prevention**: Strict adherence to good hand-hygiene protocols, and routine use of protective outer garments or dedicated attire when working with animals or their environments. A minimum of N95 respiratory protection may be appropriate if working with infected animals with clinical pulmonary disease or if performing necropsy.

### Tularemia (*Francisella tularensis*)

In humans tularemia occurs in two main syndromes: ulceroglandular and typhoidal.

- **Susceptible species**: Many species of animals can become infected with tularemia, including humans. The natural hosts are cottontail and jack rabbits, hares, voles, vole rats, squirrels, muskrat, beaver and lemmings. Cattle
appear to be resistant to tularemia. Sheep are particularly susceptible to clinical disease. Tularemia has been seen in dogs, cats, pigs and horses and has been reported in birds, reptiles and fish.

- **Incubation period:** 3-15 days
- **Transmission:** Tularemia can be transmitted by ingestion, inhalation, arthropod borne vector (ticks and biting flies in North America) or direct contact through the skin and mucous membranes. The organism can be found in blood and tissues of infected animals and can survive for long periods on fomites including food and water. Aquatic animals may develop tularemia after being immersed in contaminated water. Carnivores can become infected by ingesting a contaminated carcass. Rare transmission to humans has occurred through water, cat bite or scratch, and contact with dog saliva.
- **Clinical signs:** There are six different forms of tularemia in humans, depending on the site of inoculation. Most forms of the disease present with acute onset of flu like symptoms: fever, chills, myalgia. In the ulceroglandular form an ulcer forms at the site of entry of infection along with enlarged regional lymph nodes. In the typhoidal form pneumonia is common. Painful, purulent conjunctivitis occurs in the oculoglandular form.
- **Disinfection:** Tularemia is easily killed by disinfectants including 1% hypochlorite, 70% ethanol. The bacterium can remain viable at freezing temperatures for months to years.
- **Personal protection:** Good hand hygiene procedures and barrier precautions including gloves, gowns, and respiratory protection (N95 respirator) are recommended for handling suspect or confirmed cases. Eliminate food sources and nesting places for wild rodents and do not handle wild rodents.

**Vesicular Stomatitis:** [Return to Top]

- **Susceptible species:** Horses, donkeys, mules, cattle, swine, SA camelids and humans. Sheep and goats rarely show clinical signs.
- **Incubation period:** 24-48 hours in humans.
- **Transmission:** VS is transmitted by insect vectors especially sand flies and black flies. Humans may be infected by contact or aerosol.
- **Clinical signs:** Infections in humans are very rare and typically result in flulike symptoms including fever, headache, and myalgia and rarely may develop oral blisters similar to herpes virus. Recovery usually occurs in 4-7 days.
- **Disinfection:** 2% sodium carbonate, 4% sodium hydroxide, 2% iodophore disinfectants and chlorine dioxide.
- **Miscellaneous:**
- **Personal protection:** Barrier nursing precautions including gloves, gowns, and eye protection is recommended when handling suspect cases. Consider respiratory protection (N95 respirator) when treating lesions.

**West Nile Virus:** [Return to Top]

- **Susceptible animal species:** equine, new world camelids, and humans
- **Incubation period:** 3 to 14 days.
- **Transmission:** WNV is transmitted by the bite of a mosquito. At least 43 species of North American mosquitoes are susceptible to infection. Birds are the primary reservoir hosts.
- **Clinical signs:** Most cases of WNV are mild and flu-like with fever, headache and myalgia. Weakness, malaise, anorexia, lymphadenopathy, nausea and vomiting may also be seen. A skin rash occasionally develops on the neck, trunk, arms or legs. In more severe cases there may be signs of encephalitis, meningoencephalitis or meningitis with symptoms of high fever, headache, neck stiffness, stupor, disorientation, tremors, convulsions, severe muscle weakness, flaccid paralysis and coma.
- **Disinfection:** Little or no information has been published on the susceptibility of WNV to disinfectants, however related flaviviruses are destroyed by many disinfectants including 1% bleach, 2% gluteraldehyde and 70% ethanol.
• Miscellaneous: WNV first appeared in North America in 1999. Currently there is no vaccine available for humans.

