



Animal Health Center
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INFECTION CONTROL MANUAL

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1. Executive Summary

The intent of this document is to facilitate adherence to protocols designed to protect both the caretaker and the patient from exposure to infectious disease agents. Infectious disease exposure is common in a hospital setting, and the goal of these procedures is to mitigate exposure risk by a diversity (young, old, species variations, etc.) of patients to caregivers with variable health status. These practices have their foundation in the discipline of public health.

Hand washing and hygiene are at the core of preventing the spread of disease in a hospital setting. Correct hand-washing practices must be followed at all times.

Another essential prevention method against spread of nosocomial infection is the proper and appropriate use of Personal Protective Equipment (PPE). Adherence to hospital policy regarding the use and disposal/laundrying of PPE must be followed at all times.

Food or drink are not allowed in animal holding or treatment areas. The application of cosmetics and handling of contact lens are also prohibited in these areas. Food and drink should be consumed in designated areas only.

Specific policies are provided for the control of multi-drug resistant organism infections (MDRI). It is imperative that all personnel know and follow specified procedures for handling known MDRI cases.

All personnel must be familiar with protocols identifying and placing patients in isolation. These protocols are provided, in detail, within this document for reference.

2. Introduction

A primary concern of the College of Veterinary Medicine is the safety of personnel (staff, students, visitors) and patients. The College is committed to providing training and resources that are necessary to ensure this commitment to safety is effected.

Numerous pathogens are associated with nosocomial and zoonotic diseases and many are encountered commonly in veterinary medical practice. These pathogens include, but are not limited to, microorganisms such as *Salmonella*, *E. coli*, multidrug resistant organisms such as methicillin-resistant *Staphylococcal aureus*, *Pseudomonas*, and other bacteria. Viral and prion-associated diseases are encountered also. Intervention at the earliest possible stage of the encounter of disease spread is accomplished by identification of animals with potential for infectious disease and proper isolation, appropriate handling of suspected cases including risk assessment of responsible personnel, and further reduction of exposure by disinfection and cleaning of areas utilized. Self-reporting of health risks of subpopulations that may be more susceptible or vulnerable to potential infection is required. These subpopulations include individuals that may be pregnant, those with immunosuppressive disorders, individuals undergoing treatment with immune-suppressive drugs, those with open skin wounds or chronic skin diseases, and others with chronic disease processes. It should be noted that very elderly or young, healthy individuals might be at an increased risk, as well. ***Anyone with a condition that a person believes may make them vulnerable to infection while carrying out their normal daily duties within the College of Veterinary Medicine is required to notify the Associate Dean for Admissions and Student Affairs and the Director of the Animal Health Center (Chair of the Biosafety and Infection Control Committee).***

3. General guidelines for infection control

General Biosecurity Policies and Procedures

Personal Protective Actions and Equipment

Hand Hygiene

Nosocomial infections are recognized as a major concern in human medicine with approximately 2 million incidents reported annually in the United States and costing an estimated \$4.5 to \$11 billion. It should be expected that the risk of nosocomial infections is probably even higher in veterinary medicine due to the nature of veterinary patients with their grooming and toiletry habits. Total counts of bacteria on the hands of human medical staff have ranged from 3.9×10^4 to 4.6×10^6 . ***Hand hygiene has been considered the most important tool in controlling and preventing nosocomial infections.***

- Regardless of glove usage, wash hands before and after each patient encounter.
- Wash hands after contact with feces, body fluids, vomitus, exudates, or any surface or article contaminated by these substances.
- Wash hands before eating, drinking, or smoking.
- Wash hands after using the restroom.
- Wash hands after cleaning animal cages or areas used by patients.
- Wash hands whenever visibly soiled.
- Alcohol-based hand rubs may be used if hands are not visibly soiled, but washing of hands with soap and water is preferred.
- Do not wear hand jewelry or artificial nails when handling animals.
- Keep fingernails trimmed short.
- Correct hand washing procedure:
 - Wet hands with running water
 - Place soap in palms and rub together to make a lather
 - Scrub hands thoroughly **for a minimum of 20 seconds (Need a timer? Hum the “Happy Birthday” song from beginning to end twice.)**
 - Rinse hands in running water thoroughly
 - Dry hands with a disposable (paper) hand towel
 - Turn off faucet using the disposable towel to prevent contact of faucet control with clean hand
- Correct use of hand rubs:
 - Ensure hands are visibly unsoiled
 - Place alcohol-based hand rub in palms
 - Apply to all surface of the hands
 - Rub hands together until dry
- More information regarding hand hygiene can be found at:
 - Günter Kampf and Axel Kramer. Epidemiologic Background of Hand Hygiene and Evaluation of the Most Important Agents for Scrubs and Rubs. Clinical Microbiology Reviews, October 2004, p. 863-893, Vol. 17, No. 4.
<http://cmr.asm.org/cgi/content/full/17/4/863>

- Another excellent resource regarding hand hygiene can be found with the webpage for the Center for Food Safety and Public Health at Iowa State. <http://www.cfsph.iastate.edu> (CFSPH Main Menu->Infection Control -> Disinfectant Resources)

Use of Gloves

- It is not necessary to wear gloves when examining or handling apparently healthy animals. However, the use of gloves will reduce the chance of unintentional microbe transmission, will reduce skin contact with animals and may reduce the potential for developing allergies.
- Gloves should be worn when handling feces, body fluids, vomitus, and exudates
- Gloves should be worn when cleaning cages, litter boxes, and contaminated surfaces and equipment.
- Gloves should be worn when handling dirty laundry.
- Gloves should be worn when handling diagnostic specimens (e.g., urine, feces, aspirates, or swabs).
- Gloves should be worn when handling an animal with a suspected infectious disease.
- Gloves should be worn when handling immune compromised animal patients.
- ***Gloves should be worn at all times when handling patients in the intensive care unit. Gloves must be changed between patients.***
- Gloves should be changed between examinations of individual animals or animal groups (e.g., litter of puppies).
- Gloves should be changed between dirty and clean procedures on the same patient.
- Gloves should be removed promptly and disposed of after use.
- Hands should be washed after removal of gloves.

Facial Protection

- Facial protection should be worn whenever splashes, sprays, or aerosolization is likely to occur.
- Facial protection may be accomplished with a face shield, or goggles/glasses worn with a surgical mask.
- Facial protection should be worn with the following procedures:
 - Dentistry
 - Lancing abscesses
 - Flushing of wounds
 - Nebulization
 - Suctioning
 - Lavage
 - Scoping procedures
 - Obstetrical procedures
 - Necropsy

Protective Outerwear and Attire

- The Mississippi State University-College of Veterinary Medicine-Animal Health Center (MSU-CVM-AHC) promotes the use of hospital dedicated attire in order to decrease the risk of transferring infectious agents to public locations where people or animals may be exposed or, conversely, unknowingly bringing infectious agents into the hospital.
- All personnel are required to wear clean professional attire, clean protective outer garments, and clean, appropriate footwear at all times. This attire should be appropriate to the job at hand (e.g., coveralls and heavy boots or closed toe/heel shoes are appropriate footwear and protective outer garments are appropriate when working with large animal patients and performing tasks that have a high risk of being soiled with infectious materials.) Professional attire covered by a laboratory coat will generally be appropriate for small animal clinical duty.
- **Scrubs, scrub tops, lab coats and other dedicated work clothes and shoes should not be worn home or into areas outside the AHC. Operating room attire (gowns, gloves, masks, etc.), including shoe covers and head covers, should be worn only in the operating room suite**
- MSU-CVM-AHC provides a laundry service for hospital and laboratory attire. A separate laundry maintained by LARAC provides laundry service for some LARAC uniforms to reduce potential for cross contamination between client and research animals.

Food and Drink, Contact Lenses, Applying Makeup

- Food and drink should not be consumed in animal holding areas or laboratory areas of the hospital. This restriction includes access areas and hallways immediately adjacent to animal holding areas and laboratories.
- If food or drinks are to be consumed or served, separate areas should be used to avoid possible contamination. A list of designated areas may be found in CVM Policy 55.6.1.06 *Food and Drink in the Hospital*.
- Clothing and shoes soiled by animal dander, feces, urine, or any other bodily secretion or excrement is inappropriate to be worn in the cafeteria or out of the building to any public area. Note that CLEAN laboratory coats worn over CLEAN surgical scrubs to prevent surgical scrubs from being soiled is the **only exception to this mandate**. Coat racks are provided immediately outside the cafeteria entrances for laboratory coat storage.
- Contact lenses should only be replaced after washing hands, and preferably in a location outside an animal holding or treatment area.
- Makeup should not be applied or reapplied in animal holding or treatment areas.

Risk Assessment and Communication

- At each stage of case workup (e.g., appointment scheduling, admissions, history taking, physical exam, etc.) every effort should be made to identify possible contagious or zoonotic diseases and appropriate steps followed to mitigate disease spread and/or contact.

- It is the responsibility of the student, faculty, or staff member to communicate any health risks they may notice to his or her immediate supervisor. As pregnancy, splenectomy, or other therapy/treatments may result in reduced immunity, provisions must be made by administration to accommodate these individuals in course and laboratory requirements.
- Faculty, staff, and students must report immediately any change in health status that may increase susceptibility to infectious agents or radiological and anesthetic hazards to their immediate supervisor or to the Academic Affairs office. These changes should be further reported immediately to the Associate Dean for Admissions and Student Affairs and the Director of the Animal Health Center (Chair of the Biosafety and Infection Control Committee).
- In cases of suspect or confirmed zoonotic diseases, clients, referring veterinarians, student, and staff contacts should be made aware of potential risks. Any person with known suspected symptoms should be encouraged strongly to seek immediate medical attention immediately.
- In cases of contagious diseases, clients and referring veterinarians should be informed and counseled on controlling spread of the disease.

Reporting Process

All individuals with a condition (e.g., immunosuppression, splenectomy, not vaccinated) that may potentially make them more vulnerable to infection while carrying out their normal daily duties within the College of Veterinary Medicine are required to notify the Dean for Admissions and Student Affairs and the Director of the Animal Health Center (Chair of the Biosafety and Infection Control Committee). Likewise, individuals that have recently traveled internationally or had exposure to reportable/exotic diseases/Biosafety Level 3 contact must adhere to the following guidelines and report their status to the Director of the Animal Health Center (Chair of the Biosafety and Infection Control Committee).

Understanding Routes of Transmission

Knowing the basic routes of infectious disease transmission can be useful in protecting one's self, the patient, and the client from known and unknown potential pathogens.

- Aerosol transmission – Occurs when pathogenic agents contained in aerosol droplets are passed from one susceptible animal to another, or from animal-to-human (zoonoses). Most pathogenic agents generally do not survive for extended periods of time within the aerosol droplet, although there are exceptions. *Streptococcus equi* can survive for 4 to 6 weeks in secretions on wood. Pressure washing of cages, stalls, etc., may re-aerosolize infectious agents that have landed previously on a surface.
- Oral transmission – Involves the consumption of pathogenic agents in contaminated feed, water, or by licking/chewing on contaminated environmental objects. This transmission can also occur inadvertently through inhalation of aerosolized material and subsequent swallowing of materials present in the nasopharynx. Feed and water contaminated with feces or urine are frequently the cause of oral transmission of disease agents. Contaminated environmental objects may include

equipment, feed bunks, water troughs, fencing, salt and mineral blocks, and other items that an animal may lick or chew. In people, oral contact with contaminated hands is commonly part of the transmission cycle of fecal-oral spread either to themselves or to their next patient. This emphasizes the need for an excellent hand hygiene protocol.

- Direct contact transmission - Requires the presence of an agent or organism in the environment or within an infected animal. A susceptible animal becomes exposed when the agent directly touches open wounds, mucous membranes, or skin through blood, saliva, nose-to-nose contact, rubbing, or biting. It is important to note that, depending on the disease agent, it is possible for direct contact transmission to occur among animals of different species, as well as to humans.
 - Reproductive transmission – a subtype of direct contact that encompasses diseases spread through venereal and in-utero routes. Venereal transmission is the spread of pathogenic agents from animal-to-animal through coitus. In-utero (or transplacental) transmission is the spread of pathogenic agents from dam to offspring during gestation.
- Fomite transmission – Requires an inanimate object to carry a pathogen from one susceptible animal to another. Fomite transmission often involves a secondary route of transmission such as oral or direct contact for the pathogen to enter the host. Anything may act as a fomite including obvious objects such as contaminated vehicles, shovels, boots/shoes, clothing, bowls/buckets, syringes, medical equipment, brushes, tack, and clippers, but also less obvious items such as keyboards, telephones, and multi-dose medicinal containers.
 - Traffic transmission – a subtype of fomite transmission in which a vehicle, trailer, or human contributes to the spread of a pathogenic agent through contaminated tires, wheel wells, undercarriage, clothing, or shoes/boots by spreading organic material to other locations.
- Vector-borne transmission – Occurs when an animal (usually an insect or arthropod) acquires a pathogen from one animal and transmits it to another. Vectors can transmit disease either mechanically or biologically. Mechanical transmission means that the disease agent does not replicate or develop in/on the vector; it is transported simply by the vector from one animal to another (flies, hands, etc.). Biological transmission occurs when the vector takes up the agent, usually through a blood meal from an infected animal, replicates and/or develops it, and then passes the agent through such acts as regurgitating the pathogen onto or injecting it into a susceptible animal. Fleas, ticks, and mosquitoes are common biological vectors of disease agents.
- Zoonotic transmission – Occurs when diseases are transmitted from animals to humans. Human exposure will actually occur through one of the five routes of transmission (listed above), but because of zoonoses medical importance, it is addressed as a separate route of transmission.

International Travel and Reportable/Exotic Disease Contact

International travel within the past 5 days

- Clothing taken outside the US/Canada should be laundered/dry cleaned before return. Any clothes worn on the return trip must be laundered/dry cleaned immediately upon return.
- All dirt and soil should be removed from shoes and personal items (watches, cameras, laptops, jewelry, cell phones, etc.) by thorough cleaning followed by disinfection with a 250-300 PPM bleach solution or Virkon-S.
- No plant or animal products should be brought to any CVM or university farm premises, including any food products purchased during any international travels regardless of whether that good passes customs inspection (except under USDA license).
- Clinicians and receptionists are responsible for ensuring clients do not fall under the restrictions noted above.

