Biological Risk Management and Containment

Handling Human Tissue, Blood and Body Fluids

Equipment and Work Practices

Containment Laboratory Guidelines

Version 2- February 2021

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Record of Amendments to Version 2

Date	Page number	Nature of amendment

Contents

1. Who are these guidelines for?

These guidelines are intended **for principal investigators (PIs), designated persons in charge, designated laboratory person (DLPs),** technical staff and students trained in the safe use of **risk biologicals** in appropriate facilities.

Note that the taking, use and storage of human tissue must be approved by either the University of Auckland Human Participants Ethics Committee (UAHPEC) or an accredited Health and Disability Ethics Committee (HDEC).

2. What are the risks of handling unfixed human tissue, blood and body fluids?

Hepatitis B virus is more prevalent in New Zealand than in North America, Europe or Australia. While vaccination against Hepatitis B can protect you from the risks of exposure to blood and tissues infected with Hepatitis B virus, there is always the potential for infection from other infectious agents such as Hepatitis C and HIV when handling human specimens. In some exceptional cases where human brain tissue is handled there is the risk of transmission of Creutzfeldt-Jakob disease (CJD). Working with blood samples containing or potentially containing SARS-Cov-2 (COVID19 virus) requires Biosafety Committee approval (contact the Biosafety Officer for more information).

3. How do I manage these risks?

The risks associated with handling human tissue can be managed by:

- Treating all human specimens, body fluids and blood as potentially infectious
- Minimising the likelihood of blood-to-blood exposure by wearing gloves, covering open cuts on skin and washing hands after procedures

These safety measures are known as **Universal Precautions** and are to be followed as outlined in section 1 below. If applicable, the additional precautions outlined in section 2 are also to be followed.

Guidelines for disposal and spill clean-up are outlined in sections 3-6. There is also a specific protocol to be followed (section 7) in the event of a "needle-stick" injury.

4. Universal precautions for handling unfixed human tissue, blood and body fluids

- Treat all human blood, tissue and body fluids as infectious.
- Absolutely no eating or drinking in the laboratory.
- Do not store food or drink in laboratories.
- Keep hand/mouth contact to a minimum.
- Wear properly fastened laboratory coats or gowns
- Remove laboratory coats/gowns when you leave the laboratory.
- Wear gloves when handling human blood, tissue and body fluids. "Double Gloving" should be considered to enable ease of glove exchange in the case of a spill.
- Cover all open cuts and abrasions.
- Take care to prevent contaminated gloves coming into contact with laboratory furniture, door handles and telephones.
- Use disposable equipment wherever possible and observe correct disposal procedures (see section 3 below).
- Wash and dry your hands after removing gloves and before leaving the laboratory/blood collection area.
- Clean up any spills of infectious or potentially infectious material immediately .
- Label all samples and store in a designated, labelled refrigerator or freezer.
- Handle all tubes with care as the outsides may be contaminated.
- When transporting samples, place tubes inside a leak-proof container with a secure lid.
- *Do not* attempt to remove needles from syringes but dispose of both together.
- *Do not* attempt to recap a needle.
- Avoid where possible techniques with the potential to create aerosols (sonication, vertexing, blowing out pipette contents). If not possible, implement effective measures (i.e. shielding)
- Report all accidents/incidents to the principal investigator or designated person in charge immediately and enter the accident/incident into the Damstra system.

5. Additional precautions for working with unfixed human tissue, blood and body fluids

- Only trained staff may take venous blood (doctors, nurses and other personnel trained in phlebotomy). Be sure to obtain consent and follow privacy protocols as stipulated in UAHPEC or HDEC approvals.
- All laboratory personnel are to be checked for Hepatitis B immunity (and vaccinated, if not immune) before handling human tissue, blood and body fluids that have not been screened for Hepatitis B. Talk to your Technical Manager for more details.
- Wherever possible, use tissue and blood that has been shown not to be contaminated by Hepatitis B, Hepatitis C or HIV.
- Do not use cells taken from staff or their relatives to transform cell lines (there is a high risk of exposure to **histocompatibility** cell lines).
- Wherever possible, work with human blood should be carried out in a certified Class II biosafety cabinet (BSC).
- Where blood is being collected with minimal processing (e.g. isolation of serum), you may conduct work outside a certified Class II BSC, provided centrifuges are fitted with sealed rotors and universal precautions for handling blood are observed.
- Larger specimens or procedures that cannot reasonably be accommodated in a Class II BSC may be handled outside the BSC provided there is adequate ventilation for aerosols, and you use adequate personal protective equipment (PPE) such as a face shield to prevent splashes.
- Liquid waste is to be pipetted into a suitable container with a lid. Wherever possible, the container should be pre-charged with an appropriate volume of disinfectant before use. If chemical disinfection is not possible, the waste should be autoclaved before disposal.
- The use of purpose-designed tissue culture vacuum aspirators is acceptable, but take special care with these, as aspiration generates aerosols. Good practice is to pre-charged with decon solution before us. Alternatively, treat the liquid collected in the sealed container with approved decontamination agents, using correct holding times.
- Use sealed tubes for centrifuging blood samples and use sealed rotors to minimise contamination in the event of tube failure.

- In the event of tube failure, disinfect the centrifuge rotor and bowl with an approved decontaminating agent (see *Benchtop Decontamination* guidelines).
- Clean and decontaminate laboratory benches and BSC surfaces where blood has been handled, with an approved decontamination agent. Be sure to observe correct contact times for these agents.(See *Benchtop Decontamination* guidelines)

  Report all spills, accidents or incidents to the principal investigator or laboratory manager immediately and enter the accident/incident into the Damstra system.

