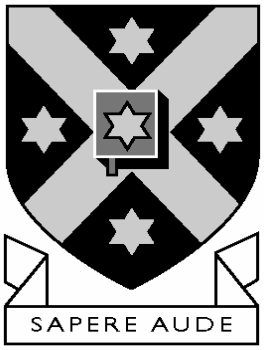
UNIVERSITY
of
OTAGO



Te Whare Wānanga o Otāgo

Biohazard Safety Manual

INTRODUCTION

The University of Otago is involved in activities in numerous areas of research and teaching that use biological products of human or animal origin. Such activities have the potential to cause harm arising from exposure to toxic or infectious agents and thus require compliance with strict operational standards.

BIOHAZARDOUS SUBSTANCES

A biohazard is defined as:

- *An infectious agent or hazardous biological material that presents a risk or potential risk to the health of humans, animals or the environment.*

Exposure to a bio hazardous agent may occur through puncture wounds, or by absorption via the respiratory tract, gastro-intestinal system, skin or mucous membranes while handling chemicals, animals, tissues, body fluids or diagnostic specimens. Human and animal materials are well known to contain specific infectious biohazards. In addition, it is accepted that
ill-defined or unknown pathogens also exist in the environment. Identification of new infectious agents, such as the virus responsible for Severe Acute Respiratory Syndrome (SARS), and greater understanding of long-established pathogens such as the human immunodeficiency virus (HIV) and hepatitis C virus, in the past decade, illustrate this point. The principles applied to the handling of biological materials of human or animal origin must therefore deal with the broad issues involved and not focus narrowly on individual infectious agents.

Despite the potential problems arising from the presence of infectious agents in biological materials it is acknowledged that there are circumstances where the use of animal or human blood and body fluids in the University is fundamental to its activities. Where use of this material is necessary, the University must ensure that satisfactory safety standards and operating procedures exist and are followed. The low probability that infectious agents

are present in samples may create only a low overall level of risk for students/staff, but these hazards could potentially have such an impact on affected individuals, that the risk of potential problems must be addressed in a comprehensive manner. Potential hazards must be avoided where possible, and minimised to an acceptable level in all other circumstances.

GENETICALLY MODIFIED ORGANISMS

Work with genetically modified organisms (GMOs) must comply with the Hazardous Substances and New Organisms (HSNO) Act and HSNO (Low Risk Genetic Modification) Regulations. The University of Otago Institutional Biological Safety Committee (IBSC) has delegated authority to approve projects generating low risk GMOs and will assign the containment controls required. The Environmental Risk Management Authority (ERMA) must approve and apply controls for high-risk genetic modifications. Work with GMOs must be carried out under physical containment level 1 (PC1) or physical containment level 2 (PC2) conditions. University laboratories graded PC1 and PC2 are listed in the "University of Otago Containment and Transitional Facility for Micro organisms and Uncleared Biological Products – Dunedin Campus – Containment and Quarantine Manual". This manual is the reference document for genetic modification projects of the University of Otago.

CONTAINMENT

The term "containment" is used to describe safe methods for managing infectious agents, or hazardous substance, in the laboratory environment where they are being handled or maintained.

The three elements of containment include laboratory practice and technique, safety equipment, and facility design. The risk assessment of the work to be done with a specific agent will determine the appropriate combination of these elements that should be employed.

The most important element of containment is strict adherence to standard

microbiological practices and techniques. The level of containment required is dictated by the risk of the microorganism being handled. Microorganisms of risk group 1 require a physical containment 1 (PC1) level of containment; microorganisms of risk group 2 require PC2 containment etc. An indication of the risk group category of a selection of microorganisms, and a description of physical containment requirements is given in the Australian/New Zealand Standard 2243.3:2002 *Safety in Laboratories Part 3: Microbiological aspects and containment facilities*.

PLEASE NOTE: *ALL teaching and research that utilises unscreened human blood must be carried out under PC2 conditions.*

TRANSITIONAL FACILITY

A 'Transitional Facility' is required to house 'uncleared goods' - which are imported goods that have not been given bio security clearance by MAF. Any 'new organism', that is, one that was not present in New Zealand immediately before 29 July 1998, or is a genetically modified organism (GMO), must be kept with appropriate containment within a transitional facility.

The University of Otago has a Containment and Transitional Facility comprising laboratories undertaking work with new organisms and uncleared biological products. The Containment and Transitional Facility is divided into sectors, each with a sector manager, and is described in the University of Otago Containment and Quarantine Manual.

STORAGE OF GMOS AND UNCLEARED BIOLOGICAL PRODUCTS

GMOs and uncleared biological products must be stored securely with appropriate containment in the University of Otago Containment and Transitional Facility. There must be a register indicating the location of the GMO or uncleared biological product, and a record of the usage and disposal of uncleared biological products must be kept. Disposal of GMOs should be by autoclaving.

TRANSFER OF GMOS AND UNCLEARED BIOLOGICAL PRODUCTS

GMOs can only be imported into New Zealand with ERMA approval, which can be given under delegation by the University of Otago IBSC. Uncleared biological products can only be imported into New Zealand if the importer holds a current MAF permit to import uncleared biological products of animal origin, on which the material to be imported is listed.

Approval by MAF is required before a GMO or uncleared biological product can be transferred to another transitional facility, or out of New Zealand. GMOs or uncleared biological products must be transported between sectors of the Transitional Facility, or between Transitional Facilities, in a sealed container that is within a second sealed container.

HAZARD IDENTIFICATION

The Health and Safety in Employment (HSE) Act 1992 and HSE Amendment Act 2002 require the identification and control of actual and potential hazards in a place of work. The hazards identified should be listed in the Departmental hazard register and the control measures defined. Hazard control must be carried our through the application of the legislated hierarchy of control: the hazard must be eliminated where practical, where elimination is not practical, the hazard must be isolated, and where it is not practical to eliminate or isolate the hazard, the hazard must be minimised. The risks associated with the handling and/or exposure to blood and body fluids are a significant hazard, and full application of the hazard controls is required.

SCOPE OF HAZARD IDENTIFICATION

Hazard identification requires consideration of both the task and also the environment/location e.g. a haematology laboratory is a location where the consideration of blood borne hazards is likely to be prominent. However the taking of blood samples in people's houses as a part of a research project is also a potentially hazardous activity but one in which the researcher may have far less control over the environment.

Laboratory-based blood and body fluid handling is a task with an obviously high-risk of exposure; however, there are other activities with risk of exposure that require consideration. The following are examples of exposure risks, however the list is not exhaustive.

- *First Aid Provision:*

  All first aiders are at risk of exposure to blood and body fluids within their role. First aiders should have Hepatitis B immunisation status ascertained as per the Vaccination Policy.

- *Gardeners and Cleaners:*

  Staff who are required to clean up areas where blood and body fluids are handled, or where there is the potential for exposure (e.g.: cleaning vomit, blood, etc. or exposure to used needles in waste, etc.) should have Hepatitis B immunisation status ascertained as per the Vaccination Policy.

- *Human Bites:*

  Human bites have occurred within the University. The blood and body fluids policy covers the procedure to be followed in such an event.

- *Animal Bites:*

  Animal bite wounds to personnel handling experimental animals occur occasionally. The blood and body fluids policy covers the procedure to be followed in such an event.

RISK ASSESSMENT

There also varying levels of risk for the transmission of blood borne pathogens which must be taken into consideration:

High risk:

- Large-bore hollow needle
- Deep puncture wound
- Needle from patient's artery or vein
- Cuts with sharp instruments especially when blood is visible on the device

Medium risk:

- Splashes of blood or other body fluids onto mucous membranes (e.g. eyes, mouth)
- Bite
- Contact of blood onto broken skin (e.g. dermatitis)
- Prolonged contact of blood with intact skin
- Contact with urine or faeces that are visibly bloodstained

Low risk:

- Contact with urine or faeces.

HAZARD MANAGEMENT

ELIMINATION AND SUBSTITUTION CONTROLS

The HSE Act and Amendments requires identified hazards to be assessed for their significance. A significant hazard is one that can cause serious harm (as defined by the HSE Act). As HIV or hepatitis infection would be serious harm under the definition, all biohazards must be identified as significant hazards.