• Personal protection: Limit exposure to mosquitoes by decreasing skin exposure (wear long sleeves and pants) and use an insect repellent containing at least 10% DEET. Stay indoors during peak mosquito biting times (dusk and dawn). Reduce the number of mosquitoes by eliminate standing water. Do not handle dead birds with bare hands.

_Yersinia pestis_ – see “Plague”

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**6.0 History of Content Edits in Infection Control SOP** [Return to Top]

- **12/14/2006:** SOP approved by Biosecurity Committee and posted to web site.
- **01/12/2007:** Sections II.4.7 and VII.2.1 changed to clarify notation of who cleans stalls with barrier precautions in main equine hospital during the day.
- **01/29/2007:** Text relevant to infection control in the clinical pathology and microbiology laboratories were inserted in Section VI. Ancillary Services, as this was inadvertently omitted during the final compilation process.
- **02/05/2007:** Added comments about restrictions on raw food diets that were inadvertently omitted during the final compilation process (Section IV.3.0).
- **01/08/2008:** Clarified sections regarding visitors to small animal isolation (Section I.3.4, I.3.5, IV.10.0)
- **01/08/2008:** Updated material regarding management of patients colonized or infected with MRSA (Sections V.12.0)
- **10/05/2008:** Updated information regarding risk communication, management of patients with contagious diseases, and management of infectious disease in patients (Sections I.1.6, I.2.3, I.2.4, I.3.2, I.4.1, and I.5.6)
- **10/05/2008:** Updated instructions regarding screening and admission of equine patients with potentially contagious diseases (Section II.6.0).
• 10/05/2008: Updated information regarding calf isolation protocols, and cleaning and disinfection information related to the Agriculture Animal Hospital (Sections III.1.1, III.2, III.6, III.15.0, and VII.2.3)
• 10/05/2008: Updated information regarding responsibilities for communication and management of patients with contagious diseases in the Small Animal Hospital (Sections IV.4.0, IV.6.0, IV.9, IV.10, IV.11.2, V, V.8.0, V.14.0, and V.15.0)
• 7/1/2010: Major revisions throughout the document, especially regarding zoonotic disease hazards.
• 7/1/2013: Updated policies and content.
• 2/1/2015: Updated policies and content, including major revisions regarding Occupational Safety policies, tools to aid VTH communication, policies regarding the remodeled Small Animal Critical Care and Urgent Care facilities, and updated Plague and Tularemia policies and procedures.
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APPENDIX

CVMBS POLICY

AIR MONITORING FOR FORMALIN AND FORMALDAHYDE CONCENTRATION
-- AREA AND PERSONAL SAMPLING --

COLORADO STATE UNIVERSITY
College of Veterinary Medicine and Biomedical Sciences Policy

Title: Air Monitoring for Formalin and Formaldehyde Concentration Area and Personal Sampling

Policy ID: EHS001-2015

Effective Date: April 1, 2015

[ ] New Policy [ ] Revisions of Existing Policy [ ] Other:

1. **Policy Purpose**
   This policy exists to protect the health of student, faculty and staff through the monitoring of formaldehyde and formalin concentration levels in the air of the gross anatomy laboratory.

2. **Application of Policy**
   This policy applies to any College of Veterinary Medicine and Biomedical Sciences’ laboratory that is involved in the dissection of animal and human cadavers which promote or utilize formaldehyde or formalin.

3. **Exemptions**
   Any exemption from this policy must be approved in writing by the Dean.

4. **Definitions**
   Formalin/Formaldehyde – Chemicals commonly used in the preservation of animal and human cadavers.
   
PPE – Personal Protective Equipment

5. **Policy Statement**
   The College strives to provide a safe environment for students to learn and for faculty to teach in. To this end, laboratories that are involved in the dissection of animal and human cadavers will:

   Air sampling done following the protocol as established by the University Environmental Health Services Department (attached).