Reportable/Exotic Disease/Biosafety Level 3 contact within the past 7 days

- Personnel who have visited a Biosafety level 3 or 3+ laboratory dealing with exotic/reportable disease outbreak investigation or research and/or have traveled out of US/Canada and have had contact with animals, including livestock, birds, horses, zoo animals, pets, wildlife, or laboratory animals, will be restricted from access to the CVM or university farm premises for 7 days post animal contact. Clothing, footwear, and personal items worn during the animal contact should be treated as above.
- Personnel who have been helped investigate or control any exotic disease outbreak within the borders of US/Canada will be restricted from access to the CVM or university farm premises for 7 days post animal contact. Clothing, footwear, and personal items worn during the investigation should be treated as described above.

Tours and public offerings

- CVM staff coordinating visits, open house activities, or tours may restrict access to any member of the group should they fall under any of the above limitations, as well as ensure that no member of the tour group be pregnant, have any immunologically limiting disease, or be on any immunologically suppressing drug therapy, if that group is to have any access to animal areas including the barns and hospital. This restriction applies also to all students and CVM employees giving both formal and informal tours.

- ***Visitor Policy Form***

The College of Veterinary Medicine's goal is to ensure the safety of all visitors and patients. It is the College's responsibility to protect the public and its patients from adverse risks. The College regrets any inconvenience this may cause. As a result:

Please inform all members of your group of these precautionary measures.

Please inform your College of Veterinary Medicine tour leader/contact if any member of your group has any health issues that may compromise that individual's immune system defenses, including pregnancy, immunosuppressive diseases, and/or immunosuppressive drug therapy.

Please inform your College of Veterinary Medicine tour leader/contact if any member of your group has traveled outside the United States or Canada within the past 5 days, or if any member of your group has had contact with any animals outside the United States or Canada within the past 7 days, or if any member of your group has been in an area under quarantine for an exotic animal disease within the United States or Canada within the past 7 days.

Please confirm that all members of the tour group have been informed of the above issues and have agreed to abide by any restrictions deemed necessary.

Signature of group leader

Date

4. Patient isolation determination

Small Animal

During the Phase II Orientation to clinics and at the beginning of each primary care Community Veterinary Services rotation students are instructed in appropriate handling of cases and proper isolation protocols. This includes each student taken to isolation and instructed about the processes for entering and caring for a patient admitted to isolation. This is verified with the electronic ID scan.

This process includes:

- All loose articles of clothing and equipment will be removed before entering the anteroom of isolation.
- PPE includes gowns, gloves, shoe covers, and face shields/masks (if warranted) be donned.
- A footbath with a phenol solution will be set up just outside the isolation room.
- Any item brought into isolation will stay in isolation or be disposed of with bio-hazardous materials. All supplies and equipment needed for patient care will be found in isolation. If an item needs restocked, notify the technician in the area.
- The isolation ward will be indicated as “occupied” with external door signage.
- ICU personnel will be notified regarding occupancy so video monitoring may occur.
- All PPE will be removed before exiting isolation and disposed of in bio-hazardous marked bags.
- After removal of boots/shoe covers, shoes will pass through the phenol footbath or disinfectant applied. Hands will be washed and hand sanitizer utilized after washing but before leaving the isolation anteroom.
- Personnel are instructed to use prudence when returning to the AHC and as to patient interaction selection.

Identification of potential infectious disease patients

- The health care team will monitor and identify potentially highly infectious cases at the earliest possible stage of the visitation process. (Example: If a client/referring DVM calls with a young, minimally vaccinated puppy with diarrhea; a suspicion of parvovirus will be made and the patient handled accordingly until a definitive diagnosis is made.)
- Any suspect animal will be identified immediately upon admission, the student/house officer/faculty member notified, and appropriate protocols followed to minimize exposure to healthy animals and, if applicable, personnel.
 - Establish two types of restricted animal access.
 - Animals **suspected strongly** of having the following diseases or signs should be treated as probable highly infectious (limited access and exposure), and, if admitted, placed immediately in isolation:
 - Acute distemper, parvo, infectious hepatitis, leptospirosis, bordetellosis (kennel cough), feline upper respiratory tract infections, or any other undiagnosed infection that appears to be contagious.

- Restricted access for any animal with a multi-drug resistant infection (MDRI). These include:
 - Any organism susceptible to one or two antimicrobial families
 - Gram-negative infections resistant to 3rd-generation cephalosporins (extended-spectrum beta-lactamase (ESBL) producers) and fluoroquinolones.
 - *Methicillin-resistant Staphylococcus aureus* (MRSA)
 - Clinical microbiology will:
 - Report suspected MDRIs to the head technician in the service.
 - Veterinarians listed on the submission will be notified by email or phone call.
 - The record should be flagged to indicate the organism is a MDRI.
- Suspect animals will be admitted to the Animal Health Center for examination via an alternate route minimizing contact with patients in the reception areas and outpatient hospital areas. Likewise, if contagious potential is known ahead of presentation, patients will be presented to the AHC using alternate route (side hallway between Landscape room and AHC administrative offices). Patient should be transported through this area by gurney to minimize spread of contagion. If used, personnel must physically quarantine the alternate route until such time as it can be properly disinfected.
- Suspect animals should be taken immediately to Room a1511 (2nd choice is a1510) for taking history and performing a physical examination. These exam rooms are located in an area with less traffic and therefore provide less potential exposure to healthy, client-owned animals and personnel. The objective of infection control involves elimination/isolation of the source, reduction of susceptible host(s), and/or interruption of transmission.
- If the animal has a highly contagious disease it is either discharged immediately via the alternative route or admitted to small animal isolation (Room a1509).
- Quarantine signage (blue contaminated room sheets) is placed on both exam room doors (Room a1511, 2nd choice is a1510) and directions followed for contacting LARAC for cleaning/disinfecting.
- Personnel are reminded to wash their hands and wear appropriate Personal Protective Equipment (PPE) when handling such cases.

Equine

At the beginning of each Equine Medicine and Surgery Services rotation, students are instructed in appropriate handling of cases and proper isolation protocols. This includes each student taken to isolation and walked through the processes for entering and caring for a patient admitted to isolation. This process is verified with the electronic ID scan.

Guidelines for Receiving and Managing equine patients at high risk of carrying 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, or infections with bacteria that are resistant to multiple antimicrobial drugs.

- 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.
- Patients with moderate contagious disease risk status may be required to be housed in isolation.
- When, out of necessity, patients with moderate or elevated contagious disease risk status are housed in the main inpatient areas, an effort must be made to use appropriate barrier/restricted access nursing and biocontainment practices with the patient.
 - Barrier nursing precautions must be used at all times.
 - Disinfectant (phenol) footbaths or foot mats must be used.
 - Stalls housing these patients should be cordoned off.
 - Empty stalls should be maintained on either side and across the aisle as caseload permits.
 - Using stalls at the end of aisles is preferred to stabling near main traffic corridors.
 - Once a “contaminated” stall is vacated, cleaned, sanitized, and cultured, that stall should not be reused until the results from the LARAC cultures have been returned and evaluated. The equine service chief will be given a copy of the culture results.

Enteric contagious infection

Horses frequently develop loose stools and even diarrhea for reasons other than contagious infections. Because it is clinically difficult to determine the difference, guidelines have been established to determine how the horse developing loose stool or diarrhea during hospitalization will be handled.

- Clinical signs associated often with infectious diarrhea or impending diarrhea include:
 - Inappetence
 - Fever (rectal temperature > 101.7°F, if receiving NSAID tx > 101.5°F)
 - Neutropenia (PMN < 2000/μL)
- Diarrhea requiring initiation of enteric precaution is defined as fluid manure to cowpie consistency manure with a fecal pat less than 2 cm thick and one or more of the clinical signs noted above.
- Any horse admitted with infectious diarrhea will be admitted directly to isolation.
- Any horse admitted to isolation should not enter the hospital unless for critically needed, advanced diagnostic procedures.

Enteric Precaution

Any non-neonatal horse (> 4 weeks old) exhibiting any 2 or more of the above clinical signs in the absence of diarrhea may stay in the main wards but will have enteric precaution procedures instituted.

- Barrier nursing precautions must be used at all times.
 - Booties, gloves, and gowns are required to enter the stall or the cordoned area.
 - Remove booties, gowns, and gloves and dip feet as you leave the cordoned area even if it is just to run to the exam room to get a catheter cap or needle. There are no exceptions.
 - Use hand disinfectant as you depart the cordoned area.
 - A 6'X10' boundary area will be cordoned with rope and or tape centered on the stall door. Hang disposable gowns on a rack within this boundary. Place disposable gloves and booties in a rack within this boundary. Place disinfectant (phenol) footbath and absorbent paper within the boundary near the stall door. Ideally, leave the stall immediately adjacent to the enteric precaution stall empty as well as the stall immediately across the hall.
 - LARAC will be notified as soon as possible.
- Begin, continue, or re-initiate *Salmonella* and *C. difficile* culture series. Additionally, the senior clinician may request the equine diarrhea PCR panel and equine enteric disease culture panel.
- Post the appropriate Infectious Disease Control (IDC) card and inform LARAC.
- LARAC personnel will handle manure and gutter area as if contaminated by an enteric pathogen using their IDC protocols.

Colic cases

Both medical and surgical colic case animals may develop loose stools and even diarrhea for reasons other than contagious infection due to the administration of mineral oil, dioctyl sodium succinate, infusion of large amounts of fluid intravenously or directly into the bowel, and surgical manipulation and/or resection of segments of intestine, as examples. Because it can be clinically difficult to determine the cause, guidelines have been established for dealing with the colic patient that develops diarrhea.

- Colic patients that have the above interventions that can lead to loose stools or diarrhea will be given a 48-hour window of exception for movement to isolation. However, enteric precautions will be instituted if loose stools or diarrhea are noted.
- Continuation of diarrhea beyond 48 hours will require patient transfer to isolation.
- The 48 hour window of exception will be rescinded if the colic patient has diarrhea accompanied by neutropenia (PMN < 2000/ μ L), inappetence, and fever (rectal temperature > 102°F, or if receiving NSAID tx > 101.5°F)

Mares and neonates

Neonatal foals frequently develop loose stools and even diarrhea for reasons other than contagious infections. Such causes include gastric ulcers, “foal heat diarrhea,” sepsis, lactose intolerance secondary to prematurity, etc. Because it can be clinically difficult to determine the difference, guidelines have been established for dealing with foals ≤ 4 weeks of age that develop diarrhea.

- Any neonatal foal from which a communicable pathogen (*Salmonella* spp., *Clostridium difficile*, etc.) is cultured in the stool shall be moved to isolation.
- Any neonatal foal that is *C. difficile* toxin A or B positive will be moved to isolation.
- Neonatal foal exhibiting diarrhea with clinical issues that may result in diarrhea and having one of the following findings and from which no pathogen has been isolated may stay in the main hospital with enteric precaution protocols instituted.
 - Neutropenia (PMN $< 2000/\mu\text{L}$)
 - Inappetence
 - Fever (rectal temperature $\geq 102.5^\circ$)

Criteria for terminating enteric precaution in horses and foals

All of the following criteria must be met for discontinuing enteric precaution protocols as well as the consensus of the senior clinicians on duty.

- Diarrhea resolved or determined not to be infectious in origin, (Example: blister beetle toxicity).
- Inappetence, neutropenia, and fever resolved.
- Five sequential negative *Salmonella* spp. cultures.
- Two negative *Clostridium difficile* toxin A&B tests

Food Animal

The goal of the biosecurity plan is to ensure to a reasonable degree, protection of animal handlers, the patient, and other patients of the food animal clinic.

Cases seen in the food animal clinic can be divided into four types based on risk of contagious or zoonotic disease.

Isolation cases – These are cases at high risk of transmission of zoonotic or significant pathogens.

- Any neonate or non-neonate patient with a diagnosed zoonotic disease, or with a high index of suspicion (as per the faculty clinician on the case) of having a zoonotic disease (e.g., *Salmonella*, *Cryptosporidium*) or significant contagious disease (Johne’s, BVD, acute viral respiratory agents, contagious vesicular diseases, etc.) should be admitted to isolation or should be moved as soon as feasible to isolation.
- Any sick animal from farms/ranches that have a known endemic zoonotic or a significant contagious disease on the premise shall be placed into isolation immediately and not be admitted to the main clinic floor, including for initial work-up.

Special/Enteric Precautions cases –Cases with non-acute respiratory tract disease and cases with GI disease that is not considered to represent a significant zoonotic or contagious threat.

- These patients may be housed in-hospital with special handling precautions to prevent introduction or fomite spread of disease agents.
- The clinician (faculty case doctor) has authority and responsibility to determine the need for Special Precautions procedures on any case.
- If these cases develop a condition requiring isolation, they must be moved to isolation as soon as possible.

General hospitalized cases – All other hospitalized patients not categorized as isolation or special/enteric cases. This classification is subject to change during the period in which the animal is hospitalized.

- If possible, diarrheic cases are to be placed in stall 1 in the corner of the barn away from the main traffic flow.
- In the event stall 1 is not available, stall 3 will be utilized.

Outpatient cases - Those cases presented to the clinic for outpatient procedures and routine evaluation that are considered tentatively as minimal risk to the hospitalized population.

- Cases presented to the clinic for work-up of potential zoonotic disease or contagious disease will follow the described protocol for isolation cases and not enter the main clinic floor for evaluation.

5. Isolation areas

Protocol for Small Animal

Students are instructed in appropriate handling of cases and proper isolation protocols. This includes taking students to isolation and demonstrating the processes for entering and caring for a patient admitted into isolation.

Placing a patient in isolation

- Any animal suspected of having certain infectious diseases will be identified immediately on admission, the student/house officer/faculty member notified, and appropriate protocols followed to minimize exposure to healthy animals and, if applicable, personnel.
 - Establish 2 types of restricted animal access:
 - Animals suspected strongly of having the following diseases or signs should be treated as probable highly infectious cases (limited access and exposure) and, if admitted, placed immediately into isolation:
 - Acute distemper, parvo, infectious hepatitis, leptospirosis, bordetellosis (kennel cough), feline upper respiratory tract infections, or any other undiagnosed infection that appears to be contagious.
 - Restricted access for any animal with a multi-drug resistant infection (MDRI). These include:
 - Any organism susceptible to one or two antimicrobial families.
 - Gram-negative infections resistant to 3rd-generation cephalosporins (extended-spectrum beta-lactamase (ESBL) producers) and fluoroquinolones.
 - Methicillin-resistant *Staphylococcus aureus* (MRSA).
- Suspect animals will be admitted to the Animal Health Center for examination via an alternate route minimizing contact with patients in the reception areas and the outpatient hospital areas. Likewise, if contagious potential is known ahead of presentation, bring patient into AHC using alternate route (side hallway between Landscape room and AHC administrative offices). If an alternate route is used, quarantine personnel physically off the alternate route until such time as that route can be properly disinfected.
- If possible, owners should be instructed to leave their pet in their car until the animal can be properly admitted. The internal vehicle environmental conditions **must** be maintained at a safe temperature (heating/cooling) for animals.
- Suspect animals should be taken immediately to Room a1511 (2nd choice room a1510) for obtainment of history and physical examination. These exam rooms are located in an area with less traffic and providing therefore less potential exposure to healthy client-owned animals and personnel. The objective of infection control involves elimination/isolation of the source, reduction of susceptible host(s), and/or interruption of transmission.
- If the animal is found to have a highly contagious disease then it is either discharged immediately via the alternative route or admitted to the Small Animal Isolation (Room a1509).

