

General Biosecurity Standard Operating Procedures (SOP)

Contents

Massey IVABS Philosophy Regarding Infection Control	3
Goals for the Massey University (MU)-VTH Biosecurity Program.....	3
Biosecurity Committee	3
The Biosecurity Committee will:.....	3
Structure of the Biosecurity Committee	4
Infection Control Principles	5
Optimizing Hygiene	5
Hands should be washed:.....	5
Recommended technique for hand washing:	5
Recommended method for using a hand sanitizer:	6
Barrier Nursing Precautions	6
Standard Attire:	6
Minimize Unnecessary Contact with Patients.....	7
Eating and Drinking	7
Disposal of Infectious Waste	7
Basic Cleaning and Disinfection.....	8
Disinfection Protocol for Instruments and Equipment	9
Breaking Transmission Cycle	10
Routes of Disease Transmission	10
Zoonotic Infections	11
People with Special Infectious Disease Risks	11
Visitors in the MU-VTH.....	11
Clients in the MU-VTH.....	11
MU-VTH Risk Communication Regarding Contagious Disease Status of Patients	12
Environmental Surveillance.....	12
Reportable Animal Diseases in New Zealand.....	13
Research and Teaching Animals.....	13
Post Mortem (PM) Room Complex Biosecurity Standard Operating Procedure (SOP)	14
Goals.....	14

Definitions applicable to the PM Room complex.....	14
Food and drink in the PM Room complex.....	14
Procedures.....	14
Proper access to the PM Room	14
General safety and hygiene.....	14
Protection from zoonotic diseases.....	15
Prevention of the spread of infectious disease agents from the Dirty Area.....	15
Disinfection.....	15
Quarantine.....	16
Appendices	17

Massey IVABS Philosophy Regarding Infection Control

Biosecurity, infection control, and biosafety are essential functions at all health care and research facilities, including veterinary hospitals. Good infection control practices are not the only feature defining excellence in veterinary care, but it is impossible to achieve excellent patient care without employing logical infection control procedures. Procedures used at Institute of Veterinary, Animal and Biomedical Science (IVABS) at Massey University (MU) are intended to reduce the risk of all nosocomial and zoonotic illness. Biosecurity and infection control procedures used at IVABS, including MU Veterinary Teaching Hospital (MU-VTH) are specifically tailored to address contagious disease threats as they are encountered in this unique environment.

Goals for the Massey University (MU)-VTH Biosecurity Program

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

Biosecurity Committee

The IVABS Biosecurity Committee will be responsible for biosecurity associated with clinical activities in the Veterinary Hospital, post mortem facilities, the Large Animal Teaching Unit and research and teaching laboratories. The full Terms of Reference for the operation of the Biosecurity Committee are available elsewhere. Below includes the summary of the Committee goals and structure.

The Biosecurity Committee will:

- 1) Develop policies and procedures for Biosecurity in the Institute. The policies and procedures should model best practice, be cost efficient and be achievable within the operating structures of the Massey University Veterinary Teaching Hospital (MU-VTH) and the wider Institute. The policies and procedures should take into account the requirements of the Australian Veterinary Boards Council and the American Veterinary Medical Association for accreditation of veterinary programs.
 - a) The policies and procedures should explicitly address:
 - i) Control of nosocomial infection
 - ii) Control of animal-to-human and human-to-animal infections
 - iii) Passive and active surveillance
 - iv) Systematic and regular reporting of results of surveillance.
- 2) Manage implementation of biosecurity procedures to ensure compliance and adherence to best practice.
- 3) Provide advice to clinicians, technical staff, students and other staff on matters pertaining to biosecurity. The committee will be the primary resource information and advice on biosecurity associated with clinical activities.
- 4) Prepare an annual budget and monitor its costs against that budget.
- 5) Report on its activities:
 - a) Annually to the Veterinary Teaching Hospital Board and the IVABS Executive Committee.
 - b) Twice annually to the Clinical Services Management Committee and IVABS Management Committee on results of passive and active surveillance.
- 6) Promote and develop scholarly activities associated with biosecurity with the intent of publishing results of investigations in peer-reviewed formats and at scientific and professional meetings.
- 7) Promote biosecurity in veterinary facilities to the veterinary profession.
- 8) Develop staff capacity and expertise in biosecurity.

Structure of the Biosecurity Committee

The current IVABS Biosecurity Committee comprises of:

- Dr. Magda Dunowska - A member of the Infectious Diseases Group of the Institute, Chair
- Mr James Connell - The College of Sciences' Radiation and Biological Compliance Officer
- Prof Joe Mayhew - an equine clinician
- Dr. Janelle Wierenga - a small animal clinician
- Lisa Hine - a production animal technologist
- Mr Mike Reily - LATU Manager
- Mrs Janet Molyneux - VTH Director
- Dr Mark Collett - a pathologist
- Mr Jaime McDonald - IVABS Compliance Technician, Executive Officer

Infection Control Principles

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

- 1) **Optimize hygiene** through the use of standard precautions including hand washing, proper attire and barrier protection, minimizing unnecessary contact with patients, appropriate disposal of infectious materials and proper cleaning and disinfection.
- 2) **Break transmission cycles** by understanding routes of disease transmission, creating barriers to direct and indirect transmission of infectious agents for patients with differing risks for contagious disease transmission, and effective use of hygiene protocols. This includes consideration of traffic patterns and housing of patients, as well as traffic patterns of personnel and guests within the VTH.
- 3) **Target and refine infection control procedures** through surveillance and other investigative procedures.
- 4) **Enhance education and awareness** regarding nosocomial and zoonotic disease risks through optimizing communication about the purpose for these guidelines and procedures.