   Sampling will be conducted at least annually, more often if indicated by prior results, and in conjunction with the laboratory class. Discussions will occur with the faculty for agreed upon time to conduct sampling. Every effort will be made to ensure sampling occurs during a scenario in which the cadavers will be new to the lab so concentrations will be considered to be the highest to ensure a sample that fits a worst case scenario.

*Helping animals, people, and the planet*
Additional sampling will also be conducted when a change occurs in the mechanical air handling system, process of cadaver use or it has been determined additional risk has been introduced in to the environment through the addition of different chemical materials.

Specific air monitoring will be conducted for the animal laboratory sections if, in consultation with University Environmental Health Services the results of the human anatomy classes exceed regulatory levels and it is evaluated to be a risk.

Sampling results will be shared with the Faculty and be posted in the laboratory.

If sampling results are reported above established OSHA action levels, an investigation will be initiated to determine the cause. If it is determined engineering controls will not abate the issue, a PPE program (i.e. respirator) will be established and training will be conducted.

6. References
   CSU Formaldehyde Control Program (attached)

7. Forms and Tools
   None

Approval:

Mark D. Stetter, Dean - CVMBS

Date 3/30/15

Helping animals, people and the planet
Chemical Name or Class – Formaldehyde

This a BMP template and is not complete until 1) lab specific information is entered into the box below 2) lab specific protocol(s)/procedure(s) are added to the protocol/procedure section and 3) the BMP has been signed and dated by the PI and relevant personnel.

Print a copy and insert into your Laboratory Safety Manual and Chemical Hygiene Plan. Refer to instructions for assistance.

Department: ________________________________  Date BMP was written: ________________________________
Date BMP was approved by PI/Delegate: ________________________________
Principal Investigator: ________________________________
Internal Lab Safety Coordinator/Lab Manager: ________________________________
Lab Phone: ________________________________
Office Phone: ________________________________
Emergency Contact: ________________________________  (Name and Phone Number)
Location(s) covered by this BMP: ________________________________  (Building/Room Number(s))

Type of BMP (check one)   Process ☒ Hazardous Chemical ☐ Hazardous Class

Purpose

Formaldehyde and Formalin, commonly used as fixatives and as nucleic acid denaturants, is a regulated carcinogen. The OSHA Permissible Exposure Limit is 0.75 ppm in an eight hour time weighted average. Approximately 1.5 grams of vaporized Formaldehyde will achieve this concentration in a typical laboratory (not accounting for air flow). The odor threshold of formaldehyde is reported to be as low as 0.1 ppm. While formaldehyde is a gas, it is mainly used in laboratories and sold as a solution in water or methanol.
Formaldehyde – BMP Instructions

Physical and Chemical Properties/Definitions of Chemical Group

<table>
<thead>
<tr>
<th>CAS#: 50-00-0</th>
<th>Class: Flammable Liquid and Vapor</th>
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<tbody>
<tr>
<td>Color: Clear</td>
<td>Form (Physical State): Gas, Liquid (as 37% or 16%)</td>
</tr>
<tr>
<td>Boiling Point: -19 °C (Gas), 91-101 °C (Liquid Mixture)</td>
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</tr>
<tr>
<td>Molecular Formula: CH₂O</td>
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</table>

Potential Hazards/Toxicity:

LD₅₀
Oral: 100 mg/kg [Rat]
Dermal: 270 uL/kg [Rabbit]

Permissible Exposure Limits (PEL): 0.75 ppm

Acute Effects
Hazardous in case of eye contact (irritant), of ingestion. Slightly hazardous in case of skin contact (irritant, sensitizer, permeator). Non-corrosive for skin. Non-corrosive to the eyes. Non-corrosive for lungs. Severe over-exposure can result in death.

Chronic Effects
Slightly hazardous in case of skin contact (sensitizer)

Mutagenic Effects
Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. Classified possible teratogen for humans.

