



Ontario Veterinary College

Ontario Veterinary College Health Sciences Centre

Infection Control Manual

This updated Manual of Infection Control Procedures details the methods used in the Hospital to control the spread of infection, to and between animals and humans. It is produced by the Infection Control Committee, a committee of the Ontario Veterinary College Teaching Hospital, whose composition and function are listed in this publication.

The Manual will be available for consultation by all concerned persons in the Hospital. The Committee welcomes comments regarding procedures and any area of infection control at the Teaching Hospital

August 9, 2009

Mission Statement

The Infection Control Committee (ICC) is responsible for development, maintenance and monitoring of infection control activities in the Ontario Veterinary College Teaching Hospital, and to reduce the incidence and impact of sporadic infectious diseases and outbreaks amongst animals and humans.

Index

Infection Control Committee

Infection control at the Ontario Veterinary College Teaching Hospital (OVCTH) is run under the auspices of the Infection Control Committee (ICC), the composition of which is described below. Daily infection control activities are performed by Infection Control Practitioner (ICP), under the supervision of the Chief of Infection Control. The ICC is an advisory committee to the Associate Dean, Administration and Chief Operating Officer of the OVC Health Sciences Centre.

Terms of Reference/Composition

Purpose

The overall purpose is to advise and assist in all matters relating to infection control. This extends to the identification and reduction of risk of infection for patients, staff and visitors to the OVCTH. Major components include:

- advising on the content and monitoring of the organization-wide infection control program
- providing advice and support to OVCTH to meet its legislative, accreditation, governmental and ethical obligations relating to infection control practice
- identifying and interpreting current best practice standards with regard to infection control in the context of the strategies and goals of the OVCTH
- monitoring compliance with legislative requirements, organizational policies and procedures relating to infection control practices
- providing a forum for regular consultation between the infection control team and other OVCTH staff

Guiding Principles

1. Infection prevention and control strategies are designed to protect patients, owners, veterinary personnel and the community.
2. While poorly quantified, healthcare (hospital)-associated infections (HAIs) occur in veterinary clinics and can have a significant impact on animal health. Although not all HAIs are preventable, a significant percentage of these infections can be prevented with proper adherence to basic, practical infection control practices. While the proportion of preventable HAIs in veterinary clinics is unknown, it has been estimated that 30-70% of HAIs in human hospitals are preventable.
3. A systematic approach to infection prevention and control requires all veterinary personnel to play an active role in protecting every person and animal associated with activities at the OVCTH.
4. Veterinary personnel need to follow infection prevention and control protocols at all times and use critical thinking and problem solving in managing clinical situations.

Composition and Function

The ICC reports to the Associate Dean, Administration and Chief Operating Officer and is comprised of the following individuals:

- Chief of Infection Control (Chair)
- Infection Control Practitioner (ICP)
- Associate Dean, Administration and Chief Operating Officer (or designate)
- Animal Health Laboratory Representative
- Nursing Representative
- Clinical Faculty Representative: Companion Animal Hospital
- Clinical Faculty Representative: Large Animal Hospital
- Ruminant Field Services Representative
- Primary Healthcare Centre Representative

Additional members may be added at the discretion of the ICC Chair and Associate Dean, Administration and Chief Operating Officer. The Associate Dean, Administration and Chief Operating Officer appoints individuals with input from the appropriate group, if applicable.

Responsibilities

The ICC Chair's responsibilities include:

- Calling meetings (semesterly)
- Interaction with the ICP
- Interacting with housing managers and pharmacy personnel as needed
- Evaluation of protocol breaches
- Coordinating protocol development
- Outbreak Investigation
- Communicating with ICC Members and other relevant individuals regarding infection control issues
- Coordinating periodic review of protocols

The ICP's responsibilities include:

- Daily infection control activities such as ward census
- Co-ordination of cage/stall quarantine
- Communication with animal housing and other relevant individuals
- Monitoring and collating surveillance results and collating results
- Identifying and reporting infection control breaches
- Recording infection control orientation of personnel

- Communicating with the Animal Health Laboratory on reporting of Internally Reportable Diseases
- Maintaining a record of Internally Reportable Diseases
- Performing infection control orientation of new personnel

The Associate Dean, Administration and Chief Operating Officer is ultimately responsible for the implementation of infection control protocols and disciplinary action regarding serious or recurrent protocol breaches.

The ICC Chair and ICP will work closely in implementing, maintaining and monitoring the program. The ICP will act as the 'front-line' infection control professional and will be the main liaison between the ICC and clinical personnel for routine issues. The ICC Chair will assume primary responsibility for protocol development and outbreak investigation, and will work with the ICP and Associate Dean, Administration and Chief Operating Officer in dealing with problems with protocol compliance.

Function

The ICC will meet on a formal basis at least once a semester. Efforts will be made to facilitate attendance by all committee members, however 4 individuals will constitute a quorum.

Email communication will be encouraged to discuss routine and emergency issues. Voting by email will be allowed and coordinated by the Infection Control Committee Chair. The decision on whether to submit a measure to email vote will be made by the ICC Chair, however a formal meeting can be required if a request is made by 2 or more ICC members. All votes will be decided by simple majority. The Chair of the meeting will not vote except to break a tie.

Infection Control Manual

This Infection Control Manual will act as a resource and contain all approved infection control protocols. This manual will be updated as necessary. This may be in the form of minor additions or changes, or a complete review and revision. This will be determined by the ICC. The Infection Control Manual will be available to the public on the OVCTH website.

All infection control protocols are not contained within this Manual. Standard operating procedures (SOPs) are developed and approved by the OVC Health Sciences Centre. The Infection Control Committee, through the Chief of Infection Control and/or ICP will participate in development and review of SOPs relating to infection control activities (e.g. cleaning and disinfection, movement of animals). All SOPs are available online through the OVCTH website.

Basic Principles of Infection Prevention and Control

A documented infection control program is an important component of delivery of optimal veterinary care and protection of veterinary personnel, animal owners and the public at large. Infection prevention and control measures can be broadly divided into three main categories: those that decrease host exposure, decrease host susceptibility and increase host resistance to infectious pathogens.

1. Decreasing *exposure* is the most important aspect of disease control in most situations. If a pathogen does not encounter an individual, then disease cannot occur. The number of organisms to which a host is exposed is also an important factor in determining whether or not colonization or infection (disease) will ensue. Depending on the pathogen, decreasing or preventing exposure may be easy, difficult or impossible.
2. There are many factors that interact to determine whether or not infectious disease will develop in a particular host. In most cases, simple exposure of an animal to an infectious agent does not mean that disease will result. The *susceptibility* of the individual to a particular number of an infectious agent plays an important role. Although difficult to quantify, certain situations may result in increased susceptibility to infection and disease. Many factors causing increased susceptibility are not preventable, but some are, and efforts should be undertaken to address these issues. Factors to consider include judicious use of antimicrobials and gastroprotectants (particularly proton pump inhibitors), provision of proper nutrition, adequate pain control, and appropriate management of underlying disease.
3. Measures to actively increase *resistance* of a host are commonly used in veterinary medicine, but these should be considered only the third line of defense, after those meant to decrease exposure and susceptibility. Vaccination is currently the main technique used to increase resistance of animals or humans to infection. However, no vaccine is 100% effective. Therefore, while vaccination is an important part of infection prevention and control, it should not be considered the main component of an infection control program. In addition, many HAI-infections are caused by opportunist microorganisms for which vaccines are unavailable.

Section I: General Policies

Food and Drink

Food and drink must not be consumed or stored in any patient housing, examination, treatment or procedure areas, as well as areas where biological specimens are handled or medications are dispensed. Food and drink must not be stored in refrigerators that are intended for storing medications or biological specimens. Microwaves in animal care areas are not to be used for food intended for people.

Animal Identification

All animals must be readily identifiable at all times. Horses must have a number tag affixed to their halter and a stall card placed on their stall door. Small animals must be identified using a id-band and cage card. In uncommon situations, when the use of a halter tag or id-band is not possible for medical reasons, the animal's movement outside of its cage or stall must be carefully performed so that can be no confusion as to the identity of the animal. The cage or stall where an animal resides must be properly identified in all situations.

Notification of Testing Results for Animals that Have Been Discharged

It is not unusual for animals to be discharged while test results are pending. If an infectious disease is considered possible and test results are pending, a discussion of the potential problems must be had with the owner or agent by the attending clinician (or another designated clinician) and recommendations made to reduce risks of disease transmission. This must be documented in written discharge instructions. Further, test results must be promptly reported to the owner/agent and this documented in the medical record. Discharge summaries must be promptly updated to include the relevant information.

Discharge of Animals Known or Suspected to be Shedding Infectious Pathogen

Whenever available, information sheets that have been developed (i.e. equine MRSA, equine Salmonella) should be provided with the discharge or sent to the owner/agents promptly after identification of the infectious disease.

Sharps

Injuries from needles and other sharp implements are common in veterinary medicine but are largely preventable. Although there is not the level of risk of bloodborne pathogen exposure in veterinary practice as there is in human medicine, serious outcomes can result following needlestick or other sharps injuries, including significant trauma, secondary infection and drug reaction (i.e. toxic, allergic, idiosyncratic). Proper sharps handling practices are a practical yet effective way of reducing workplace injuries.

- Use appropriate barriers (e.g. closed toed shoes) and safe work practices when using sharp instruments and devices (e.g. needles, scalpels, etc.), after procedures and when cleaning used instruments. Never remove needle caps by mouth.
- Do not bend or manipulate needles in any way.

- Do not pass uncapped needles to another person.
- Ensure proper animal restraint to reduce inadvertent needlestick injuries from animal movement.
- Do not recap needles by hand. If recapping is required, use the “one-handed scoop” technique (see below), forceps or a needle cap holder.
- Ensure that approved point-of-use sharps disposal containers are located everywhere needles are handled. These containers are puncture-resistant, leak-proof, and prevent removal (both accidental and intentional) of discarded sharps.
- Always dispose of sharps immediately in an approved sharps disposal container.
- Never dispose of needles or other sharps into anything other than an approved sharps container, even if they are capped or otherwise contained. This reduces the risk of accidental injury to veterinary personnel, patients, clients and non-veterinary personnel (e.g. waste disposal personnel).

The most important precaution for preventing needle-stick injuries is to *avoid recapping needles*. When it is absolutely necessary to recap needles as part of a medical procedure or protocol:

- Use a mechanical device such as forceps or hemostats to replace the cap on the needle.
- Alternatively, the needle can be recapped using the “one-handed scoop” technique:
 - Place the cap on a flat horizontal surface.
 - Holding the syringe with the attached needle, or the needle hub alone (when unattached), scoop up the cap with the needle by sliding the needle tip inside, without touching the cap with one’s other hand.
 - Once the point of the needle is covered, tighten the cap by pushing it against an object, or by pulling the base of the needle cap onto the hub of the needle *with the same hand holding the syringe*.

After injecting live vaccines or aspirating body fluids or tissue, the used syringe should be placed in a sharps container with the needle attached. Following most other veterinary procedures, the needle and syringe may be separated for disposal of the needle in the sharps container. This is most safely accomplished by using the needle removal device on an approved sharps container, which allows the needle to drop directly into the container without being handled or touched. Forceps can also be used to remove the needle.

Sharps containers must be disposed of when $\frac{3}{4}$ full. Veterinary technicians will normally do this but it is the responsibility of all personnel to ensure that proper sharps containers are available and that containers are not overfilled. The person disposing of a sharps container must promptly replace it with a new one.

Client Needlestick Injury Avoidance/Sharps Handling

In situations where clients are being recommended to treat their animals at home with injectable medications or fluids, it is our responsibility to ensure that they can do this properly and safely. The following protocols must be followed:

- If the client does not have experience with injection of drugs or fluids the animal, they must be taught how to do so and report that they understand. This must be documented in the medical record.
- An approved sharps container must be available and the owner must know how to use it. Owners must be instructed to cap the container when it is $\frac{3}{4}$ full and return it to OVC, a medical waste company or other appropriate location for disposal.
- If there are concerns that the client cannot or will not handle needles safely, and these concerns cannot be resolved, injectable medications or fluids must not be dispensed.