- Quarantine signage (blue contaminated room sheets) is placed on both exam room doors and directions followed for contacting LARAC for cleaning/disinfecting.
- Before entering the anteroom of the isolation unit, all loose articles of clothing and equipment must be removed.
- Enter the anteroom.
- Don PPE including gown, glove, shoe covers, and face shield/mask (if warranted)
- Set up a (phenol) footbath just outside the isolation room.
- Prepare the cage with cage liners, bowls, etc., as indicated or directed.
- Have the patient brought immediately to the isolation ante-room so you can assume control of the patient
- Place the patient into the isolation ward.
- To exit, remove carefully all PPE, paying special attention to prevent contamination of clothing, and just prior to exiting the ward discard PPE into the biohazard waste container.
- Step into the footbath with shoe covers, remove, and discard
- Wash your hands.
- Step into the footbath with shoes or apply disinfectant to soles.
- Enter the ante-room.
- Any item brought into isolation will stay in isolation or be disposed of with bio-hazardous materials. All supplies and equipment needed for patient care can be found in the isolation area. If an item needs restocked, notify the technician in the area.
- Use alcohol-based hand sanitizer prior to leaving the anteroom.
- The isolation ward will be indicated as “occupied” by external door signage.
- ICU personnel will be notified as to the occupancy status so video monitoring may occur.
- A clean smock should be donned over your clothing.
- Personnel are instructed to use prudence and proper patient interaction when returning to the AHC.
- A patient will be discharged only from isolation to return to their home environment via the alternative route used for admission.
- If at any time during these processes the person’s clothing becomes contaminated or soiled, they are to follow procedures as outlined to exit the isolation area and then proceed immediately to the large animal locker room (a1733 or a1732). Once there, they should remove their clothing and place those items into a biohazard bag to be taken to the CVM laundry. Proceed to shower. A set of clean clothes or scrubs will be donned.
- These processes are posted in the anteroom of the small animal isolation as reference.

Protocol for Equine

Any horse admitted for the diagnostic work-up or treatment of suspected highly contagious disease (see list following) shall be admitted directly to the isolation facility.

- Any diarrhea case
- *Streptococcus equi equi*
- Equine Herpes Virus 1
- Equine Influenza Virus
- Equine Infectious Anemia
- Vesicular Stomatitis Virus
- Other

Transfer to Isolation

- Any hospitalized horse meeting the definition of contagious diarrhea or developing any of the above diseases will be transferred to isolation and LARAC notified.
- Any personnel entering or leaving this area must comply with all PPE, sanitation, disinfection, and traffic pattern requirements.
- If there is a maintenance issue in an isolation stall or building wide that makes maintaining a patient in the isolation facility untenable, a maintenance person will be expected to resolve the issue and will do so in full compliance with all PPE, sanitation, disinfection, and traffic pattern requirements. The senior clinician on the case and the service chief will decide if the issue can wait until the stall and/or building is vacated.

Transfer out of Isolation

- With rare exceptions, a horse transferred to isolation will stay there until discharge.
- A consensus of senior clinicians and the service chief will be required to allow a horse from isolation to return to the main hospital.

Movement of Personnel in and out of Equine Isolation

- Equine isolation is divided into four zones denoting the level of risk of contamination.
 - Zone 1— clean bathroom hallway and bathrooms encountered immediately when entering the keycard access restricted door on the north side of the building across from the research wing.
 - Zone 2— the anteroom corridor connecting the Zone 1 corridor on the west end and the supply room and the equine isolation nurses station on the east end.
 - Zone 3— Stall anteroom. Each anteroom is a separate Zone 3 restricted area.
 - Zone 4— Stall. Each stall is a separate Zone 4 restricted area.
 - Zone 4a— animal access, muck bucket, waste removal corridor.
- Keycard access to isolation is limited to equine clinicians and staff, students currently on the rotation, and LARAC personnel responsible for cleaning isolation.
- Access is via the door on the north side across from the research wing. Entry is into Zone 1— the clean zone.

- On entering Equine Isolation (Zone 1), pick up a pair of clogs and clean coveralls and proceed to the rest room. Remove your outer clothes and shoes and put on the coveralls and clogs. Clothes worn in the main hospital must be hung in a separate area in the bathroom from where the coveralls worn in isolation are hung. Leave any personal equipment, such as stethoscope, thermometer, etc., in the rest room as these items are supplied in the isolation stall. If a higher quality stethoscope than that provided is required, your personal stethoscope must be cleaned thoroughly and wiped with alcohol upon leaving isolation.
- Move to the bench that separates the Zone 1 hall from the Zone 2 hall into which the isolation anterooms open. On that bench, remove your Zone 1 clogs you were wearing so that they remain in Zone 1. Swing around on the bench and use a set of clogs or boots designated for Zone 2. If admitting a new patient, select a pair of rubber boots to take to the stall.
- Sit on the bench that separates the Zone 2 hall from the isolation stall anteroom (Zone 3). Remove your Zone 2 footwear so that they remain in Zone 2. Swing over and place your feet into the boots you have brought with you, or that were already in the anteroom. These boots may not be worn in Zone 2 until the animal leaves and the boots have been disinfected. Cover your coveralls with an impervious gown and put on a pair of exam gloves.
- If you need to enter the animal access corridor (dirty hallway) behind the isolation stall to empty manure or trash, place over your rubber boots a pair of booties located just outside the stall door. Discard the plastic booties and place on clean exam gloves as you re-enter the stall.
- Leaving isolation involves reversing the procedures described.
 - Remove the impervious gown and gloves and wash your hands.
 - Sit on the bench and remove rubber boots then use hand disinfectant.
 - Swing over the bench and put on the clogs you left in the hall.
 - Walk to the bench that separates the Zone 2 hall from the Zone 1 hall.
 - Remove the clogs you wore in the Zone 2 hall, swing over the bench into the Zone 1 hall, and put on the Zone 1 clogs you left there.
 - Walk to the rest rooms and change into your personal clothing or in the equine isolation nurse's station, immediately wash your hands and use hand sanitizer.
 - Place the coveralls into the laundry hamper and put the clogs back in the hall.
 - Wash your hands and dip your shoes as you leave the isolation facility.

Movement of supplies in and out of Equine Isolation

- Feed and bedding should be placed next to the personnel entrance to the animal access corridor immediately across from the feed and bedding storage shed before entering the equine isolation unit through the key card access door. Once required PPE is donned appropriately, enter the animal access corridor via the stall for which the feed and/or bedding is intended.
- Supplies such as fluids, absorbent paper, etc., may be taken through the key card access door or placed at the door near the end of the clean corridor that opens into the supply closet.

- LARAC will support Equine Isolation following LARAC SOP (Livestock-06) and AHC List of Duties.

Equine Isolation Patients needing advanced diagnostic tests

- Whenever possible, diagnostic, surgical, and therapeutic procedures should be performed wherever the high-risk patient is housed, rather than moving the patient to common exam rooms or treatment areas. However, because it is impractical to duplicate expensive equipment for isolation needs only, it will be necessary from time to time to move a high-risk patient.
- If at all possible, these procedures should be performed late in the afternoon.
- It is the clinician's responsibility to ensure that LARAC is informed of the need to move high-risk patients through the hospital so that required personnel can disinfect the hallway and room after a procedure is finished.
- The clinician shall inform all services assisting with the procedure about the known or suspected pathogen and appropriate barrier precautions.
- During the procedure, personnel must follow appropriate barrier nursing precautions at all times.
- A horse transferred from isolation into the AHC should enter the hospital through the roll-up door between equine and food animal. If an ultrasound is needed, it should be performed immediately inside this door. If radiology is required, the animal must be moved through the main corridor.
- Doors to all the wards off of the main corridor should be closed as the high-risk patient is moved through the AHC. There should be no other horses in the main corridor.
- Any manure should be removed immediately and the floor bleached after a high-risk patient passes through the corridor.

Protocol for Food Animal

Guidelines applicable to Special Precautions cases

- Cases needing special precautions are placed preferentially in the lowest traffic areas (Stalls 1, 2, and 3).
- A yellow stall sign stating special precautions is affixed to identify the occupant, and phenol footbaths are placed at stall entrances.
- Personnel entering stall should wear gloves, an outer impermeable gown, and plastic booties over rubber boots. On exit, booties and gloves are discarded into a biohazard bag located at the stall, while gowns are hung up and can be reused if not soiled. Students are not permitted to use personal thermometers and stethoscopes. A designated stethoscope and thermometer will be provided for use with these cases. After removal of plastic booties, personnel should step through footbath. Hands are to be washed on exiting the stall, and an alcohol-based hand sanitizer used following hand washing. Stall-side protective items are restocked and phenol footbaths changed daily by the food animal senior technician.

- Following any animal movement (i.e., out of the barn to isolation) the floor will be disinfected with dilute bleach solution by a person following immediately behind the animal.
- LARAC will provide daily stall maintenance and final cleaning/disinfection according to established procedures.

Guidelines applicable to Isolation cases

Scales pens/Mature animals

- Any patient too large to be placed in indoor isolation will be placed into Scales isolation stalls and LARAC notified. These cases include any patient with a suspected or confirmed zoonotic or highly contagious pathogen.
- In the event that more than one case is present in the Scales isolation facility, there will be a stall left empty between animals. If this is not possible, tarps will be hung on the stalls between cases to prevent nose-to-nose contact and fecal contamination of other stalls unless animals are from the same farm/ranch.
- A box or cart will be placed stall side (1 per stall) with all equipment/supplies needed for each case.
- Footbaths (phenol) will be placed at the entrance to each occupied stall and at the entrance/exit from Scales.
- Traffic will be limited through the area when isolation cases are present.
- Personnel entering stall should wear gloves, an outer impermeable gown, and plastic booties over rubber boots. On exit, booties, gloves, and gowns are to be discarded into a biohazard bag located at the stall. Students are not permitted to use personal thermometers and stethoscopes. A designated stethoscope and thermometer will be provided for use with these cases. After removal of plastic booties, personnel should step through footbath. Hands are to be washed upon exit of the stall and an alcohol based hand sanitizer used following hand washing. Stall-side protective items are restocked and footbath phenol solution are changed daily by the food animal senior technician.
- In the event that examination and advanced diagnostics need to be performed, animals will be restrained in the stall or in the hydraulic chute at the scales facility. Following animal movement, the path of animal movement and working facility will be disinfected using dilute bleach.
- In the event that an animal is too fractious or cannot be managed at the Scales facility due to patient attitude; it will be discharged to the client.
- Following discharge of the patient, the stalls will be cleaned by LARAC according to protocol and the stalls cultured as described above.

Small Ruminant/Calf Isolation

- All personnel are to enter the building from the main entrance. Patients will enter the facility through the side door and are not to be taken through the main entrance.
- When admitting a patient into the isolation facility personnel will enter the main entrance and don proper isolation attire according to protocol. The animal will be handed off from a handler on the side entrance to the person within the isolation facility. LARAC will be notified of occupancy.

- The food animal technicians will stock the isolation facility by providing Rubbermaid containers pre-packed with essential supplies.
- Routine equipment and supplies in isolation are not to be removed from the building. Special equipment (ultrasound, surgical packs, etc.) taken into small ruminant isolation, can be removed is appropriately disinfected or sterilized. Any medication taken into isolation will not be removed and will be discarded following discharge of the patient.
- Each pen will have an individual chlorhexadine scrub and alcohol container. These containers will be used for only 1 patient and following discharge all remaining gauze will be discarded and the container sterilized. When there are no patients in isolation the containers will not be filled.
- Each pen will have an individual footbath charged with 1 Stroke (1 ounce/gallon water) or appropriate disinfectant
- Upon entering isolation, a footbath (1 Stroke (1 ounce/gallon of water) will be walked through. All personal equipment and coveralls are to be removed. Coveralls will be replaced with designated isolation coveralls or with an outer impermeable gown. Designated isolation rubber boots (or plastic boot covers) and gloves will be worn at all times in isolation. After donning all required PPE, another footbath will be walked through into the isolation room. When one exits isolation, the footbath will again be walked through. Plastic booties and gloves will be discarded into a biohazard bag. Gowns may be reused (for the same patient) if not soiled. Coveralls will be placed into a laundry basket to be emptied once daily by the food animal technician and taken to AHC Central Sterile area to be laundered. The footbath will be walked through again. Hands will be washed and hand sanitizer applied before exiting the facility.
- In the event that there is more than one patient in isolation, the same PPE will not be worn while examining/treating each animal. All of the procedures described above will be followed before handling each individual patient.
- Students are not permitted to use personal thermometers and stethoscopes. A designated stethoscope and thermometer will be provided for use with these cases.
- Patients will be housed in individual pens with no nose-to-nose contact between animals.
- Following an animal's discharge, pens will be cleaned by LARAC personnel according to standard protocol and will then be cultured before another patient is placed into the pen. If another case is admitted into isolation from the same farm/ranch, it can be placed into the pen before culture results are reported.
- Boots/shoes should be disinfected before entering the main hospital floor.

6. General cleaning and surveillance

Disinfectants

The effective use of disinfectants requires proper knowledge of spectrum of activity, correct delivery and application, appropriate concentration and contact time, and compatibility with other chemicals. The following information is provided to help. Included links contain additional useful information regarding disinfectants and disinfection procedures.