The hierarchy of hazard control as per the legislation is:

- Elimination, where practicable, or
- Isolation; where elimination is not practicable or
- Minimisation, where elimination and isolation are not practical controls.

ELIMINATION CONTROLS

Elimination is the preferred level of control. Does the research or teaching really require the use of the biohazard substance? If it can be achieved without using the substance the risk is eliminated.

Elimination could involve the substitution of a less hazardous substance, and so when planning teaching or research, the first consideration is the type of

biological products to be used. The flow chart on page 11 maps out the process for identifying blood and body fluid sources with the lowest risk.

ISOLATION CONTROLS

Isolation of the exposure to the hazard may include some of the following:

- The exclusion of individuals not involved in the procedures from the immediate environment
- The appropriate cleaning of equipment, management of spills and use of hazardous waste disposal methods to prevent exposure to other parties
- Automation of laboratory procedures.

MINIMISATION CONTROLS

In many situations blood and body fluids will continue to be used for the purpose of research or teaching. Minimising the exposure to biohazards includes the following:

- Laboratory design
- Experiment design – e.g.: minimise use of needles, scalpels, glass Pasteur pipettes, minimise generation of aerosols, centrifugation should be carried out in sealed tubes or a sealed rotor
- Staff training
- Standard operating procedures
- Safe waste management
- Staff vaccinations
- Personal protective equipment

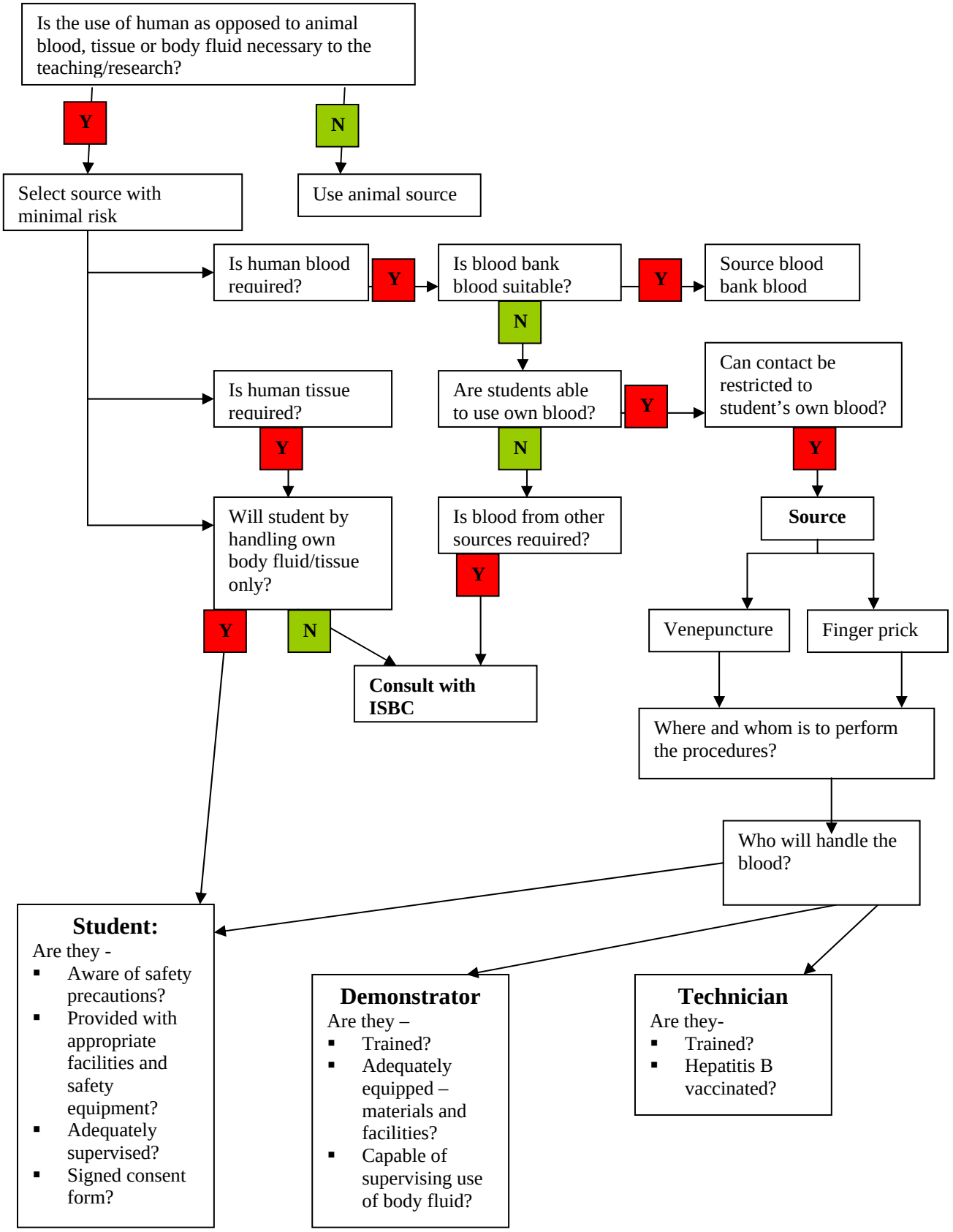
These steps minimise but do not eliminate exposure risk. Where exposure is known or suspected to have occurred, the health of the individual must be monitored in accordance with the following policies:

- *Blood and body fluid exposure policy*
- *Vaccination policy*

VACCINATION

The process of hazard identification should include consideration of any work practices that have the potential to expose employees to human blood and body fluids. A practical step for the management of such hazards, in association with handling requirements, is for the employer to provide vaccination where available. It must be remembered that vaccinations are not available for all of the identified risks, and that the universal precautions remain the most critical preventive control. Hepatitis B is one vaccination that should be available to staff who are at risk of exposure to blood and body fluids. The process for vaccination requires an education session on the vaccine, potential side effects, effectiveness, etc., consent by staff for vaccination, often pre-testing for current immunisation statue, then the actual vaccination administration.

Diagram 1: Identifying the lowest risk blood and body fluid source:



STANDARD OPERATING PROCEDURES FOR WORK IN A BIOLOGICAL LABORATORY

The Australian/New Zealand Standard 2243.3:2002 Part 3: Microbiological aspects and containment facilities, and MAF 154-03-02 Microbiological Standard are the guiding documents for the operational procedures within a containment facility. For further details, see your Transitional Facility Sector Manager, listed in the University of Otago Containment and Transitional Facility Manual.

Please note: biological laboratories are likely to contain chemical hazardous substances in addition to biological hazardous substances. The laboratory requirements for HSNO Exempt Laboratories (chemicals) must be met in addition to biological requirements in these situations. Please contact the health and safety office or your Departmental Laboratory Manager for further information on chemical hazards.

PROCEDURES FOR WORK REQUIRING PC1 OR PC2 CONTAINMENT CONDITIONS

1. NO eating, drinking or smoking in laboratories

2. NO pipetting by mouth.

3. NO licking of labels

4. ALL cuts and abrasions on hands MUST be covered with an occlusive (not perforated) dressing. Gloves MUST be worn where splashing of blood or other body fluids onto skin is a likely event and must be worn when cleaning and decontaminating equipment.

5. Laboratory coats or gowns MUST be worn at all times in laboratory areas. Coats and gowns used in laboratories MUST NOT be worn into recreation areas, e.g.: staff rooms and tearooms, or into library areas.

6. Hands must be washed at the end of each work period.

7. Clerical and manual recording activities carried out on work benches must be undertaken on areas separate from those where technical work with micro organisms or uncleared biological products.

8. Workbenches shall be decontaminated following spills, and also when work is completed. Use of 70% isopropanol or ethanol, or 1% Virkon is recommended for routine decontamination.

9. Laboratory wastes shall be decontaminated before disposal.

10. Safety glasses, face shields and other protective devices shall be worn where appropriate to protect eyes and face from splashes and other hazards.