Personal Protective Equipment

Personal protective equipment (PPE) is an important routine infection control tool. PPE use is designed to reduce the risk of contamination of personal clothing, reduce exposure of skin and mucous membranes of veterinary personnel to pathogens, and reduce transmission of pathogens between patients and to veterinary personnel. Some form of PPE must be worn in all clinical situations, including any contact with animals and their environment. **Tables 1 and 2 summarize infectious disease control precautions by disease condition and agent, and recommended personal protective equipment for routine veterinary procedures, respectively.**

Lab Coats

Lab coats are meant to protect clothing from contamination, but generally they are not fluid resistant, so they should not be used in situations where splashing or soaking with potentially infectious liquids is anticipated. These garments should be changed promptly whenever they become visibly soiled or contaminated with body fluids, and at the end of each day. *Lab coats worn in the clinic should not be worn outside of the work environment.* Lab coats worn when handling patients with potentially infectious diseases should be laundered after *each* use, because it is almost impossible to remove, store/hang and reuse a contaminated lab coat without contaminating hands, clothing or the environment.

Scrubs (non-surgical personnel)

Scrubs are an acceptable form of protective outerwear in clinical situations provided they are used properly. The main disadvantage of using scrubs is that they are more difficult to change than a lab coat. People wearing scrubs in clinical situations must be prepared to change their scrubs regularly if they become soiled or contaminated.

Scrubs must not be worn outside the clinic. They must not be taken home by personnel to be washed. Rather they should be washed on-site, with other clinic laundry. Scrubs should be changed and washed at the end of each day and whenever they become visibly soiled.

Scrubs (surgical personnel)

Designated scrubs should always be worn during surgery. These scrubs should not be worn during other procedures or when handling patients. Scrubs worn for surgery should be covered with a lab coat outside of the surgical suite.

Non-Sterile Gowns

Gowns provide more coverage for barrier protection than lab coats, and are typically used for handling animals with suspected or confirmed infectious diseases. Permeable gowns can be used for general care of patients in isolation. Impermeable (i.e. waterproof) gowns should be used to provide greater protection when splashes or large quantities of body fluids are present or anticipated. *Disposable gowns should not be reused, and reusable fabric gowns should be laundered after each use, because hanging/storing and reusing contaminated gowns inevitably leads to contamination of hands, clothing or the environment.* Gloves should be worn whenever gowns are worn. Gowns (and gloves) should be removed and placed in the trash or laundry bin before leaving the animal's environment, and hands should be washed immediately afterwards.

Personnel should learn to remove gowns properly, in such a way as to avoid contaminating themselves and the environment. The outer (contaminated) surface of a gown should only be touched with gloves.

1. After unfastening or breaking the ties, peel the gown from the shoulders and arms by pulling on the chest surface while hands are still gloved.
2. Ball up the gown for disposal while keeping the contaminated surface on the inside.
3. Remove gloves and wash hands.
4. If body fluids soaked through the gown, promptly remove the contaminated underlying clothing and wash the skin.

Gloves

Gloves can reduce the risk of pathogen transmission however they are only effective if used properly. They should be worn when there is a reasonable likelihood of contact with infectious agents (i.e. contact with wounds, urine or the haircoat of leptospirosis suspects, contact with the coat of animals with ringworm, contact with feces) or when there will be contact with a patient body site at higher risk for developing infection (i.e. invasive devices). Gloves should also be worn when cleaning cages and environmental surfaces, as well as when doing laundry if gross contamination of items is present. Gloves are also recommended for personal protection if skin lesions are present on the hands.

- Gloves should be removed promptly after use, avoiding contact between skin and the outer glove surface.
- Gloved hands should not be used to touch surfaces that will be touched by people with non-gloved hands.
- Care should be taken to avoid contamination of personal item such as telephones, pens and pagers. Telephones should never be answered while wearing gloves.
- Hands should be washed or an alcohol-based hand sanitizer should be used immediately after glove removal. It is a common misconception that using disposable gloves negates the need for hand hygiene. *Gloves do not provide complete protection against hand contamination, therefore hand hygiene immediately after removing gloves is essential.*

- Disposable gloves must not be washed and/or reused.

Face Protection

Face protection prevents exposure of the mucous membranes of the eyes, nose and mouth to infectious materials. Face protection typically includes a nose-and-mouth mask (e.g. surgical mask) and goggles, or a full face shield. Face protection should be used whenever exposure to splashes or sprays is likely to occur, including dental procedures, nebulization, and wound lavage.

Respiratory Protection

Respiratory protection is designed to protect the respiratory tract from zoonotic infectious diseases transmitted through the air. **The need for this type of protection is limited in veterinary medicine** because there are currently few relevant airborne or aerosol zoonotic pathogens in companion animals. An N-95 rated disposable particulate respirator is a mask that is inexpensive, readily available, easy to use and provides adequate respiratory protection in most situations. However, people need to be fit-tested to ensure proper placement and fitting of N95 masks. Special N95 masks are required for people with beards. Surgical masks are not a replacement for N95 masks. If an N95 mask is indicated for management of a case, only personnel who have the appropriate mask AND who have been properly trained and fit-tested may be involved in the animal's care. People that want or need to have an N95 mask must request fit testing from Environmental Health and Safety through their supervisor.

Footwear

Closed toed footwear must be worn at all times to reduce the risk of injury from dropped equipment (e.g. scalpels, needles), scratches from being stepped on by dogs, and to protect the feet from contact with potentially infectious substances (e.g. feces, discharges and other body fluids).

Designated footwear or disposable shoe covers are required in areas where infectious materials are expected to be present on the floor, in order to prevent their spread to other areas. Designated footwear or disposable shoe covers may be required for patients with infectious diseases that are kept on the floor (e.g. in a large dog run) or that may contaminate the floor around their kennel (e.g. an animal with severe diarrhea). Such footwear must be removed as the person leaves the contaminated area, and should be immediately disposed of in the garbage (if disposable), or left at the entrance of the contaminated area on the "dirty" side.

Protective Clothing Requirements

Protective clothing must be worn in all patient management situations, as well as for any access to areas such as the Intensive Care Unit. Protective clothing must be changed regularly and immediately whenever visibly soiled.

Standard protective clothing requirements are as follows:

Companion animal wards

- Clean laboratory coat or scrubs
- Close-toed footwear

Large animal wards

- Clean laboratory coat or coveralls
- Steel-toed footwear

Operating rooms

- Clean surgical scrubs and cap
- Close-toed footwear

Supply areas/pharmacy

- Clean laboratory coat or scrubs
- Close-toed footwear

Ruminant Field Service

- Clean coveralls
- Steel-toed footwear
- Overboots are required for certain situations if steel-toed rubber boots are not the primary footwear

Protective Clothing in the Cafeteria

Clean laboratory coats are allowed in the cafeteria. Coats must be visibly clean and odour-free. Personnel that wear scrubs must cover their scrubs with a clean laboratory coat before entering the cafeteria. Coveralls are not permitted in the cafeteria.

Protective Clothing Outside of the OVCTH

Protective clothing (laboratory coats, scrubs, coveralls) must never be worn outside the OVCTH except when used for OVCTH activities such as Ruminant Field Service farm visits.

Laundry

The OVC laundry must be used to launder laboratory coats, scrubs and coveralls. Those items should never be taken home.

Jewelry/Other Accessories

Bracelets, large rings, long chains or other items of jewellery that might contact patients are not appropriate. Medic-Alert and religious items are exempt. Items such as OVC identification batches on lanyards must be worn in such a manner that they will not contact a patient or environmental surface.

In operating rooms, stud earrings only should be worn. Drop earrings are not acceptable. A clean cap must cover all earrings.

Hair

Long hair must be confined to prevent entanglement with objects and animals.

Fingernails

Artificial nails are not to be worn in the hospital environment as they have been demonstrated to harbour pathogenic bacteria and have been associated with outbreaks in human hospitals. Nails must be $\leq \frac{1}{4}$ "(6mm).

Hand Hygiene

Hand hygiene is one of the most important infection control tools and is the responsibility of all individuals involved in health care. **Hand hygiene should be performed:**

- Before and after contact with a patient
- After contact with any body fluids of a patient
- Before eating
- After contact with the patient's environment
- After glove removal
- After using the restroom

Effective hand hygiene kills or removes microorganisms on the skin while maintaining hand health and skin integrity (i.e. prevents chapping and cracking of skin). Sterilization of the hands is not the goal of routine hand hygiene - the objective is to reduce the number of microorganisms on the hands, particularly the number of microorganisms that are part of the transient microflora of the skin, as these include the majority of opportunistic pathogens on the hands. There are *two methods* of removing/killing microorganisms on hands: washing with *soap and running water* or using an *alcohol-based hand sanitizer*.

Alcohol-Based Hand Sanitizers

Alcohol-based hand sanitizers/rubs are, with some exceptions, the *preferred method* for decontaminating hands that are not visibly soiled. They have superior ability to kill microorganisms on the skin than hand washing with antibacterial soap, can quickly be applied, are less likely to damage skin, and can be made readily available at almost any point of care.

Alcohol-based hand sanitizers must contain at least *70% alcohol*. Use of products containing **emollients** helps to reduce skin damage, which can otherwise occur with frequent use of hand sanitizers. Products containing alcohol and chlorhexidine are also available. Chlorhexidine provides some residual antimicrobial action on the hands after use, but it is unclear whether or not these combinations provide any true benefit in clinical settings.

Alcohol-based hand sanitizers are not effective against certain pathogens, including bacterial spores (e.g. clostridial spores) and *Cryptosporidium* spp. If hands are potentially contaminated by one of these organisms, hand washing with soap and running water is required. Although even antimicrobial soaps are similarly ineffective against these pathogens directly, the physical process and mechanical action of hand washing can decrease the number of these organisms on the hands.

Technique:

1. Remove all hand and arm jewelry.

2. Ensure hands are visibly clean (if soiled, follow hand washing steps).
3. Apply between 1 to 2 full pumps or a 2-3 cm diameter pool of the product onto one palm.
4. Spread the product over all surfaces of hands, concentrating on finger tips, between fingers, back of the hands, and base of the thumbs. These are the most commonly missed areas.
5. Rub hands until product is *dry*. This will take a **minimum of 15 to 20 seconds** if a sufficient volume is used.

Hands must be fully dry before touching the patient or patient's environment/equipment for the hand rub to be effective, and to eliminate the rare risk of flammability in the presence of an oxygen-enriched environment, as may occur in the presence of gas anesthetic machines.

Hand Washing

Most transient bacteria present on the hands are removed during the mechanical action of washing, rinsing and drying hands. Hand washing with soap and running water must be performed when hands are visibly soiled. If running water is not available, use moistened towelettes to remove all visible dirt and debris, followed by an alcohol-based hand rub.

Bar soaps are not acceptable in veterinary practice settings because of the potential for indirect transmission of pathogens from one person to another. Instead, liquid or foam antibacterial soap should be used

- Soap should be dispensed in a disposable pump dispenser
- Soap containers should not be refilled without being disinfected, since there is a risk of contamination

Technique:

1. Remove all hand and arm jewelry.
2. Wet hands with warm (not hot) water. Hot water is hard on the skin, and may lead to additional skin damage.
3. Apply liquid or foam soap.
4. Vigorously lather all surfaces of hands for a **minimum of 15 seconds**. This is the minimum amount of time required for mechanical removal of transient bacteria. Pay particular attention to finger tips, between fingers, backs of the hands and base of the thumbs. These are the most commonly missed areas.
5. Using a rubbing motion, thoroughly rinse soap from hands under warm running water. Residual soap can lead to dryness and cracking of skin.
6. Dry hands thoroughly by blotting hands gently with a paper towel. Rubbing vigorously with paper towels can damage the skin.
7. Turn off taps with paper towel to avoid recontamination of your hands.

Visitors

The OVCTH recognizes the importance of the human animal bond and is dedicated to allowing visitation of patients by owners under controlled circumstances in most cases. However, in some situations, visitation may pose undue risk to the animal, owner, veterinary personnel or facility, and will be restricted or prohibited.