Gerald McDonnell and A. Denver Russell. Antiseptics and Disinfectants: Activity, Action, and Resistance. *Clinical Microbiology Reviews*, January 1999, p. 147-179, Vol. 12, No. 1. <http://cmr.asm.org/cgi/content/full/12/1/147>

Center for Food Safety and Public Health at Iowa State.
<http://www.cfsph.iastate.edu> (CFSPH Main Menu->Infection Control -> Disinfectant Resources)

Only disinfectants that have been approved by the AHC or by LARAC may be used. It is not permissible for any student/employee to purchase and use unauthorized disinfectants or detergents due to potential interactions with other chemicals.

Alcohol

Alcohol, ethanol or isopropyl alcohol, is rapidly bactericidal to vegetative forms of bacteria, but ineffective against bacterial spores. The bactericidal activity drops sharply at concentrations less than 50%, with optimal concentrations between 60-90% by volume. Concentrations higher than 90% are less effective as some water is required for efficacy. Alcohol at effective concentrations denatures proteins causing membrane damage and cell lysis. Alcohol is fast acting and kills most bacteria within 5 minutes. It is not considered a high level disinfectant; however, due to its lack of efficacy against spores and isopropanol's ineffectiveness against non-enveloped viruses (ethanol is considered virucidal.)

Aldehydes

Glutaraldehyde and formaldehyde denature proteins and disrupt nucleic acids. Glutaraldehyde is the most commonly used aldehyde disinfectant. It is effective against bacteria, fungi, viruses, and mycobacteria. Aqueous solutions of glutaraldehyde are acidic and are not sporicidal. It is considered to be a high level disinfectant if it is activated (made alkaline by an alkalizing agent). Once activated by an alkalizing agent that increases the pH to 7.5-8.5, it is sporicidal but has a limited shelf life of 14 to 28 days. Some reports question its efficacy against mycobacteria, thereby indicating that alcohol or phenol may be a better disinfectant. But, in general, most experts consider glutaraldehyde effective. Glutaraldehyde's efficacy against *Cryptosporidium* is controversial, with some reports indicating it is an effective disinfectant and some indicating that it is not effective. Glutaraldehyde is relatively non-corrosive to metals, rubber, plastic, and cement and is used for disinfection of equipment, such as endoscopes. It maintains antimicrobial activity in the presence of organic matter, although it is always best to remove organic matter before any disinfection. Caution should be exercised, as aldehydes can be highly irritating

and toxic to humans or animals either by contact or inhalation of fumes. Aldehydes are known to have carcinogenic potential and personal protective equipment should be worn when handling these chemicals.

Chlorhexidine

Chlorhexidine is considered to be very effective against vegetative forms of gram negative and positive bacteria, as well as *Mycoplasma*. It is variably effective against *Mycobacterium* with some mycobacteria being sensitive while others are highly resistant. It has limited to no effect on spores, viruses, *Cryptosporidium*, rickettsia, or *Pseudomonas*. It exerts its antimicrobial effect by reacting with negatively charged groups on cell membranes, thereby altering bacterial permeability. Chlorhexidine can only exert this function within a limited pH range of 5.0-7.0, and is easily inactivated by soaps and anionic detergents. It does retain antimicrobial activity in the presence of organic matter, including use on skin surfaces. It is relatively non-irritating and non-toxic to mammals but is toxic to fish. It should not be discharged into the environment. Chlorhexidine is generally non-corrosive to most materials. Three and one-half ounces of chlorhexidine per gallon of water provides approximately a 0.1% concentration solution and is commonly used to soak items that come into contact with patient skin such as brushes, halters, and twitches. Soak time should be at least 15 minutes.

Chlorine

Sodium hypochlorite or bleach, is used widely, fast acting, cheap, and has a broad spectrum of activity. It is relatively corrosive, especially at higher concentrations in addition to being relatively unstable. The efficacy of bleach is directly related to the level of available chlorine in the solution. Undissociated hypochlorous acid, which is dependent on pH, is significantly more active than hypochlorite ion (OCl⁻). At higher pHs, HOCl dissociates into hypochlorite ion with microbiocidal activity decreasing. HOCl is proposed to work by inhibition of key enzymatic reactions within the cell, protein denaturation, and inactivation of nucleic acids. It has a broad spectrum of activity as demonstrated by being effective against vegetative gram negative and positive bacteria at less than 1 PPM and mycoplasma at 25 PPM within seconds. A 100 PPM solution kills 99.9% of *Bacillus subtilis* spores within 5 minutes and fungal agents in 60 minutes. To disinfect Parvovirus contaminated surfaces, a solution of ¾ cup of bleach to 1 gallon of water is applied after initial cleaning and allowed to soak for a minimum of 10 minutes. A concentration of 1000 PPM is required for mycobacteria. Most viruses are inactivated within 10 minutes at 200 PPM, although 33,000 PPM has been recommended for Foot-and-Mouth Disease virus. It has not been shown to be effective against *Cryptosporidium*. Commercial bleach preparations are typically 5.25% NaOCl with approximately 50,000 PPM available chlorine. Light and some metals, as well as some detergents, organic debris, and vaporization of volatile chlorine gas when left in open containers rapidly inactivate chlorine compounds. Over the course of 30 days, the levels of available chlorine will have been reduced by half or more even in closed polyethylene containers. There was no decomposition of NaHClO solution when stored in a closed brown glass bottle. Hypochlorites should never be mixed with acids or ammonia as this will result in the rapid release of toxic chlorine gas.

Bleach dilutions and the resulting chlorine concentration

5.25% Bleach solution ratio	Bleach dilution Per unit H ₂ O	Chlorine PPM
1:500	1.5 tsp / gal H ₂ O 7.5 ml / gal H ₂ O	100
1:200	1.5 Tbsp / gal H ₂ O 22.5 ml / gal H ₂ O	250
1:100	1.25 oz / gal H ₂ O 37.5 ml / gal H ₂ O	500
1:50	2.5 oz / gal H ₂ O 75 ml / gal H ₂ O	1000
1:10	1.5 cups / gal H ₂ O 360 ml / gal H ₂ O	5000

Iodine compounds

Iodine compounds are similar in action to hypochlorite compounds. Iodine compounds may be even more sensitive to inactivation by organic debris. Iodine also is subject to inactivation by sunlight. Iodine compounds are relatively broad spectrum in their activity and work by denaturing proteins, thereby interfering with enzymatic reactions within the organism and disrupting cell membrane integrity. Concentrated iodine compounds are irritating to skin, corrosive to rubber and metal, and will stain clothes, skin, and other organic material.

Iodophors

Povidone or tamed iodine solutions are used widely for skin decontamination. An iodophor is a combination of iodine and a carrier that provides a sustained release reservoir of iodine thereby releasing small amounts of free iodine into solution. Free iodine enhances antimicrobial activity and more rapid bactericidal activity compared with full strength povidone iodine solutions. It is relatively inexpensive, non-toxic, and non-irritating unless a person has developed a specific hypersensitization through previous repeated contact.

Oxidizing agents

Hydrogen peroxide works by the production of hydroxyl free radicals, which can denature membrane lipids, DNA, proteins, and other cellular components. It is available commercially in most stores as a 3-10% solution, but can be purchased at much higher concentrations, up to 90%. It has broad-spectrum activity against most vegetative gram-positive and negative bacteria, although it is considered somewhat more effective against gram-positive bacteria. The production of catalase and other peroxidases can render these bacteria resistant to lower concentrations of hydrogen peroxide. Higher concentrations (in

the 30% range) and longer contact times are required for sporicidal and virucidal activity. Even then, some non-enveloped viruses may be resistant. Hydrogen peroxide breaks down into environmentally non-toxic byproducts. It can cause drying and irritation of skin. Virkon-S® (potassium peroxymonosulfate and sodium chloride) which has been used as a surface disinfectant is a peroxygen molecule, organic acid, and surfactant combination with wide microbial spectrum of activity and some efficacy in the presence of organic material. Virkon-S® is the disinfectant recommended most often for foot-and-mouth disease prevention. High concentrations of hydrogen peroxide can corrode metal, vinyl, and rubber surfaces.

Accelerated hydrogen peroxide is a relatively new class of disinfectants but is superior in that it requires less contact time (1-5 minutes), maintains activity in the face of organic debris, and contains a detergent. They all have a broad spectrum of activity and are effective against non-enveloped viruses and bacteria.

Phenols

Phenols are broad-spectrum disinfectants that function by denaturing proteins and inactivating membrane-bound enzymes to alter the cell wall permeability of microorganisms. Phenols are typically formulated in soap solutions to increase their penetrative powers, and, at 5% concentration, are considered bactericidal, tuberculocidal, fungicidal, and virucidal for enveloped viruses. Phenols are not effective against non-enveloped viruses and spores. Phenols do maintain activity in hard water and in the presence of organic matter and have some residual activity after drying. Phenolic disinfectants are generally safe for humans, but prolonged exposure may cause skin irritation. Phenols can accumulate in porous materials, and the residual disinfectant can cause tissue irritation. Concentrations over 2% are highly toxic to all animals, especially cats. Neonates have shown increased susceptibility to toxic effects of phenols.

Quaternary ammonium

Also known as “quats” or QACs, these compounds are cationic detergents that are attracted to the negatively charged surfaces of microorganisms where they irreversibly bind to phospholipids in the cell membrane and denature proteins, thereby impairing permeability. QACs can be from different manufacturing “generations” and their chemistry may vary, with later generations being more germicidal, less foaming, and more tolerant of organic debris. QACs are highly effective against Gram-positive bacteria, and have good efficacy against Gram-negative bacteria, fungi, and enveloped viruses. They are not effective against non-enveloped viruses or mycobacteria and are considered sporicidal but not sporicidal. QACs have some residual effects, keeping surfaces bacteriostatic for a brief time. They are more active at neutral to slightly alkaline pH but lose their activity at pHs of less than 3.5. QACs are considered stable in storage, but are, in general, more easily inactivated by organic matter, detergents, soaps, and hard water (this may vary with the “generation”). QACs are generally considered non-irritating with low toxicity at typical working dilutions, but this characteristic may vary with generation and product to a certain degree. However, QACs are toxic to fish and should not be discharged into water sources (i.e., streams, ponds, lakes).

Small Animal

Cleaning and decontamination practices

- Animal holding cages within each of the service areas will go through a cage washer sterilization every 8 weeks or as scheduled. This includes any area where cages are used for patient holding. Service area and room numbers are: ICU A1502; Small Animal Internal Medicine ward #2; Community Veterinary Services wards #3, 4, 5, and 6; Small Animal Surgery wards #8 and 9; Anesthesia Recovery A1709; Diagnostic Imaging A1808; and Isolation (after each patient).
- Confirmation of sanitization will be documented using thermal sensitive tape applied to the service area cages and passed through the cage washer. This verifies that the cage reaches 180 degrees for 10 minutes.
- A record of this cage washing and area decontamination is kept in the AHC administration office
- Students, clinicians, and technicians are encouraged to frequently wash their hands, especially between patients. Signs placed throughout the Animal Health Center serve as a reminder.
- Technicians should disinfect clipper blades, leashes, muzzles, and other appropriate items between patients.
- Containers holding antiseptics (e.g., 4x4 gauze soaked in chlorhexidine or povidone iodine scrub, and “cold packs”) may allow growth of an organism resistant to certain disinfectants. Once per 6 week student rotation containers should be emptied, cleaned, either autoclaved or washed in sodium hypochlorite (bleach), and dried before restocking. Logistically, the service may wish to have two to three sets of such containers to allow rotation.
- Custodial services (maintenance for public movement areas) are required to change mop water at least daily, vacuum cleaner bags at least weekly, and use vacuum cleaners with a sealed HEPA filter system. Mop waters are changed at the beginning of each 12 hour shift and as custodians move within the Animal Health Center from one area to another. Floor scrubbers that **do not** recycle water are used in most areas (IPC Eagle). These machines provide clean water for scrubbing/cleaning, and the dirty water is vacuumed from the floor surfaces and discarded. Animal holding areas are maintained by LARAC.

The following protocols should be followed for animals with MDRI

- The cage should be identified with a card indicating it has a MDRI. Small animals should be identified with a temporary ID collar.
- The technician shall add a warning to the medical record of the animal by using the “OTHER” designation on the red, colored patient warning page. This warning may be removed if two negative cultures confirm that the infection no longer exists, and the clinician believes the infection has resolved.
- The animal should be held in the same cage or stall during its entire stay in the AHC. This cage / stall should be as far removed from other patients as logistically feasible. Patient transfer to the isolation facility is preferred

- Personnel should wear disposable gloves and a gown when handling MDRI animals. They should wash their hands and decontaminate* any instruments used (e.g., stethoscopes, bandage scissors, thermometers, etc.) after contact.
- When the animal is taken to another location, such as radiology or surgery, that service must be notified that the animal has a MDRI and the area subsequently decontaminated*.
- When a small animal is transported to another area via gurney, the transport device should be decontaminated* promptly and then cage-washed.
- These animals should typically be handled last when treating a series of animals.
- When the MDRI infected animal is discharged or dies, the cage and its wheels should be decontaminated * on site and then taken to the cage washer.
- Reference charts regarding disinfectants and their action/activity are available within the isolation unit for review.

* Use CDC “Intermediate level disinfectant” – (this does NOT include chlorhexidine (Nolvasan®)).

Additional resource for common disinfectants used in veterinary medicine, include class, application and activity, and are listed in

Equine

Attire

- The MSU-AHC 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.
- This attire should be appropriate to the job at hand. Coveralls and sturdy leather boots or sturdy leather shoes are probably the most appropriate attire. When working with large animal patients performing tasks accompanied by a high risk of contamination by infectious materials, wear appropriate, protective outer garments-PPE).
- Personnel must clean and disinfect footwear if working in the Equine Service.

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 before, and after examining each patient.
- Clean exam gloves must worn when handling high-risk patients (i.e., infectious disease suspects, or highly susceptible patients such as those on antibiotics, colic cases, 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.

- AHC Equine student workers should wipe stall door handles with alcohol twice daily.
- Boot brushes and footbaths are located at the end of each hallway. Before exiting a stall, knock the excess shavings off your boots. Use the boot brush at the end of the hall to remove any remaining gross debris from your boots and then dip boots in the phenol footbath and step onto absorbent paper as you exit the hall into the main corridor. Student workers will change these footbaths and absorbent paper once to twice daily. The current footbath solution contains One-Stroke at 15ml/gallon dilution.
- Exam rooms will be cleaned with a detergent first and then sprayed with Oxivir® in an Ortho® sprayer set at 8 oz/gallon. Oxivir® is accelerated peroxide. It is a disinfectant and not a cleaning agent. It should be used by spraying a light coating around the room only after cleaning.
- Horses should have their feet picked clean as they exit their stall unless it is dangerous to perform (Example: as with a neurologic horse or one that is very lame).
- Do not wear shoes/boots dedicated to the AHC to your home.