Developmental Toxicity
Classified reproductive system toxin. The substance may be toxic to kidneys, liver, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Personal Protective Equipment (PPE):

Respirator Protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N99 (US) or type P2 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use
respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Respirators should be used only under any of the following circumstances:

- As a last line defense (i.e., after engineering and administrative controls have been exhausted).
- When Permissible Exposure Limits (PELs) have been exceeded or when there is a possibility that the PEL will be exceeded.
- Regulations require the use of a respirator.
- An employer requires the use of a respirator.
- There is a potential for harmful exposure due to an atmospheric contaminant (in the absence of PEL).
- As PPE in the event of a chemical spill clean-up process.

Lab personnel intending to use/wear a respirator mask must be trained and fit-tested by EHS. This is a regulatory requirement.

**Hand Protection**

Handle with nitrile or chloroprene gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove’s outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

☐ Latex  
☒ Nitrile  
☐ Neoprene  
  Vinyl  
☐ Other: Chloroprene  

**NOTE:** Consult with your preferred glove manufacturer to ensure that the gloves you plan to use are compatible with the chemical or class outlined in the BMP.

Refer to glove selection chart from the links below:

http://www.chemrest.com/  
http://www.mapaglove.com/  

**Eye Protection**

ANSI approved safety glasses or goggles.

☒ ANSI Approved Safety Glasses  
☒ Chemical Splash Goggles  
  Face Shield
Skin and Body Protection

Flame resistant lab coats should be worn. These laboratory coats must be appropriately sized for the individual and be buttoned to their full length. Laboratory coat sleeves must be of a sufficient length to prevent skin exposure while wearing gloves. Full length pants and close-toed shoes must be worn at all times by all individuals that are occupying the laboratory area. The area of skin between the shoe and ankle should not be exposed.

☐ Long pants and closed toed shoes that do not expose any skin between the ankle and foot (minimum required for entry into lab)

☐ Laboratory coat (Specify material – i.e. standard polyester blend, 100% cotton fire resistant, non-woven material such as Tyvek)
- Coveralls with head coverage (i.e. Tyvek)
- Over the shoe booties (i.e. Tyvek)

Hygiene Measures

Wash thoroughly after handling. Wash hands before eating. Remove contaminated clothing and wash before reuse.

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Engineering Controls

(Indicate engineering devices to be utilized. Note: If work cannot be conducted with appropriate engineering controls, consult with EHS).

Work with this chemical in a certified ducted fume hood or ducted Biosafety cabinet. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

☐ Fume Hood
☐ Biosafety Cabinet (specify whether it is ducted; must be ducted if used in conjunction with volatile compounds)
- Enclosed System (specify type i.e. glove box/bag, sealed chamber)
- Powder Handling Enclosure
- Other (specify)

First Aid Procedures

If Inhaled

Move person into fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Consult a physician.

In Case of Skin Contact

Flush with plenty of water for at least 15 minutes while removing contaminated clothing. Take victim immediately to hospital.
In Case of Eye Contact

Check for and remove contact lenses. Flush eyes with plenty of water for at least 15 minutes lifting upper and lower eyelids and removing contact lenses. Consult a physician. Continue rinsing eyes during transport to the hospital.

If Swallowed

Never give anything by mouth to an unconscious person. Get medical aid immediately. Do NOT induce vomiting. If conscious and alert, give milk, activated charcoal, or water.

If Injected (Puncture)

Aspirate the wound. Flush with plenty of water for at least 15 minutes. Consult a physician.

Special Handling & Storage Requirements

Wear personal protective equipment. Ensure adequate ventilation. Do not get in eyes, on skin, or on clothing. Do not ingest. Keep away from clothing and other combustible materials. Storage: Store in secondary containment with Carcinogen label on the primary container, secondary containment and the storage location. Keep container tightly closed in a cool, dry, and well-ventilated. Store away from heat sources and in a flame proof area.

Spill & Accident Procedures

Location(s) and Types of Fire Extinguisher(s)

Location(s) and Types of Chemical Spill Clean-up Kit(s)

Spill – Assess the extent of the danger. Help contaminated or injured persons. Evacuate the spill area. Avoid breathing vapors. If possible, confine the spill to a small area using a spill kit or absorbent material. Keep others from entering contaminated area (e.g., use caution tape, barriers, etc.)