Visitation of animals not in isolation or being handled with enhanced precautions is permitted as per OVCTH visitation protocol and at the discretion of the attending clinician. Visitors must abide by hospital policies regarding visiting hours and visitation procedures. In rare situations such as a potential outbreak, it may be determined that visitation of all patients should be temporarily suspended. This decision will be made by the Associate Dean, Administration and Chief Operating Officer and Chief of Infection Control, in consultation with the appropriate clinic head(s).

Visitation of animals being housed in isolation is discouraged but may be permitted under specific circumstances as described OVC-HSC SOPs. Any request for visitation must be considered in light of the potential risks to the visitors and the hospital. Visitation will only be permitted if it can be done in a manner that does not pose a risk to the owner, veterinary personnel and the facility. Owners will be restricted from having direct contact with the animal. *Owners are never allowed to have direct contact with rabies suspects, nor are they allowed to be in a situation where indirect contact with the animal or body fluids from a rabies suspect could occur.*

Hospital Tours

The OVC Dean's Office regulates OVC tours. Tour participants are not permitted in surgical preparation areas, operating rooms, treatment rooms, patient housing areas, isolation or the Intensive Care Unit. The exception is tours of the OVCTH that are provided to visiting faculty/clinicians or other professional personnel, accreditation visits or other official visits as opposed by the Dean's Office. In those situations, access to patient housing areas will be permitted as long as the tour is directed by a clinician or member of University administration and permission has been granted by the Office of the Associate Dean, Administration and Chief Operating Officer.

Non-client animals

The only animals that are allowed in the OVCTH are patient, teaching or research animals. Pets of clients and University personnel are not permitted in the OVCTH except for medical treatment, or OVC-associated activities such as blood donation.

Infection control training/testing

Infection control training is important to ensure that all personnel understand current infection control protocols and practices. All personnel will have access to the current infection control manual electronically, as it will be available on the OVCTH website. Hard copies will be available in selected areas of the hospital and will be provided to any personnel upon request.

All hospital personnel and students that have direct or indirect contact with patients are required to pass an infection control examination. For new personnel, this examination must be passed

before they are allowed to work in the OVCTH. Existing personnel must pass the examination every 3 years. The examination will be online and in an open-book format. It can be repeated until the pre-determined passing grade is achieved.

Visiting faculty/graduate students/clinical trainees

All personnel involved in clinical care must undergo OVCTH infection control orientation and examination, regardless of the amount of time they will be at the OVCTH. Participation in clinical duties will not be permitted until infection control orientation has been documented and the examination passed.

Compliance

Infection control guidelines constitute the accepted and expected level of patient care. Compliance with guidelines is not optional. Failure to comply with guidelines is considered to be failure to deliver the standard level of care that is required of all OVCTH personnel. Non-compliance with protocols will be documented by the Chief of Infection Control and this information forwarded to the Associate Dean, Administration and Chief Operating Officer. Further actions will be taken as per the OVCTH Compliance Assurance SOP.

If OVCTH personnel have concerns with current protocols, they can convey their concerns to the Infection Control Committee through the Chief of Infection Control. The Committee will address all concerns, but compliance with established protocols in the interim is mandatory.

Any questions regarding infection control practices must be directed to the Chief of Infection Control. In the event of conflicting opinions regarding the need for, or implementation of, infection control precautions, the final decision will be that of the Chief of Infection Control.

Infection Control Protocols

All protocols dealing with infection control practices are developed and approved by the Infection Control Committee. There will be communication with relevant groups during protocol development and suggestions by those groups will be considered during protocol development.

Pet Accessories

Clients are discouraged from leaving pet accessories such as blankets, toys and beds. If these are left, the client will be informed that if the pet is identified as carrying an infectious disease, the items will be destroyed.

Standard Practices

Wounds and Bandages

Wound infections can be caused by many bacterial pathogens, some of which can be transmitted between animals or between animals and people. One example is methicillin-resistant *Staphylococcus aureus* (MRSA), which can infect both people and animals, but there are a variety of other pathogens that are of concern. This includes both multidrug resistant (e.g. *S. aureus*, *S. pseudintermedius*, enterococci) and susceptible bacteria. Wounds provide a prime

site for invasion of opportunistic bacteria such as these. Even wounds that are not known to be infected should be protected from contamination by veterinary personnel and from the environment to reduce the risk of secondary infection.

- Sterile gloves should be worn for debridement, treatment and bandaging of deep wounds and those involving vital structures. Clean, non-sterile examination gloves are adequate for these procedures if the wound is more superficial.
- **Bandages must be kept dry** to prevent bacterial strike-through. This means keeping the outside of the bandage as dry as possible, and also including sufficient absorbent material in the bandage itself to prevent discharge from the wound from soaking through the bandage. If the outside of a bandage appears wet, it should be changed.
- **Used bandage materials should be considered infectious.** Such materials should be placed directly in the garbage and not on the floor, examination table or any other surface. The risk of contamination and spread of any pathogen is likely higher for wounds with a large amount of discharge.
- Wound treatments and bandage changes should be performed in an area that is easily disinfected (e.g. on an examination table). Wound irrigation and lavage should be performed in such a way that the fluid used is contained (e.g. in a sink or tub, or with disposable absorbent material).
- Hands should be washed thoroughly before and after changing a bandage. Equipment used for bandage changes (e.g. bandage scissors) should be cleaned and disinfected between uses.

Bandage Change Protocols

Changing bandages poses a risk to both the patient and veterinary personnel. Bandage changes provide the opportunity for contamination of a clean infected site or for transmission of infectious agents from the animal to personnel.

Changing bandages on animals not suspected as having an infected site

1. Assemble all required materials
2. Ensure proper assistance
3. Procedures
 - a. Wash/sanitize hands
 - b. Wear a hat or pin up hair to prevent touching the patient
 - c. Remove bandage and dispose of immediately.
 - d. Perform all procedures required on the patient
 - e. Do not touch pens, phones etc. with contaminated gloves
 - f. Re-bandage if required

- g. Remove gown
- h. Remove gloves
- i. Wash/sanitize hands

Changing bandages on animals with known or suspected multidrug resistant infection

1. Assemble all required materials
2. Ensure proper assistance
3. Procedures
 - a. Wash/sanitize hands
 - b. Wear a hat or pin up hair to prevent touching the patient
 - c. Gown
 - d. Remove bandage. Dispose of all infected material directly into biohazardous waste
 - e. Perform all procedures required on the patient
 - f. Do not touch pens, phones etc. with contaminated gloves
 - g. Collect diagnostic specimens, if required. Contamination of containers must be avoided. Have specimen collected by properly attired but clean person or obtain sample by sterile syringe and place in the appropriate container held by another person (similar to the technique used in surgery).
 - h. Re-bandage if required
 - i. Place all potentially contaminated items in appropriate container for disinfection or discard
 - j. Remove gown
 - k. Remove gloves
 - l. Wash/sanitize hands
 - m. Clean and disinfect the area where bandage changing was performed

Diagnostic Specimen Handling

Urine from animals with suspected urinary tract disease, and all feces, aspirates, and swabs should be treated as potentially infectious material. Protective outerwear (e.g. lab coat) and disposable gloves should be worn when handling these specimens. Gloves should be discarded and hands washed immediately after handling these items. Care should be taken to avoiding touching clean items (e.g., microscopes, telephones, food) while handling specimens or before glove removal. A separate refrigerator should be used for diagnostic specimens, and it must be cleaned on a regular basis.

Notification of AHL Bacteriology Reports

The AHL bacteriology laboratory will directly report isolation of certain organisms (see below), in addition to the electronic reporting system. The mechanism will be as follows:

Weekdays: AHL personnel will contact the Infection Control Practitioner (ICP) and notify him/her of the result. He/she will then notify the attending clinician and investigate the case further if indicated. If the ICP is away from the clinic, the ICP phone will be left with the Large Animal Desk or Chief of Infection Control, who will assume primary reporting responsibilities.

Weekends/Statutory Holidays: On Saturdays and Holidays, AHL personnel will call the Large Animal Desk or Small Animal Desk and inform them of the result. Personnel working at the Desk will then contact the clinician that submitted the sample by **phone or pager** and notify them of the result. They will also leave a voicemail message for the ICP notifying him/her of the result. There will be no reporting on Sundays. In the unlikely event that AHL personnel are unable to contact the Large or Small Animal Desks, they should contact a large animal (Ext 54412) or small animal veterinary technician (54168).

Organisms requiring immediate notification

- *Salmonella* spp
- Methicillin-resistant *Staphylococcus aureus*
- Methicillin-resistant *Staphylococcus pseudintermedius*
- Vancomycin resistant enterococci

Other organisms may be added to this list based on discussions of the AHL Bacteriologist and Infection Control Committee.

Animal Bites

Bites that occur in the OVCTH must be managed and reported as per Hospital protocols, as presented in the Appendix. Any changes that may occur in this Hospital protocols supersede information in this manual.

Management of Animals with Suspected Rabies

Animals with acute neurological disease are commonly encountered. While it is very rare for these to have rabies, rabies must be considered in many situations. It is important to err on the side of caution when determining whether to declare an animal a 'rabies suspect'. If an animal is suspected of having rabies, the following must be carried out by the attending clinician:

1. Notify the Infection Control Practitioner (ICP)
2. Notify the owner that rabies is being considered. The owner should be told about the potential for zoonotic transmission, that the animal will be tested for rabies if it dies/is euthanized and rabies is still considered a possible diagnosis, and that the owner should make a list of individuals that have contacted the animal recently.

3. In the Small Animal Clinic all rabies cases should be kept in the isolation area. In the Large Animal Clinic rabies suspects will be housed in appropriately labeled ward or isolation stalls. In both clinics, a sign-up sheet of all people and handling the patient should be placed on the door. Entry and treatment of this patient should be limited.
4. Rabies Suspect sheets must be placed on the stall or cage door. The names of all OVC personnel coming into contact with the animal must be recorded on this sheet.
5. If further diagnostic work is to be done, students, staff, including laboratory technicians that may handle specimens, must be warned that the animal may have rabies. Do not insist that they handle the animal or specimens if they do not wish to do so. Wear barrier protective clothing including gloves and gowns and insist anyone handling the animal do likewise.
6. Invasive procedures and procedures likely to result in contact with bodily fluids should be avoided. If performing nasogastric intubation in horses, wear mask and goggles and DO NOT suction via mouth, only by pump or syringe.
7. If an individual has recently been bitten, ensure that the wound, bare hands, etc., are washed thoroughly with strong soap or disinfectant. The wound should be opened to encourage bleeding. This may help flush out the virus and will make the deeper areas of the wound accessible. The application of a quaternary ammonium compound (0.1% benzalkoniumchloride) or other substance (43.70% ethanol, tincture of thimerosal, tincture of iodine up to 0.01% aqueous solution of iodine) of proven lethal effect on rabies is advised.
8. If there is high-risk exposure (i.e. bite), the ICP will promptly notify the Clinic Head, Associate Dean, Administration and Chief Operating Officer, Occupational Health & Safety (ext. 52133) or Student Health Services (ext. 52131) (if staff or students are involved, respectively) and the local Medical Officer of Health in the case of exposure of owners (Wellington-Dufferin-Guelph Health Unit, 125 Delhi Street, 821-2370).
9. If rabies is considered a *likely* differential diagnosis or is confirmed, the local CFIA Officer (in Guelph 519 -822-1931) must be contacted. If rabies is considered to be an *unlikely* cause, yet rabies protocols are being implemented because of prudence, the CFIA does not need to be notified.
10. If rabies is confirmed, or considered *likely*, the ICP will immediately notify the Clinic Head, Associate Dean, Administration and Chief Operating Officer, Occupational Health & Safety (ext. 52133), Student Health Services (ext. 52131) and the local Medical Officer of Health in the case of exposure of owners (Wellington-Dufferin-Guelph Health Unit, 125 Delhi Street, 821-2370).

Maintenance of Clippers

Use of good-quality clippers and maintenance of clipper blades are of great importance. Improper clipper use or maintenance can result in skin trauma, with subsequent risk for infection, or transmission of opportunistic pathogens between patients.

Following routine use of clippers on areas of unbroken skin and non-infectious animals, *basic cleaning with a stiff brush* to remove visible dirt and hair from the blade is likely adequate. More thorough cleaning and disinfection of the blade, as described below, should be done periodically as well, depending on how often the clippers are used.