Optimizing Hygiene

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

There are **two methods** of removing/killing microorganisms on hands: washing with soap and running water or using an alcohol-based hand sanitizer. **Alcohol-based hand sanitizers** are not effective against certain pathogens, including bacterial spores (e.g. clostridial spores) and *Cryptosporidium spp.* Alcohol is also not as effective against non-enveloped viruses (e.g. canine parvovirus, feline panleukopenia virus) as it is against most other microbes. Nonetheless, alcohol-based hand sanitizers may be useful even if alcohol-resistant pathogens like *Clostridium difficile* are present. The improved hand hygiene compliance seen with alcohol-based hand sanitizers and their efficacy against other pathogens are important aspects of infection control. **Washing hands with soap and running water** can decrease the number of **all** organisms on the hands via the physical process and mechanical action of hand washing.

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

Hands should be washed:

- 1) Before and after handling each patient
- 2) After touching blood, body fluids, secretions, excretions and contaminated items, whether or not gloves are worn
- 3) Immediately after gloves are removed
- 4) Between tasks and procedures on the same patient to prevent cross-contamination of different body sites
- 5) After handling laboratory specimens or cultures
- 6) After cleaning cages or stalls
- 7) Before meals, breaks, smoking or leaving work for the day
- 8) Before and after using the restroom

Recommended technique for hand washing:

- 1) Remove all hand and arm jewellery.
- 2) Wet hands and forearms with warm water.
- 3) Add at least 3-5 mL (1-2 full pumps) of soap to palm of hand.

- 4) Lather up and vigorously scrub each side of the hands beyond the wrist for 10-30 seconds, cleaning between fingers, under rings and fingernails.
- 5) Rinse under warm water until all soap residue is removed.
- 6) Dry hands with paper towel or warm air dryer.

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

Recommended method for using a hand sanitizer:

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

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 anaesthetic machines.

Barrier Nursing Precautions

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

- 1) Wear gloves and protective clothing such as lab coats, smock, apron or coveralls when you are handling patients known or suspected to be infected with infectious or zoonotic diseases.
- 2) Gloves, surgical masks and protective eyewear should be worn for procedures that commonly result in the generation of droplets, splashing of blood or other body fluids, or the generation of bone chips.
- 3) If a glove is torn or a needle stick or other injury occurs, the glove should be removed and replaced with a new glove as soon as patient safety permits.
- 4) The use of washable boots, shoes or shoe covers minimize the spread of infectious material throughout different parts of the hospital.
- 5) Additional protection in the form of face shields or respirators may be necessary depending on the circumstances and disease.

Standard Attire:

The MU-VTH maintains a dress code to promote professionalism and to assist with biosecurity efforts. For details see IVABS Basic Personal Protective Equipment SOP). The key points of the above policy include:

- 1) Dedicating attire specifically for use in the MU-VTH is the first line of defence against taking animal and human pathogens to your home environment.
- 2) All personnel working with patients or their environments are encouraged to wear hospital dedicated attire (clothing, footwear, and outer garments that are worn only when working at the MU-VTH or while on field service duty) and not worn elsewhere.
- 3) All personnel are required to wear footwear and protective outer garments when working with patients or their environments that is appropriate to the job at hand. For example coveralls and heavy boots or shoes are the most appropriate footwear and protective outer garments when working with large animal patients.
- 4) All personnel working with patients or their environment are required to wear closed toe footwear that is safe, protective, clean, and cleanable. Footwear that becomes soiled or contaminated must be cleaned and disinfected

and should not be constructed of a porous or absorbent material. From a safety perspective, footwear that may be appropriate for use in the small animal hospital may not be appropriate for use in the large animal hospital.

- 5) It is advisable to have an extra set of clean protective outer garments available at all times.
- 6) Specific requirements regarding attire to be worn in various hospital sections are listed in a separate SOP (IVABS Basic Personal Protective Equipment SOP).
- 7) Students should always wear freshly laundered protective outer garments when beginning a rotation, and must regularly launder them while on rotations.
- 8) Personnel that work in both the small and large animal hospitals must have attire available that is appropriate for different areas of the hospital.

Minimize Unnecessary Contact with Patients

Accomplishing the patient care and teaching mission of the MU-VTH requires intensive contact with multiple patients through routine activities. However, it is important to remember that this contact is accompanied by the potential for transmission of infectious and or zoonotic agents.

- 1) All personnel should minimize contact with patients whenever reasonable in order to minimize the risk of nosocomial exposure for these patients, especially if not directly responsible for their care.
- 2) If, for the purpose of teaching, students are asked to perform examinations or assist with procedures on multiple patients, their hands must be washed between patients, and stethoscopes and other equipment must be wiped with alcohol or hand sanitizer between patients.
- 3) Personnel that contact patients known or suspected of being infected with contagious pathogens must be limited to only those essential for appropriate patient management.
- 4) When appropriate, patients should be monitored by observation without physical contact.
- 5) In order to decrease the potential for inadvertent trafficking of infectious agents, personnel should also minimize, when possible, movements into areas used by different services, unless necessary. For example, medicine personnel should minimize visiting areas used by surgery personnel, personnel assigned to the large animal hospital should avoid visiting areas used by small animal personnel, etc.
- 6) Personnel should avoid entering stalls except when necessary (e.g., avoid entering stalls during rounds).
- 7) When possible, personnel should work in areas with higher likelihood of being contaminated last (*after* working on patients in other areas).

Eating and Drinking

- 1) Food or drink should not be consumed or stored where animals are examined, treated, or housed.
- 2) Personnel are also prohibited from eating, drinking, or storing food in areas where biological specimens are handled, or medications are compounded or stored. This includes teaching laboratories, exam rooms, the breezeway, or reception areas.
- 3) Food and beverage storage is not allowed in any refrigerator or freezer used to store medications, or biological specimens.
- 4) Microwaves used in animal care areas (e.g., equine medicine records room) are not to be used to heat food intended for people.

Disposal of Infectious Waste

- 1) Precautions should be taken to prevent injuries caused by needles, scalpels, and other sharp objects. To prevent needle injuries, personnel should avoid recapping needles, purposely bending or breaking needles, or removing needles from disposable syringes. Sharps should be placed in a puncture-resistant container for disposal; consult with staff in charge of your area or biosecurity personnel if the size of large syringes or sharps prevents placement in regular sharps containers.
- 2) Waste should be bagged in the area where it was generated and re-bagged once outside of the infected area.