Disinfection of equipment

- All instruments, equipment, and other objects, including floats, mouth specula, endoscopes, grooming tools, clipper blades, etc., must be sterilized or disinfected between uses on different patients.
- Stainless steel buckets are to be cleaned, scrubbed with dilute chlorhexidine or dilute bleach, and sent for sterilization, which will be indicated by activated sterilization tape holding the bucket handle to the bucket.
- Stomach tubes will not be re-used on any patient other than the original patient to which it was assigned. After that patient is discharged, the stomach tube will be discarded.
- Reflux is only to be collected within buckets specifically designated for that purpose. These buckets must be cleaned of organic debris and then scrubbed with dilute bleach solution between uses.
- Reusable dose syringes and funnels must be disassembled, cleaned of all organic debris with a detergent, and then soaked for 10 minutes in dilute bleach 250 – 500 PPM solution.
- Stethoscopes owned by personnel may be used in the main hospital, but should always be wiped with alcohol between patients. Hospital-owned stethoscopes should be used in isolation unless, at the clinicians' discretion, a higher quality stethoscope is required for diagnostic purposes. If the optional stethoscope is used, it must be cleaned thoroughly and sanitized before being used again.
- Digital thermometers should be cleaned thoroughly to remove any debris and then wiped with alcohol between patients.
- Hoof picks should be cleaned thoroughly to remove any debris and wiped with alcohol between patients.
- Twitches must be cleaned thoroughly and soaked in 250 PPM bleach or 0.5% chlorhexidine for 10 minutes after each patient.

- Any other instruments routinely carried by personnel (Example: a bandage scissors, must be cleaned and wiped with alcohol between patients.

Containers holding antiseptics (e.g., 4x4 gauze soaked in chlorhexidine or povidone iodine scrub and “cold packs”) have been known to allow growth of organisms resistant to those disinfectants. On a weekly basis containers used for antiseptics in each exam room must be emptied, cleaned, either autoclaved or washed in sodium hypochlorite (Chlorox), and dried before restocking. Logistically, the service may wish to have two to three sets of containers that allow for rotation.

Guidelines for receiving and managing patients

Stall Assignments

- Equine technicians or clinicians make stall assignments. Personnel should check with them before putting an animal into a stall.

Tack

- Tack owned by clients should be sent home with the client. Hospital owned halters are to be used while the animal is hospitalized. All tack should be disinfected between patients by soaking halters, lead ropes, brushes, eye masks, muzzles, etc., in chlorhexidine solution or in dilute bleach.

Salmonella Surveillance

- Because of the risks and consequences associated with nosocomial salmonellosis, the MSU-CVM Equine service maintains an active surveillance policy. All hospitalized patients will have five serial stool samples submitted for *Salmonella* spp. culture. If the patient’s stay is longer than 5 days and any signs of possible GI disease develop, another series of five serial *Salmonella* cultures will be initiated unless the patient is moved to isolation. *C. difficile* cultures may also be initiated.

Coggins Status

- Because of the risks, consequences, and legal requirements associated with equine infectious anemia coupled with the congregation of horses in a public setting, the MSU-CVM Equine service requires all horses arriving on the premises to have had a negative Coggins test performed within the past 12 months. If an animal should arrive without a negative Coggins test within the past 12 months, a blood sample shall be submitted immediately. Should a horse arrive at the MSU-CVM **WITHOUT** a negative Coggins within the past 12 months and the patient demonstrates signs compatible with EIA, said horse will be moved immediately to isolation. Should a horse have a negative Coggins within the past 12 months but be exhibiting signs compatible with EIA, said horse should be **STRONGLY CONSIDERED** for transfer to isolation.

Patient Records and Medications

- Medical records will be maintained in the equine nurses’ station in the patient records’ rack designated by using the stall number for that patient. Unless the records are being used in rounds or are currently being updated, they must be

placed here. **The medical records for horses in isolation or enteric precaution should not go the stall.**

- Medications may be kept in a carryall on the shelf of the patient's stall or in the blue boxes on the wall of the equine nurses' station. After discharge, any unused medication should be discarded or returned to Pharmacy. The blue carryall and the blue box should be cleaned and bleached upon patient discharge before use for the next patient. The shelf on the front of the stall door should be placed in the stall so that it is disinfected when the stall is disinfected.

Stall Cards and Treatment Orders

- A stall card must be posted at the time a patient is admitted and placed in a stall. Affix a standard hospital patient/client sticker to an index card and place it in the cardholder on the stall door. When a patient is discharged, throw the card on the floor in the open doorway to let LARAC know the stall has been vacated. It is helpful also to leave LARAC personnel a note indicating patient discharge and any special instructions on the whiteboard by the Equine Student Room.
- Daily treatment orders must be posted each morning on each stall door. Physical exam data are filled in the appropriate boxes when the exam is performed. Initials are indicated in the appropriate treatment box when the treatment is performed. Hands of CVM personnel should be sanitized with alcohol before handling the treatment sheet (as this document becomes part of the permanent record). If a treatment sheet should become soiled with blood, manure, or any other bodily fluid, it **must** be transcribed onto a blank treatment sheet and initialed by the student on the case prior to placing the sheet in the record.
- Horses in isolation require two treatment sheets; one in the isolation stall where the horse resides and one on the equine nurses' station door. Treatments will be transcribed to the sheet in the nurse's station, which will then be added to the medical record.

Feed and Water

- All grain and other supplements (including those provided by the client), must be stored in covered containers with tight fitting lids. Because the proper handling of client provided feed and supplements cannot be ascertained, such feed should not be stored in the hospital feed room. Precaution should be taken to ensure that these feeds are not mistakenly given to another animal.
- Hay is provided to hospitalized horses in either hay nets or removable hayracks that hang from the wall. When an animal is discharged, hay nets must be soaked in 0.1% chlorhexidine solution for at least 30 minutes. If use, hayracks will be removed and sent to cage wash for disinfection.
- Water buckets are placed in the feed room after they have been washed and sanitized in the cage wash. Clean water buckets are placed in the stall for each patient. The water buckets are filled from the spigot at the back of each rear door. **Stall buckets should not be filled or rinsed with the hose in the back dirty aisle way.** Buckets should be rinsed at least two or three times a day from the water spigot at the back stall door. The rinse water is then emptied gently into the drain

out the back stall door taking care not to allow any water to splash back up out of the drain and onto the bucket. The bucket is then refilled with water from the clean spigot.

Patient Discharge

- Before discharge, clients or their agents must be instructed about infectious disease hazards associated with the patient and recommendations about control of such hazards on home premises.
- Upon discharge, notify LARAC and remind them the animal is suspected of having a contagious disease. LARAC personnel will place a card on the door notifying cleaning personnel of the status of the stall and culture results.
- Students, staff, and faculty are responsible for breaking down the shelf on the stall door, cleaning the carryall and any other equipment on the shelf, and cleaning the medication box in the equine nurses' station. Any fluids, IV lines, fluid pumps, etc., in the stall also need to be removed and cleaned/disinfected. The shelf may be placed in the stall for disinfection.

LARAC cleaning and culturing protocol

Inherently, an animal hospital is confronted with dealing with and caring for animals with infectious diseases. Trying to prevent the spread of such infectious organisms to other animals and humans must be paramount in our husbandry management. To be successful in this endeavor, all persons involved in the care of animals and their environment must be aware of and follow all infectious disease containment procedures. There must be free and open communication among AHC equine clinical staff, LARAC personnel, and facilities management personnel so that all are made aware of a suspicious or confirmed contagious disease. Such communication allows appropriate infectious disease containment practices to be initiated and followed in a prompt and thorough manner. The most common infectious disease agents encountered in the equine clinic of AHC are enteric pathogens (e.g., *Salmonella* spp.) and respiratory pathogens (e.g., *Streptococcus equi*). Presented below is a written program for the initiation of an infectious disease control (IDC) program and the steps required to carry out such a program.

Determination of suspicious or confirmed infectious disease

On admission to the hospital each horse has a stool sample submitted for culture in an effort to identify any potential carriers of enteric pathogens. During hospitalization, each patient's clinical status and laboratory values are evaluated on a continual basis to determine improvement or change in the animal's condition. If conditions present that indicate an infectious process (e.g., soft stool, anorexia, fever, leucopenia, purulent nasal discharge, sub-mandibular swelling), the equine clinician in charge of the case will determine if the animal is to be transferred to the equine isolation facility. If the change in condition is minor (e.g., appetite and attitude still good, soft stool can be attributed to medical management, afebrile, lab work WNL, dry cough) the clinician may decide it is appropriate to continue treating the animal in the hospital with the initiation of certain precautionary measures and further monitoring with diagnostic tests. Once it has been

determined that the change in the animal's condition warrants initiation of precautionary measures, LARAC should be notified immediately.

Visual Signage to alert staff to initiation of Infection Disease Control Measures

Red Card – Indicates a “sick” animal with a probable infectious disease process supported by diagnostic confirmation of a pathogenic organism and/or supporting clinical presentation (anorexic, febrile, depressed) and lab data (leucopenia). **It is considered standard practice that an animal presenting with these signs warrants transfer to the equine isolation facility.**

Yellow Card – Indicates an animal presented with or developed a potentially infectious bodily discharge (e.g., soft stool or diarrhea, purulent nasal discharge, cough, wound drainage) but remains alert with good attitude, good appetite and stable clinical lab data. Therefore this patient does not meet the criteria for movement to isolation. However, the animal's condition does warrant continued observation and the use of precautionary measures in handling and management. This situation is classified often as “enteric precautions” by the equine AHC staff.

Responsibilities of communicating the need for IDC measures

Equine clinical staff is to:

- Communicate to the LARAC staff via written communication the presence of a known infectious or potentially infectious case in the clinic. Pertinent information that must be shared includes: *the client/patient name; the stall number; the clinical problem that is causing the initiation of protective measures; and the plan to transfer patient to isolation or to remain in the clinic.* Filling out an Infectious Disease Control (IDC) notification card (sample below) and attaching it to the back of an appropriately numbered and colored (red or yellow) stall card best communicate this information. This card with its attached identifying information is then placed in the upper left hand corner of the white board by the LARAC team leader's office in the area marked “IDC notice.” These cards can be found in a box located in the equine nurses' station.

<p>Notification of IDC Measures</p> <p>Date _____</p> <p>Client/Horse Name: _____</p> <p>Clinician in charge: _____</p> <p>Problem initiating precautionary measures: _____</p>

Plan transfer to Isolation? Yes No

- If during normal working hours, in addition to written notification, verbally communicate the initiation of IDC measures directly to a LARAC team leader and/or the LARAC individual working in the equine service that day. During the week this person is usually a student worker. This notification will help ensure prompt initiation of necessary protective measures.
- Initiate, communicate, and maintain infectious disease control measures to be followed by the veterinary students, technical support staff, and the clinical staff in the daily care of the animal.

LARAC staff responsibilities

- Once LARAC has received notification of initiation of IDC measures, the following steps are to be followed:
 - Verify information obtained from the IDC notification card.
 - Place the appropriate numbered and color-coded card (red or yellow) on the back door of the stall involved.
 - Weave yellow caution tape through the nylon gate at the end of the drain hallway involved. This entire drain hall is now considered contaminated and special precautions are required for entering and exiting this hallway. Keep the nylon gate closed to discourage random entrance into the corridor.
 - Hang an orange biohazard bag at the end of the involved drain hallway to use as a receptacle for used PPE materials. These bags and PPE can be found in the glass cabinet in the cart room. Also, make sure there is a full container of hand sanitizer at this end of the drain hallway.
 - Empty and remove muck buckets belonging to the animal in question and replace them with IDC muck buckets (black with bold orange stripe). The removed muck buckets are to be placed outside the exterior door of the cart room for thorough cleaning and sanitization.
 - Ensure that the LARAC worker assigned to equine is aware of the initiation of IDC measures and familiar with all that entails.
 - Notify the LARAC animal health technician to the presence of any cases requiring IDC measures. Effective notification includes combinations of verbal face-to-face conversations, email, text messaging and posted information.
 - Follow established precautionary measures until the horse has been discharged, the stall is cleaned and sanitized, and cultures obtained.

Infectious Disease Control (IDC) Measures

Stalls

All occupied stalls are to be picked several times a day. The picking of the stall is done by the veterinary students assigned to the case so that they may evaluate thoroughly the

animal's overall condition. Manure is placed into a muck bucket that sits in the drain corridor outside the back stall door. **Students are NOT to enter the dirty (contaminated) drain corridor!** The muck buckets are emptied from the drain hall into the dump cart that is rolled into the dirty hallway at the dirty end of each drain hall. LARAC personnel are responsible for emptying the muck buckets. They will perform this duty as often as needed during their routine daily tasks. If students need muck buckets emptied or have a need for more muck buckets, contact the LARAC worker.

Standard procedures for emptying the muck buckets of manure and soiled bedding

- **Only LARAC workers should enter into the dirty drain corridors.** Personnel should wear gloves when dumping muck buckets. Frequent visual rounds should be made to keep all muck buckets emptied in a timely manner.
- A foot brush and 10% bleach foot bath should be used on the bottom and sides of shoes before exiting the dirty drain corridor. Hands should be sanitized before exiting the hallway with an alcohol based hand sanitizer located at the end of the dirty drain corridor.
- **When cautionary measures are in place, whether coded yellow or red, PPE (Personal Protective Equipment) is required when entering and working in the involved dirty drain corridor. PPE should include gown, gloves, plastic shoe covers, and mask.** This equipment can be found in a cabinet in the cart room. PPE should be worn whenever an individual is working within the involved dirty drain corridor. The muck buckets belonging to the "infectious" horse should be emptied last. When work within the dirty drain corridor is complete but prior to exiting the hallway, the PPE should be removed and disposed of by placing it in a biohazard bag at the end of the drain corridor. Remove debris from the bottom of your boots using the boot brush. Step into foot bath. Discard your PPE. Once your gloves have been removed, sanitize your hands using an alcohol-based hand sanitizer located on the wall at the end of each drain hall. The dirty drain hall requiring precautionary measures should be the last hallway done in order to diminish the possibility of spreading disease. The dump cart should be rinsed and sprayed with Oxyvir five 16 or 10% bleach after it has been dumped and before returning to use.