Clippers should be thoroughly cleaned and disinfected after every use on an animal with a potentially transmissible infection (e.g. an animal with diarrhea), on any area where the skin or hair is significantly contaminated with feces, urine, blood or other body fluids, and before *and* after use on an area where the skin is broken (especially if there is evidence of skin infection). First, a stiff brush should be used to remove visible dirt and hair from the blade, and a soapy, wet cloth used to remove any visible debris from the body of the clippers. (The brush should be sterilized or discarded after use on a potentially infectious case). The clipper blades can then be sterilized using a chemical sterilant (e.g. glutaraldehyde (8-10 hr), 1:16 accelerated hydrogen peroxide for 8h)) or by autoclaving. The body of the clippers can be sterilized using hydrogen peroxide vapour or ethylene oxide. Otherwise, after removing all visible debris, thorough manual wiping with a cloth wetted with a standard disinfectant solution should be performed, paying particular attention to the small crevices of the device and allowing for adequate contact time with the disinfectant. Refer to the clipper's instruction manual to determine what degree of contact with liquid the clippers can safely withstand.

Surgical Protocols

Personal Protective Equipment

All personnel in the surgical area should wear designated surgical scrubs, a surgery cap or hair bonnet, and a nose-and-mouth mask when surgery is underway, regardless of whether or not they are directly involved in the procedure itself. Personnel directly involved in the procedure should also wear a sterile gown and sterile gloves. **Scrubs worn in surgery should not be worn when handling or treating other patients**, and must be covered with a lab coat when outside the surgery area (see Personal Protective Equipment under Routine Procedures).

Hand Hygiene

A surgical hand scrub must be performed before putting on a sterile gown and sterile gloves. Various surgical scrub techniques have been described. Most commonly, a **structured five-minute surgical scrub with antibacterial soap** is used:

- Remove all hand and arm jewelry
- A pick or file should be used to clean all dirt out from underneath the fingernails.
- If hands or arms are visibly dirty, they should initially be washed with soap and water as per standard hand hygiene protocols.
- Hands and forearms are then lathered with antibacterial soap. Scrubbing with a bristled sponge proceeds proximally from the fingertips to the forearms, just below the elbow. Additional details can be found in a surgical reference book.
- A sterile towel must be used to dry the hands before donning a gown and gloves.

Application of **commercial alcohol-chlorhexidine combinations** can be used as a replacement for traditional surgical scrubbing. This approach has been shown to be equally effective at removing bacteria, and is less time consuming and irritating to the skin, particularly if a surgical hand scrub is required multiple times in a day. If such a commercial combination is

used, hands must be thoroughly washed and fingernails carefully cleaned initially. It is also critical to follow the label directions regarding the amount of product to use and how to apply it.

Surgical Site Management

Pre-Operative Care

Pre-operative management of the surgical site may be very important, but there has been very little research in this area in veterinary medicine. The goal of pre-operative surgical site management is to greatly reduce the number of potential pathogens without creating a physical environment that may increase bacterial colonization or infection post-operatively.

If the patient's hair coat is visibly dirty, bathing the animal before surgery is reasonable if there is adequate time for the hair coat to dry before the procedure. In humans, it has been suggested that any method of hair removal can be associated with higher surgical site infection (SSI) rates, but this is not practical for the vast majority of procedures in veterinary medicine. Shaving the surgical site the night before has been associated with higher SSI rates in humans, therefore ***clipping (not shaving) of the surgical site should only be performed right before surgery***. Care must be taken to avoid damaging the skin during this procedure, as abrasions provide sites for invasion and proliferation of opportunistic bacteria. Use of good quality, well-maintained clippers and blades helps to reduce the risk of skin abrasions. If skin lesions around the surgical site are noted before or after surgery, the finding should be recorded and investigated, to determine whether equipment maintenance and/or personnel training need to be improved. ***Animals should not be clipped in the surgery area/suite itself.***

Skin preparation after clipping is critical. Typical practices include thoroughly cleaning and scrubbing the site with antibacterial soap, followed by application of alcohol, and finally application of a chlorhexidine or iodine solution. Potential problems that need to be avoided include:

- Failure to prepare a large enough area of skin
- Inadequate initial cleaning with soap and water
- Contamination of preparation solutions
- Inadequate contact time with the antiseptic
- Contamination of the area during or after preparation due to improper technique

If skin preparation solutions (e.g. antibacterial soap and water, alcohol, chlorhexidine, iodine) are kept in refillable containers, these containers must be disinfected when empty before being refilled. Contamination of these solutions with bacteria that are resistant to their respective antimicrobial actions can occur. Refilling the containers without disinfecting them can allow these resistant contaminants to accumulate. An outbreak of catheter site infections was reported in a small animal clinic that was associated with contaminated skin preparation solutions.

Post-Operative Care

Post-operatively, a surgical incision site is highly susceptible to opportunistic infection from the bacteria of the patient's own microflora, from the environment or from hospital personnel. Contact with the surgical incision, particularly with bare hands, should be avoided. Covering or bandaging incisions for a minimum of 24 to 48 hours after surgery has been recommended in humans; this is also a reasonable recommendation in veterinary medicine in most situations.

Bandage changes should be performed using aseptic technique. Owners and handlers should be instructed on how to manage an animal with an incision, and the signs for which to look that may indicate the development of a surgical site infection. There is no objective information about the need to cover surgical incisions for more than 48 hours in veterinary or human medicine, but arguments can be made for both sides. *Preventing the animal from licking, scratching or otherwise traumatizing the surgical site is critical.* Damaging to the healing incision or the skin around it can result in the deposition of opportunistic pathogens, and make it easier for bacteria to grow in the area.

Surgical Environment

The surgical area should only be used for surgical procedures, and should not be used for non-surgical procedures between surgeries. Entrance to the area is restricted at all times to minimize traffic in the room. The number of people in the surgical area has been identified as a risk factor for SSI in small animals, so only essential personnel should be allowed in the area during any surgical procedure. This does not preclude the presence of people in the operating room (OR) for teaching purposes. All personnel participating in the procedure, including those performing surgical nursing duties, must be trained in operating room procedures.

Cleaning, Disinfection and Sterilization

Equipment Considerations

Single-use equipment (e.g. hypodermic needles) should not be re-sterilized or disinfected for re-use. Such items should be properly disposed of immediately after initial use.

Multi-use equipment must be properly cleaned and disinfected between each patient. There are three categories of multi-use equipment used on patients: **critical**, **semi-critical** and **non-critical**. Each category defines how instruments must be cleaned and disinfected to prevent transmission of infectious agents, as per **Table 1**.

Classification	Definition	Level of Processing/Reprocessing
Critical equipment/device (e.g. surgical instruments)	Equipment/device that enters sterile tissues, including the vascular system	Cleaning followed by sterilization
Semi-critical equipment/device (e.g. endoscopes, thermometers)	Equipment/device that comes in contact with non-intact skin or mucous membranes but does not penetrate them	Cleaning followed by High Level Disinfection (as a minimum), sterilization is preferred
Non-critical equipment/device (e.g. stethoscope)	Equipment/device that touches only intact skin and not mucous membranes, or does not directly touch the patient	Cleaning followed by Low Level Disinfection, in some cases, cleaning alone is acceptable

Table 1: Spaulding's (1970) Classification of Medical Equipment/Devices and Required Levels of Processing and Reprocessing

Sterilization of Instruments

Complete sterilization of surgical instruments and any items that might come in contact with the surgical field is a crucial procedure. Poor sterilization or inappropriate handling of instruments after sterilization can result in contamination of sterile tissues during surgery. Steam sterilization (i.e. autoclaving) is most commonly used in veterinary clinics. Quality control testing of autoclaves should be performed regularly and documented:

- **Steam indicator strips** must be included in all surgical kits and linen packs. The person opening the pack must inspect the strip. If any strip indicates incomplete sterilization, the items within the pack must not be used. The result must be immediately reported to the Infection Control Practitioner and the location where the pack was sterilized (i.e. central supply, small animal surgery, large animal surgery)
- **Biological sterility indicators** should be used periodically. These indicators contain bacterial spores, which are the most resistant form of bacteria. After being autoclaved, the

indicator is submitted for testing to ensure that all of the spores have been killed by the sterilization process.

- **Yearly inspections** of all autoclaves must be performed and any issues promptly identified.

Cold Sterile

Cold sterile solutions are not to be used for items that can undergo steam sterilization. Chemical sterilization (cold sterilization) is only appropriate for sterilization of endoscopes.

Flash Sterilization

Flash sterilization involves sterilization of means steam sterilization of an unwrapped instrument or device for 3 to 10 minutes in 270° F saturated steam. Flash sterilization should not be used unless absolutely necessary for emergencies only. Flash sterilization should never be used for surgical implants.

Cleaning and Disinfection

Cleaning and disinfection are two separate tasks. **Cleaning** involves the removal of visible organic matter with soap or detergent, whereas **disinfection** involves the application of a chemical or other procedure in order to kill the remaining microbes that cannot be adequately removed by cleaning. Cleaning is essential because the survival time of many infectious agents outside the host is prolonged by the presence of organic matter, and organic matter also decreases the effectiveness of disinfectants. Depending on the level of disinfection used, disinfection kills or prevents the growth of the many or most pathogens.

Equipment should be cleaned and disinfected according to its intended use, the manufacturer's recommendations, and OVCTH protocols. Equipment must be cleaned before sterilization or disinfection. Surfaces where animals are housed, examined, or treated should be made of non-porous, sealed, easy-to-clean materials to facilitate cleaning and disinfection and minimize infection transmission.

Personnel whose duties include cleaning and disinfection of equipment and different hospital areas should be trained regarding how to safely handle and use the products available in the clinic. Material Safety Data Sheets (MSDS) should be readily accessible for all the applicable chemical products.

Cleaning

Cleaning entails the removal of all forms of organic matter (e.g. feces, urine, blood, food, dirt etc.) from a surface.

Disinfection

Disinfection can only be maximally effective if it is preceded by thorough cleaning. Some pathogens (e.g. clostridial spores, *Cryptosporidium*) are highly resistant to disinfection, therefore cleaning in these cases is particularly crucial in order to mechanically remove the organisms.

- Ensure all areas are well ventilated during disinfection
- Always apply the selected disinfectant according to the product label, with particular attention to:

- Appropriate dilution
- Required contact time
- If patients or personnel may have direct skin contact with the surface, or if the disinfectant used may damage a particular surface, the disinfectant may need to be rinsed off with clean water after an appropriate amount of time has elapsed.
- After disinfection, allow all surfaces to dry completely.

Non-patient areas

General purpose, non-patient areas such as hallways, will be cleaning by housekeeping staff. Floors will be swept to remove debris and a quaternary ammonium disinfectant will be applied.

Disinfection Procedures if Diarrhea is Passed in Hospital

Feces should be removed immediately. Disinfectant (Peroxigard, 1:64 dilution) should then be liberally applied to the area. Disinfectant should be left in place for at least 10 minutes prior to rinsing. Gloves must be worn if there is the possibility of direct or indirect contact (i.e. cleaning up with paper towels), and hand hygiene must be performed immediately after glove removal.

Small Animal Clinic and Large Animal Clinic

Specific details of cleaning and disinfection practices for those facilities are provided in the appropriate section below.

Footbaths and Footmats

Footbaths or footmats are used to decrease (but not eliminate) microbiological contamination of footwear. Footbaths are shallow containers containing a disinfectant solution. Footmats are spongy commercial mats covered with a durable, easy-to-clean material that can be saturated with disinfectant. Footmats can increase compliance because they are easier to use, but they are more expensive and more difficult to maintain than footbaths.

Data regarding the need for and efficacy of footbaths and footmats are very limited. It has been shown that footbaths can reduce bacterial contamination of footwear in large animal clinic settings. Although other sources of contamination have been shown to be more significant in infection transmission, footwear and floor surfaces cannot be overlooked in an infection control program, because patients so often have extensive direct contact with the floor. Possible problems with footbath or footmat use must also be considered. Footbath or footmat use is almost invariably accompanied by spillage of disinfectant solution; this can create a slipping hazard on smooth floor surfaces, which are typically present in small animal clinics. Certain disinfectants can also damage floor surfaces with prolonged contact.