- 3) If an infectious disease is suspected, trash must be sealed in trash bags for waste disposal. Seal the bag with tape then double bag and seal with tape, spray the surface of the bag with an appropriate disinfectant, and bring to the post-mortem room for incineration.
- 4) Biological samples collected from patients with elevated contagious disease risk should be sealed in plastic bags and labelled with the appropriate information prior to submission to diagnostic laboratories. Care should be taken to avoid contaminating the outside of plastic bags.
- 5) Cleaning and bandaging of wounds known to be infected with infectious agents of concern (e.g., MRSA or other highly resistant bacteria) should not be conducted in high traffic areas and should occur in areas that can be easily cleaned and disinfected. Barrier precautions should be used to prevent contamination of hands and attire, and care should be taken to avoid environmental dissemination through drainage of flush solutions or careless handling of bandage materials. Follow procedures in this document for environmental disinfection and disposal of these materials.

Basic Cleaning and Disinfection

Personnel using disinfectants in the VTH are expected to be familiar with this basic cleaning and disinfection section in order to understand the activity of and potential interactions among the various disinfectants used in the VTH.

General Disinfection Protocol for Contaminated Surfaces

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

Disinfectants

A variety of disinfectants are used at the VTH in order to decrease the likelihood of transmission of infectious agents. Several factors have been considered when choosing disinfectants for a particular use in the VTH.

Disinfectants vary in their toxic and irritation potential for people and animals. In general alcohols, povidone iodine, and chlorhexidine solutions are used when contact with skin or other tissues is likely or required. Other cleaning and disinfecting agents such as bleach (hypochlorite), Virkon, phenols and quaternary ammonium compounds are only applied to equipment or facility surfaces.

- 1) Disinfectants can only reliably be expected to be effective when applied to clean, non-porous surfaces. Some materials such as unsealed wood and dirt essentially cannot be disinfected or decontaminated through routine procedures. In addition, non-porous surfaces will not be reliably decontaminated if disinfectants are applied in the presence of dirt, oil, biofilms and biological materials.
- 2) Disinfectants vary greatly in their spectrum of activity. In general, protozoa such as *Cryptosporidium*, bacterial spores, mycobacterium, and non-enveloped viruses are very hardy and resistant to disinfection.
- 3) Organic material rapidly deactivates most disinfectants. The likelihood that organic material will be present on surfaces should be considered when choosing a disinfectant.
- 4) Ensuring maximal decontamination requires that disinfectant solutions be applied at appropriate dilutions and be left on surfaces for an adequate amount of contact time (often at least 10-15 min).
- 5) Although most disinfectants are used for their short term decontamination activity, some disinfectants maintain residual disinfectant activity when left on surfaces for longer periods.
- 6) It is critical to rinse and remove all residues from previous disinfectant, if another disinfectant is to be applied. For example, quaternary ammonium based disinfectants and bleach will react to produce a noxious gas.

Footbaths and Footmats

Infectious agents are frequently recovered from floor surfaces in the environment around infected animals. It is recommended that either 1% Virkon or 1% Acell Prevention solutions are used in all disinfectant footbaths and footmats throughout the MU-VTH.

- 1) Footbaths solutions should be changed at least once per week, or earlier if required.
- 2) Footbaths should be changed whenever they are judged to contain excessive amounts of bedding or dirt.
- 3) Footmats or footbaths should be refilled by anyone that notices they are dry or low on volume; this is the responsibility of ALL people working in this area (students, staff, or faculty).
- 4) Personnel are required to use footbaths or footmats appropriately whenever they are encountered. Footbaths require full immersion of feet, and therefore water impervious footwear must be worn wherever footbaths are employed.
- 5) Footmats do not require full immersion of feet, as the mat is designed to place solution on the soles and sides of the soles of shoes. However, splash contact with the tops and sides of shoes occurs commonly, and impervious footwear is strongly recommended for personnel working in areas where footmats are used.

Disinfection Protocol for Instruments and Equipment

All MU-VTH equipment must be appropriately cleaned and decontaminated prior to its return to Central Supply in order to minimize the risk of transmission of contagious disease agents. Equipment used specifically in small or large animal hospital areas is discussed under their respective hospital areas.

Thermometers

- 1) Glass thermometers are not to be used in the MU-VTH in order to decrease risks associated with broken thermometers and mercury exposures.
- 2) Personnel using electronic thermometers on multiple patients should clean and disinfect the thermometer between patients.
- 3) Electronic thermometers should also be thoroughly disinfected daily using alcohol and/or chlorhexidine wipes. Plastic thermometer cases should be regularly soaked in disinfectant solution.
- 4) Multi-use thermometers should never be used on patients that have a high risk of enteric disease caused by contagious pathogens (e.g., parvovirus enteritis or salmonellosis). Instead, disposable thermometers or individual thermometers are assigned for use with each patient, and discarded after discharge.

Endoscopes:

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

Stethoscopes:

It is recommended that stethoscopes be cleaned regularly with soap and water, and disinfected between patients with hand sanitizer. Immediate cleaning and disinfection is required when stethoscopes are visibly soiled or after examination of a patient with a suspect infectious disease.

Breaking Transmission Cycle

Routes of Disease Transmission

Many disease agents can survive for extended periods of time in the air, on surfaces and in organic material. Pathogenic disease agents can be spread from animal-to-animal, animal-to-human or even human-to-animal, through inhalation, oral consumption, contact with nasal or ocular mucosal surfaces, and direct contact via fomites or vectors. Awareness of these routes of disease transmission can help mitigate their potential effects.