Stalls are stripped routinely and re-bedded as needed for the animals' comfort and to diminish accumulation and spread of enteric pathogens. An increase in this frequency may be done at the request of the clinician.

Stall and implement care following discharge of animal

- After an animal has been discharged, the stall is stripped of all bedding, the interior is scrubbed with detergent and water to remove organic debris, and, lastly, the stall is sanitized with an accelerated peroxide compound (for example, Oxivir® @ 8oz/gal water) or 10% bleach (discouraged due to extensive corrosion). **If the stall was used under IDC precautions, notify the LARAC animal health technician that the animal has been discharged so that a culture can be collected post-cleaning**

- The stall implements, muck buckets, manure forks, shovels, and brooms are removed from the vicinity, scrubbed with detergent and water to remove organic debris, rinsed, and sprayed with 10% bleach solution or accelerated peroxide compound at the appropriate dilution.
- Stall buckets and feeders are removed from the stalls, scrubbed with detergent and water to remove gross organic debris and then sent through the cage washer for sanitization before reentering the system. Routinely, buckets and feeders go through the cage washer located in the AHC Central Sterile Area or in the cage washer located in the 1A hallway of the research wing.
- **In the case of a real or suspected infectious disease process**, buckets and feeders from the stalls involved are transported outside via the cart room exit, scrubbed to remove organic debris, and then taken to the 1A cage washer to avoid transport of these contaminated articles through clean corridors of the hospital.
- Once the stall has been cleaned and sanitized, a blue DO NOT USE sign is placed on the front stall door as an indication the stall has been cleaned but should NOT be used. The sign contains the date that the stall was cultured and who took the culture sample. Notify the LARAC animal health technician that the stall cleaning and sanitization have been completed.
- A LARAC animal health technician will collect cultures from the cleaned and sanitized stall that housed an infectious or potentially infectious horse. After cleaning and sanitizing the stall, it is only necessary for the surfaces to be dry at the time cultures are obtained. Cultures need to be collected no later than 12 hours after sanitization. Once the cultures are obtained indicated, a sign will be placed on the front of the stall door that states “Do Not Use Stall. Cultures Taken” and the date cultures were obtained. As a general rule, 2 to 3 days pass from the time cultures are taken to the time the results are available for review. If the culture results are acceptable, the sign will be removed and the stall is ready to return to use.

Maintenance of Drain Hallways

The drain hallways are swept, scooped, rinsed, and the drains sanitized ONCE A DAY or as needed. In cleaning the drain hallways, do not contaminate the interior of the stalls by inadvertently forcing dirty water under the back stall doors. After cleaning, sanitization is accomplished by spraying down the drain hallway floors and grates with an accelerated peroxide compound (for example, Oxivir® @ 8oz/gal water) or 10% bleach (discouraged due to extensive corrosion) followed by spraying waste water into drain. **NOTE:** When cleaning the drains, water must be running at both ends. Allow floors to dry.

Maintenance of Muck Buckets

Stall

- Each patient is assigned at least two muck buckets that are situated in the drain hallway outside the back door of that horse’s stall. LARAC is responsible for emptying and maintaining muck buckets.
- The muck buckets within the drain hallway are emptied on a regular PRN basis.

- Daily when the drain hallways are cleaned and sanitized, the muck buckets are rinsed of gross debris and sanitized with an accelerated peroxide compound (Oxivir® at 8 oz/gal water, for ex.) or 10% bleach solution after emptying.

Treatment Rooms (x4)

- The muck buckets that are used in each of the equine treatment rooms are dumped and replaced with a CLEAN muck bucket twice a day (the first thing in the morning and the last thing in the afternoon).
- The dirty muck buckets that have been rotated out are placed outside the exterior door of the cart room and are scrubbed with a detergent, rinsed, and sprayed with an accelerated peroxide compound (Oxivir® at 8 oz/gal water, for ex.) or a 10% bleach solution so that they are available for the next rotation of use.
- Clean muck buckets available for use are stored on a rack outside the exterior door of the cart room.
- Shovels used to scoop manure in the treatment rooms are removed, treated, and rotated in the same manner.

Maintenance of General Passage Hallways

General Passage Hallways include the hallways on either side of the equine nurses' station, the main hallway (Large Animal Corridor) and each of the three stall corridor hallways.

- Each of these hallways is swept and sanitized using the electric floor scrubber with an accelerated peroxide compound (Oxivir® at 8 oz/gal water, for ex.) or 10% bleach (discouraged due to extensive corrosion) Monday, Wednesday and Friday.
- If a situation arises that does not allow access to these hallways at the time the cleaning is scheduled (e.g., hallway is occupied by animals, rounds are in progress, excitable horse present, too much clutter blocking access, request by clinician to stop), then cleaning will not be done at that particular time. Cleaning will be performed at the next scheduled time.

Maintenance of Foot Baths, Foot Brushes and Disinfectant Spray Bottles

- Once a week the **foot brushes** located at the end of the drain hallways are cleaned of organic debris by spraying forcefully with the hose, and then sanitized by inverting in a 10% bleach solution and allowing brushes to soak for 30 minutes. While this is being done, a "fresh" previously sanitized foot brush is rotated in for use.
- The accelerated peroxide spray bottles (or 10% bleach solution) located at the end of the drain hallways and the **foot bath** (phenol or 10% bleach) outside the cart room are changed once a day, preferably the last thing in the afternoon.

Traffic Control

- Doors leading to the stall corridors from the dirty hallway, and from the clean main hallway to the drain hallways should be kept closed to discourage passage between dirty and clean areas.
- Access from the large animal parking lot or the loading dock into the back hallway or the last stall corridor hallway should be restricted to authorized personnel only.

Facilities personnel, students, or housekeeping should NOT be using these doors to gain access into the clinic area.

- Only LARAC personnel involved in maintaining the cleanliness of the equine clinic should be in the back “dirty” hallway. They should be familiar with and follow all sanitary measures. The **FOOT BATHS** should be used **every time** an individual has to exit the dirty hallway.
- The centrally located double door in the back hallway should NOT be used for access by facilities personnel from outside to inside into the back hallway. It is to be kept locked by a barrel bolt that is released easily on the inside to allow use as an emergency exit in the case of a fire.

Daily LARAC Record Keeping

To be performed by a member of the LARAC staff assigned to and completing the routine daily tasks in the equine clinic.

- Once daily the temperature and humidity must be read and recorded on the observation sheet in the middle hallway. Make sure to reset the thermometer once the high and low has been recorded.
- At the end of a work period, the daily task list should be filled out and initialed to ensure completion of all tasks and recording of any problems encountered. This daily task list is located in a binder kept in the LARAC team leader’s office.
- Record the census, including the admissions and discharges and not just the balance remaining.
- At the end of the month observation sheets should be filed in the filing cabinet in the team leader’s office area, and the census sheets turned in to the LARAC manager.

RODAC Plates and Cultures

- Swabs for RODAC plates are taken of random stalls. Site sampled include stall doors, floors, walls, drain walkway floors, and drain grates on a routine basis (4 times a year) in an effort to monitor infection control.
- Upon reading the growth on the RODAC plates, if the colony count is over 31 colonies then cultures are obtained and submitted to identify organisms involved.
- Any stall that housed an animal with diarrhea or was under enteric precautions is cultured after the animal leaves following cleaning and sanitization.
- Once a “contaminated” stall is vacated, cleaned, sanitized, and cultured, it should not be used again until the results from the cultures have been returned and evaluated. The equine service chief will be given a copy of the culture results.

Food Animal

General guidelines applicable to all cases

- Coveralls are mandatory when interacting with patients. Students should start the day in clean coveralls and have a second set available in the event the initial ones becomes dirty. Contingent on the situation, faculty may direct students to change coveralls at any time. Students are expected to comply. Coveralls are expected to be worn in the animal clinical areas. Students should not be observed in coveralls in

other public areas beyond the operator's desk (e.g., dining room, classrooms, library).

- Footwear that can be cleaned and disinfected must be worn in animal areas. Rubber boots are mandatory when working with patients.
- Hand washing is required after patient contact. Hand washing should be followed by application of hand sanitizer. Students should wear gloves when appropriate.
- Instruments, blood tubes, syringes, needles, needle caps, and any other such instrument or device should NEVER be placed in one's mouth.
- Disinfection of stethoscopes, thermometers, and other personal equipment is required after use. Disposable wipes, Lysol®, or alcohol swabs should be used for cleaning and disinfection before use on another patient.
- Before entering public areas, footwear are required to be cleaned and walk-through mats/footbaths are required to be used to disinfect shoe soles. This process is also to be followed when leaving/entering the hospital and between entering and leaving patient stalls. Rubber boots are to be removed in the food animal anteway, and are not to be worn in the student room. Foot mats/foot baths will be charged (with 1 Stroke (1 ounce/gallon of water) or Virkon S®) and will be cleaned/re-charged daily by the senior technician.
- Personnel (excluding LARAC when stripping/cleaning stalls) shall enter and leave stalls from a designated gate in each stall (except when moving animals).
- Clean stalls should not be walked through to access other areas of the hospital.
- Pre-weaned calves will have a nipple bottle assigned. After use, the nipple bottles must be cleaned in water and disinfected with 1% bleach.
- Hospitalized animals will be assigned a rope halter. Following discharge, halters are cleaned and disinfected in a 10% bleach solution, allowed to dry, and restocked for future use.
- Reusable equipment used in patient treatment should be cleaned and disinfected using 1% (or greater) bleach solution or Ruhof Biocide® disinfecting spray.
- Transporters and tables are cleaned with laundry detergent between animals of different owners. If a significant infectious disease is suspected, items are disinfected using 4.25% peroxide.
- Healthy animals and neonates are to have exams/treatments done before ill or isolation/enteric/special precaution cases.
- Containers containing 4x4 gauze soaked in chlorhexadine or alcohol will be emptied, cleaned, and autoclaved once weekly to decrease contamination and resistant organism growth. All gauze sponges in each container will be used or discarded before refilling/restocking. Alternatively, containers may hold dry gauze which can be moistened with irrigation or disinfectant after removal from the container.
- Consumption of food and drink is limited to the student room, as described in the syllabus. This policy is in effect at all times, including weekends and holidays.
- Traffic pattern through the Food Animal section – Doors leading to the main corridor are to remain closed to discourage unregulated, non-participant foot traffic through the section.

- Owner traffic and visitation. Case doctors often prefer owners or farm personnel to be at hand during examination of an animal. This is permissible as long as responsible CVM personnel accompany them **at all times**. However, to facilitate hospital operations, owners are not to be present in the surgical or obstetrical theater unless required specifically by case doctors.
- Owners may request to visit hospitalized animals. **They may do so on a scheduled basis, and must be accompanied by a case doctor or student at all times.** Owners must comply with all biosafety procedures employed in the food animal section (outerwear, footwear, etc.). During the time of the visit, hospital operations must be suspended. Therefore, in effort to accommodate visitations and ongoing hospital activities, visitation is limited to once per day for a maximum of 30 minutes at a time. Hospital visitation is a privilege and may be suspended or revoked by the direction of the AHC Administration. **Owners are not to enter isolation stalls or the calf/small ruminant isolation facility.**
- Cell phones and electronic image capture. Student cell phone use is forbidden while in the food animal clinic. Photos for educational purposes are permitted with case doctor permission, but may not be distributed outside the MSU CVM by any means.
- In the event that an owner refuses to pay for isolation or special precautions hospitalization, the animal will be discharged to the client.

Milking Cows

- Milking personnel must wear gloves.
- Lactating cows are examined once daily with the California Mastitis Test and the results recorded in medical record unless directed otherwise by the case veterinarian.
- In the event that more than one lactating cow is hospitalized, milking should occur first in normal cow(s) and proceed to cows with mastitis of increasing severity. The milking machine will be disinfected between each case.
- Udders are prepared for milking using a dry wipe, predipping full length with 0.5% iodine, allowing 30 seconds or more contact time, followed by thorough cleaning of teats using disposable paper towels (one new, clean towel per teat). The milking unit is then applied.
- Immediately following milking, teats are dipped full length in 0.5% iodine post dip.
- The milking claw and milk lines are rinsed by drawing 2 gallons of warm. Disinfection is accomplished by drawing 2 gallons of hot water containing chlorhexidine solution. Rinsing with 2 gallons of hot water to remove residue follows the disinfection step.

Barn Surveillance Protocol

- Routine barn surveillance for *Salmonella sp.* shall be conducted not less than four times yearly.
- Designated areas of the barn shall be swabbed with a sterile 4x4 gauze moistened with sterile saline irrigation or sterile water. The gauze will then be placed in a sterile specimen cup and submitted for routine *Salmonella sp.* screen. Designated swab areas are to include the floor of the chute area, student rounds room floor,

technician office/food animal pharmacy floor, small ruminant/calf exam room, two stalls (random), the anteroom where rubber boots are changed, and any other suspicious area.

- No more than two samples shall be pooled for culture.
- In the case of a positive sample, individual samples will be cultured to determine the area of concern.

When an area is deemed to be contaminated, the area will be re-cleaned and disinfected following the LARAC stall disinfection procedures, then the area re-swabbed for surveillance cultures. Following the discharge of enteric/suspect cases, LARAC will be responsible for cleaning and disinfecting stalls. Stall swabs for *Salmonella* surveillance will be obtained following cleaning. Stalls will not be used until negative culture results have been returned.

Biosecurity Procedures in the Field Services Ambulatory Vehicles

- All material taken onto farms by Field Services is to be removed from the premises when leaving.
- All boots are to be disinfected before leaving the premises. Coveralls that are heavily contaminated with fecal and bloody material should be removed and placed in garbage bags before one enters vehicles.
- All discarded materials are disposed of properly on return to CVM – sharps in sharps containers, excess vaccine and vaccine bottles to biohazard bags, used blood tubes in biohazard bags, etc.
- All floor mats are removed and washed on return to CVM.
- The outer surfaces of the trucks, including wheels, are scrubbed with detergent and rinsed. Seat surfaces inside the truck are cleaned, as necessary. The veterinary technicians will demonstrate proper cleaning techniques.

Enforcement of policy

CVM expects that all faculty, staff, and students comply with these policies. If students have questions they should feel free to ask faculty for guidance.

Students should expect that the AHC Administration will enforce these policies. If a student is observed violating one of these policies once, the course grade will be adjusted down 10%. For example, if a student had a 92% course grade at rotation end, it will become 82% with a single violation. Multiple violations are possible, and will result in a 10% course grade decrease for each incident.