11. Significant spills and accidents shall be reported immediately to the laboratory supervisor. A written record of the accident shall be prepared and provided to the Sector Manager.

12. Additional procedures for work requiring PC2 containment conditions

13. Where significant quantities of infectious aerosols are likely to be produced, a Class II biological safety cabinet shall be used.

14. Where large volumes or high concentrations of infectious material are to be centrifuged, a centrifuge fitted with sealed rotors or safety caps shall be used.

15. Laboratory doors should normally be closed when work is in progress.

16. The use of syringes and needles shall be restricted to parental injection and aspiration of fluids from laboratory animals and diaphragm-capped bottles. After use, the needle and syringe shall be placed in a puncture-resistant container for disposal by high-temperature incineration. The needle should not be removed from the syringe or recapped before disposal.

17. When transporting any container of viable organisms between labs or to an autoclave elsewhere in the building, the container shall be transported within a second unbreakable and closed container, which can be readily decontaminated.

BIOLOGICAL SAFETY CABINETS

Biological safety cabinets reduce the risk of airborne infection by preventing the escape of aerosols into the laboratory environment. Biological safety cabinets minimise the potential contact between the operator and the pathogens through the use of directional airflow, HEPA filtration of supply and/or exhaust air and a physical barrier (cabinet door). For further details on Biological Safety Cabinets, please refer to AS/NZS 2647:2000 Biological safety cabinets – Installation and Use. Safety cabinets must be turned on before use to be effective.

HEPA FILTERS

HEPA (High Efficiency Particulate Air) filters have particle removal efficiencies of 99.07% or better for 0.3 micron diameter particles. This size of particle is used as the basis for filter definition because it is the most difficult size of particle to remove. The filters are very delicate and easily damaged. If the cabinet is moved for any reason, the cabinet will need testing and certification prior to use. HEPA filters are effective in removing air particles, but will not filter chemical gases or vapours. Therefore, recirculating Class II cabinets should not be used when volatile hazardous substances are being used.

Please refer to the University of Otago Exempt Laboratory Compliance Manual for information on the use of fume cupboards.

LAMINAR FLOW CABINETS

Laminar flow cabinets are NOT biological safety cabinets.

These cabinets blow HEPA filtered air across the work surface towards the operator, blowing any generated aerosols into the operator face. This type of cabinet only provides protection for the sample, not the worker.

CLASS I BIOLOGICAL SAFETY CABINETS

These cabinets protect the worker, but not the work.

These cabinets are open fronted, protect both the operator and the environment and are for work with low and moderate risk agents, where the protection of the sample is not critical. They work by dragging air inwards from the room away from the operator and prevent the escape of air borne pathogens into the laboratory. The air is exhausted through a HEPA filter, either back into the laboratory or externally.

CLASS II BIOLOGICAL SAFETY CABINETS

These cabinets protect the worker and the work.

These cabinets are open fronted, protect the operator, the work and the environment for work involving low to moderate risk agents. They work by an inward flow of room air that enters the front opening without crossing the work area. The air is HEPA filtered and generates a downward flow over the work, protecting the work, as well as filtering any exhaust air released into the laboratory environment, protecting the workers. The amounts of room air drawn into the intake grille and the amount of air exhausted through the exhaust filter are equal. This balance is critical: positive pressure will allow the outflow of pathogens, while negative pressure will result in inflow of room contaminants.

Again, volatile hazardous substances will not be filtered out by the HEPA filter and can be re-circulated into the laboratory environment.

The placement of the biological safety cabinet within the laboratory is critical, to ensure uninterrupted inward airflow. Ideal locations are in a “dead end” corner of the laboratory, away from doorways, throughways, windows, room air supply diffusers, fume hoods and heating equipment.

Please refer to the Safe Method of Use for the operation of biological safety cabinets. Biological safety cabinets throughout the University must be certified annually by an external provider as arranged by the health and safety office. The report on the cabinets and any deficiencies will be discussed with the Transitional Facility Sector Manager. Repairs are generally completed at the time of certification, however, if cabinets are non-certified or non-functional they must be clearly labelled to prevent unsafe use.

STERILISATION AND DISINFECTION

Sterilisation is the destruction of all forms of microbial life. Disinfections destroy specific pathogenic organisms by physical or chemical means.

There are levels of disinfection:

- HIGH LEVEL DISINFECTION

  Inactivates fungi, viruses and bacteria. High-level chemical disinfectants may be ineffective against bacterial spores if the spores are present in large numbers. Extended exposure time may be required.
- INTERMEDIATE LEVEL DISINFECTION

  Destroys fungi, some viruses, and some bacteria including mycobacterium.
- LOW LEVEL DISINFECTION

  Kills vegetative forms of bacteria, some fungi, and some medium-sized and lipid containing viruses. Low-level disinfectants do not reliably kill bacterial spores, mycobacteria or small or non-lipid viruses.

Microorganisms vary in their resistance to physical or chemical agents. It is important that the method used will destroy the microorganisms present – the Material Safety Data Sheet (MSDS) for the disinfectant should provide information, or alternatively contact the Biological Safety Officer. Generally, liquid chemical germicides are used for the decontamination of large surfaces or for equipment that cannot tolerate high temperatures, and requires high concentrations and long exposure or soaking time, with the potential to create other (chemical) hazards. Any substance used for chemical disinfection or sterilisation must be used in accordance with the instructions, including the use of personal protective equipment where required. Direct contact between the microorganism and the germicide is essential for effective disinfection. Therefore all items must have gross contamination removed prior to, or during the cleaning period, or the efficacy may be reduced.

CHEMICAL DISINFECTION

PRINCIPLES:

A. Use phenolic disinfectants for most organic matter, tuberculous material and general bacteriology, but not for blood or viruses.

B. Use hypochlorite or Virkon for minimal organic matter including blood and viruses.

C. Use aldehydes for special purposes only.

TABLE 1: CHEMICAL DISINFECTION				
Substance	**Advantages**	**Disadvantages**	**Use**	**Comments**
CHLORINE COMPOUNDS				
Sodium Hypochlorite Solution (liquid bleach) Dilutions of household strength hypochlorite bleach solutions for use: • 1:10 for surface decontamination (e.g. benches) • 1:3 disinfection of gross contamination and soaking of contaminated items. • 10 – 60 min soak time	Broad spectrum, inexpensive, widely available, bactericidal at low temperatures.	Toxic, corrosive to skin and metals, unstable at optimum effective pH of 6, inactivated by organic matter, deteriorates under light and heat; shelf life of dilutions is less than 1 week.	Useful as a bactericidal, sporicidal and veridical agent. General disinfectant, waste liquids, surface (wiping down) decontamination, emergency spill clean up and instrument disinfection.	Note 1: Hypochlorite solutions depend on the release of available chlorine and this is partly dependent on pH. They must be freshly diluted in water and should not be stored in the diluted state, as the more acid pH of these solutions will result in slow loss of chlorine. Note 2: Hypochlorite is rapidly inactivated (available chlorine is used up) by excess organic material. Note 3: When disinfecting a liquid spill, calcium hypochlorite granules may be used to decontaminate the spill before cleaning up the liquid or alternatively the liquid may be wiped up with absorbent material (wearing gloves) and then a surface decontamination applied. Note 4: Hypochlorite is corrosive for metals such as aluminium and copper, and may damage electrical circuits if excess free chlorine is released into the atmosphere.