- **Aerosol transmission** occurs when infectious agents contained in aerosol droplets are passed between susceptible species. Most pathogenic agents do not survive for extended periods of time within the aerosol droplets and as a result, close proximity of infected and susceptible animals is required for disease transmission. The greater the distance between animals, the less likely transmission will occur. Aerosol transmission may occur in a veterinary hospital through close contact of animals and/or humans. Infectious agents may be freshly aerosolized (as in a sneezing cat with feline respiratory virus), may be re-aerosolized by high-pressure washing of cages, stalls or pens or on dust particles by air currents. Temperature, relative humidity and ventilation play important roles in aerosol transmission of pathogens.
- **Oral transmission** involves exposure to infectious agents by the gastrointestinal route. This also can occur inadvertently through inhalation of aerosolized material and subsequent swallowing of materials through the nasopharynx. Contaminated environmental objects include equipment such as food and water dishes, and any other items an animal could lick or chew. Feed and water contaminated with feces or urine are frequently the cause of oral transmission of disease agents. In people, oral contact with contaminated hands is commonly part of the transmission cycle for oral-fecal agents, which exemplifies the need for excellent hand hygiene among personnel working around animals. Appropriate handling and segregation of patients with diarrhea will help control the spread of potentially infective organisms in feces as will proper cleaning and disinfecting of food and water dishes.
- **Direct contact transmission** requires an animal or person to directly contact another infected animal or person. **Indirect contact transmission** occurs through contact with surfaces or materials that have been contaminated with a variety of substances (e.g., blood, discharge from wounds, saliva, nasal secretions or aerosolized respiratory droplets, genitourinary secretions, fecal material, etc). It is important to remember that patients in the hospital have a highly likelihood of being infected with contagious pathogens, and therefore surfaces throughout the facility have a high likelihood of being contaminated with infectious agents. As such, the most important method of reducing the potential for direct and indirect contact transmission is the segregation of infected animals and minimizing contact with them. Since not all infected animals show signs of illness, generalized efforts to decrease the likelihood of animals coming into direct contact and segregating patients in different populations (e.g., inpatients and outpatients) are warranted.
- **Fomite transmission:** Fomites are objects that serve as intermediates in contact transmission cycles. Virtually any object can serve as a fomite, even a person acting as a caregiver. For example: a door knob, keyboard, telephone, clothing, thermometer, stethoscope, hose, leash, brush, shovel, etc., are all items that can be contaminated with infectious agents and serve as an exposure source involved in contagious disease transmission. An important aspect of fomite transmission is that portable items can be contaminated near one patient and then be a source of transmission for patients or personnel in other areas of the hospital. The most important means of controlling transmission by fomites is through proper cleaning and disinfection, use of barrier nursing precautions, separation of equipment, as well as the appropriate recognition and segregation of diseased animals. Whenever possible, clinically ill animals should be handled and treated only after all healthy animals have been handled or cared for.
- **Vector transmission** occurs when an insect or arthropod acquires a pathogen from one animal and transmits it to another. Fleas, ticks, flies and mosquitoes are common biological vectors of disease overseas. The most effective means to prevent transmission of vector-borne is the elimination or reduction of the insect vector, or at a minimum, separation of the vector from the host. Most of the vector-borne diseases are exotic to New Zealand.

Zoonotic Infections

While the risk of contracting a zoonotic disease among the general population is, on average, low, veterinarians and other people that routinely contact animals have an increased risk of exposure to zoonotic disease agents. In cases of exposure to suspect or confirmed cases of zoonotic diseases, all known client, referring veterinarian, student, and staff contacts should be recorded and reported to the Biosecurity Personnel. The Biosecurity Personnel and faculty clinician in charge of the case will then work together to ensure that all potentially exposed individuals are contacted. Any persons with known or suspected infections associated with work at the MU-VTH are strongly encouraged to seek medical attention immediately after reporting the event to a supervisor.

People with Special Infectious Disease Risks

Personnel, clients and students whose immune systems are compromised are at greater risk from exposure to zoonotic diseases. Immune status is affected by many conditions and those at increased risk may include: children under the age of 5, pregnant women and the elderly. While the most profound immune suppression is caused by HIV/AIDS, other diseases and conditions that can compromise or alter immune function include pregnancy, organ failure, diabetes, alcoholism and liver cirrhosis, malnutrition or autoimmune disease. Certain treatments can also be associated with immune suppression, including radiation therapy, chemotherapy, chronic corticosteroid therapy, or immunosuppressive therapy associated with bone marrow or organ transplants, implanted medical devices, splenectomy, or long-term hemodialysis. It is important to note that some of these conditions or diseases may have a social stigma, making it difficult for a person to share their personal health information. **All personnel, including students, are required to inform their supervisors about any special health concerns (e.g., pregnancy, immunosuppression, etc.) that might impact the risk or consequences of infection with zoonotic agents prior to handling any patients. All discussions will be kept confidential; however, communication among staff about the situation may be necessary for implementation of appropriate precautions and / or alteration of normal clinical or teaching procedures in the hospital.**

Visitors in the MU-VTH

Educating the public about the role that veterinarians have in society is an important function of IVABS, and allowing visitors to have some access to the MU-VTH supports this mission. However, there are unique safety and health risks associated with exposure to the MU-VTH environment, and visitors are a potential mechanism for spreading infectious agents in the hospital environment.

- 1) Visitors must be directly supervised while visiting the MU-VTH. Physical contact with patients that are not owned by those specific visitors is not allowed. Tours for the public are coordinated through the MU-VTH reception or IVABS office and are led by trained personnel (typically veterinary students).
- 2) Visitors are never allowed to enter small animal isolation or large animal isolation, except with the express permission of the clinician in charge of the case and the Biosecurity Personnel.
- 3) VTH personnel supervising visitors should use appropriate opportunities to educate them about zoonotic and nosocomial disease hazards that are associated with hospitalization of animals.
- 4) Visiting lay people should not be allowed to enter anesthesia preparation areas or surgery theatres.
- 5) Children visiting the MU-VTH must be directly supervised by an adult at all times while in the MU-VTH.