There are limited indications for footbaths or footmats. Footbaths or footmats should be considered when personnel will be walking on a surface that could potentially be more contaminated than the general floor environment, and where spread of this contamination might pose a risk to patients or personnel. The most likely area where footbaths or footmats could be useful would be at the exit of an animal housing area (e.g. dog run) that contains a potentially infectious case, and where clinic personnel will be walking in and out of the potentially contaminated area. The need for routine use of footbaths or footmats in isolation areas where animals are confined in cages is questionable.

If footbaths or footmats are used, they must be filled with accelerated hydrogen peroxide (Peroxigard). They must be cleaned and the solution replaced daily or when grossly soiled, whichever comes first.

Waste Management

Veterinary biomedical waste is a potential source of both zoonotic and non-zoonotic infectious pathogens. Therefore, it is important to handle all such waste appropriately. In Canada, biomedical waste is defined and regulated at the provincial/territorial and municipal levels, and includes sharps, tissues, contaminated materials, and dead animals.

- **Used sharps** are considered *biomedical waste* and should be disposed of in accordance with regulations from municipal and provincial/territorial authorities. Use approved puncture-resistant sharps disposal containers to remove, store and dispose of used sharps such as needles, blades, razors and other items capable of causing punctures.
- **Non-anatomical waste containing blood or body fluids** (e.g. chest tube drainage containers, blood-filled tubing), must also be packaged as *biomedical waste*.
- **Liquid waste** such as urine, feces, irrigating solutions, suctioned fluids, excretions and secretions *may be poured carefully down a toilet*. If there is likely to be splashes or sprays during this disposal process, appropriate personal protective equipment should be worn. If a toilet is not accessible, fluids are to be poured directly down drains through sinks or floor drains. Care must be taken to avoid contaminating areas with splashes or sprays. The drain should be rinsed after to reduce residual contamination.

Waste Disposal/waste streams

V.T.H. Waste Stream Management

1. **Designated:** CLEAR, PINK BAGS\WHITE LABEL (Prepared Landfill)
 - Blood stained items i.e. dressings, gauze, drapes, gloves, etc., non-recyclable plastics i.e. syringes, fluid bags, fluid lines and administration sets non-recyclable glass, i.e. drug bottles (*with label defaced*), *empty* vacutainers, wrapped or boxed broken glass.
2. **Biohazardous:** ORANGE BAGS\ORANGE TAG (Incineration)
 - Blood soaked items; dressing, gauze, drapes, gowns, animal parts or tissues, and any garbage (except sharps) from infectious cases.
3. **Sharps:** YELLOW OR RED CONTAINER (Incineration)
 - Needles, stylets, non-reusable scalpel blades, used vacutainers, blood vials, empty vaccine containers, capillary tubes
4. **Chemotherapeutic:** YELLOW LID ON WHITE PAIL (Incineration)
5. **Recyclable:** CONTAINERS MARKED 'RECYCLE' = (Recycling Depot) Hard plastics, i.e.: saline and water containers, syringe cases, empty detergent bottles (triple rinsed), glass bottles, pop cans.

6. **Regular:** BLACK BAGS (*Landfill*)
 - Paper, paper towels, string, pens, etc.
7. **Hazardous:** TX ROOMS- LA(1423) & SA(1258) (*Environmental Health and Safety Dept.*)
Dead batteries, light bulbs are taken to dispatch for disposal.
 - N.B. FLUIDS MUST BE DRAINED FROM ALL CONTAINERS, BAGS OR LINES.
8. **All manure and shavings** are to go in the brown buckets on wheels with the "*Manure Only*" sign. This manure is for mulch used on campus for fertilizer. There is to be **NO GARBAGE** (i.e. rubber gloves, syringes, veterinary supplies and materials, etc.) placed in the brown manure buckets. All stalls are bedded with shavings unless otherwise requested.

Antimicrobial Use

Peri-operative Antimicrobials

Administration of peri-operative (i.e. before, during and after surgery) antimicrobials is an important and complex issue. The goal of peri-operative antimicrobial therapy is to reduce the risk of post-operative infection, while minimizing the negative impact on the patient's natural microflora and the risk of antimicrobial-associated complications such as diarrhea.

There is currently very little objective information about the need for antimicrobials for specific veterinary procedures, as well as the optimal choice of drug(s), timing and dosages.

Antimicrobials are indicated in clean-contaminated, contaminated and dirty procedures.

The need for antimicrobial prophylaxis in clean procedures is unclear. In human medicine, antimicrobials are not typically recommended for clean procedures such as arthroscopy, however there are conflicting opinions. Regardless, it is unclear whether recommendations from human medicine should be directly extrapolated to veterinary procedures, because there are obvious differences in post-operative incision care and patient environment for animals, which may increase the risk of infection. The need for peri-operative antimicrobial therapy for different procedures, particularly clean procedures, requires further research. Concerns with this practice that currently exist include inappropriate timing of administration (i.e. too far in advance of surgery or starting after surgery), excessive duration of therapy, inadequate dosing and inappropriate drug choice.

If peri-operative antimicrobials are used, they should be administered so that therapeutic levels are present at the surgical site at the time of first incision. This typically requires parenteral (i.e. not oral) administration of an antimicrobial approximately one hour before surgery. If the surgical time is longer than two half-lives of the drug(s), then an additional dose should be given during the surgery. In human medicine, it has been shown that starting antimicrobial therapy after surgery is no more effective than not using antimicrobials at all. Typically, antimicrobials are not needed after surgery since the highest-risk time for contamination of the surgical site (i.e. during the surgery itself) is already passed.

Chloramphenicol Use Protocols

Chloramphenicol is a potentially useful antimicrobial but one that can be associated with severe human health risks. While extremely rare, the health risks associated with adverse reactions to chloramphenicol through handling the drug necessitate prudent use. The following guidelines apply:

1. Chloramphenicol can be prescribed without restriction, however documentation of the reasons for its use must be provided.
2. Prescribing clinicians must complete the Chloramphenicol Use Form (see Appendix 4). This form will be available at the Pharmacy. Chloramphenicol prescriptions will not be filled if this form is not fully complete.
3. A copy of the completed form will be kept on file in the Pharmacy. Another copy will be forwarded to the Infection Control Practitioner (ICP).
4. The ICP and Chair of the Infection Control Committee will review each form. Any concerns about appropriateness of use will be directed to the prescribing clinician.
5. Concerns about inappropriate use will be discussed with the Infection Control Committee. Repeated inappropriate use by a clinician may result in a prohibition of that clinician from prescribing chloramphenicol without prior consent of the Chair of the Infection Control Committee.

Vancomycin Restriction Protocol

1. Vancomycin is a restricted drug at the OVCTH. For vancomycin to be used, the following criteria must be present:
 - a. Culture must have identified the causative agent.
 - b. Vancomycin must be the only option based on susceptibility of the organism and patient factors (ie documented drug allergy precluding use of another drug).
 - c. The causative organism must have documented susceptibility to vancomycin *in vitro*.
 - d. The infection must not be amenable to local therapy alone.
 - e. There must be a reasonably likelihood that the patient could survive with appropriate treatment.
- 1) If a clinician feels that a case fits the criteria outlined in Point 1, permission must be sought from the Chief of Infection Control (or designate). In the unlikely event that a designated individual cannot be contacted, the attending clinician may prescribe vancomycin provided all attempts to contact all the designated individuals are recorded. Voicemail or email messages must be left for the designated individuals and pager/cell phone contact must be attempted. Vancomycin use will be reviewed as soon as possible by the ICP and Chief of Infection Control.
- 2) Local (i.e. intrarticular) therapy with vancomycin does not require authorization. However, the Pharmacist will record its use and forward this information to the ICP. Vancomycin use

in the VTH will be reported at the next Infection Control Meeting. The Committee reserves the right to require authorization for local therapy should it appear that local therapy is being excessively used or misused.

Isolation

Isolation is an important practice that is designed to reduce the risks of disease transmission to and from patients. Successful use of isolation requires prompt and appropriate detection of animals at increased risk of shedding infectious agents, proper isolation facilities and adherence to adequate protocols.

Known or suspected diseases/syndromes requiring isolation

The following diseases or syndromes indicate increased infectious disease risk. Animals with these specific **diseases** are considered infectious and must be housed in isolation. For the following **syndromes**, the attending clinician must perform an assessment of the likelihood of an infectious cause. If it is determined that an infectious cause is unlikely, the animal may be housed with the general hospital population. Infection Control should be contacted if there is any question as to whether an animal should be isolated. Additionally, isolation of other cases may be required at the discretion of the attending clinician and/or ICP or Chief of Infection Control. If there is doubt about the need for isolation, prudence dictates that the animal be isolated until its status can be determined. The Chief of Infection Control will have the final decision on all questions about whether animals require isolation, but the input of the attending clinicians will be considered in all cases.

In some cases, it may be determined that adequate patient care cannot be provided in isolation. It must be emphasized that 'adequate' and 'ideal' are different, but if it is determined that it would be unsafe (to the animal or staff) or inhumane to house the animal in isolation, AND that adequate biocontainment can be performed outside of isolation, exceptions can be made. These must be made with **prior** consent of the ICP and/or Chief of Infection Control. If an exception is made, protocols for adequate management of the animal outside of isolation will be discussed **prior** to the animal being moved. While every effort will be made to accommodate exceptions, Infection Control believes that moving an animal would pose a high risk to the rest of the patient population or personnel, the animal may not be moved.

Syndromes/Diseases Requiring Isolation*

- Rabies
- Suspected infectious diarrhea
- Fever of unknown origin
- Ectoparasite infection
- *Chlamydophila psittaci* (birds)
- Methicillin-resistant *Staphylococcus aureus* (MRSA)
- Methicillin-resistant *Staphylococcus pseudintermedius* (MRSP)
- Leptospirosis
- Upper respiratory tract infection
- Ringworm
- Q-fever
- Periparturient small ruminants

- Vancomycin-resistant enterococci (VRE)
- *Streptococcus equi* infection (strangles, horses)
- Acute neurological disease that does not clearly have a non-infectious cause.
- Any animal that has aborted a fetus in the preceding week or may be in process of doing so.
- All Federally Reportable Diseases (See appendix).

* **Isolation** means housing in the appropriate isolation unit or use of isolation practices within the main hospital with the approval of the ICP and/or Chief of Infection Control.

Return of Medication to Pharmacy from Isolation Cases

Medications and intravenous fluids from cases known or suspected or having an infectious disease may not be returned to the pharmacy if they have been handled in the stall or stall anteroom. Medications that are stored and handled in the nursing area in the Isolation Unit can be returned to the Pharmacy.

Infection Control Monitoring

Disease surveillance and centralized reporting of results are important components of the infection control program. Both passive and active surveillance methods are involved.

Passive surveillance

The Animal Health Laboratory will forward copies of all bacterial culture results from internally reportable diseases. Infection control personnel will have access to all laboratory data from submission from the OVCTH. These data will be accessed through the electronic medical record or diagnostic laboratory databases. Larger datasets of OVCTH patient results required for retrospective study will be requested from the Animal Health Laboratory as needed.

Active surveillance

Active pathogen surveillance will be performed in an organized manner throughout the hospital. This will include, but not be limited to, *Salmonella* environmental surveillance in the Large Animal Clinic and equine MRSA surveillance. Periodic environmental surveillance, other than described above, may be implemented by the ICP or Chief of Infection Control to address specific concerns. Additional testing of resident or client animals may be performed as required.

Environmental Surveillance

Environmental surveillance will not be performed routinely. The exception is *Salmonella* culture of stalls that have housed diarrheic horses, as is described elsewhere in this document. No other routine environmental surveillance will be performed. Periodic surveillance in the large and small animal clinic for *Salmonella* or other pathogens may be indicated and will be directed by the ICP. As a general philosophy, environmental surveillance will only be performed when there is a reasonable likelihood that an action will occur based on the results or when results are anticipated to provide important information for evaluation of infection control protocols or disease transmission risk.