7. Scales Equine Theriogenology Biosecurity Plan

The theriogenology caseload is composed of horses presented for reproductive assessment/treatment. Generally the following is applicable.

- Animals seen are healthy and current on pertinent vaccinations. Vaccination history data are contained within the records.
- The open air stalls and availability of paddocks for housing generally limits direct contact and risk of aerosol exposure.
- Because students feed and water their individual patient animals, spread by caretaker is less likely.
- However, incoming horse(s) could be at an inapparent stage (incubation/recovery) of an infectious disease, specifically strangles, *Rhodococcus* infection, or salmonellosis. Thus measures that limit exposure to other patients are employed.

Specific control measures

Prevention- general

- History taken will confirm vaccine and EIA status of in-patient animals.
- History taken will confirm no on-going significant infectious disease problems exist on home farm.
- Immune status of foals born at facility or accompanying dam will be ascertained (IgG measured).
- Stalls are cleaned and disinfected completely between horses (new admission), and water/feed buckets are cleaned daily (disinfected after animal is discharged). Exam/treatment area, stocks, etc., are cleaned between exam periods (i.e., 3-4x daily)
- Students wash (clean hands/arms) between exams.
- Students observe animals for nasal discharges, changes in demeanor, breathing, coughing, and temperament several times daily. At least once daily, observations are recorded.
- Pre-existing protocols cover use of nondisposable instruments and equipment in breeding management (AVs, phantom, etc.), as well as breeding management protocols (minimum contamination breeding).

Prevention-specific

- Sick/special needs foals- attendants wear gloves/disposable gowns/boot covers & change these with each treatment.
- Adult horses identified as ill are transferred to the Equine Medicine Service and transported/moved to the service area.
- Horses coming from the AHC equine Hospital. Sometimes extended care patients from the Equine Medicine & Surgery Service are moved to the Scales facility. Only horses admitted with a non-infectious illness are eligible for Scales housing and these horses are placed typically into a stall next to empty stalls (no direct contact). Caretakers follow hygienic protocols established by the equine section.

8. Infection Control in the Diagnostic Laboratory Services

All general guidelines as documented in section 3 of this document apply for the Diagnostic Laboratory Services laboratories.

Introduction

Infection control for the Diagnostic Laboratory Services area is based on the principles of biosafety, biosecurity, and biocontainment. The Diagnostic Laboratory Services area contains both research and clinical laboratories. The Office of Regulatory Compliance (ORC) regulates the research laboratories therefore this document addresses the clinical diagnostic and teaching laboratories not covered by the ORC.

The Diagnostic Laboratory Services laboratories include sample receiving, microbiology, histopathology, clinical pathology, necropsy, and the student teaching laboratory. The Diagnostic Laboratory Services is an AAVLD accredited laboratory that follows the administrative policies, work practices, procedures, and guidelines that include infectious disease control practices.

Each laboratory operates as a Biosafety Level 2 laboratory where the initial processing of clinical specimens and serological identification of isolates are done safely. Each laboratory has developed standard operations procedures that identify the hazards that will or may be encountered and that specifies practices and are designed to minimize or eliminate exposures to these hazards. Personnel are trained and knowledgeable in the appropriate laboratory techniques, safety procedures, including use of personal protective equipment, and hazards associated with handling infectious agents.

For purposes of biosecurity, the diagnostic microbiology laboratories will not release isolates to unauthorized individuals or unaccredited institutions, laboratories, or industry without proper and required certification.

Failure to adhere to biosafety, biosecurity, and biocontainment requirements will result in a report to MVRDL system/DPPM administration for corrective action as deemed necessary.

At the beginning of each Laboratory Services Rotation, faculty and appropriate staff from each area that interacts with students on the rotation will reinforce the principles of hygiene and cleanliness, disinfection practices and a thorough explanation of pathogens and situations particular to the specific area.

Sample Submission:

- All specimens to be submitted to the Diagnostic Laboratory Services are routed through either Sample Receiving or Clinical Pathology Laboratory based on the origin of the submission.

- Specimens delivered from the MSU/AHC clinic should be transported in biohazard plastic bags to proper area listed above.
- Specimens delivered to the individual diagnostic laboratories should be transported in a clean, spill proof container, such as a sealed Tupperware container.
- Faculty, staff, and students not assigned to DPPM should not visit physically or enter the diagnostic microbiology or other service laboratories to receive results, check on preliminary findings, deliver specimens, or other such activities. For the purposes of biosecurity and biocontainment, the diagnostic microbiology and other service laboratories will be operated as limited-access areas.

Laboratory Services Rotation Student Laboratory:

- Laboratory coats are required when working with isolates or biologic material in the student laboratory. Lab coats should never be worn when leaving the laboratory (to go to another area of the clinic, breakroom or outside the building).

Necropsy:

Students on the Laboratory Services Rotation:

Students on the necropsy rotation will follow necropsy disinfection protocols for cleaning the necropsy floor/tables, instruments and aprons. Infectious disease control practices are in accordance with those documented in section 3 of this document. Eye glasses and face shields are supplied when deemed necessary by the pathologist. Avian necropsies, and primate necropsies (when approved by Laboratory Director) are performed in the biosafety cabinet with pathologist supervision

Students performing necropsy are required to wear coveralls and boots on the necropsy floor. These items are provided in the necropsy locker room. Following necropsy, boots are washed in a boot wash (Virilon-S solution) and then disinfected (Biodet ND32). The boots are left in necropsy to air dry. The soiled coveralls are put in the necropsy laundry shoot in the necropsy locker room to be laundered on site. Should a student bring their own coveralls to necropsy, they are to write their name on the label and leave them for laundering.

Visitors:

- Visitors must enter necropsy through the locker room.
- Visitors must receive approval from that pathologist on the necropsy floor and may be denied if certain infectious agents are suspected, or if there are too many individuals on the necropsy floor and safety is a concern.
- Visitors must wear laboratory coats (found in the necropsy laundry room) that they must place in the laundry shoot in the locker room after leaving necropsy.

- Visitors must wear boots or boot covers when walking on the necropsy floor. The boots or boot covers must be left at necropsy exit. If deemed appropriate by the pathologist, visitors may be asked to change into coveralls.

9. Shelter Medicine Program Infection Control and Biosecurity

Shelter Medicine Program Guidelines for Students Traveling to Area Shelters

Because animals at animal shelters are at a higher risk of contracting and subsequently shedding contagious diseases, care should be taken to prevent the spread of disease while at the shelter and prevent the spread of disease to the Animal Health Center at the College of Veterinary Medicine.

Biosecurity on the Mobile Unit, Stationary Clinic and Shelter Medical Day Trips

- Students may wear scrubs to depart the college or begin the day in the stationary clinic, but should also bring a clean pair of scrubs to change into before leaving the shelter
- Students will depart the school in professional attire and change to scrubs upon arrival at the shelter. Students should wear only closed toe shoes while on the mobile unit or at the shelter.
- Students will change back into their professional clothes at the end of the day for the return ride to school. Worn scrubs should be placed into plastic bags and handled as potentially biohazardous. Immediately upon your return the worn scrubs should be laundered.
- Students will not re-enter any areas in the building in which animals are present or may be present and will have no contact with client owned or research animals after spending time at an animal shelter or humane organization until they have showered and changed into clean clothes.
- Animal bites will be reported to the hospital administration, and an accident report will be submitted. If needed, students will be dismissed from the remainder of the day for necessary follow up with a physician.
- Contact between animals should be minimized as much as possible. Cages should be cleaned with an appropriate disinfectant between each animal visit.
- The mobile unit and stationary clinic will be cleaned each night between shelter visits.
- Food and drink are not permitted on the mobile unit. Food consumption should occur in designated break/lunch areas within the shelter and stationary clinic.
- Students and personnel should wash their hands after handling animals. Gloves should be worn when handling animals with suspected diseases.
- Immunocompromised students are responsible for making that health information known to veterinarians and technicians on the mobile unit and in the shelter program.

Homeward Bound Animals

Homeward Bound Animals are dogs and puppies from area shelters that are transported to adoption guarantee shelters in the northeastern United States. These animals are removed from the shelters and placed into foster homes for no less than 2 weeks before transport and range greatly in health status, immune status, and

length of time out of the shelter environment. During their time in foster homes, veterinary care and health maintenance of these animals may be provided through the shelter medicine program. As often as is possible, health maintenance procedures will be handled on the mobile unit. If additional care is needed, animals may be treated in the Animal Health Center small animal clinic and should be handled as client owned animals.

On transport days, all animals are contained in the large animal corridor. At this point the animals should be fully vaccinated and should have been in foster care for a minimum of 2 weeks. Additionally, foster volunteers and shelter employees are advised not to bring animals with obvious signs of illness.

10. Multidisciplinary Laboratory Biosecurity/Veterinary Medical Teaching Program

General cleanliness and hygiene

- Maintaining cleanliness and appropriate personal hygiene are responsibilities of ALL personnel working or studying in the Multidisciplinary Laboratories (MDL).
- Clean exam gloves should be worn when handling high-risk patients (i.e. infectious disease suspects, or highly susceptible patients such as those on antibiotics, colic cases, or neonatal foals), when working with anatomical specimens, and when handling laboratory specimens, such as animal tissue and fluids including but not limited to blood, urine, fecal matter, skin cultures and hair samples.
- Surfaces or equipment contaminated by feces, secretions, or blood must be cleaned and disinfected immediately by students participating in a laboratory activity and/or these in charge of a patient.
- Hand washing is required after removing protective gloves, after returning to the AHC or laboratory from rest rooms, after handling animals, or returning from other outside areas. Disposable cleansing tissues (Kleenex®) rather than handkerchiefs must be used, when necessary, for personal purposes.
- Personal items, such as coats, hats, umbrellas, and purses, must be stored in lockers outside the AHC or lab or at some designated location near the vicinity of the personal workspace. These items should not be carried through animal holding or treatment areas or a laboratory.
- Good housekeeping, (i.e., cleanliness) is important for reducing laboratory risks and hazards. Desktops and laboratory benches must be free of unnecessary paper, chemicals, and equipment.
- Cabinet and lab bench tops are to be cleaned with Biocide or alcohol as directed by faculty members in charge of the laboratory. This solution can be found at lab bench stations throughout the MDL, as well as in the center of MDL 1, in the student diagnostic lab on the third floor or at individual lab bench areas.
- Laboratory and AHC visitors are restricted. If persons are allowed in the laboratory or AHC, they must be accompanied by a class member or a member of the staff and provided with appropriate protection. (See Section 3: General Guidelines for Infection Control, Tours and Public Offerings, Visitor Policy Form)
- The professional student MDL is not currently an approved location for conducting regulated, IACUC-approved, live animal procedures. No live animal handling should be performed in this area.
- The Veterinary Medical Technology classroom is IACUC-approved for small animal labs. It is covered under the IACUC for Small Animal Technical Skills.

Disinfection of equipment

- All instruments, equipment, or other objects such as mouth speculums, endoscopes, grooming tools, clipper blades, etc., must be sterilized or disinfected between uses on different patients.
- Reusable dose syringes and funnels need to be disassembled, cleaned with a detergent of all organic debris, and then soaked in dilute bleach 250 – 500 PPM solution for 10 minutes.
- Stethoscopes owned by personnel may be used in the teaching laboratories, but they must be wiped with alcohol between patients.
- Digital thermometers should be cleaned thoroughly between patients to remove debris and wiped with alcohol.
- Any other instruments carried routinely by personnel, such as bandage scissors, must be cleaned and wiped with alcohol between patients.

Food/Beverages

- Cosmetics, food, candy, and beverages must be kept outside laboratory areas, animal holding areas, and animal treatment areas. They should be consumed in designated areas, such as cafeteria and break rooms. Contiguous spaces, for example hallways, are not designated spaces for consumption of food, candy, and beverages.
- Tobacco products (including smokeless) are not to be used on campus.

Attire

- The MSU-CVM 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 with patients or in laboratory activities.
- This attire should be appropriate to the job at hand (e.g., lab coat over classroom attire or surgical scrubs for small animal exposure whereas coveralls with heavy boots or shoes are appropriate footwear with protective outer garments when working with large animal patients). There is a high risk of contamination with infectious materials while performing animal related tasks.
- Loose jewelry should be removed prior to labs.
- Footwear: It is recommended that all personnel wear sturdy boots or shoes at all times while working with large animals. Such footwear is easier to clean and disinfect compared with footwear constructed of porous materials (e.g. running shoes), and helps protect against injury when working around large animal patients.
- Personnel must be willing to disinfect footwear while working
- Laboratory attire appropriate to the specific learning activity should be worn at all times. No sandals, open toed shoes, or high-heeled shoes are to be worn during laboratory activities. Long hair is to be tied back during laboratories.

- Effective protective apparel must be accessible. Protective safety glasses or face shields are required to be worn when potential spill, splatter, exposure to contaminated biological aerosols, or impact conditions occur.
- **Laboratory coats, surgical scrubs, gloves, masks, booties and other protective apparel must not be worn outside laboratory spaces or CVM.**

Guidelines for dogs/cats arriving from area animal shelters

Because dogs and cats from animal shelters are more likely to have contracted contagious disease, it is important to be vigilant for nosocomial transmission of upper respiratory and enteric diseases. It is extremely important to segregate these animals from the general hospital population and take biosecurity precautions whenever these animals are present at MSU-CVM.

- Shelter animals are housed in the MDL housing unit (L3525 and L3527). No shelter animal is to enter the AHC without specific orders from the course leader.
- All shelter animals enter and leave the building through the MDL loading door (L2601).
- Shelter animals are walked in the designated dog walking area. Fecal waste matter deposited on the lawn must be picked up immediately and deposited into the waste dumping station.
- Personal protective attire is to be worn when working in the animal housing area: lab coat and gloves
- Lab coats worn in the animal housing area are not to be worn into the classrooms, common areas, AHC, or out of the CVM building.
- Care should be taken to prevent contact between dogs.
- Patients with clinical signs of disease, such as respiratory, GI, or fever of unknown origin, should be handled as high-risk patients. Additional consideration and precautions should be followed with suspect dermatological conditions (zoonosis. Determination should be made as to the cause of clinical signs as specific diseases of concern (and that are commonly seen, include ringworm (dermatophytes) and ectoparasites (fleas, ticks, mites, etc.) Faculty assigned to the course should be notified immediately for instructions for appropriate biosecurity.
- Personal hygiene with hands washed should be observed at all times between animals and before leaving the area.
- A clean leash is provided for each shelter patient. These leashes should not be used for any other animal or leave the MDL area.
- Stethoscopes used on shelter animals must be cleaned with alcohol or chlorhexidine after each use.
- Thermometers must be cleaned after each use with alcohol or chlorhexidine.
- Animal housing rooms are depopulated, scrubbed and sanitized weekly by LARAC staff.