Clients in the MU-VTH

- 1) Clients are allowed unescorted access to MU-VTH waiting rooms and adjacent restrooms, within the small and large animal reception areas. Clients must be escorted to other areas of the hospital by MU-VTH students or personnel.
- 2) Biosecurity personnel may restrict access to patient care areas whenever it is deemed appropriate to minimize risks of zoonotic or nosocomial infections. In addition, clinicians may, at their discretion, exclude clients from patient care areas whenever there are concerns about safety or disruption of the work environment.
- 3) At the primary clinicians' discretion, clients may be left unattended with their animals in examination rooms, treatment areas, and patient housing areas. However, clients must always be asked to refrain from touching any other animals in the area.

- 4) Clients are not allowed to visit patients that are housed in small animal or large animal isolation units, except with the express permission of the Biosecurity Personnel. Permission will generally only be considered if patients are in critical condition and the likelihood of survival is questionable.
- 5) Clients must always adhere to policies regarding use of barrier nursing precautions that are relevant to their animals and where they are housed.
- 6) VTH Personnel responsible for patient care are required to appropriately educate clients about zoonotic and nosocomial disease hazards that are inherently and necessarily associated with hospitalization of animals.
- 7) Children visiting the MU-VTH must be directly supervised by an adult at all times while in the MU-VTH.

MU-VTH Risk Communication Regarding Contagious Disease Status of Patients

Efficient communication regarding the risk of spreading contagious disease is essential given the complexity of patient care at MU-VTH and the number of individuals working in this environment. Effective, proactive communication regarding the real and potential infectious status of patients decreases the likelihood of potential nosocomial or zoonotic disease spread.

- 1) All MU-VTH patients should be evaluated by clinicians and students to identify contagious disease risks. It is the **responsibility** of the **senior clinician assigned to every case** to appropriately assess the risk of contagious disease transmission and to institute **appropriate infectious disease control efforts** consistent with Biosecurity SOP.
- 2) In addition to **people directly involved in the patient care**, the **Companion Animal Nursing Supervisor** (T.Hardisty@massey.ac.nz) or **Large Animal Nursing Supervisor** (J.Wilson@massey.ac.nz) and the **Biosecurity Personnel** (Magda Dunowska: M.Dunowska@massey.ac.nz or another member of the Biosecurity Committee) should be notified about all suspected/confirmed infectious disease patients. This includes, but is not limited to, diseases with the potential to cause zoonotic disease, highly contagious diseases, highly pathogenic diseases, bacteria with multiple drug resistance or important resistance patterns (e.g. MRSA or VRE), disease agents that are highly persistent or difficult to disinfect using routine hygiene practices, or diseases of regulatory concern. This notification should be performed either by the student assigned to the case or by the veterinarian with primary responsibility for the case.
- 3) All significant contagious disease risks must be appropriately communicated to MU-VTH personnel and clients in order to effectively manage the threat of infection in people and animals that might have contact with a particular patient.

Environmental Surveillance

This program was established to monitor and identify the spread of infectious agents at the MU-VTH. Currently, environmental samples are cultured on regular basis to detect specific microorganisms. These include *Salmonella* spp., methicillin-resistant *Staphylococcus aureus* (MRSA) and methicillin-resistant *Staphylococcus pseudointermedius* (MRSP). These pathogens were selected based on their ability to persist in the environment, and their potential for nosocomial or zoonotic spread.

- 1) Electrostatic dust collection wipes (Swiffer®, Proctor & Gamble) are used for routine environmental surveillance on smooth floors and hand-contact surfaces throughout the hospital.
- 2) Routine sampling is scheduled at about bi-monthly intervals. Areas to be sampled include floor and hand-contact surfaces from high traffic areas through the IVABS building and Large Animal Teaching Hospital (LATU) building.
- 3) Disposable latex gloves are worn when handling wipes, changing gloves between samples.
- 4) Floor samples are collected using the commercial sweeper mop, sweeping a majority of the floor surface area. The sweeper mop is disinfected with 70% ethanol between uses and allowed to dry.
- 5) Hand-contact surfaces (door knobs, handles, keyboards, telephones, medical instruments, etc.) are sampled with the wipes using a gloved hand.
- 6) After sampling, wipes are placed into pre-labeled sterile plastic bags using a gloved hand.
- 7) Samples are immediately transported to the laboratory for processing.
- 8) Biosecurity personnel report any positive culture results back to MU-VTH Staff responsible for the positive area as soon as results become available. Any positive areas are cleaned, disinfected, and re-sampled.

- 9) These data are routinely summarized by Biosecurity Personnel and reported quarterly to the Biosecurity Committee.

Reportable Animal Diseases in New Zealand

If an exotic disease is suspected in any of the MU-VTH patients, the Ministry for Primary Industries (MPI) should be contacted immediately (:

The list of reportable diseases is available on the MPI web site:

Research and Teaching Animals

Personnel using animals for research and teaching in the MU-VTH must adhere to all applicable biosecurity procedures.

Post Mortem (PM) Room Complex Biosecurity Standard Operating Procedure (SOP)

Goals

- 1) Clarity regarding proper access to the PM Room at all times.
- 2) Importance of general safety and hygiene (Note: Use of the band saws, the captive bolt, and the euthanasia solutions are covered in separate SOPs).
- 3) Protection of all users from exposure to zoonotic disease agents.
- 4) Prevention of the spread of infectious disease agents from the Dirty Area to the exterior of the PM Room.
- 5) Provide guideline protocols for disinfection.
- 6) Enforce strict quarantine measures if and when necessary.

Definitions applicable to the PM Room complex

- 1) **Dirty Area** = the PM Room floor, photography room, microscope and staining area, formalin storage area and washroom, slaughter room
- 2) **Clean Area** = entrance area behind white tiled wall and on the same level, Technician's office, trimming room, museum, bin/store room, and the change rooms

Food and drink in the PM Room complex

No food of any type may be consumed within the PM Room complex. The chewing of gum is also banned. Technicians' lunches and other edibles may be stored in closed containers in their change room lockers. Likewise, all water bottles should be stored in change rooms and water should be consumed within their walls. Hands should be washed thoroughly prior to eating and/or drinking.