SUBSTANCE	ADVANTAGES	DISADVANTAGES	USE	COMMENTS
VIRKON	Effective against a broad spectrum of fungi, bacteria and viruses.	Solutions of Virkon should be freshly prepared (<1 week old) to be effective.	1. Cover spillage with Virkon powder. 2. Leave for at least 3 minutes. 3. Mop up with paper towels, which are then autoclaved. 4. Wash contaminated area with 1%Virkon.	Note 5: VIRKON is marketed as having the widest proven spectrum of any available disinfectant. It is based on the oxidising ability of potassium monopersulphate. It has been shown to be effective against 71 types of bacteria, 33 types of virus and 15 fungi. It is also effective against HIV, hepatitis B virus, polio virus and Mycobacterium tuberculosis. It is resistant to inactivation by organic material and contains surfactant.
IODINE PREPARATIONS				
Iodophors Effective at 10 - 1 000 ppm (0.003 – 0.1%) free iodine, soaking time of 10 – 30 minutes.	Broad spectrum, germicidal over a wide pH range, generally nonstaining, less toxic and less irritating than aqueous or alcoholic iodine solutions.	Not consistently sporicidal, efficacy reduced by organic matter, some iodophor solutions support growth of Pseudomonas		
ALCOHOLS				
70% - 80% ethanol, 60 – 95% isopropanol in water, 10 – 30 minute contact time.	Low toxicity, rapid action, low residue, non-corrosive	Rapid evaporation limits contact time, flammable, eye irritant, may damage rubber, plastic, shellac, ineffective against bacterial spores.	Skin disinfectant and antiseptic, surface decontaminator, bench top and cabinet wipe down.	
ALDEHYDES				
Glutaraldehyde 0.5 – 2.5% alkalinised aqueous solution, 2 – 30 minute contact time, up to 12 hours to kill spores.	Broad spectrum, does not corrode metal, can tolerate organic load.	Expensive, pH, temperature dependent, pungent odour, toxic, skin, eye and respiratory tract irritant, carcinogenic, activated solutions have less than 2-week shelf life.	Cold sterilant and fixative surface decontamination, instrument, equipment, and glassware.	**TRY TO AVOID USE – IF REQUIRED, MUST BE APPROVED BY IBSC, NOT RECOMMENDED. ENVIRONMENTAL MONITORING REQUIRED IF IN USE.**

Formalin 3 – 27% formalin (1 – 10% formaldehyde) in 70 – 90% alcohol, 10 – 30 minute contact time.	Broad spectrum, inexpensive, does not corrode metal, can tolerate organic load.	Pungent odour, skin, eye and respiratory tract irritant, potential carcinogen, may require 24 hours or more to kill spores.	Cold sterilant and fixative, surface decontaminate, instruments and equipment.	**TRY TO AVOID USE – IF REQUIRED, MUST BE APPROVED BY IBSC, NOT RECOMMENDED. ENVIRONMENTAL MONITORING REQUIRED IF IN USE.**

Sterilisation

Sterilisation is achieved through physical means of steam or dry heat. These methods are more reliable than chemical germicides. Steam autoclaving is generally the most practical method for laboratory sterilisation and decontamination.

STERLISATION				
Method	**Advantages**	**Disadvantages**	**Uses**	**Comments**
Autoclaving: AS/NZS 2243.3:2002 Section 6.6.5: page 58 outlines the general requirements for times and temperatures of sterilisation: *"Sufficient penetration time should be allowed for all parts of the load to reach the desired temperature. Minimum sterilisation times after attainment of temperature shall be –* *a) 15 min at 121^{0}C; or* *b) 4 min at 134^{0}C."*	Minimal time required, most dependable	Loading and packing critical to performance, gross contamination and dirt must be removed first, maintenance and quality control required to ensure effectiveness, damage to heat sensitive items.	Laboratory heat resistant equipment. Treatment of biological waste prior to disposal.	Maintenance and upkeep of autoclaves is regulated under the ----------. Current certification of the autoclave must be displayed. Only trained and authorised persons are permitted to use autoclaves. Personal protective equipment and safety measures must be readily available where required. Where University of Otago autoclaves are in use, monitoring quality control checks must take place monthly as per…..
Dry Heat Hot Air Oven: 160^0 – 180^{0}C for 2 –4 hours, 121^{0}C for 16 hours (minimum temperature), 140^{0}C for 3 hours, 160^{0}C for 2 hours, and 170^{0}C for 1 hour.	Penetrates water insoluble materials, less corrosive to metals and sharp instruments than steam.	Slow diffusion, penetration, loading and packing critical to performance, not suitable for reusable plastics.		
Boiling: Maximum temperature achievable is 100^{0}C for 10 – 30 minutes.	Minimal equipment required.	Cumbersome, not practical for everyday laboratory use, not reliably sporicidal.		

Ultraviolet Light	The light emitted by UV lamps is germicidal, and can reduce the number of pathogenic microorganisms on exposed surfaces and in the air.	UV light has poor penetration and accumulations of dust and dirt will reduce efficacy. **UV light can cause burns to the skin and damage eyes. Skin and eyes must not be exposed to UV light.**	To improve efficacy, the following should be observed: ➢ Clean the bulb at least every 2 weeks, turn off the power and wipe with an alcohol moistened cloth. ➢ Blue light output is not an indication of the lamp's effectiveness. Measure radiation output at least twice yearly with an UV meter and replace bulb when emission declines to 70% of its rated output. ➢ Post warning signs to discourage personnel from entering areas where and when there is risk of exposure to UV light. ➢ Wear protective equipment required (UV protection glasses)	NOTE: The UV lights in biological safety cabinets are included in the annual test conducted by an approved outside organisation.

EMERGENCY BIOHAZARDOUS SPILL MANAGEMENT

(A) SMALL, MANAGEABLE SPILLS

It is important that the supervisor of the laboratory is informed as soon as possible regarding ALL spillages.

CLOTHING

1. Promptly remove affected article carefully and place in a biohazard plastic bag.
2. Wash article in **hot** water containing soap powder. A normal hot water wash cycle is considered sufficient to inactivate pathogens.

BENCHES, FLOORS, ETC

1. Ensure all non-essential personnel are immediately moved out of the affected area.
2. Supervisor or other trained persons should clean up all spills of a potentially hazardous nature.
3. Wear disposable gloves, and mop up excess liquid with paper towels. Calcium hypochlorite granules may be used to decontaminate a liquid spill before cleaning up. The paper towels should then be sealed in bags that are in turn placed in a biohazard bag and disposed of appropriately.
4. The contaminated area should then be thoroughly wetted with disinfectant. Freshly prepared Virkon[1] solution should be used for surface decontamination. For larger spills, or bulk items, a bleach (5% sodium hypochlorite) solution freshly diluted 1:3 should be used to soak items. Once treated, the biohazard waste should be bagged and disposed of as per guidelines.

(B) CONTAMINATED EQUIPMENT

Once again where possible, supervisory staff should carry out these procedures.

CENTRIFUGES

Mop up excess liquid with paper towels and dispose of in biohazard bags. Spray or wipe out the inside with 70% isopropanol or Virkon. Pour some isopropanol or Virkon into contaminated buckets and leave for 10 minutes contact time before washing out in hot soapy water.

SMALL PORTABLE ITEMS

Treat with 70% alcohol or Virkon and then wash in hot soapy water. Virkon can be used to wash contaminated equipment but metal items should not be soaked in it.

(C) LARGE OR UNKNOWN BIOHAZARDOUS SPILLS

This is a Biological Substances Spill/Incident.

DUNEDIN RESPONSE

- If the spill is unmanageable or of known significant risk – phone University Security 5000 – report biological substances spill. Provide name, contact number and location. Contact your Sector Manager and/or Laboratory Manager immediately.

- If spill is manageable but not sure how to clean up – clear the area/take necessary precautions, contact Laboratory Manager and Sector Manager for advice. If the Sector Manager or Laboratory Manager are not available, or require further assistance, contact Security on 5000 and report a biological incident.

- Security – on receiving notification – phone through Biological Substances Response Team Members in order until contact is made. Provide details available. Arrange to meet in area.

WASTE MANAGEMENT

The waste management process provides protection for individuals and the community from exposure to blood and body fluids, or bio hazardous agents. The University of Otago has adopted the New Zealand Standard 4304:2002 Management of Healthcare Waste (which includes laboratory, mortuary and pharmaceutical waste) as guidelines for waste management.

WASTE SEGREGATION

All waste products should be categorised as either hazardous or non-hazardous. Non-hazardous waste can be disposed of through landfill or general waste streams. Hazardous waste is further categorised into sharps and non-sharps. For additional information on hazardous substances, please refer to the HSNO Exempt Laboratory Compliance Manual and the Radiation Safety Management Plan.