6. Disposing of waste specimens

- Decontaminate human tissue specimens and blood by autoclaving wherever practicable.
- Where autoclaving is impractical, small amounts of human material can be placed in a sealed sample tube and treated with approved decontamination agents, using correct holding times, before sending out for disposal as biohazardous waste.
- If using a sluice sink for disposal, human specimens are to be decontaminated first, by autoclaving or using chemical agents as directed by the *Chemical Decontamination of Liquid Biohazardous Wastes* guidelines.
- Ensure that all disposal of human tissue complies with tissue consent procedures and donors' wishes as stipulated in the UAHPEC or HDEC approval.

7. Disposing of waste equipment

- All disposable equipment, tissues/wipes and gloves used in handling human specimens are to be considered biohazardous waste.
- Double-bag any items that might puncture a biohazardous waste bag.
- When in doubt, discard waste into a sharps bin in preference to a biohazardous waste bag.
- Glass containers, vacutainer tubes, scalpels, syringes and needles are to be placed in sharps bins (purpose-designed scalpel blade removers are recommended).
- Do not overfill a sharps bin – ensure the lid is secure before putting the bin out for collection.

8. Cleaning and disinfection of equipment

- Soak glass items in a fresh solution of an approved decontamination agent, using correct holding times
- Note that the efficacy of many disinfectants is severely hampered in the presence of protein, therefore ensure the use of correct decontamination agent at the right concentration for the correct holding time (I.e. Trigene 1:10)
- Do not use sodium hypochlorite to disinfect metal equipment as it is corrosive. Instead, use Accel Prevail, HLD4 or Trigene as directed in the *Benchtop Decontamination* guidelines.

9. Cleaning up blood spills

- Wear gloves throughout the clean-up procedure.
- Decontaminate with a fresh solution of approved decontamination agent with contact times as directed in the *Benchtop Decontamination* guidelines.
- After clean-up, discard gloves in biohazardous waste bag and wash hands.

10. How to use approved decontamination agents

For details refer to the *BRMC Benchtop decontamination* guide

Please Note:

- Use all stocks of liquid decontaminating agents within the manufacturer's expiry dates, as they will not be effective after this date.
- Do not store diluted solutions for longer than the recommended stability times. Ready-made dilutions of Trigene, HLD4 and Accel Prevail are only stable for 6 months, 30 days and 30 days respectively.
- All containers of approved decontamination agents are to be labelled with the identity of the decontamination agent, its concentration and the expiry date.
- 70% ethanol is not an approved or effective decontamination agent for benchtop decontamination as it evaporates too rapidly. However, it can be used as a cleaning agent.

11. What to do in case of "needle-stick" injury

- Report any needle-stick or similar injury involving blood or body fluids to the principal investigator or designated person in charge as soon as practicable.
- Do not assume that a colleague's blood is safe, or that past Hepatitis B vaccination guarantees immunity.
- Contact Student Health, or after-hours accident and emergency care provider, and seek medical assistance/advice. If a clinically qualified infectious disease expert is available at Grafton they may be consulted before seeking external advice.
- University Health and Counselling or the after-hours accident and emergency care provider may arrange tests for Hepatitis B, Hepatitis C and HIV infection in the donor.
- Enter the needle stick injury into the Damstra system

12. Definitions

Designated laboratory person (DLP) means the trained person in each research group who has been given the authority to receive purchase requests made in SciTrack and to make a formal request for a purchase order via STC. In containment and transitional facilities DLPs will have additional training to enable them to scrutinise documentation for restricted items and provide support to researchers.

Designated person in charge means a staff member in any of the following roles: sector manager, facility manager, floor manager or technical manager.

Principal Investigator (PI): In the context of hazard containment and transitional facilities, a principal investigator is the holder of an independent grant administered by the University and the lead researcher for the grant project, usually in the sciences, such as a laboratory study or a clinical trial. The phrase is also often used as a synonym for "head of the laboratory" or "research group leader." The PI is responsible for assuring compliance with applicable University standards and procedures, and for the oversight of the research study and the informed consent process. Although the PI may delegate tasks, they retain responsibility for the conduct of the study.

Creutzfeldt-Jakob disease (**CJD**) is an incurable neurodegenerative disease caused by an infectious agent called a prion. It occurs clinically in one new patient per million people per year in NZ. CJD is at times called a human form of mad cow disease (bovine spongiform encephalopathy or BSE). However, given that BSE is believed to be the cause of Variant Creutzfeldt–Jakob disease (vCJD) in humans, the two are often confused. Human blood and tissues may also carry other prion causing diseases or transmissible spongiform encephalopathy (TSE) but these are much rarer than CJD.

Histocompatibility, or tissue compatibility, is the property of having the same, or sufficiently similar, human leukocyte antigens (HLA).

Fixed human tissue: Tissue that has been rendered nonviable (i.e. devoid of infectious agents) through the use of crosslinking agents such as formaldehyde or glutaraldehyde solutions; or by rendering tissue sterile through prolonged submersion in ethanol.

Universal Precautions refers to the practice, in medicine and research, of treating all human specimens (human tissue, blood and body fluids) as potentially infectious and avoiding parenteral transmission (i.e. blood-to-blood contact) by means of wearing nonporous articles such as medical gloves, safety glasses and face shields, decontaminating work surfaces and decontaminating the materials before disposal.