Procedures

Proper access to the PM Room

Routine access will be limited to the passage (that passes the female student change/locker room) from the ground floor corridors on the side of the IVABS Tower. Staff and students need a swipe card to gain entrance. A bell at the entrance is available for anyone without a swipe card. The green doors between the slaughter room and the PM Room floor dirty area will normally be kept closed (and locked when feasible). One reason for this is to keep birds (sparrows, fantails, ducks) out. Human access through the slaughter room will be restricted to essential activities, such as admitting large carcasses or live animals destined for necropsy or for use of the forklift (or as an emergency exit). This entrance is NOT to be used as a human thoroughfare. If you're outside and not wearing protective clothing, and you need to communicate, there is a phone on the wall of the slaughter room with a list of relevant extension numbers.

General safety and hygiene

Ordinary clothing may be worn in the Clean Area. Gumboots must be worn by anyone (including maintenance staff) entering the Dirty Area. Spare gumboots of various sizes are available outside the staff change rooms for visitors (please return after use!). Lab-coats or coveralls are to be worn by anyone working with specimens in the Dirty Area. All users of the Dirty Area should note that, despite special treatment with a non-slip preparation, the floor can be exceedingly slippery. Walk carefully! Spare lab-coats of various sizes are available in the staff cloakroom. Please return after use - if the lab-coat is soiled, place in the appropriate bin (in the respective staff change rooms) for laundering. Boots and coveralls worn during necropsy examinations must not be worn outside the PM Room complex. Distinctive black boots and coloured coveralls are available for use outside the PM Room complex. When not in use, knives should be left on a table (students - please note). Any needle sticks, cuts or other injuries, no matter how small, should be reported immediately to one of the technicians or to the pathologist on duty. When LEAVING the Dirty Area, step into the footbath or onto the rubber mat with BOTH feet. If gumboots are excessively soiled, wash them down in the boot-rinse before stepping into the footbath - we'd like to keep the disinfectant in the footbaths relatively clean so that it will not need to be changed too frequently - the disinfectant is expensive!!

Protection from zoonotic diseases

Infectious agents of concern include *Cryptosporidium* spp., *Salmonella* spp., certain *Campylobacter* spp., *Giardia* spp., *Mycobacterium bovis*, *M. tuberculosis*, and other possibly zoonotic mycobacteria, *Leptospira* spp., *E. coli*, *Chlamydophila psittaci*, *Erysipelothrix rhusiopathiae*, *Streptococcus suis* type 2, *Toxoplasma*, ringworm fungi, and any other organism which could pose a respiratory, gastrointestinal, central nervous system, skin, or other human health risk. Extra care needs to be taken if staff or students have an immune deficiency, or are pregnant. Where exposure to any of the above infectious organisms is suspected, precautions (especially for anyone concerned about their immune status) including double-gloving, wearing a face mask, appropriate waste disposal, disinfection of equipment and tables, thorough hand washing, and attention to the bagging of soiled lab-coats/coveralls for laundering, are essential. Extra special precautions need to be applied when marine mammals, zoo animals, exotic pets, and wild birds/reptiles/amphibians are necropsied, as these animals could harbour bacteria, viruses, protozoa, fungi, and other agents that could pose a threat to human and domestic animal health.

Prevention of the spread of infectious disease agents from the Dirty Area

In this respect, the following common sense approaches, to be followed by all users of the PM Room Dirty Area, should be routine:

- 1) Wash hands thoroughly (spray bottles containing alcohol-based sanitisers are also available, and their use is advised).
- 2) Clean gumboots and plastic aprons.
- 3) Clean up all waste, place in appropriate disposal bins, and wash down tables and clean soiled equipment.
- 4) General purpose cleaning agents include "Ammo Kleen", "Pine Oil", "Jiff Crème", and commercial bleach.
- 5) Appropriate disinfection of equipment and tables.
- 6) Ensuring that both (already clean!) gumboots are immersed in the footbath.
- 7) Placing of soiled lab-coats/coveralls in the laundry containers in the change rooms, or in the case of students, in appropriate plastic bags available in the student change rooms.

Disinfection

- 1) Stainless steel footbath: Either Virkon or Accel Prevention can be used in the footbath. The solutions are changed each Thursday afternoon.
 - a) For Virkon: Fill with 30 litres water (3 buckets), add 300 g Virkon (i.e. 1% solution).
 - b) For Accel Prevention: Add 0.75 L to 29.25 litres of water (1:40) dilution.
- 2) Portable rubber footpad: Fill with 1.5 buckets of water, add three squirts (75 ml) of Hycon FB; wash out, clean and replenish each Thursday afternoon.
- 3) Knives, forceps, scissors, etc., are rinsed in water and then placed in the dishwasher set at 80 °C, before being placed on a trolley for reuse.
- 4) Tables to be washed down by the user(s) after use. If a zoonotic or contagious disease is suspected, the table is to be cleaned and then liberally sprayed with a suitable disinfectant. The recommended disinfectant is Accel Prevention, but other disinfectants that have proven activity against pathogen in question can also be used.
- 5) Wheels of the forklift (for whenever the forklift is driven out of the slaughter room): Either Sterigene or Accel Prevention spray. We are considering purchasing disinfectant "wheel mats" that the forklift could be driven over.
- 6) Other equipment used on a daily basis (e.g. hoist, band saws, head vice, chains, ropes and tie-downs) to be disinfected with either Sterigene or Accel Prevention daily.
- 7) Any equipment that is to be sent away for repair/loan is wiped/sprayed with either Sterigene or Accel Prevention before removal. Items for repair on campus must have a decontamination certificate attached.
- 8) Yellow bins containing waste must be washed on the outside and sprayed with either Sterigene or Accel Prevention prior to being placed in the chiller awaiting transport for disposal.

