Contents

1. OBJECTIVE

To prescribe RMIT University expectations for the:

- Safe conduct of personnel working and operating with biological materials
- Communication of information, instruction and training on bio-hazardous substances
- Roles and responsibilities of Staff, Students and Contractors for managing the risks associated with activities involving biological materials.

2. BACKGROUND

N/A

3. SCOPE

This process applies to all RMIT Colleges, Portfolios and activities globally. For further information, refer to the local operating procedures of individual laboratories.

4. WHAT MUST GO RIGHT?

The expected outcomes – known as 'what must go right' – will be that:

- All Staff, Students and Contractors will be appropriately trained and provided with the required Personal Protective Equipment (PPE) prior to engaging in any activities involving biological materials
- A risk assessment has been undertaken prior to any work and, as required, additional controls have been implemented
- Handling, storage and disposal of hazardous materials, including waste, occurs in a controlled and secure manner such that the risk of exposure to personnel and environment is minimised.

5. PROCEDURE/IMPLEMENTATION

5.1. Background

Biologically hazardous substances, also referred to as biohazards, bio-agents or biohazardous substances and/or materials, include any substance in the form of aerosols, fluids, cultures or solids which pose a risk in the form of disease, and includes as a minimum:

- Human or animal tissue and fluid, e.g. blood, urine
- Any pathogenic biological material
- Bacteria
- Viruses
- Fungi
- Prions
- Parasites
- Animal handling
- Genetically Modified Organisms (GMO's).

Biohazards can pose a risk to the HSW of personnel, the community and the environment and are required to be strictly controlled to manage the risk of exposure within and outside of the laboratory.

Laboratory Acquired Infections (LAIs) refer to any infection acquired through direct or indirect exposure to biological materials through a laboratory or laboratory-related activities (e.g. Brucellosis, Hepatitis B). There are four routes through, which personnel may be exposed:

- Mucous Membranes (e.g. from splashes or exposure to gases)
- Inhalation of Aerosols
- Skin Penetration (e.g. needle-stick injuries, bites or scratches)
- Ingestion (e.g. from contaminated hands or clothes transmitting onto food).

It is estimated that most LAIs are acquired through the inhalation of airborne infectious agents. Many common laboratory tasks generate aerosols and include, for example, shaking, sonication, centrifuging, grinding and animal handling. Aerosols may also be unintentionally generated as a result of incidents (e.g. spills).

The potential for LAI must be considered and if it cannot be eliminated by avoiding the use of the substance, the risks associated with LAIs must be minimised to As Low As Reasonably Practicable (ALARP). Depending on the biological agent being considered, additional precautions may need to be considered in addition to the requirements described in this procedure.

5.2. Risk Assessment

A risk assessment is required before undertaking research, teaching or operational work with biohazards. Specifically, a risk assessment must be completed prior to working with any new biological agents or when undertaking a new process with existing biological agents. Risk assessments must be approved by the individual completing the assessment, their supervisor and, where applicable, the Head of School if:

- The assessed risk is moderate or greater
- The activities involve human tissues or humans as subjects

The aim of the risk assessment is to identify the hazards and risks associated with all aspects of the work to be undertaken, and to consider general biosafety requirements, including but not limited to:

- The microorganisms involved in consideration of source, risk group, volume, concentration, modality of transmission, host range, minimum infectious dose, vectors and the nature of the proposed work
- Required protective measures (e.g. PPE) and equipment needs
- Handling, storage and disposal of materials and wastes, including decontamination of potentially contaminated waste
- Physical containment requirements and facility design, including use of biological safety cabinets
- Responding to spills and loss of containment incidents.

A Chemical Risk Assessment must also be completed for all dangerous and/or hazardous chemicals prior to their use and/or storage in the laboratory. The Safety Data Sheet (SDS) of the chemical must be reviewed and considered to inform the risk assessment.

All completed risk assessments must be reviewed and updated as necessary when changes occur to equipment, operators or work practices.

All pregnant women must consult with their supervisor or local Senior Advisor HSW to ensure laboratory activities undertaken will not affect their unborn baby (i.e. teratogen effect).

Gas cylinders, radioactive substances and cryogenic materials present unique hazards and require special considerations. Refer to local laboratory operating procedures for more information.

5.3. Biosecurity

Laboratory biosecurity refers to the regulated, as well as personal security measures designed to prevent the loss, theft, misuse, diversion or intentional release of pathogens and toxins (refer to **AS/NZS 2243.3 – Safety in Laboratories**). Individual facilities holding pathogens or toxins must have a specific biosecurity program in place.

Additionally, in accordance with **AS/NZS 2243.3 – Safety in Laboratories**, a register must be maintained of all animals and microorganisms, including GMOs, which must include details regarding their biological identity, location and accessibility.