NON-HAZARDOUS WASTE

Non-hazardous waste should be categorised as recyclable or general waste. Recycle where possible, and bag general non-hazardous solid waste for landfill and disposal of liquid non-hazardous waste down the sewer.

HAZARDOUS WASTE

All biological waste must be stored in biohazard yellow bags or sharps containers labelled with the biological hazard symbol.

DISPOSAL OF BIOHAZARD SHARPS

E.g. contaminated hypodermic syringes, needles

- Dunedin Campus

Sharps containers should be readily available wherever sharps are in use. There is a range of sizes of yellow biohazard bins currently available from Nuplex Mediwaste who are contracted to supply and remove biohazard sharps containers. Only approved containers may be used. Containers must not be over-filled. Nuplex steam sterilises containers for medical waste sharps at 140^0C for 45 minutes.

- Christchurch Campus
- Wellington Campus
-

DISPOSAL OF BIOHAZARDOUS WASTE - GENERAL

E.g.: blood and body fluid contaminated materials, tissues, laboratory cultures, genetically modified organisms.

Contractor Removal Process

Bio hazardous non-sharps waste must not enter the general waste stream. All contaminated and potentially contaminated items must be collected into yellow biohazard bags for collection by Nuplex Mediwaste. All bags must be labelled with the biohazard symbol. Tie the bag securely, preferably with a cable tie. Waste should be removed regularly to prevent build up. Secure cages for storage prior to collection by Mediwaste should be allocated for each work area.

Internal Treatment Process

Bio hazardous waste may be sterilised by autoclaving prior to disposal into the general waste stream as non-hazardous waste. All treated bio hazardous waste must be removed from yellow bio hazardous bags prior to being discharged into the general waste stream. Use clear autoclave bags.

DISPOSAL OF HUMAN BLOOD, BODY FLUIDS & UNCLEARED BIOLOGICAL PRODUCTS

The recommended means of disposal of human samples and uncleared biological products is by autoclaving, where practicable, or via biohazard containers and collection by Nuplex (Medical-waste disposal company). The samples (e.g. whole blood, supernatants or pellets, uncleared BSA) to be disposed of must be in sealed tubes and then placed in the biohazard container. If the tubes are made of glass a solid biohazard container with sealable lid should be used. Sealed plastic tubes can be placed in polythene biohazard bags, but these should be put in a secondary, solid, container for transportation from the laboratory to the waste collection point.

If disposal via the biohazard container is not practicable (e.g. large volumes of liquids), the material can be autoclaved before disposal down a sink (liquids) or via the general waste stream (solid waste). Use of a dedicated sink, flushing and then cleaning the sink with Virkon afterwards are recommended for disposal of disinfected liquid wastes.

An alternative for disinfection before disposal, where autoclaving or collection by the medical-waste disposal company is not practicable, is the use of household bleach (5% sodium hypochlorite) at an appropriate dilution for the biological load present. For most purposes i.e. for liquid waste with a low biological load, a solution at 500 - 1000 ppm available chlorine will be appropriate - this equates to a 1 in 50 or 1 in 100 dilution of household bleach i.e. add 10 to 20 ml of bleach per litre of waste.

For pipette discard jars, use of bleach at 2000 - 2500 ppm (i.e. 1 in 20 to 1 in 25 dilution of household bleach) is recommended. An alternative is bleach at 1 in 100 dilution combined with a non-ionic detergent at 0.7% (v/v).

In all cases, a 15-minute exposure of the biological material to bleach is adequate but a minimum of 30 minutes is recommended. For effective biocidal action of bleach, a pH range of 6 to 8 is optimal; acidic solutions are likely to give off chlorine gas. All bleach solutions should be freshly prepared and changed daily. Do not add fresh bleach to old solutions.

The use of Haz-Tabs for chlorine disinfection may provide an easier alternative to household bleach and is at least as effective – available chlorine should be as for sodium hypochlorite solutions i.e. 1000 ppm for general disinfection, 2500 ppm for pipette jars; 10,000 ppm for cleaning up blood spills. Quantity of tablets used depends on their size; the 1.8 gram tablets may be most useful for laboratory applications. Haz –Tabs can be purchased from Global Science.

For dilute solutions containing urine, flushing directly to the sanitary sewer is also appropriate. The use of a "sluice" sink is recommended with care taken to avoid splashes.

a) Bio hazardous Waste: Blood Disposal

For material with a high biological load such as whole blood or serum, autoclaving or medical waste disposal must be used wherever possible. If chemical disinfection must be used, dilute household bleach 1 in 5 (to give 10,000 ppm) and add in a 1:1 ratio to the liquid to be disinfected. Large volumes of blood can also be disposed of through Nuplex Medismart – contact Nuplex for specific information.

b) Bio hazardous Waste: Body Parts Disposal

Human body parts use and disposal are subject to the Human Tissue Act 1964. Human body parts should only be categorised as infectious waste if they have not been claimed by the owner or family/whanau. Contact Nuplex Medismart to arrange disposal. Human body parts must not be combined with any other waste. For animal carcasses and larger items contact Nuplex to arrange disposal.

c) Biohazardous Waste: Body Fluid Waste other than Blood

Samples of urine, saliva, etc. should be treated as infectious waste, with disposal through a dedicated sink to the sewer or pre-treated with Virkon or Bleach.

d) Bio hazardous Waste: genetically modified organisms (GMOs) and uncleared biological products

All waste containing GMOs or uncleared biological products must be autoclaved, treated with bleach or disposed of using biohazard bags. Animal waste products contaminated with GMO should also be autoclaved prior to disposal.

DISPOSAL OF ANIMAL BLOOD AND BODY FLUIDS

If practicable, the procedures outlined above for human material should be used. However, direct flushing of animal blood and body fluids to the sanitary sewer may be acceptable. A dedicated sink is recommended and must not be used for hand washing. Care should be taken to ensure that blood is collected only from healthy animals. If infection is suspected, the guidelines for material of human origin must be followed. Animal carcasses should be disposed of through the medical waste collection system.

BLOOD COLLECTION PROCEDURES

COLLECTION OF FINGER PRICK SAMPLES

Student Blood Samples

These guidelines relate to experiments in which up to a volume of 100 μl of blood is:

(a) Collected in a capillary tube; or

(b) Dropped onto a reagent pad (such as a glucometer).

1. Experiments involving blood collection of any method must have ethical approval.

2. Students must only handle their own blood, or blood that has been made safe by deproteinising in perchloric acid.
   If a second person needs to be involved in taking or handling the blood (e.g. during a treadmill or exercise experiment), protocols must be referred to the Biological Institutional Safety Committee for advice.

3. Students should be warned of the possibility of fainting and given advice on remedial action and precautions.

4. Students should sign a consent form that includes a statement that they had read and fully understood the procedures set down and understand the reasons for them.

5. Blood must be collected at a work area that has:
   a) Suitable PC 2 bench coverings,
   b) Approved spring-loaded lancets
      (Not simple lancets; contact IBSC for advice)
   c) An adequate supply of platforms and lancets to ensure that there is no reuse even by the same subject
   d) Container for sharps
   e) Container for used swabs
      ((d) & (e) must be easy to use without contaminating the lids, etc)
   f) Supply of swabs and disinfectant

g) 70% ethanol for swabbing skin prior to pricking

h) Supply of non-porous dressings

i) An uncluttered, uncrowded environment

j) An eyewash station available

k) A chair or couch for students who feel faint

6. Procedures should be designed to ensure that:

a) Finger pricking is not done until the student has completed arrangements to collect and process the sample, i.e. the capillary tube is ready and calibrated (if required); if the sample is to be deproteinised, a tube with perchloric acid should be at the work station, a swab and occlusive dressing should be ready.

b) Lancets and platforms are never reused, e.g. load lancet device immediately before use – any lancet device on the bench is regarded as used and must be unloaded.

c) Wherever practicable an occlusive dressing is applied as soon as blood has been collected.

d) The student disposes of the lancet and platform and cleans up any spilt blood before leaving the workstation.