Small (<1L) – If you have training, you may assist in the clean-up effort. Use appropriate personal protective equipment and clean-up material for chemical spilled. Double bag spill waste in clear plastic bags, label and submit for hazardous waste pickup.

Large (>1L) – Dial 911 and EHS at 491-6745 for assistance. Call the EHS pager at 419-5250 for emergency assistance.
**Chemical Splash on Body or Clothes** – Remove clothing and rinse body thoroughly in emergency shower for at least 15 minutes. Seek medical attention. Notify supervisor and EHS at 491-6745 immediately.

**Chemical Splash in Eyes** – Immediately rinse eyeball and inner surface of eyelid with water from the emergency eyewash station for 15 minutes by forcibly holding the eye(s) open. Seek medical attention. Notify supervisor and EHS at 491-6745 immediately.

**Medical Emergency**

Dial 911 immediately.

**Location(s) of First Aid Kit(s)**

**Location(s) of Emergency Shower(s)**

**Location(s) of Eyewash(es):**

**Life Threatening Emergency, After Hours, Weekends and Holidays – Dial 911.** All serious injuries must be reported to Risk Management and Insurance and EHS at 491-6745 immediately.

**Non-Life Threatening Emergency** – Go to an approved provider or to the hospital emergency room. All serious injuries must be reported to Risk Management and Insurance and EHS at 491-6745 immediately.

**Needle Stick/Puncture Exposure** (as applicable to chemical handling procedure) – Wash the affected area with antiseptic soap and warm water for 15 minutes. For mucous membrane exposure, flush the affected area for 15 minutes using an eyewash station. All needle stick/puncture injuries must be reported to Risk Management and Insurance and EHS at 491-6745 immediately.

The nearest hospital, clinic, or infirmary, University of Colorado Health (Poudre Valley Hospital), is located at 1024 S. Lemay Avenue.
Decontamination/Waste Disposal Procedures

Wearing proper PPE, decontaminate equipment and bench tops using soap and water. Dispose of the used formaldehyde and disposables contaminated with formaldehyde as hazardous waste.

General Hazardous Waste Disposal Guidelines

Labeling Waste

- Affix an **on-line hazardous waste tag** on all waste containers as soon as the first drop of waste is added to the container.

Storage Waste

- Store hazardous waste in closed containers, in secondary containment and in designated location (SAA)
- Double bag dry waste using transparent bags
- Waste must be under the control of the person generating and disposing the waste

Disposal of Waste

- Dispose of regularly generated chemical waste within 9 days
- Call EHS for questions
- Empty Containers
  - Dispose as hazardous waste if it once held extremely hazardous waste (irrespective of the container size)

Safety Data Sheet (SDS) Location

Online SDS can be accessed at [http://msds.ehs.colostate.edu](http://msds.ehs.colostate.edu)

Protocol/Procedure

*(Add lab specific protocols here)*

Prepare the following solutions in ventilated chemical fume hood:

1. **Standard Fixative: FA-PBS** (Reagent formaldehyde, 37% in PBS [137 mM NaCl, 2.7 mM KCl, and 11.9 mM KH₂PO₄/Na₂HPO₄, pH = 7.4])

<table>
<thead>
<tr>
<th>37% Formaldehyde</th>
<th>100 μl</th>
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<tbody>
<tr>
<td>PBS (see SOP for PBS)</td>
<td>900 μl</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>1000 μl</strong></td>
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2. **FA-PBN** (Reagent formaldehyde, 37% in 100 mM PBN [10 mM Phosphate Buffer, 150 mM NaCl, pH =7.4])

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<thead>
<tr>
<th>37% Formaldehyde</th>
<th>100 μl</th>
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<tbody>
<tr>
<td>PBN (see SOP for PBN)</td>
<td>900 μl</td>
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3. FA-PEMS
(Reagent formaldehyde, 37% in PEMS [100 mM PIPES, 2 mM MgSO₄, 2 mM EGTA, pH = 7.0])