5.4. Containment

Containment measures are necessary for biohazards to minimise the risk of exposure to Staff, Students and Contractors. Containment measures may be physical (e.g. controlled access, barriers, closed systems, fume cupboards) or procedural (e.g. spill control procedures).

Physical Containment (PC) facilities are controlled facilities used at RMIT to reduce the risk of exposure to biological hazards. Biohazards are classified into four risk group categories (i.e. 1-4) in accordance with the level of risk they pose to laboratory Staff, the community and the environment. The categorisation of biohazards is required to determine the minimum containment requirements that must be complied with to prevent release of organisms from the facility.

Additional requirements for physical containment of GMOs within dedicated facilities (e.g. laboratories) are provided in the relevant legislative instrument and must be complied with where applicable. These facilities must be accredited for work with GMOs by the Office of the Gene Technology Regulator (OGTR). Further information and guidance are provided in Appendix 9

Only appropriately trained Staff and Students may work or operate within PC and GMO facilities.

Decontamination of potentially contaminated equipment, surfaces and waste must be considered and controlled to ensure containment of biohazards.

Disposal of contaminated waste may be achieved by autoclaving or incineration at approved RMIT facilities. Alternatively, contaminated waste should be collected by an approved waste disposal contractor.

Individual laboratories must have their own procedure/s for containing and decontaminating unintended releases of biohazards (e.g. spills) as described in Appendix 9.2.

5.5. General Laboratory Rules

5.5.1. General Rules

For all RMIT laboratories, the following general safety rules apply:

- Appropriate PPE must be worn at all times (refer to section 4.9)
- Activities such as smoking, eating, drinking, handling of contact lenses and application of make-up are all prohibited
- Storage of food and drink in refrigerators or storage areas of the laboratory is prohibited, unless these items are to be used for teaching or research purposes only and will not be consumed
- Lifting of heavy objects must be avoided and dedicated lifting devices/trolleys must be used and assistance of others sought where required
- Use of any plant or equipment must not be allowed without having first received dedicated instruction and/or training by the relevant supervisor

- Existing cleaning and decontamination protocols must be complied with. For biohazard facilities the following minimum requirements must be considered:
  - Work benches, equipment and other laboratory items must be regularly decontaminated
  - All spills must be contained, and the area cleaned and decontaminated.
- Safety signage and safety instructions must be observed and adhered to at all times
- Open flames must not to be left unattended or used in proximity to flammable solvents
- All laboratory equipment must be regularly tested, calibrated and maintained in safe working condition.

5.5.2. Housekeeping Rules

For all RMIT laboratories, the following minimum housekeeping rules apply:

- Access to laboratory must be controlled and restricted to authorised and trained personnel only
- Floors must be kept tidy and dry
- Working spaces (e.g. benches and fume cupboards) must be kept clean and free from chemicals and/or equipment when not in use
- Fire escape routes must be kept clear at all times, ensuring aisles and exits (e.g. emergency) are free from obstruction
- Access to emergency equipment must be maintained at all times, including fire extinguishers, first aid, chemical spill kit(s) and emergency showers/ eyewashes
- Office and meeting spaces must be kept separate from areas where hazardous materials or laboratory related processes occur
- Reading and writing materials must not be stored on facility benches.

5.5.3. Personal Protective Equipment

PPE is required to prevent injuries and exposure of personnel to hazardous chemical and biological substances. PPE must be worn before entry into the laboratory and, in any case, before handling any potentially hazardous materials. PPE must be removed before exiting the laboratory to avoid contaminating areas outside of the laboratory.

The following minimum PPE rules apply to all personnel operating within RMIT laboratories:

- Appropriate protective clothing must be worn (e.g. gowns, overalls, laboratory coats, flame resistant clothing)
- Appropriate protective footwear must be worn (i.e. enclosed shoes) to protect feet from hazards such as hot/corrosive liquids and falling objects
- All loose clothing and long hair must be fastened
- Approved safety spectacles or goggles must be worn where advised and, in any case, in all areas where tools or substances may cause eye injury
- Hearing protection must be worn where advised and if there is a risk of excessive noise above Occupational Exposure Limits (OEL)
- Gloves must be worn when handling chemicals and biological materials. Ensure the correct glove type is used, specific to the substance being handled. Refer to the SDS of the chemical and laboratory procedures for more information
- Respiratory protection may be required when working with certain airborne agents
- PPE must be removed and replaced immediately if contamination occurs. Any materials suspected of contamination (e.g. laboratory coats) must be decontaminated in accordance with laboratory procedures.

5.6. Biohazard Guidance

To reduce the risks associated with transport, handling, storage and disposal of hazardous biological substances, the relevant SDS or similar document for biological agents as well as available risk assessment(s) must be consulted and complied with.