Guidelines for receiving other patients

Cage Assignments

- Cage assignments are made by LARAC or MDL staff.
- CVM owned leashes and muzzles are used while the animal is hospitalized. All leashes and muzzles should be disinfected between patients by soaking them in chlorhexidine solution for (leashes) or dilute bleach for (muzzles).

Patient Records and Medications

- Students assigned to the patient maintain patient records.
- Records are to be kept in the rack outside the student surgery lab (L3120) or with the patient at all times.
- Patient medications are kept in the student diagnostic lab (L3130)

Feed and Water

- Students care for humane society animals and CVM animals assigned to student groups. Students are responsible for the food and water for their patients.

LARAC MDL cleaning and culturing protocol

LARAC Infectious Disease Control

Inherently an animal hospital is confronted with dealing with and caring for animals with infectious diseases. Trying to prevent the spread of such infectious organisms to other animals and humans must be paramount in our husbandry management. To be successful in this endeavor all persons involved in the care of the animals and their environment must be aware of and follow all infectious disease containment procedures. There must be free and open communication between MDL and instructional staff, LARAC personnel, and facilities personnel so that all are made aware of a suspicious or real contagious disease. Such communication allows appropriate infectious disease containment practices to be initiated and followed in a prompt and thorough manner. Presented below is a written program for the initiation of an infectious disease control (IDC) program and the steps required to carry out such a program.

Determination of suspicious or confirmed infectious disease

If conditions present that indicate an infectious process (i.e. soft stool, anorexia, fever, leucopenia, purulent nasal discharge, sub-mandibular swelling) the clinician in charge decides if it is appropriate to continue treating the animal in the MDL housing. Certain precautionary measures and further diagnostic tests may be initiated. Once it has been determined that the change in the animal's condition warrants the initiation of any precautionary measures, LARAC needs to be notified promptly.

Responsibilities of communicating the need for IDC measures

- MDL staff is to

- Communicate to the LARAC staff via written communication the presence of an infectious or potentially infectious case in MDL. Pertinent information that must be shared includes; the animal, the housing room number, and the clinical problem that is causing the initiation of protective measures.
 - If the adjacent animal holding room is available, the infectious or potentially infectious animal may be relocated into this room for isolation and observation/treatment purposes.
 - If during normal working hours, in addition to written notification, also verbally communicate the initiation of IDC measures directly to a team leader and/or the LARAC individual working in MDL that day. This will help ensure prompt initiation of all necessary protective measures.
 - Initiate, communicate and maintain the infectious disease control measures established by the MDL and instructional staff that are to be followed by the vet students, the technical support staff and the clinical staff in the daily care of the animal.
- LARAC staff
 - Once LARAC has received notification of initiation of IDC measures, these steps should be followed
 - Verify written information obtained from MDL staff.
 - Ensure that the LARAC worker assigned to MDL is aware of the initiation of IDC measures and familiar with all that that entails.
 - Notify the LARAC animal health technician of the presence of any cases requiring IDC measures so that appropriate measures may be taken.
 - Follow all established precautionary measures until the dog/cat has been discharged, the cage cleaned, sanitized and cultures obtained.

Infectious Disease Control (IDC) Measures

Classification of infectious disease

High Risk	Moderate Risk	Zoonotic Potential
Canine Parvovirus	Infectious Canine Hepatitis (CAV-1)	Rabies*
Canine Distemper	Leptospirosis	Leptospirosis
Canine Infectious Tracheobronchitis	Feline Infectious Peritonitis	Canine Brucellosis
Feline Calicivirus	Salmonellosis	Sporotrichosis
Feline Rhinotracheitis	Campylobacteriosis	Dermatophytosis
Feline Panleukopenia	Hospital Diarrhea	Giardiasis
Chlamydiosis	Cheyletiella Mange	Round/Hook Worm
Q-Fever	Sarcoptic Mange	Salmonellosis
Exotic Newcastle Disease (Plague)*	Giardiasis	Campylobacteriosis
Canine Brucellosis	Chlamydiosis	Q-Fever
Avian Influenza*	Tularemia	Tularemia
	Cryptosporidiosis	Plague
		Cat Scratch Disease (Bartonella)
		Cheyletiella Mange
		Sarcoptic Mange
		Toxoplasmosis
		Cryptococcosis - birds
		Cryptosporidiosis
		Monkey Pox *
		Tuberculosis
		Mycobacterium bovis*

* denotes a reportable disease

Classification of Disease

- Suspicion of High Risk Infectious Disease Not Identified prior to arriving at MSU-CVM
 - If the patient has entered the MDL area, before the potential for a high-risk infectious disease has been identified, every effort must be made to identify possible areas of contamination. All areas where potential contamination with infectious material may have occurred must be cleansed thoroughly with an effective

disinfectant solution All students and clinicians handling the patient must wear gloves, gowns and protective boots as soon as the potential for high-risk infectious disease has been identified. All other students with patients in the housing area whose patients may have been exposed to the infectious disease should be informed of the risk and the symptoms of the disease in question. Vaccination status should be determined and updated vaccination recommended for diseases to which the animal has been exposed and for which there is a vaccine available (especially for parvovirus, canine distemper, panleukopenia, infectious tracheobronchitis). The shelters are responsible for keeping their animal's vaccination status up to date.

- Contamination of Persons in Contact with Patient Suspected of High Risk Infectious Disease
 - Any person (student, clinician, technician, staff member) who has unprotected contact with a patient suspected of high risk infectious disease must immediately be provided with a clean uncontaminated set of surgical scrubs or change into other clean uncontaminated clothing. The contaminated clothing should be placed in a plastic bag and transported for laundering. After placement of the clothing in the bag, the person must thoroughly wash his/her hands prior to any further contact with other patients or clients. In addition, any person who experiences contamination of their personal clothing during protected contact with a patient suspected of high risk infectious disease must immediately change clothing as outlined above. Zoonotic risk must be assessed and appropriate action taken.
- Contamination of Persons in contact with patient suspected of moderate infectious disease
 - MDL personnel and/or students, who are required to have contact with a patient suspected of a moderate risk infectious disease, must wear a protective gown and gloves. A special trash receptacle labeled as BIOHAZARDOUS MATERIAL-POTENTIALLY INFECTIOUS must be located nearby and all gowns, gloves, and soiled cage materials must be placed in this receptacle. This trash will be disposed of by LARAC personnel. ALL PERSONNEL WHO HAVE CONTACT WITH THE PATIENT MUST IMMEDIATELY AND THOROUGHLY WASH THEIR HANDS AFTER REMOVING THEIR GOWNS AND GLOVES, AND PRIOR TO ANY OTHER PATIENT CONTACT. If any article of personal clothing becomes soiled with infective material or comes into close contact with the patient, procedures as described above must be followed. Any equipment, which has become soiled by infective material, should be immediately and thoroughly cleansed with an effective disinfectant solution (Example: 1:10 dilution bleach) prior to

being utilized for any other patient. Zoonotic risk must be assessed and appropriate action taken

- Admission of Patients Suspected of ZONOTIC POTENTIAL Infectious Disease
 - All patients entering the MDL surgical area from area shelters are screened for signs of infectious disease. These animals may show signs of zoonotic infectious disease after arriving at CVM.
 - Students and personnel, who are required to have contact with a patient suspected of having a zoonotic infectious disease, must wear a protective gown and gloves. A special trash receptacle labeled as BIOHAZARDOUS MATERIAL-POTENTIALLY INFECTIOUS, must be located nearby and all gowns, gloves, and soiled cage materials must be placed in this receptacle. The LARAC staff will dispose of this trash. ALL PERSONNEL WHO HAVE CONTACT WITH THE PATIENT MUST IMMEDIATELY AND THOROUGHLY WASH THEIR HANDS AFTER REMOVING THEIR GOWNS AND GLOVES, AND PRIOR TO ANY OTHER PATIENT CONTACT. If any article of personal clothing becomes soiled with infective material or comes into close contact with the patient, procedures as described above must be followed. Any equipment that has become soiled by infective material should be immediately and thoroughly cleansed with an effective disinfectant solution (Example: 1:10 dilution bleach) prior to being utilized for any other patient.
 - Students and personnel, who have had contact with a patient suspected of having a zoonotic infectious disease known to be transmitted by fomites must not enter into areas of food preparation or distribution designed for human consumption wearing the same clothing and shoes as during the potential exposure. The use of disposable barrier clothing is required. Clothing and shoes must be changed before leaving the building in these circumstances. Clothing should be bagged and laundered, and shoe bottoms and sides disinfected. Students are encouraged to speak with a physician regarding their personal health status and zoonotic exposure.
 - Shelters should be informed of the zoonotic potential of their animal's disease as soon as a reasonable suspicion or confirmation of a zoonotic disease is established. The client should be encouraged to contact their local physician for further advice following exposure to a zoonotic disease. See Table above.
 - Immunocompromised people (clients, students, staff, faculty, technicians) may be exposed to zoonotic diseases in our hospital or laboratories. Special precautions to lower the risk for acquisition of an infectious agent from animals. Immunocompromised persons should self-identify to the Dean for Admissions and Student Affairs, section head, or AHC director.

Resources for more information on these issues are: Healthy Pets, Healthy People at www.cdc.gov and PAWS (Pets Are Wonderful Support) [Pets and the Immunocompromised Patient] at www.pawssf.org/library_immunocompromised.htm. These sources provide helpful material for attending veterinarians and the immunocompromised community.

Daily LARAC Record Keeping

To be performed by a member of the LARAC staff assigned to and completing the routine daily tasks in the equine clinic.

- Once daily the temperature and humidity must be read and recorded on the observation sheet. Make sure to reset the thermometer once the high and low has been recorded.
- At the end of a work period the daily task list should be filled out and initialed to ensure completion of all tasks and recording of any problems encountered. This daily task list is located in a binder in the LARAC team leader's office.
- Record the census, including the ins and outs, not just the balance.
- At the end of the month the observation sheets should be filed in the filing cabinet in the team leader's office area, and the census sheets should be turned in to the LARAC manager.

11. Clinical Outreach Services

Animal Emergency and Referral Center – Flowood, MS

Current safety precautions observed at the Animal Emergency and Referral Center in Flowood, MS include

- Distemper, Parvo and Feline respiratory cases are hospitalized in viral isolation. We limit access to viral isolation to one technician each day. That technician wears a disposable gown, gloves and booties and utilizes a footbath (phenol) to enter and exit. The assigned technician does not work on immunologically naïve patients during the day (i.e., puppies if they have a Parvo case.) All equipment used in viral isolation remains in viral isolation. Nothing is moved back and forth. Garbage is carried directly to the dumpster.
- Any patients with suspected contagious bacterial cases (those with high fever and high white counts, or Lepto suspects) are kept in our bacterial isolation ward. Similar precautions are taken as with viral cases, however, we don't require booties or a footbath. We try to limit access to the doctor, technician and student on the case. Those patients are treated last.
- Isolation procedures are posted on the window of each ward. They were modified from those that we obtained from College of Veterinary Medicine.
- Suspected viral (e.g., Parvo) cases are kept outside of the facility in the owner's car until a confirmatory test (e.g., Parvo snap test) is performed. Patients that test positive are brought into the hospital through the rear entrance and carried into the viral isolation ward. They are not allowed to walk on our premises. We do not use students in viral isolation.
- All diarrhea/vomiting cases are seen in Exam Room 3. The room is disinfected completely from the top to bottom if, for example, a Parvo case slips through. Further, it is mopped and wiped down after any gastrointestinal case is seen using a cleaner approved for killing parvo virus.
- Team members **wear gloves at all times** when examining or handling any animal, and changed between animals. Gloves are worn when cleaning cages and running diagnostic laboratory equipment (i.e. handling bodily fluids).
- New disposable thermometer covers and disposable fecal loops/fecal tubes are used for all patients. No items are re-washed.
- An exam glove is placed over the stethoscope head when examining an animal with external wounds or wet with body fluids.
- Urinary catheterization is performed using sterile gloves for passing the catheter, and barrier gloves for restraining and positioning.
- Lead aprons and thyroid shields are worn during radiology. X-ray monitoring badges are worn. We have eliminated the problem of people being exposed in the direct beam. We close the door most of the time while radiographs are being taken. We try to minimize the number of people involved to radiograph a patient.

- Standard OR procedures are followed as outlined in our handbook (i.e., clean scrubs, booties, cap, gown and mask). Clean scrubs are changed into prior to entering the OR suite.

Veterinary Specialty Center – Starkville, MS

Special considerations for the Veterinary Specialty Services on Stark Road in Starkville, MS include

Safety Regulations – Zoonotic Disease

It is the responsibility of all personnel to determine the vaccination status for rabies in all animals before any examination begins. Students should NOT assume someone else has made this inquiry and make certain this information is obtained before handling any animal at Veterinary Specialty Center. This vaccination status must be documented by official records obtained from the referring veterinarian and should not be based solely on the client's recollection that the vaccines are "current." Any patient admitted without a current status of their rabies vaccination will be treated as a rabies suspect until proven otherwise. Safety precautions include minimal handling and wearing of protective gloves at all times when working with these animals or any bodily fluids from said animal (urine, blood, saliva).

Daily Cleaning Protocol

- All tables and instruments are wiped clean with Accel® disinfectant cleaner (hydrogen peroxide 0.5%) between each patient and at the end of the day.
- All floors are swept and mopped with Consume Eco-Lyzer® (dimethyl benzyl ammonium chloride 2.18%, n-octyl decyl dimethyl ammonium chloride 1.63%, dioctyl dimethyl ammonium chloride 0.82%, dodecyl dimethyl ammonium chloride 0.82%) at the end of each day.
- Common anesthetic equipment such as hoses are cleaned daily and endotracheal tubes are discarded after each use.
- Cages are cleaned with Accel® after each use.
- Carpets used in patient examinations and the lobby are sent away for cleaning once weekly.

Viral suspect patients

- Any suspect animal will be immediately limited to few personnel contact wearing gloves and lab jackets at all times, and limited to one room
- Any instruments, tables and/or cages that come in contact with patient will be sanitized in Accel® disinfectant cleaner.
- All floors will be swept and mopped with Consume Eco-Lyzer.