Outbreak Investigation

Outbreak investigation will be coordinated by the Chief of Infection Control and ICP. If deemed necessary by the Chief of Infection Control and Associate Dean, Administration and Chief Operating Officer, an outbreak team will be formed. This will be organized by the ICP and will include the ICP, Chief of Infection Control, a representative from nursing and a representative from clinicians in the appropriate area (i.e. large animal clinic). Other personnel may be recruited as required.

Hospital Closure

In the event of an uncontained or large outbreak, or one involving a particularly concerning pathogen, the Outbreak Team may recommend partial or full closure of the VTH. The recommendation will be made to the Associate Dean, Administration and Chief Operating Officer and appropriate Clinic Head by the Chief of Infection Control on behalf of the Outbreak Team. The final decision will be made by the Dean.

If partial or full closure of the hospital is elected, an email will immediately be sent to all clinicians, technicians, agricultural assistants and students. University of Guelph Communications will be contacted to determine whether a press release is required. Decisions about further communications will be made by the Dean or a designate.

Companion Animal Hospital Protocols

Standard OVCTH protocols are in place for aspects such as cage cleaning. Please refer to Clinic SOPs for details of general practices. Specific infection control-related practices are described here.

Food and Water Bowl Cleaning

Food and water bowls of patients with infectious diseases should be cleaned and disinfected separately from items used on non-infectious cases. Otherwise disposable dishes can be considered for these animals. Cleaning alone (with regular dish soap) is adequate for food and water bowls from other patients. Toys, litter boxes, and other miscellaneous items should be cleaned and disinfected between patients, or discarded if they are not amenable to proper cleaning and disinfection. Gloves should be worn when handling items from patients carrying zoonotic pathogens or any items that are visibly soiled. Litter boxes should be cleaned out at least daily. Ideally, litter boxes should not be handled by pregnant women, however if daily cleaning and disinfection are performed properly, the risks are minimized.

Surgical Procedures on Potentially Infectious Animals

Elective procedures will not be performed on potentially infectious animals. Emergency or otherwise critical procedures can be performed provided a plan has been developed to reduce the risk of pathogen transmission. If an infectious case requires surgery, the ICP will be notified to help develop an appropriate infection control plan. Clinicians are responsible for notifying small animal surgery technicians prior to the commencement of induction/ surgery of a suspected infectious or confirmed infectious case.

Only staff, clinicians and students directly related to the case may be allowed access to the surgery room to minimize exposure to the infectious patient/surgery. This should reduce the chances of contaminating the rest of the hospital. All personnel involved with the case **must** wear isolation gowns, caps, masks and gloves while handling the patient. All efforts **must** be made to avoid contamination of the area as well as the equipment, shelves and supplies.

Admission of Animals from Humane Societies or Shelters for Elective Surgery

Humane societies, animal shelters and similar facilities typically contain transient, stressed populations of animals, large numbers of young animals, sick animals and animals with unknown health and vaccination status. As such, they should be **considered high risk from an infectious disease standpoint**. Animals admitted from these facilities must be subjected to a high degree of scrutiny.

All animals from such facilities should be examined immediately upon arrival. They will not be allowed to come in contact with other animals in the waiting/reception area. Animals with abnormalities including, but not limited to, fever, nasal discharge, ocular discharge, coughing/sneezing, diarrhea and skin lesions will not be accepted and will be immediately returned to the Humane Society, as will animals they have been housed with.

In an ongoing outbreak of an infectious disease at an animal shelter, admission of animals from the facility for elective procedures will be restricted (admission for emergencies only).

Animals from these facilities will be housed separately from other patients, if possible. Use of a separate ward, separate area of a ward or leaving empty cages between those animals and other patients can be used, depending on the degree of separation required for the diseases of primary concern.

For elective procedures (e.g. spay, neuter):

- All dogs, cats and ferrets must have been vaccinated against rabies at least 2 weeks prior to presentation if they are more than 14 weeks old.
- All dogs and cats must have received other routine vaccinations at least twice if they are more than 14 weeks old, with the most recent vaccine administered at least 2 weeks prior to presentation.
- All animals must have been dewormed with a broad spectrum anthelmintic at least 7-10 days prior to admission.
- Animals with abnormalities including, but not limited to, fever, oculonasal discharge, coughing/sneezing, diarrhea and potentially infectious skin conditions should not be admitted for elective procedures.

Feeding of Raw Meat

Raw meat-based diets for cats and dogs may contain a variety of enteropathogens including *Salmonella* spp, *Clostridium difficile*, *Clostridium perfringens*, *Escherichia coli* and *Campylobacter* spp. Animals fed raw diets may shed high levels of pathogens in their feces. Therefore, both raw diets and feces from animal fed raw diets may pose a risk to hospitalized animals and hospital personnel, and may contaminate the hospital environment.

1. Raw meat diets will not be fed to client, research or resident dogs and cats in the OVCTH. Owners requesting that raw meat be fed will be informed this is against Hospital protocols.
2. Other than commercial pet foods, all food brought to the VTH will be inspected by a clinician to ensure raw meat is not present, and the meat has been properly cooked. Information regarding preparation and storage of the food will be obtained. If there are concerns regarding preparation or storage, the food will be returned to the owner or discarded.

Animals with a history of being fed raw meat within the past 30 days will be considered at higher risk for shedding enteropathogens. Non-diarrheic raw-fed dogs will be housed with the general patient population but will be walked in a separate area (See "Dog Walking"). Diarrheic dogs that have been fed raw meat will be considered infectious and will be housed in isolation.

Dental Procedures

Dental procedures often entail a significant risk of splash exposure involving saliva, blood, and bacteria-laden debris. Procedures such as ultrasonic scaling can result in aerosolization of large numbers of bacteria. There is also potential for personnel to sustain cuts and abrasions

from dental equipment or teeth during dental procedures. To reduce the risk of transmission of harmful bacteria from the animal's mouth to veterinary personnel, the person performing the procedure and anyone in the immediate vicinity should wear:

- Protective outerwear (e.g. lab coat, scrubs)
- Disposable gloves
- Surgical (i.e. nose and mouth) mask
- Protective eye glasses/goggles, or a full face shield

Dental procedures will be performed in a contained area away from other patients, personnel and high traffic areas. Procedure such as bandage changes, wound care or placement of invasive devices (e.g. intravenous catheters, urinary catheters) will never be performed in close proximity to a dental procedure due to the risk of contamination by aerosolized bacteria.

Dog Walking

There are three different areas for walking **non-diarrheic** dogs. These are designated for different groups.

- 1) Immunocompromised animals: These are walked in the courtyard off the sunken lounge. Dogs must be leashed at all times and kept away from any people that may be present in the area. Feces should be immediately removed after defecation.
- 2) High-risk dogs for shedding enteropathogens: Non-diarrheic dogs that are at increased risk of shedding enteropathogens are to be walked in this area, which is one of two enclosed dog walking areas attached to the small animal clinic. An appropriate sign designates this area. Dogs that are to be walked in this area include dogs that are fed raw meat. Other dogs may be walked here at the discretion of Infection Control and the attending clinician. This may include dogs that have recently had diarrhea and dogs that are thought to be at high risk of shedding enteropathogens for other reasons. Dogs should only be present in this area for a short time. It is only used for urination and defecation, not exercise. Dogs must be restrained on a leash at all times. Feces must be removed immediately after defecation.
- 3) Other client dogs: These lower risk patients are walked in the 2nd enclosed area attached to the small animal clinic.

Intensive Care Unit

Moving animals in ICU

Movement of animals creates increased opportunities for disease transmission. Therefore, animals should not be moved between different cages in the ICU without a specific reason to do so. Once an animal has been placed in an ICU cage, it may not be moved to a different cage without the consent of an ICU attending clinician.

Semi-Isolation in the Intensive Care Unit

In some situations, animals that would normally be isolated may require intensive care that cannot be delivered outside of the ICU. If a case that would normally be isolated is deemed unable to be transferred to isolation, the attending ICU clinician(s) will contact the ICP to determine the appropriate plan. Accommodations will be made whenever possible but if the ICP believes that housing the animal in ICU would place an undue risk on the health of other patients, permission to keep the animal in ICU may be declined. In most situations, a plan can be developed to reduce the risk to other patients and maintain optimal individual animal care. The following issues will be considered:

1. **Housing:** The animal will be housed as far from other patients as possible. The known/possible infectious disease and its route of transmission will be considered when developing the management plan. In cases where aerosol or airborne transmission is possible, the only potential place to house the animal in the ICU is the enclosed quiet room. If contact transmission is the concern, then housing in other areas of the ICU might be possible, depending on the animal and caseload. However, the enclosed quiet-room should be considered the primary place to house potentially infectious cases.
2. All potentially infectious cases should be prominently **identified** with a cage sign.
3. **Barrier precautions**, consisting of a gown and gloves must be worn whenever the animal is handled or a run is entered. Gown, then gloves, must be removed immediately thereafter and hands promptly washed or disinfected with an alcohol-based hand sanitizer.
4. Animals housed under **semi-isolation protocols** in the ICU must not be walked outside. If they will not defecate in their cage or run, a ward run will be designated for their use. They will be taken there to urinate and defecate. That run will only be used by that animal and will be thoroughly cleaned and disinfected after the animal is finished using it.
5. Any **medical equipment** that comes into contact with the animal and/or the cage or run is considered infectious and must be disinfected or discarded after use. Fluid pumps must be wiped down with disinfectant regularly, and prior to being used on another animal.
6. If the animal must be taken to another area of the hospital for diagnostic procedures or treatment, the ICP should be notified so that a plan can be developed to manage the risk.
7. **Contact** with potentially infectious animals should be kept to a minimum.

Small Animal Isolation

The small animal isolation unit consists of one anteroom for preparation and supplies, and two isolation runs that can be equipped with cages. Clinicians with cases requiring isolation must contact the Small Animal Housing Team Leader at ext. 54150 to arrange for isolation housing. Only one animal can be housed in the unit at a time unless otherwise instructed by the ICP. Patients are to remain in the isolation unit until discharged or until approval for movement into another ward is provided by the ICP.

Please refer to OVCTH SOP's for management of cases in the isolation unit.

Treatment Supplies

Clinicians and students on the case should determine supplies and equipment (i.e.: catheters, bandage material) needed for treatment and obtain them from the Small Animal Ward Treatment Room (1258) before entering isolation. **Any supplies taken into the isolation unit must be discarded or disinfected before being taken out to another area.** Medications that are taken into the isolation unit may not be returned to Pharmacy.

Food Preparation

Patient food preparation should take place in the ward kitchen (Room 1268) and be taken into the unit following the guidelines above (gown, gloves, boots). Food should not be prepared or left in the isolation unit.

Leptospirosis Protocol

Given the concern of zoonotic and nosocomial transmission of leptospirosis within the OVC-HSC, precautions must be taken for all animals in which leptospirosis is considered a reasonable differential diagnosis (e.g., dogs with signs of renal or hepatic disease, where an alternative diagnosis has not been made). In patients where leptospirosis is considered a reasonable differential diagnosis, treatment with an appropriate antibiotic (i.e., dogs: intravenous ampicillin or, if tolerated, oral doxycycline) should be started (or continued, if the dog is being treated at the time of referral). Animals must not be walked outside (a dedicated run can be used for defecation/urination if necessary) and contact precautions, consisting of gloves and gown, must be used when having contact with these patients, their urine, bedding, or housing environment. Overboots must be worn when entering runs housing leptospirosis suspects that are incontinent or potentially contaminated with urine. Walking restriction and contact precautions must be followed until discharged from the OVC-HSC or until the animal is considered of low risk for transmission, as defined below. If urinary incontinence is present, placement of an indwelling urinary catheter should be considered during the first 48 hours of antibiotic therapy to minimize urinary contamination of the environment if medically appropriate and tolerated by the patient. If splashing or aerosolization of urine is a risk (e.g. replacing urinary catheter, handling fractious urine-soaked animal), eye and face protection, consisting of goggles and a mask, or a full face shield, should be worn.