- 9) White or blue bins containing material for rendering must be sprayed with either Sterigene or Accel Prevention when loaded onto a Massey ute.
- 10) Once weekly, the top of the tiled wall, all doorknobs, light switches, taps, hand rails, and other frequently handled surfaces are sprayed with a 70% ethyl alcohol solution.
- 11) There are two hand sanitiser stations available: One alcohol quick-drying sanitiser (“Purell”) is located on the wall near the photography room, and the other is a foot-operated hands-free sanitiser containing “Alsoft”, which is also alcohol-based and quick-drying.

Quarantine

If any such serious event were to take place, the staff of the PM Room complex would follow all directives from MPI (Ministry of Primary Industries). Minimal requirements would most likely involve strict access control, use of higher grade personal protective equipment (disposable coveralls and overshoes, masks, and other items deemed necessary).

Appendices

Appendix 1. Summary of Detergents and Disinfectants Used in the MU-VTH

Disinfectant and its Dilutions	Activity in Organic Material	Spectrum of Activity	Comments
<p>Chlorhexidine (Nolvasan®, Microshield) 0.05%-0.5%</p> <p><i>Typically used for disinfection of items that contact skin or mucosal surfaces (e.g., muzzles, endotracheal tubes, etc)</i></p> <p><i>Contact time: at least 15 minutes.</i></p>	Rapidly Reduced	<input type="checkbox"/> Mycoplasmas Effective <input type="checkbox"/> Mycobacteria: Variable <input type="checkbox"/> Gm+ Bacteria Effective <input type="checkbox"/> Gm- Bacteria: Effective <input type="checkbox"/> Pseudomonas: Limited Activity <input type="checkbox"/> Rickettsiae: Limited Activity <input type="checkbox"/> Env. Viruses: Limited Activity <input type="checkbox"/> Chlamydiaceae: Limited Activity <input type="checkbox"/> Non-Env. Viruses: No Activity <input type="checkbox"/> Fungal Spores: Limited Activity <input type="checkbox"/> Bacterial Spores: No Activity <input type="checkbox"/> Cryptosporidia: No Activity <input type="checkbox"/> Prions: No Activity	<input type="checkbox"/> Broad antibacterial spectrum but limited in effectiveness against viruses. <input type="checkbox"/> Used to disinfect materials that patients closely contact (muzzles, endotracheal tubes, etc.) <input type="checkbox"/> Easily inactivated by soaps and detergents. Inactivated by anionic detergents. <input type="checkbox"/> Low toxicity potential; Typical dilutions are non-irritating even when contacting mucosa. <input type="checkbox"/> Bactericidal activity on skin is more rapid than many other compounds, including iodophors. <input type="checkbox"/> Residual effect on skin diminishes re-growth. <input type="checkbox"/> Only function at limited pH (5-7). <input type="checkbox"/> Toxic to fish, should not be discharged into the environment.
<p>Povidone Iodine (Betadine®)</p> <p><i>Used for skin decontamination and disinfection (e.g. surgical preparation).</i></p>	Rapidly Reduced	<input type="checkbox"/> Mycoplasmas Effective <input type="checkbox"/> Mycobacteria: Limited Activity <input type="checkbox"/> Gm+ Bacteria: Effective <input type="checkbox"/> Gm- Bacteria: Effective <input type="checkbox"/> Pseudomonas: Effective <input type="checkbox"/> Rickettsiae: Effective <input type="checkbox"/> Env. Viruses: Effective <input type="checkbox"/> Chlamydiaceae: Effective <input type="checkbox"/> Non-Env. Viruses: Limited Activity <input type="checkbox"/> Fungal Spores: Effective <input type="checkbox"/> Bacterial Spores: Effective <input type="checkbox"/> Cryptosporidia: No Activity <input type="checkbox"/> Prions: No Activity	<input type="checkbox"/> Broad spectrum. <input type="checkbox"/> Very low toxicity potential; appropriately diluted solutions are suitable for use on tissues or on materials that contact skin or mucous membranes. People can become sensitized to skin contact. Dilution of iodophors increases free iodine concentration and antimicrobial activity. Staining of tissues and plastics can occur. Stable in storage. Inactivated by organic debris and qac's. Requires frequent application. Corrosive.