7. A staff member or demonstrator should be at the workstation whenever blood is being taken.

8. Particular care must be taken to ensure that instruments such as glucometers and lactometers are properly decontaminated after use. Viruses are unlikely to be destroyed by the assay procedures. The waste reagents should be treated as bio hazardous.

9. Training:

All staff, including demonstrators, must be specifically instructed in the particular procedures being used and should ideally have carried them out on themselves.

OTHER BLOOD SAMPLES

Students, both postgraduate and undergraduate may be involved with research projects in which blood or other body fluids that have not been made safe or screened are used.

SUBJECT CONSENT

It is important that as part of the research protocol a signed consent form is obtained from the subjects which gives consent for testing in the event of a hazardous exposure of staff at a later date. It is important to remember that samples may be stored for some considerable period of time before testing is done. It may be very difficult or impossible to track subjects down, particularly at short notice, to gain their consent for testing. Contact details of the subjects need to be taken so that should testing need to be done as a result of a hazardous exposure, then the results of those tests can be communicated to the original subject.

If a subject refuses to give consent, then it is advised that blood should not be taken from that individual.

It needs to be carefully explained to the individual that the blood will be tested for Hepatitis B, Hepatitis C and HIV only in the event that a potentially hazardous exposure to a researcher has occurred.

The consent procedures apply for student or own blood sample collection.

GUIDELINES FOR VENEPUNCTURE PROCEDURES

1. PRINCIPLES:

(a) Protocols must be referred to the Institutional Biological Safety Committee for review.

(b) Wherever possible, venepuncturists should be recruited or trained to take venepuncture samples.

(c) PC2 conditions are required for the collection of unscreened blood (refer AS/NZS 2243.3 page 19)

(d) A staff member must directly supervise blood collection and handling of blood specimens at all times.

(e) It is desirable that students should only handle only their own blood.

2. BLOOD COLLECTION AND HANDLING

Physical facilities used to collect venepuncture samples must provide the following:

a) The site where blood is collected must not have extensive movement of other people and should provide a measure of privacy for the subject.

b) Good lighting.

c) The subject should be seated comfortably. A couch must be available for subjects who feel faint or who prefer to lie down during collection of samples.

d) Adequate bench and shelf space must be available for supplies and waste containers, and the work environment must be uncluttered and set out in an ergonomically appropriate manner so that the risk of accidents is minimised.

e) Surfaces must be impervious to blood, have an intact surface and be capable of withstanding disinfection after blood spills.

f) Waste containers must be durable. They must be designed and located in a manner that minimises any risk of being tipped over or spilling wastes. The containers must include:

- A tough walled container for sharp wastes (needles, glass, etc) that has minimum risk for spilling contents if tipped over and can be sealed securely before disposal;

- A durable container for other wastes (e.g. yellow bio hazardous bag). Any waste container that holds blood, tissues or body fluids must be labelled with the biohazard symbol, or be placed in an outer wrapper that displays this symbol.

g) An eyewash station should be available.

3. SUPERVISION:

a) The Supervisor must be able to recognise unusual levels of anxiety that may preclude safe venepuncture or require special care in the procedure.

b) The Supervisor must be able to recognise adverse outcomes including fainting, formation of a haematoma and arterial puncture in the subjects and be able to provide first aid.

c) A professional trained venepuncturist should perform the procedure unless it is a training exercise for students who are required to learn venepuncture skills. Where students are being trained in venepuncture, direct supervision in proportion to their degree of inexperience is required.

4. SUPPLIES:

a) Approved disinfectants for swabbing skin prior to venepuncture: 70% alcohol (ethanol or isopropanol), 70% alcohol-based or iodophor products.

b) Cotton swabs supplied in a form that avoids cross contamination risks.

c) Non-porous dressings.

d) The preferred method for blood collection is vacuum tube systems and double-ended needles. Disposable syringes and needles may also be used. Reusable glass syringes and needles should not be used.

e) A clean tourniquet. A quick release catch or Velcro fastening is preferred.

f) Waste containers (see (a) above).

g) Needles must **never** be re-capped following use.

h) Suitable racks that will accommodate sample tubes and are not easily tipped over.

5. VENEPUNCTURE:

a) A procedure checklist should be available for individuals who are not familiar with venepuncture procedures.

b) All necessary tubes, new disposable collection equipment, labels and racks should be put out on the workspace before each procedure is commenced.

c) The subject must be seated comfortably, or be recumbent, during the collection procedure.

d) The tourniquet should be applied, a suitable vein selected in good lighting and the skin prepared with a fresh antiseptic swab. The antiseptic should be allowed to dry spontaneously before the venepuncture is performed. After removal of the needle, firm pressure should be applied on the puncture site with a dry swab.

e) An occlusive dressing should be applied when bleeding has stopped as a small amount of blood will usually ooze from the site during the next 15 minutes and the amount may be increased if a dressing is not used. The dressing may be removed after approximately 30 minutes or at the end of the laboratory session.

f) All wastes must be disposed of in appropriate containers. Sharp waste containers should be reserved for appropriate wastes **only**. Waste containers **must not** be overfilled.

g) The surface must be cleaned if any blood was spilled before the next subject is processed.

h) It is not essential that gloves be worn during venepuncture procedures, as the procedure does not normally result in spilling of blood. Gloves should be worn if the person taking the blood has any cuts, scratches or abrasions on their hands.

i) The laboratory environment must be uncluttered and use supplies and equipment that are not likely to lead to puncture accidents or contamination of individuals or laboratory surfaces with samples. Disposable items must be used when handling human samples and should not be reused.

j) Students should be aware of the possibility of fainting, the signs and symptoms of fainting and of remedial actions they can take.

k) Students should sign an acknowledgement and consent form before commencing the practical. It should acknowledge that they have received and understood instruction on safe practices for collection and handling of human blood samples and will comply with University safety requirements. Students who are asked to provide blood samples are to be regarded as potential volunteers and must not be placed under duress from staff or fellow students. They must provide a signed consent to indicate that they volunteer to have the sample(s) collected. A single written consent before collection of the first sample in each course, with verbal confirmation before collection of subsequent samples is appropriate.

l) All equipment that comes in contact with blood or its derivatives must be regarded as potentially infected. Particular care must be taken to disinfect appropriate parts of equipment after use. Wastes must be regarded as

potentially infective. Viruses are unlikely to be destroyed by most assay procedures.

6. TRAINING:

All staff supervising procedures, including demonstrators, must be specifically trained and competent in the procedures being used and should have carried them out. Other staff must be trained in safe work practices when involved in laboratory work that uses human blood. Staff must be aware the subjects do sometimes faint during venepuncture and must be able to recognise when that is about to happen. They must be able to manage the subject and prevent injury.

USE OF ANIMALS OR ANIMAL PRODUCTS

Provided educational targets are adequately met, animal blood is preferred to human blood, since it carries less risk. Animal blood is regarded by experienced veterinary practitioners as 'remarkably safe' to handle. However, a number of microbial diseases transmissible from animal to man (zoonoses) have a phase during which the infective agent may be present in the peripheral blood. It is therefore possible for zoonoses to be transmitted. Zoonoses may be acquired through animal bites and scratches, contact with tissue and cultures, body fluids, exposure to aerosols produced as a result of activities such as cage cleaning.

RISK ASSESSMENT

It is important that risks are assessed. Two factors need to be taken into consideration, these are: the likelihood and potential severity of harm. For example research using rodents is common and allergic disorders related to working with rodents are common hence this is an important and common risk that need appropriate prevention and monitoring. Rabies is a fatal disease, but does not occur in animals in New Zealand and therefore specific precautions are not routinely needed. However, researchers handling material from overseas or travelling overseas may need protective measures. (see appendix)

PREVENTATIVE MEASURES

Preventative measures involve a wide range of approaches. These include:

- Administrative procedures
- Education and training
- Environmental / engineering
- Personal protective equipment
- Immunisation

LABORATORY ANIMAL ALLERGIES

Exposure to laboratory animals can result in allergic responses in susceptible individuals. Allergies can develop following inhalation of airborne animal allergens or after eye or skin contact with hair, dander, urine, saliva and serum or body tissue of laboratory animals. Symptoms can be mild (itchy eyes, runny nose, sneezing, red raised itchy patches on skin) to severe (wheezing, chest tightness, shortness of breath).