The following minimum requirements and guiding rules must be complied with unless a risk assessment or other relevant document (e.g. SDS) indicates otherwise.

5.7. Handling

Personnel working with biohazards must actively seek to reduce the risk of exposure by minimising the production of aerosol and the use of good microbial practices, including, for example, carrying out work inside a biological safety cabinet (see Appendix 9.3). The use of centrifuges, pipettes and freeze-drying require specific techniques to reduce the risk of exposure. Refer to local operating procedures for more information.

5.7.1. Storage

Biological materials should not be stored for long periods of time on laboratory benches but should be transferred to dedicated storage areas. All containers must be clearly labelled:

- All chemical containers must clearly display the product name, details of supplier/manufacturer, chemical composition, and basic safety information
- Biological materials, such as cultures, must clearly display their contents and indicate the date of inoculation.

5.7.2. Transport

Transportation of biohazardous substances outside of a containment facility must only occur if the material is contained inside a primary container and enclosed by a secondary container. Both containers must be sealed and unbreakable and have been decontaminated prior to removal from the facility.

GMOs must not be removed from a containment facility unless being transported:

- To another containment facility of equivalent PC level or higher
- For the purpose of storage, decontamination and/or disposal
- With written permission from the regulator.

5.8. Waste Disposal

Waste must not be disposed of into a drain or sewer. Each laboratory must provide suitable, clearly labelled waste disposal containers for biohazardous substances that are removed and disposed by an approved and licenses waste disposal operator.

The disposal container must be suitable for the hazardous waste category, which at RMIT University include chemicals, cytotoxic, biohazardous and radioactive. Waste must be sorted and segregated according to solid waste, sharps waste, liquid waste, and animal carcasses and other biological waste.

Biological must be further segregated according to the following criteria:

- Infectious waste – yellow bags with black biohazard symbol
- Cytotoxic waste – purple bags with cytotoxic waste symbol

- Radioactive waste – red bags with black radioactivity symbol.

Biohazardous waste must be decontaminated prior to disposal. This can be carried out at RMIT (e.g. autoclaving) or by an approved and suitably licensed waste disposal operator.

All sharps must be disposed of into rigid, impact resistant, puncture-proof, sealable containers to be segregated according to the following criteria:

- Cytotoxic waste
- Infectious waste (includes all sharps except those contaminated by cytotoxics).

5.9. Human Biological Material Guidance

All activities involving humans and human biological materials (e.g. tissues, blood products, organs, DNA) must have current Human Ethics and Head of School approval. As a general rule, all human and animal tissues and fluids should be treated as potentially infectious.

Special care must be taken when handling human blood, serum (e.g. human sera and derivatives), and other bodily fluids and substances that are visibly contaminated with blood to avoid exposure to the risk of blood-borne pathogens.

Blood-borne pathogens are infectious and disease-causing microorganisms present in human blood (e.g. Hepatitis B, HIV). The minimum controls required to be implemented to reduce the risk of transmission of blood-borne pathogens form part of the overall response outlined in this document. Additional considerations include:

- Minimising exposure through use of engineering controls (e.g. safer medical devices), procedural and administrative controls (e.g. safe sharps handling and disposal methods, handwashing methods, training), and the provision of PPE
- Making available vaccinations to all staff with occupational exposure (where applicable)
- Managing exposure incidents (refer to section 4.13), including ongoing post-exposure medical assessments of affected individuals (where applicable).

5.10. Use of Sharps

Working with sharps (e.g. needles, syringes, scalpel blades, broken glass) poses an inherent risk of cuts or lacerations to laboratory staff that, combined with biological agents, increase the risk of infections from blood-borne pathogens caused by percutaneous injury (i.e. entry of the agent directly into bloodstream).

As a general rule, the use of sharps should be minimised to ALARP. For this reason, RMIT does not permit Staff or Students to use sharps without having received minimum training and formal authorisation.

Sharps must be discarded at the point of use into approved sharps containers.

5.11. Animal Research Risks

All activities involving animals at RMIT must have current Animal Ethics approval.

Facilities containing animals that are infected with, or may contain, infectious microorganisms are required to be designed and managed in accordance with legislative requirements and better practice considerations to prevent the escape of the animals and microorganisms from containment.

In addition to the relevant controls outlined in this procedure, working with animals must consider the following minimum considerations:

- Type, size and number of animals to be handled
- The risk of animals becoming infected or transmitting infections
- Potential for personnel to be exposed to injury or illness as a result of animal handling
- Animal housing and maintenance
- The risk of the animal escaping and establishing itself in the local environment
- Provision of adequate ventilation and respiratory protection to prevent personnel developing laboratory animal triggered allergies.