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<tbody>
<tr>
<td>37% Formaldehyde</td>
<td>100 µl</td>
</tr>
<tr>
<td>PEMS (see SOP for PEMS)</td>
<td>900 µl</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>1000 µl</strong></td>
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4. FA-PBT (EM-grade formaldehyde, MeOH-free, 16% in PBT [137 mM NaCl, 2.7 mM KCl, and 11.9 mM KH₂PO₄/Na₂HPO₄, 0.1% Triton X-100, pH = 7.4])

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<tr>
<td>16% EM-grade formaldehyde</td>
<td>250 µl</td>
</tr>
<tr>
<td>PBT (see SOP for PBT)</td>
<td>750 µl</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>1000 µl</strong></td>
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5. FA-BFB (EM-grade formaldehyde, MeOH-free 16% in BFB [150 mM PIPES, 3 mM MgSO₄, 1.5 mM EGTA, 1.5% v/v Nonidet P-40 (NP-40)])

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<tbody>
<tr>
<td>37% Formaldehyde</td>
<td>100 µl</td>
</tr>
<tr>
<td>PEMS (see SOP for BFB)</td>
<td>900 µl</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>1000 µl</strong></td>
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6. PLP Fix (2% Paraformaldehyde, 0.4 M Sorrenson Buffer, 75 mM Lysine, 10 mM NaIO₄)

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<tr>
<td>16% Paraformaldehyde (see SOP for Paraformaldehyde)</td>
<td>1.25 ml</td>
</tr>
<tr>
<td>NaIO₄</td>
<td>0.0214 g</td>
</tr>
<tr>
<td>0.4 M Sorrenson Buffer (see SOP for Phosphate Buffer)</td>
<td>8.75 ml</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>10 ml</strong></td>
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7. Bouin’s Fixative (4% Paraformaldehyde, 0.5% Picric Acid, 0.1 M NaH₂PO₄/Na₂HPO₄, pH = 7.2)

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<tbody>
<tr>
<td>16% Paraformaldehyde (see SOP for Paraformaldehyde)</td>
<td>125 µl</td>
</tr>
<tr>
<td>1.2% Saturated Picric Acid (see SOP for Picric Acid)</td>
<td>250 µl</td>
</tr>
<tr>
<td>0.5X Sorrenson Buffer (see SOP for Phosphate Buffer)</td>
<td>125 µl</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>500 µl</strong></td>
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8. Modified Zamboni’s Fixative (4% Paraformaldehyde, 1.6% Glutaraldehyde, 0.2% Picric Acid, 0.1 M NaH₂PO₄/Na₂HPO₄, pH = 7.4)

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<tbody>
<tr>
<td>16% Paraformaldehyde (see SOP for Paraformaldehyde)</td>
<td>125 µl</td>
</tr>
<tr>
<td>50% Glutaraldehyde (see SOP for Glutaraldehyde)</td>
<td>16 µl</td>
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</table>
### 1.2% Saturated Picric Acid
(see SOP for Picric Acid) | 83 µl
---|---
0.1 M NaH₂PO₄/Na₂HPO₄ (pH = 7.4)
(see SOP for Phosphate Buffer) | 125 µl
**Total** | **500 µl**

**Note:** Any deviation from this BMP requires approval from the PI.

---

**Documentation of Training (Signature of all users is required)**

- Prior to conducting any work with the chemical or class in this BMP, designated personnel must provide training to his/her laboratory personnel specific to the hazards involved in working with this substance, work area decontamination and emergency procedures.
- The Principal User must provide his/her laboratory personnel with a copy of this BMP and a copy of the SDS provided by the manufacturer.
- The Principal Investigator must ensure that his/her laboratory personnel have attended appropriate laboratory safety training or refresher training within the last year.

I have read and understand the content of this BMP:

<table>
<thead>
<tr>
<th>Name</th>
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