Controls:
To reduce the risk of allergic responses, the following may be applied:

- Ventilation and other engineering controls
- Selection of staff to eliminate employing staff with known allergic response syndromes
- Filtered cage systems
- Respiratory protection such as masks
- Protective clothing – gloves, gowns, shoe covers restricted to use within the animal facility
- Regular hand washing and showering after handling laboratory animals

Regular cleaning and decontamination of animal facilities

GUIDELINES FOR THE USE OF ANIMAL PRODUCTS:

1. Animals should be well maintained and have a history of good health, or the carcass should have been inspected by a veterinarian.

2. It is preferable to use mature animals rather than juveniles.

3. Small laboratory animals should be obtained through the Animal Facilities operated by the University Animal Welfare. Animal Ethics Committee Approval may be required for the use of animals and/or tissues.

4. Large animals used should have been maintained under the direction of the Director of Animal Welfare or a veterinary practitioner through the University Animal Ethics or other Institutional facilities e.g.: AgResearch Invermay. Collection of blood from a slaughter plant is not recommended. Other tissues may be collected from a slaughter plant provided the carcasses have been inspected prior to tissue removal.

5. Normal precautions for handling blood and dealing with accidents as detailed in the Standard Laboratory Practices for the Control of Infection Risks must be followed.

Note: Animal blood products, whole blood, serum or plasma are generally available through the Animal Facilities operated by the University of Otago. This service avoids the need for departments to purchase their own animals or blood products.

ZOONOSES

- Zoonoses is a disease of animals (where the animal is the primary host) where the disease is transmissible to humans.
- Zoonoses may be acquired through animal bites and scratches, contact with tissue and cultures, body fluids, exposure to aerosols produced as a result of activities such as cage cleaning.

MODE OF TRANSMISSION

Zoonoses can be transmitted buy a number of routes which are:

- Direct contact
- Food and water
- Fomites
- Aerosols
- Vectors

The following tables provides examples of zoonoses, causative micro-organisms and animals most commonly associated with transmission to humans have been developed from the publication: *Zoonoses in New Zealand, C R Wilks, M W Humble, Veterinary Continuing Education, Massey University, Palmerston North 1997 ISBN 0-9583634-0-4*

TABLE ONE: ZOONOSES ASSOCIATED WITH DIFFERENT ANIMALS

ANIMAL	ASSOCIATED ZOONOSES
Cage birds	Camplyobacteriosis, Salmonellosis, Yersiniosis, Ornithosis (psittacosis)
Cats	Salmonellosis, Yersiniosis, Ringworm, Pasterurellosis, Fleas, Cheyletiella sp, Toxoplasmosis, Cat Scratch Fever
Cattle	Milker's Nodule, Camplyobacteriosis, Leptospirosis, Salmonellosis, Tuberculosis, Yersiniosis, Ringworm, Cryptosporidodiosis, Fascioliasis
Deer	Camplyobacteriosis, Leptospirosis, Salmonellosis, Tuberculosis, Yersiniosis, Cryptosporidodiosis, Fascioliasis
Dogs	Camplyobacteriosis, Salmonellosis, Yersiniosis, Ringworm, Sarcoptes Scabeii, Pasterurellosis, Visceral Larva Mirgranes, Hydatid Disease, Dipylidium Caninum, Fleas, Cheyletiella sp.
Horse	Salmonellosis, Tuberculosis, Ringworm, Cryptosporidodiosis
Opossums	Leptospirosis, Salmonellosis, Tuberculosis, Yersiniosis, Cryptosporidodiosis, Camplyobacteriosis, (?)
Pig	Camplyobacteriosis, Leptospirosis, Salmonellosis, Tuberculosis, Yersiniosis, Cryptosporidodiosis, Erysipeloid, Streptococcus Suis, Sarcoptes Scabeii
Rodents	Camplyobacteriosis, Leptospirosis, Salmonellosis, Yersiniosis, Cryptosporidodiosis, Pasterurellosis, Fleas, Rat Bite Fever, Hynenolepis Spp
Sheep	Orf, Camplyobacteriosis, Salmonellosis, Yersiniosis, Cryptosporidodiosis, Fascioliasis, Erysipeloid

TABLE TWO: ZOONOSES BY CATEGORY OF INFECTIOUS AGENT

ZOONOSES	AGENT	MEANS OF TRANSMISSION	HOST ANIMAL	Immunisation
ARTHROPODS				
Fleas	Fleas	Contact	Dogs, cats, small mammals, birds	NIL
Mites	S.Scabiei, Cheyletiella sp.	Contact	Cats, rabbits, pigs, dogs and others	NIL
Ticks *(Mainly North Island)*	Heamaphysalias longicornis	Contact	Sheep, cattle, dogs	NIL
BACTERIAL				
Anthrax	Bacillus anthracis	Contact, inhalation, ingestion	Farm animals	
Brucellosis	Brucella spp	Contact, ingestion	Swine, dogs, cattle, sheep and goats	NIL
Campylobacter	Campylobacter Jejuni or C.Coli	Contact, Ingestion	Farm animals puppies, kittens, poultry, rodents, swine	
Erysipeloid (*Rare in NZ)*	Erysipelothrix rhusiopathiae	Percutaneous	Wide variety of animals	NIL
Haverhill Fever	Streptobacillus moniliformis			
Leptospirosis	Leptospira sp.	Broken skin & conjunctiva	(Common) Cattle, pigs, sheep, opossums, rats, mice, hedgehogs; (less common) deer, goats, dogs and horses	NIL
Pasteurellosis	Pasteurella multocida	Bites	Cats, dogs, pigs, rodents and sheep	NIL
Rat Bite Fever	Spirillum minus	Rat bite	Rats	
Salmonellisis	Salmonella enterica	Contact, inhalation, ingestion	Farm animals, rodents, reptiles, amphibia	NIL
Streptococcus	Streptococci	Percutaneous or oral	Wide variety of animals	NIL
Tetanus	Clostridium tetani	Bite and soil contaminated puncture wounds	Horses, and other equinae (also carried by other mammals, and present in soil)	As per NZ Ministry of Health guidelines; www.moh.govt.nz
Tuberculosis	Mycobeacterium	Contact, inhalation, ingestion	Primates, possums, deer, cattle, pigs	As per NZ Ministry of Health guidelines; www.moh.govt.nz

ZOONOSES	AGENT	MEANS OF TRANSMISSION	HOST ANIMAL	Immunisation
BACTERIAL (continued)				
Yersiniosis	Yersinia sp.	Oral (Faecal contamination)	Wide variety of animals	NIL
CHLAMYDIAL				
Psitticosis	Chlamydia psittaci	Inhalation	Wild and caged birds	NIL
FUNGAL				
Histoplasmosis	Histpolasma capsulatum	Inhalation of fungi	Dogs, other domestic and wild species	NIL
Ringworm	Dermatophytes	Contact	Dogs, cats, guinea pigs, cattle, sheep, rabbits, rats and mice	NIL
HELMINTHS				
Fascioliasis	Fasciola hepatica	Ingestion	Sheep, goats, cattle	NIL
PROTOZOAN				
Cryptosporidiosis	Cryptosporicium	Ingestion (Faecal / Oral)	Cattle, sheep, goats	NIL
Hydatds	Echinococcus Granulosus	Faecal / Oral	Infected dogs	NIL
Toxoplasmosis	Toxoplasma gondii	Ingestion of oocytes, inhalation	Cats	NIL
RICKETTSIAL				
Q fever *(Not recorded in New Zealand)*	Coxiella burnetii	Contact, inhalation, ingestion	Cattle, sheep, goats	Vaccine available
VIRAL				
Lymphocytic choriomeningitis (LCM)	Lymphocytic choriomeningitis virus	Contact, inhalation	Mice, guinea pigs, hamsters, monkeys	
Milkers Nodule	Parapox virus	Direct contact	Cattle	NIL
Monkey B virus	Herpesvirus simiae	Bite wounds, contact	Not recorded in NZ	
Rabies *(Not recorded in New Zealand)*	Rabies virus	Bites, saliva contact	Dogs, bats, other feral animals	Vaccine available
Scabby Mouth Contagious Ecthyma or Orf *(VERY COMMON)*	Pox Virus	Skin scratches, abrasions and contact with infected sheep.	Lambs and sheep	NIL