<p>Alcohol (90% isopropanol or 70% denatured ethanol) Used to disinfect materials that personnel and patients closely contact (e.g. muzzles, instruments, hand sanitizing solutions, etc)</p>	<p>Reduced</p>	<p><input type="checkbox"/> Mycoplasmas Effective <input type="checkbox"/> Mycobacteria: Effective <input type="checkbox"/> Gm+ Bacteria Effective <input type="checkbox"/> Gm Bacteria: Effective <input type="checkbox"/> Pseudomonas: Effective <input type="checkbox"/> Rickettsiae: Ltd. Activity <input type="checkbox"/> Env. Viruses: Effective <input type="checkbox"/> Chlamydiaeae: Ltd. Activity <input type="checkbox"/> NonEnv. Viruses: No Activity <input type="checkbox"/> Fungal Spores: Ltd. Activity <input type="checkbox"/> Bacterial Spores: No Activity <input type="checkbox"/> Cryptosporidia: No Activity <input type="checkbox"/> Prions: No Activity</p>	<p><input type="checkbox"/> Broad spectrum. <input type="checkbox"/> Very low toxicity potential <input type="checkbox"/> Appropriately diluted solutions are suitable for use on tissues or on materials that contact skin or mucous membranes. <input type="checkbox"/> No residual activity on surfaces. <input type="checkbox"/> Fast acting <input type="checkbox"/> Leaves no residue. <input type="checkbox"/> Rapd evaporation. <input type="checkbox"/> Extremely flammable.</p>
<p>Virkon-S® Active ingredient: Peroxygen peroxy monosulfate Provided as powder 1% solution used for general cleaning and disinfection</p>	<p>Good</p>	<p><input type="checkbox"/> Mycoplasmas Effective <input type="checkbox"/> Mycobacteria No activity <input type="checkbox"/> Gm+ Bacteria Effective <input type="checkbox"/> Gm Bacteria: Effective <input type="checkbox"/> Pseudomonas: Effective <input type="checkbox"/> Rickettsiae: Effective <input type="checkbox"/> Env. Viruses: Effective <input type="checkbox"/> Chlamydiaeae: Effective <input type="checkbox"/> NonEnv. Viruses: Effective <input type="checkbox"/> Fungal Spores No Activity <input type="checkbox"/> Bacterial Spores No Activity <input type="checkbox"/> Cryptosporidia: Limited Activity <input type="checkbox"/> Prions: No Activity</p>	<p><input type="checkbox"/> Broad spectrum. <input type="checkbox"/> Low toxicity of diluted form <input type="checkbox"/> Low pH (acidic) <input type="checkbox"/> Fast acting <input type="checkbox"/> Corrosive, <input type="checkbox"/> leaves residue if not rinsed off. <input type="checkbox"/> 1% solution stable for 7 days, 20% loss of activity after 14 days in 350ppm hard water <input type="checkbox"/> Retains activity at low temperature <input type="checkbox"/> Biodegradable</p>
<p>Trigene (re-branded as Anistel or Sterigene) Active ingredient: Halogenated Tertiary Amine (HTA) General cleaning and disinfection, intermediate risk applications use @1:100 dilution Heavy soilage and High risk areas use @ 1:50 dilution In the presence of blood/ mycobacteria/bacterial spores use @ 1:10 dilution</p>	<p>Good</p>	<p><input type="checkbox"/> Mycoplasmas: Effective <input type="checkbox"/> Mycobacteria: Effective <input type="checkbox"/> Gm+ Bacteria: Effective <input type="checkbox"/> Gm Bacteria: Effective <input type="checkbox"/> Pseudomonas: Effective <input type="checkbox"/> Rickettsiae: Effective <input type="checkbox"/> Env. Viruses: Effective <input type="checkbox"/> Chlamydiaeae: Effective <input type="checkbox"/> NonEnv. Viruses: Effective <input type="checkbox"/> Fungal Spores: Effective <input type="checkbox"/> Bacterial Spores: Effective <input type="checkbox"/> Cryptosporidia: Limited Activity <input type="checkbox"/> Prions: No Activity</p>	<p><input type="checkbox"/> Broad spectrum. <input type="checkbox"/> Low toxicity <input type="checkbox"/> Nonirritant <input type="checkbox"/> Fast acting <input type="checkbox"/> Noncorrosive <input type="checkbox"/> Biodegradable <input type="checkbox"/> Recommended dilutions and contact times vary for different agents <input type="checkbox"/> Stable for up to a 6 months in diluted form, up to 3 years as a concentrate <input type="checkbox"/> Retains activity at low temperature <input type="checkbox"/> Denatures DNA/RNA</p>

<p>Accel Prevention Active ingredient: Accelerated Hydrogen Peroxide (AHP) 5 Minutes @ 1:40 Dilution: Bactericidal, General Virucide, Fungicidal and Tuberculocidal 30 Seconds @ 1:128 dilution: Broad-Spectrum Sanitizing</p>	<p>Good</p>	<p><input type="checkbox"/> Mycoplasmas Effective <input type="checkbox"/> Mycobacteria: Effective <input type="checkbox"/> Gm+ Bacteria: Effective <input type="checkbox"/> Gm Bacteria: Effective <input type="checkbox"/> Pseudomonas: Effective <input type="checkbox"/> Rickettsiae: Effective <input type="checkbox"/> Env. Viruses: Effective <input type="checkbox"/> Chlamydiaceae: Effective <input type="checkbox"/> NonEnv. Viruses: Effective <input type="checkbox"/> Fungal Spores: Effective <input type="checkbox"/> Bacterial Spores: Effective <input type="checkbox"/> Cryptosporidia: Limited Efficacy <input type="checkbox"/> Prions: No Activity</p>	<p><input type="checkbox"/> Broad spectrum. <input type="checkbox"/> Low toxicity <input type="checkbox"/> Nonirritant <input type="checkbox"/> Fast acting <input type="checkbox"/> Noncorrosive <input checked="" type="checkbox"/> Stable for up to a month in diluted form, up to a year as a concentrate <input type="checkbox"/> Retains activity at low temperature <input type="checkbox"/> Biodegradable</p>
<p>SAFE4 Active ingredient: Halogenated Tertiary Amine (HTA) General cleaning and disinfection, low risk, use @1:100 dilution, do not rinse off. General cleaning and disinfection, intermediate risk, use @1:50 dilution, do not rinse off. High-risk areas (isolation units) use @1:50 dilution, do not rinse off. Contact time: 5 to 60 minutes, depending on the agent.</p>	<p>?</p>	<p><input type="checkbox"/> Mycoplasmas: ? <input type="checkbox"/> Mycobacteria: Effective with prolonged contact time (1 hour) <input type="checkbox"/> Gm+ Bacteria: Effective <input type="checkbox"/> Gm Bacteria: Effective <input type="checkbox"/> Pseudomonas: Effective <input type="checkbox"/> Rickettsiae: ? <input type="checkbox"/> Env. Viruses: Effectiveness vary <input type="checkbox"/> Chlamydiaceae: ? <input type="checkbox"/> NonEnv. Viruses: Effectiveness vary <input type="checkbox"/> Fungal Spores? <input type="checkbox"/> Bacterial Spores? <input type="checkbox"/> Cryptosporidia? <input type="checkbox"/> Prions: No Activity</p>	<p><input type="checkbox"/> Non-toxic (diluted) <input type="checkbox"/> Non-irritant (diluted) <input type="checkbox"/> Neutral pH <input type="checkbox"/> Stable <input type="checkbox"/> Noncorrosive <input type="checkbox"/> Biodegradable</p>