Leptospirosis suspects are considered potentially infectious until they have received at least 48 hours of treatment with an appropriate antibiotic or until an alternative diagnosis has been made. To reduce the risk of transmission from a contaminated haircoat, leptospirosis suspects should be bathed with a chlorhexidine-containing shampoo followed by hot-air drying after 48h of appropriate antimicrobials have been administered. After 48h of antimicrobial therapy and a proper bath, they may be handled as per standard non-infectious protocols unless another potentially infectious disease has been identified.

Large Animal Clinic Protocols

Stall Cleaning and Disinfection Protocols

Procedure:

1. Remove all bedding and waste from stall; place in appropriate receptacle.
2. Scrub all stall surfaces (floor, walls, bars, etc.) with mixture of water and detergent.
3. Scrub to remove gross debris.
4. Rinse surfaces with water.
5. Rinse out automatic waterers (if present in the stall)
6. Apply a layer of Peroxigard® (1:64 dilution) to all surfaces. Let the disinfectant sit for a minimum of 10 minutes.
7. Rinse with water and allow to air dry.
8. Bed stall as required.

Orange-Carded Stalls: Follow first 6 steps as above.

1. A Swiffer® sample should be taken for *Salmonella* culture after the stall has dried and before applying bedding to stall.
2. Carded stalls can be re-opened, and bedding applied, after the stall has come back negative for *Salmonella*.

Surgery Involving Potentially Infectious Cases

In the event that a potentially infectious case is taken to surgery, the plan for recovery stall management will be made in conjunction with the ICP *before* the horse has gone to surgery. This may involve regular cleaning, enhanced cleaning, enhanced cleaning with quarantine until environmental cultures are returned, or any other plan deemed appropriate. In the event that the ICP was not contacted prior to surgery, the recovery stall will be cleaned, disinfected and quarantined until the ICP has been contacted.

Cohorting of Patients (LA)

Three main equine wards are available: medicine ward, surgery ward and colic ward. Horses must be housed in the appropriate area. If this is impossible because of a lack of stalls or a need for a specific type of stall, then this should be coordinated with the ICP. Horses that should be in the colic ward should never be placed in the medicine or surgery wards; the secondary housing location for colic cases is isolation.

Stall Quarantine/Monitoring

- All stalls that have housed diarrheic horses, or horses identified as shedding *Salmonella* are to be quarantined after discharge of the horse.

- Following discharge, the stall will be cleaned and disinfected as per standard protocols. The stall will then be identified as quarantined by placing an “Orange Card” on the door. This will be done by an Agricultural Assistant. The stall will be noted as quarantined on the Stall Status Board in the large animal breezeway by the ICP.
- After the stall has been allowed to dry, an environmental sample will be taken for *Salmonella* culture. This will be performed by wiping a Swiffer™ cloth over various stall surfaces using a gloved hand. The cloth is then inserted into a plastic specimen bag and submitted to the Animal Health Laboratory using a Salmonella surveillance sheet. The Agricultural Assistant that collects the sample will note the date of sampling on the Orange Card.
- The ICP will collect environmental surveillance results. When a negative result has been obtained, the ICP will open the stall. This will be performed by removing the Orange Card from the stall and removing the quarantine designation from the Stall Status Board.
- If *Salmonella* is isolated from a stall sample, the stall will be re-cleaned and disinfected, and sampled as above.
- If a stall is positive on 2 consecutive samples, the ICP will investigate the stall. Multiple cultures of different sites may be performed to attempt to identify the reason for persistent contamination.

Use of Quarantined Stalls

In some situations, quarantined stalls may be used. While the objective is to leave quarantined stalls empty until culture results are obtained, there may be times when there are no other housing options. Quarantined stalls are to be used when an animal requires isolation but there are no ‘open’ isolation stalls. In such situations, the ICP will determine where the horse is housed, based on previous stall occupants, previous culture results and time from discharge of the previous occupant. At no time should horses requiring isolation be housed in the main hospital instead of a quarantined stall.

Diarrheic horses

All horses admitted to the hospital with a chief complaint of diarrhea or that have diarrhea (acute or chronic) at the time of presentation to the Hospital will be admitted directly to the Isolation Unit.

Horses that develop diarrhea during hospitalization will be immediately evaluated to determine whether there may be an infectious disease risk. If horses have one of more of the following, they must be immediately moved to Isolation:

- They are *pyrexia* (T>39C)
- They are *leukopenic* (WBC < 4 x 10⁹/L)
- There is no apparent non-infectious cause of diarrhea (aggressive intravenous fluid therapy, osmotic cathartic administration, surgical findings or procedures expected to produce transient non-infectious diarrhea)
- If those criteria are not met, horses may be admitted to Isolation or allowed to remain in the hospital for up to 24 hours. If horses remain in the hospital, they must be handled using semi-isolation protocols, as described below. A CBC and *Salmonella* culture must be submitted immediately.

Semi-isolation Procedures

Semi-isolation is an intermediate level of infection control that is applied to cases where an infectious disease is possible but not suspected. It is not to be used for convenience, for management of a likely infectious case in the main hospital. Semi-isolation provides an added level of containment beyond normal protocols but should not be considered adequate in cases where a transmissible is reasonably expected to be present.

1. Stalls must be **prominently marked** as being under semi-isolation. This is achieved by placing a large orange biohazard bag outside the door.
2. All personnel entering the stall must wear **disposable boots, gloves and gown**.
3. **Contact** with the horse without using protective outerwear is prohibited.
4. **After exiting** the stall, protective clothing should be removed in the following order: boots, gown, gloves. Hands should be washed or an alcohol hand sanitizer used promptly after removing gloves.
5. Animal under semi-isolation must **not be walked** unless medically required and approved by the Infection Control Practitioner.
6. The area encompassing a 2-metre radius around the stall must be **sprayed** with disinfectant 4 times a day.
7. **Water hose cleaning** of the wards is discouraged when semi-isolation cases are in the ward. If hose cleaning is to be performed, an area encompassing a 2-metre radius of the stall must be sprayed liberally with disinfectant and left for 15 minutes prior to hosing.
8. **Thermometers, twitches, buckets and nasogastric tubes**, if needed, will only be used for the individual horse. They will be disinfected or discarded after they are no longer needed for the horse.
9. **Visitation of horses under semi-isolation is not permitted**. At the clinician's discretion, the owner may be walked into the ward where they can see the horse, but stay outside of the 2 metre radius around the stall door. This may only be performed when a clinician, technician or student is there to directly supervise the owner and ensure that no contact with the horse or stall occurs.

Large Animal Isolation Protocols

Please refer to OVCTH SOPs.

Situations where All Isolation Stalls are Occupied/Quarantined

Elective isolation cases (i.e. chronic diarrhea) should not be admitted. Stalls should be made available in the following order.

1. Isolation stall housing a horse that is not considered infectious, and was not considered infectious throughout the duration of hospitalization.
2. Quarantined stall that previously held *Salmonella* negative horses (5 negative cultures) and that has been disinfected.
3. Quarantined stall that previously held *Salmonella* positive horse and has been disinfected but not yet had a negative environmental culture.
4. Quarantined stall that has had positive environmental cultures. The owner/agent must be informed of the higher risk of *Salmonella* prior to the horse being placed in the stall.

Orange-carding Stalls

Stalls that have housed horses with diarrhea or those that have been identified as shedding *Salmonella* will be orange-carded. The card will be placed on the stall door and horses will not be admitted to those stalls, unless except in specific situations as described above. Orange-carded stalls are cleaned and disinfected as per standard protocols. After the stall has dried, environmental sampling for *Salmonella* will be performed using a Swiffer cloth. A Swiffer-cloth will be wiped over a variety of stall surfaces and submitted for *Salmonella* culture. Once a negative *Salmonella* result has been obtained, the stall will be opened for normal use.

If *Salmonella* is cultured from a stall, the stall will be cleaned and disinfected again, and environmental sampling will be repeated. If a stall is positive on 2 consecutive occasions, the ICP will evaluate the stall to attempt to determine the cause. Multiple samples of different stall sites may be performed to identify the source of *Salmonella*.

Salmonella surveillance: horses

Active surveillance for *Salmonella* shedding is performed on two groups of horses:

- 1) Horses admitted for colic
- 2) Horses that are expected to undergo general anesthesia.

For such cases, a fecal sample must be collected from the horse at the time of admission, or as shortly thereafter as possible. Samples are to be submitted for *Salmonella* culture using the appropriate *Salmonella* surveillance AHL forms. The cost of this is covered by the OVCTH. Surveillance of other horses may be initiated by Infection Control, as deemed necessary. This surveillance program is not to be used for horses admitted with, or developing diarrhea. *Salmonella* culture in those cases must be performed as per normal diagnostic samples, at the owners' cost.

Q-fever Protocol

1. Introduction: Q-fever is a zoonotic disease caused by *Coxiella burnetii*, a rickettsial organism. Ruminants are the most common reservoirs of *C. burnetii*. The largest numbers of organisms are shed in placenta, fetal tissues and amniotic fluids, and the risk of zoonotic transmission of Q-fever is greatest during lambing.

2. As with most other infectious agents, proper hand hygiene is critical and should be performed after every contact with sheep or goats. Antibacterial soap or an alcohol-based hand disinfectant should be used.
3. All sheep and goats (including seronegative animals) handled at or within two weeks of parturition are to be regarded as 'Q' fever infected unless established otherwise. Standard isolation procedures apply. Surgical procedures are to be carried out in the surgeries, but anesthetic and surgical equipment will be treated as for infected cases. If possible the animal should be discharged immediately. If this is not practical, the animal shall be isolated during hospitalization. A sign shall be placed on the front of the stall indicating the potential infectious nature of the animal.
4. When dealing with ovine or caprine lambing or abortion cases in the wards, the following protocol is to be followed and the Animal Housing Administrator should be informed.
 - a. Wear disposable: wrist gloves; mask; gown; plastic overboots.
 - b. Dead lambs, placenta, and any related organs or tissue are to be placed in an orange biohazard garbage bag, sealed and tagged appropriately. These are to be marked 'contaminated'. If necropsy is required, the potential for *C. burnetii* infection must be prominently addressed on the necropsy request form.
 - c. Contaminated bedding - place in an orange garbage bag and seal. Mark 'contaminated'.
 - d. The pen should be thoroughly cleaned then disinfected with 10% bleach or accelerated hydrogen peroxide.
 - e. When cleaning is completed: disposable mask, gloves and boots should be placed in an orange biohazard garbage bag, sealed and tagged appropriately. Mark 'contaminated.'
 - f. Biohazardous material should be handled as per standard protocols.

Primary Healthcare Centre (PHC)

The PHC at the OVCTH poses different risks and challenges compared to the Companion Animal and Large Animal Hospitals, based on its caseload and operation, yet infection control remains a priority. The primary care nature of the caseload, in general, reduces the number of highly susceptible patients, but it by no means indicates an absence of risk to patients or staff. Some aspects of the PHC caseload may increase risk in some areas, such as an intensive rehabilitation program and resident animals in endowed care. Thus, the infection control program is as important for this facility as for other components of the OVC Health Sciences Centre.

All protocols discussed in this Manual apply to the PHC, and infection control at the PHC is directed under the auspices of the Infection Control Committee.

Specific SOPs are available through the OVCTH website.

Appendix 1: Discharge Information for Horses with Salmonella **Infection Control Measures for *Salmonella* in Horses**

General Information

Salmonella is a bacterium that is an important cause of disease in horses and other species (including people). Diarrhea is the most common disease that develops in infected animals, however fever and depression may be the only signs in some horses that get sick, while others can carry *Salmonella* without showing any signs whatsoever. *Salmonella* is transmitted via the 'fecal-oral' route, meaning that *Salmonella* is present in manure and must be ingested to infect other animals (or people). A small percentage of horses transiently carry *Salmonella* in their intestinal tracts at any time, typically without any problems. These horses can be sources of infection for other horses, and for subsequent development of disease in themselves.

Salmonella infection is diagnosed by culture of fecal samples. However, testing of a single fecal sample will not always detect *Salmonella*, and 5 negative samples are required to confidently determine that *Salmonella* is not present.

Management of a *Salmonella* positive horse on the farm

Sometimes, it is necessary for an infected horse to move onto, or return to, a farm. Because *Salmonella* is an infectious agent, certain precautions should be put in place to reduce the risk of infecting other animals or people. *Salmonella* outbreaks are uncommon on horse farms but can occur. Similarly, transmission of *Salmonella* to people on farms is uncommon but possible. Therefore, care should be taken to *reduce the risk* of this happening.