HEALTH MONITORING

As the hazard of handling laboratory animals cannot be eliminated in all cases, medical monitoring of individuals exposed to laboratory animals should be implemented. This will not reduce the risk, but will monitor staff for changes in health status. Health monitoring is required under the Health and Safety in Employment Act section 11. Health monitoring requirements can be arranged through the health and safety team, and involves provision of education on the health risk, consent for monitoring and discussion on results with the University Occupational Medical Practitioner

The following monitoring programme is advised:

Procedure	**Applicable to**
Pre-placement assessment	Every employee in direct or indirect contact with animals
Annual lung function test	Every employee in direct or indirect contact with animals
Tetanus immunisation booster every 10 years	Every employee in direct or indirect contact with animals
Rabies immunisation and follow up boosters	Direct contact with non-domestic animals
Tuberculosis test	Direct contact with non-human primates

Appendix 1:

BLOOD & BODY FLUIDS

HEALTH AND SAFETY POLICY

BLOOD AND BODY FLUIDS HEALTH AND SAFETY POLICY

PURPOSE

To ensure the safe handling of bio hazardous substances in all University of Otago workplace. To specifically ensure that the appropriate management of bio hazardous substances is undertaken to minimise risks where staff or students are exposed to blood and body fluids.

SCOPE

All University of Otago Campus areas. This policy applies to all staff, students
(undergraduate and postgraduate) and visitors in any University of Otago setting,
including field work or work off site.

ASSOCIATED DOCUMENTATION

Legislative	Health and Safety in Employment Act 1992
University	Health and Safety Policy
	Biohazard Safety Manual
	First Aid Guidelines
Additional	ACC Partnership Programme

DEFINITIONS

POLICY STATEMENT (S)

The key objective is to minimise the likelihood of accidental exposure to blood or other body fluids, and to ensure that if exposure does occur, that the situation is correctly managed to ensure the minimum possible harm occurs to the individual(s) involved.

PROCEDURE

1. Managers and Supervisors responsible for a place of work where risk of blood and/or body fluid exposure exists must ensure that the operating procedures described in the Biohazard Safety Manual are followed.

2. In the event of an exposure to blood or body fluid, the manager/supervisor of the place of work must ensure that the operating procedures described in the Biohazard Safety Manual are followed.

3. Employees and students have a duty to conform to the Biohazard Safety Manual requirements, including the reporting of any incidents.

DISTRIBUTION All Departments

Appendix 2:

VACCINATION & IMMUNISATION

HEALTH AND SAFETY POLICY

VACCINATION & IMMUNISATION HEALTH AND SAFETY POLICY

PURPOSE

The University of Otago is committed to ensuring a safe and healthy workplace for its employees.

This policy outlines recommendations for the protection of employees who may be exposed to preventable infections in the work place.

SCOPE

All University of Otago worksites.

ASSOCIATED DOCUMENTATION

Legislative	Health and Safety in Employment Act 1992
University	Health and Safety Policy
	Biohazard Safety Manual
	University First Aid Policy
	DH&SO training manual
	University Health and Safety Manual
Additional	ACC Partnership Programme

DEFINITIONS

POLICY STATEMENTS

1. The potential biological and health risks associated with the work task/environment are to be clearly identified in the hazard register for the work area.

2. The employees will be offered immunisation status assessment and vaccination according to the level of risk associated with the work tasks and work environment.

3. Where such risks exist, a formal training programme shall be provided to employees including the following:
   - Description of the hazard(s)
   - Method of transmission
   - Controls identified
   - Specifics of vaccination including reliability, side effects, test and vaccination procedure
   - Process of consent
   - Options when individuals choose not to be vaccinated.

4. The employee must complete a consent form prior to vaccination.

5. Arrangements for establishing immunisation status and administering the vaccination are the responsibility of the Department. General Practitioner, Public Health South and the University Occupational Health Nurse are options.

6. The vaccination is provided at the cost of the employer.

7. Where an employee chooses not to have the vaccination, alternative hazard exposure methods must be implemented.

DISTRIBUTION

AVC's

HOD's

DH&SO's

Support Services Directors

Unions

Appendix 3:

CONSENT TO PARTICIPATE IN A TEACHING PROGRAMME OR EXPERIMENT IN WHICH BLOOD WILL BE TAKEN

I understand that any group of individuals may include a carrier of Hepatitis, HIV or some other transmissible disease and that any contact with blood or other body fluids involves a risk of infection.

I have received a copy of the approved procedures for (____named procedure___), and the Biohazard Safety Manual that outlines the protocols for the management of minimising risk to exposure of bio hazardous agents.

I have been trained in the procedures.
I fully understand them and agree to abide by these procedures.
I consent to future blood samples, if required, following any actual or potential exposure to my samples.

I understand that the Ethics Committee of the University of Otago has approved the teaching programme or experiment in which I am about to participate.

I am willing to participate in this teaching programme or experiment.

Signed: _____

PRINT full name: _____

Date: _____

Appendix 4:

DECLINING TO PARTICIPATE IN A TEACHING PROGRAMME OR EXPERIMENT IN WHICH BLOOD WILL BE TAKEN

The theory and principles which this experiment illustrates are important and may be the subject of examination questions.

I understand that participation in this teaching programme or experiment is completely voluntary and that if I decline to take part this will not by itself prejudices my academic achievement.

I understand that I may observe the procedures if I wish, and obtain relevant data to enable me to complete the academic assignments, OR, an alternative assignment may be provided for me.

I do not wish to participate in this experiment.

Signed: _____

PRINT full name: _____

Date: _____

Appendix 5:

DEALING WITH EXPOSURE TO BLOOD

ACTIONS REQUIRED BY EMPLOYEE/STUDENT

1. If skin is splashed or penetrated, wash the area well with soap and water.
2. If the eyes are contaminated, rinse the eyes using the emergency eye wash facility.
3. If there is a splash into the mouth spit it out and rinse thoroughly.
4. Contact your supervisor or manager immediately.
5. Document the date and time of exposure, how the incident occurred and the name of the source if known.

ACTIONS REQUIRED BY MANAGER/SUPERVISOR

1. Ensure area has been washed.
2. Arrange for blood to be taken from the individual as soon as possible. The screening must include HIV, HBV, and HCV. Contact one of the following:

    - **Dunedin:** Emergency Department, Dunedin Public Hospital (4740999) for staff members, Student Health for Students (479 8212) during working hours and Emergency Department, Dunedin Public Hospital after working hours. Inform of the nature of the incident.
    - **Christchurch:** Contact Infection control or the Microbiologist on call at Christchurch Hospital (364 0640).
    - **Wellington:** ring the Occupational Health Nurse extension 6331 (pager 6331) or After Hours Manager if outside normal working hours (385 5999).

3. If the source is known, contact and arrange for blood samples to be taken.
4. Complete the accident/incident form and forward to the HOD and H&S Team.
5. Provide support for the employee involved, and advise of the EAP scheme if appropriate.

IMMEDIATE ASSESSMENT

It is important that the individual is medically assessed immediately so that treatment can be commenced if deemed necessary.

It is important to arrange follow up.

Issues to be considered:

- Action will depend on the status of the individual and the status of the source
- Is there a need for immediate antiretroviral treatment?
- Is there a need for hepatitis B immunoglobulin?
- Is there a need for hepatitis B vaccination?
- Has follow up been arranged?

Appendix 6:

MANAGEMENT OF ANIMAL BITES AND SCRATCHES

Deep puncture wounds resulting from animal bites have potentially serious zoonotic consequences and should be managed by qualified medical staff at a designated medical centre. For serious animal bite wounds the following steps should be followed:

1.

For minor skin abrasions, scratched or superficial bite wounds the following steps should be followed:

1.