Note: These are general guidelines only. An infection control program needs to be catered to the challenges and needs of each farm. It is wise to discuss infection control plans with your veterinarian or Ontario Veterinary College personnel.

1. The horse should ideally be housed in an isolated barn, away from other horses. If this is not possible, it should be in a stall as far away from other horses, particularly sick horses, pregnant mares and foals. Alternatively, it could be kept in an isolated pasture or paddock, with no contact with other horses.
2. The stall should be adequately identified as containing an infectious horse to keep other people away.
3. The horse should remain in its stall as much as possible; all the time if feasible. It should not be allowed into any public areas. If walked, it should be walked in an area that horses and people will not be using. If the horse passes any manure, it should be cleaned up promptly.
4. When the horse is handled or the stall is entered, 'barrier precautions' should be used. This means using disposable plastic overboots or boots that are only worn in the stall, disposable gloves, and coveralls or similar protective outerwear that is only used in the stall. Plastic overboots should be disposed of after every use. If other boots are used instead, they should be removed after exiting the stall and cleaned and disinfected.

5. A garbage bag should be placed immediately outside the stall for all disposable items.
6. After entering the stall or handling the horse or stall items, it is essential to wash your hands with antibacterial soap or use an alcohol-based hand sanitizer.
7. Buckets, shovels, pitchforks, wheelbarrows and other items should not be moved between an infected horse's stall and other stalls without thorough disinfection.
8. For disinfection of items, they must be cleaned, then treated with an appropriate disinfectant. A 1:10 dilution of household bleach (1 part bleach to 9 parts water) is an effective disinfectant in the absence of dirt, manure or other debris. 10-30 minutes of contact with the bleach solution is required. Other disinfectants can also be used. It is important to ensure that you are using a disinfectant (which is designed to kill bacteria) versus a cleaner (which will not kill bacteria, just facilitate removal of debris).
9. Most stalls cannot be easily disinfected. Dirt, unsealed wood surfaces and porous materials complicate cleaning and disinfection. When the stall is no longer needed, it should be thoroughly cleaned and disinfected, and left empty for as long as possible. To make wooden stall walls easier to disinfect, they can be painted with 2 coats of marine varnish to seal the surface.
10. Manure should be disposed of in an area away from other animals, and where run-off will not contaminate the water supply. Composting is an effective way of killing *Salmonella*.
11. *Salmonella* is killed by sunlight, but only if sunlight can penetrate it. If an infected horse passes manure outside, manure should be picked up and sunlight allowed to kill any residual *Salmonella*. If an infected horse is on pasture, manure should be picked up or the pasture harrowed frequently. If the pasture is harrowed, the tractor and harrow should be considered infectious until disinfected.
12. Periodic (1-2/week) fecal samples should be submitted for *Salmonella* culture. Once a negative culture is obtained, samples can be collected daily until 5 consecutive samples have been obtained, at which point the likelihood that the horse is still shedding *Salmonella* is very unlikely. Please discuss the logistics of sample collection and submission with your veterinarian.
13. When no longer required for an infectious horse, items such as buckets, twitches, lead ropes, hay nets and any other in-contact item should be disinfected or disposed of.

Frequently Asked Questions

1) Do all horses with *Salmonella* get sick?

No. Most horses that are exposed to *Salmonella* will not become infected. Even if *Salmonella* survives in the intestinal tract of a horse, disease does not necessarily develop. The likelihood of disease depends on the number of *Salmonella* that are ingested, the *Salmonella* strain, and the health status of the horse. Healthy adult horses usually require very large numbers of *Salmonella* to get sick. However, if they are being treated with antibiotics, held off feed, undergo general anesthesia, have feed changes, are shipped or encounter other stressors, they are more likely to get sick with lower doses.

2) How long will my horse continue to shed *Salmonella*?

Most horses only shed *Salmonella* for a ***reasonably short period of time***. In some cases, horses can shed for a few months, but lifelong shedding is not recognized. It is impossible to predict whether a horse will shed *Salmonella* for a few days versus a few months.

3) Is my horse at risk of infecting other horses upon return to the farm?

Yes, however the risk is probably not great in most circumstances. Most clinically normal horses (i.e. without diarrhea) shed relatively low levels of *Salmonella*. Further, most horses on farms are a relatively low risk for disease because they don't have the risk factors described above. However, we still recommend taking precautions to ensure that your horse does not transmit disease. These are described above.

4) Can *Salmonella* infect people?

Yes. *Salmonella* is a zoonotic disease. That means it can be transmitted from animals to people. People can become infected by ingesting *Salmonella* from a horse. As with horses, healthy people are reasonably resistant to infection with low levels of *Salmonella*. People with poor immune system function (caused by certain diseases or drugs), and those taking antibiotics, are at greater risk. High-risk people (immunocompromised, antibiotic-treated, very young, very old) should not be allowed to come into contact with infected horses, regardless of the infection control protocols that are in place. Good personal hygiene (especially hand hygiene) and use of infection control protocols can greatly reduce the risk of transmission of *Salmonella* to people.

5) What can be done to shorten the length of time my horse sheds *Salmonella*?

Nothing specific can be done. Antibiotics are not effective at eliminating carriage of *Salmonella* and might increase the risk of developing diarrhea. Probiotics have not been shown to be effective. Probably the best thing that can be done is to provide the horse with a good diet, good management and limiting stress.

Infection Prevention and Control Best Practices for Small Animal Clinics

Condition	Agent Name	Disease Name	Zoonotic Risk	Bite/Scratch Concern	Environmental Contamination	Arthropod Vector	PPE Protocol		
							Gloves 	Gown ^a 	Mask ^b 
Respiratory Infection	<i>Bordetella bronchiseptica</i>	Bordetellosis	+		+		+	+	
	Canine influenza virus	Influenza			+		+	+	
	Feline calicivirus	Calicivirus			+		+	+	
	Feline herpesvirus 1	FVR			+		+	+	
Respiratory Infection	<i>Bordetella bronchiseptica</i>	Bordetellosis	+		+		+	+	
	<i>Francisella tularensis</i>	Tularemia	+	+	+	+	+	+	+
	<i>Pasteurella multocida</i>	Pasteurellosis							
	Canine influenza virus	Influenza			+	+	+	+	
	Canine parainfluenza virus	Parainfluenza			+		+	+	
Gastrointestinal	<i>Campylobacter jejuni</i>	Campylobacteriosis	+		+		+	+	
	<i>Clostridium difficile</i>	<i>C. difficile</i> diarrhea	+		+		+	+	
	<i>Cryptosporidium spp.</i>	Cryptosporidiosis	+		+		+	+	
	<i>Escherichia coli</i>	<i>E. coli</i> diarrhea	+		+		+	+	
	<i>Giardia spp.</i>	Giardiasis	+		+		+	+	
	<i>Salmonella spp.</i>	Salmonellosis	+		+		+	+	
	<i>Toxoplasma gondii</i>	Toxoplasmosis	+		+		+	+	
	Canine parvovirus	Parvo			+		+	+	
	Feline panleukopenia virus	Panleukopenia			+		+	+	
Neurological Signs	<i>Listeria monocytogenes</i>	Listeriosis	+		+		+	+	+
	Canine distemper virus	Distemper			+		+	+	
	Rabies virus	Rabies	+	+			+	+	+
Skin Infection / Parasites	MRSA	MRSA pyoderma	+	+	+		+	+	
	MRSP	MRSP pyoderma	?		?		+	+	
	Fleas	Fleas	+		+		+	+	
	Lice	Pediculosis			+		+	+	
	Mites	Mange	+		+		+	+	
	Ticks	Ticks	+		+		+	+	
Skin Infection / Parasites	<i>Microsporum spp.</i> <i>Trichophyton spp.</i>	Dermatophytosis, Ringworm	+		+		+	+	
	<i>Sporothrix schenckii</i>	Sporotrichosis	+	+			+		
Wound	MRSA	MRSA	+	+	+		+	+	
	MRSP	MRSP	?		?		+	+	
	<i>Pasteurella multocida</i>	Pasteurellosis	+						
	VRE	VRE	+		+		+	+	
	Other MDR bacteria	Other MDR bacteria	+				+	+	
Zoonotic	<i>Bartonella spp.</i>	Cat Scratch Disease	+	+		+			
	<i>Borrelia burgdorferi</i>	Lyme Disease	+			+			

Legend:

+ Risk exists/PPE required; ? Unknown risk

FIV – feline immunodeficiency virus

FVR – feline viral rhinotracheitis

MDR – multidrug-resistant

MRSA – methicillin-resistant *Staphylococcus aureus*

MRSP – methicillin-resistant *Staphylococcus pseudintermedius*

PPE – personal protective equipment

RMSF – rocky mountain spotted fever

VRE – vancomycin-resistant *Enterococcus spp.*

^aDisposable gown or dedicated lab coat; ^bMask covering the nose and mouth (e.g. surgical mask); ^cEnvironmental contamination by blood; ^dTransmission by ingestion of fleas.

A = Standard PPE only, according to procedure

B = Prevent direct contact with blood

C = Cover broken skin

E = Eye protection recommended

F = Prevent direct contact with feces and transfer of fecal contamination

R = Non-dedicated lab coat recommended

S = Shoe covers recommended if there is possible fecal contamination (or urine contamination for Leptospirosis) of the floor in the area where the animal is being kept

APPENDIX 3: Recommended Personal Protective Equipment for Routine Veterinary Procedures

Procedure	Disposal Gloves	Sterile Gloves	Gown / Dedicated Lab Coat	Face Protection ^a	Other/Comment
Bandage change	+				
Crushing pills					Mask ^c
Dental procedures	+		+	+	
Digital rectal palpation	+				
Draining sterile seroma/hematoma		+			
Expressing anal glands	+				
Fine needle aspirate					
Handling soiled laundry	+		+		
Handling stool samples	+				
Handling urine samples	+ ^b				
Injections: intramuscular and					
Intranasal <i>Bordetella</i> vaccination	+				
Intravenous catheter placement					
Lancing abscess	+		+	(+)	
Obstetrical procedures: cats		+	+	+	Q-fever risk
Obstetrical procedures: dogs		+			
Oral antimicrobial administration	+ ^c				
Oral examination	+				
Urinary catheter placement		+			
Venipuncture					
Wound cleaning/debridement		+			
Wound lavage/flushing	+		+	(+)	
Wound suturing		+			

Federally Reportable Diseases

- African horse sickness
- Anaplasmosis
- Bluetongue
- Bovine tuberculosis (*M. bovis*)
- Chronic wasting disease of cervids
- Contagious equine metritis
- Equine infectious anaemia
- Foot and mouth disease (FMD)
- Highly pathogenic avian influenza
- Lumpy skin disease
- Peste des petits ruminants
- Pullorum disease (*S. pullorum*)
- Rift Valley fever
- Scrapie
- Swine vesicular disease
- Venezuelan equine encephalomyelitis
- African swine fever
- Anthrax
- Bovine spongiform encephalopathy
- Brucellosis
- Contagious bovine pleuropneumonia
- Cysticercosis
- Equine piroplasmiasis (*B. equi* and *B. caballi*)
- Fowl typhoid (*Salmonella gallinarum*)
- Hog cholera (classical swine fever)
- Newcastle disease
- Pseudorabies (Aujeszky's disease)
- Rabies
- Rinderpest
- Sheep and goat pox
- Trichinellosis
- Vesicular stomatitis

Appendix 4: Chloramphenicol Use Form

Date: _____

Stamp card/patient label

Prescribing Clinician: _____

Attending Clinician: _____

Why is chloramphenicol being prescribed?

Multidrug-resistant infection where chloramphenicol is only viable treatment option?

An oral antimicrobial is required/desired and chloramphenicol is the only option

Other (explain): _____

Will this drug be dispensed for administration to the patient following discharge?

Yes

No

If yes:

Has the *person(s) who will administer the drug* been informed about human health risks and safe handling practices? Yes No

Has information about safe handling and human health risks been documented in the discharge summary? Yes No

Signature of prescribing clinician: _____