5.12. Signage

Safety signage must be in place and maintained in all laboratories to ensure personnel can easily identify hazards, indicate restricted access areas, locate safety equipment and provide guidance during emergency situations.

All laboratories must clearly display at their entrance the following minimum information:

- Biohazard symbol and the Physical Containment Level, if applicable
- Area Supervisor (e.g. name, location, afterhours contact details)
- Deputy Supervisor (e.g. name, location, afterhours contact details)
- Inherent safety hazards
- Precautionary measures required (e.g. PPE)
- Access only for authorised persons.

Refer to ***HR HSW-PR38-WI01 - Safety Signage Guidance*** for more information.

5.13. Safety Manuals

Each laboratory must have its own Laboratory Safety Manual (or set of manuals) that include the following minimum information:

- A register of equipment, chemicals and biological agents in use within the laboratory
- Completed risk assessments for commonly performed tasks, unless where stored in the RMIT University intranet database
- Operating procedures for commonly shared equipment and processes
- General rules appropriate to the particular laboratory, including, for example, emergency procedures, movement of materials in and out, waste management and disposal procedures.

As part of laboratory safety inductions, all Staff, Students and Contractors must have demonstrated to have read, understood and agreed to observe the applicable instructions provided in the safety manual prior to undertaking any work.

5.14. Emergency and First Aid

Emergency procedures must be developed, implemented and displayed in a visible and easily accessible location of the laboratory. Laboratory inductions and training must inform personnel of these emergency procedures as well as the location of:

- Nearest fire extinguishers/fire blankets
- Fire/emergency escape routes and assembly points
- First aid box, emergency showers and eyewash facilities
- Isolation devices for gas, water and power
- Emergency PPE, spill containment equipment and procedures.

In the event that personnel requires first aid and or medical attention for:

- Skin contact with chemicals - wash the affected area immediately. If contact is to the face, safety showers must be used to wash the skin, nose and mouth for at least 15-20 minutes
- Eyes splashed with any substance - flush with water for 15-20 minutes using the eye washers
- Ingestion or inhalation of substances - seek immediate medical attention from the local First Aid Officer
- Sharps related injury - gently encourage bleeding if the exposure involves a cut or puncture, or wash with soap (e.g. chlorhexidine) and water if the exposure does not involve a cut or puncture.

Medical advice must be immediately sought if any of the above emergency scenarios occur.

5.15. After-Hours and Working Alone

Special considerations are required to reduce the risks when working in isolation or after-hours.

5.16. Information, Instruction and Training

All Staff, Students and Contractors who may be exposed to biohazardous substances must be adequately trained to understand the risks associated with the specific biological and chemical materials to which they may be exposed. Prior to operating in a laboratory, all personnel must have completed a local safety induction.

No personnel must be allowed to perform a task or operate plant/equipment without having first received relevant instructions and training by their Supervisor.

5.17. Monitoring and Evaluation

Operational Leaders are responsible for reviewing the effectiveness of risks and controls in consultation with Staff and Students. Existing measures in place must be reviewed and, if necessary, revised:

- Prior to any alteration to safe work procedures
- If new or additional information becomes available
- If new hazards are identified or incidents/injuries have occurred, including notifiable incidents
- Following a reasonable request from a staff member, student or HSR.

6. Responsibilities

6.1. Executive Leader

- Ensure legislative requirements regarding laboratory safety and containment are adequately resourced.

6.2. Operational Leader (i.e. Laboratory Supervisor/ Manager)

- Ensure all legislative requirements are met, including AQIS and OGTR.
- Advise staff on safe working practices in accordance with legislation and codes of practice.
- Maintain all current records, including training, inventory, risk assessments and SDS records.
- Respond to laboratory incidents and emergencies.
- Investigate and report any incidents, unsafe practices and accidents.
- Ensure personnel operating in the laboratory have undertaken the required training, including a safety induction in accordance with Section 4.13.
- Arrange for periodic inspection of laboratory areas to ensure good housekeeping practices are being followed.

- Review and sign-off on Risk Assessments.
- Ensure all Risk Assessments are current and being updated regularly to capture any changes.
- Ensure safety signage is placed throughout the laboratory in accordance with the requirements of Section 4.10.
- Ensure all laboratory equipment is calibrated and maintained in safe working condition.

6.3. Staff

- Comply with any relevant Codes of Practice and with all requirements listed in this document and local procedures and practices.
- Behave in a responsible manner, refraining from any careless or reckless practice or action likely to put others at risk.
- Ensure a Risk Assessment has been carried out prior to undertaking any work. For standard processes, a previous Risk Assessment may be used so long as it is still current and valid. Refer to your Operational Leader for clarification.
- When working with biological materials, observe good microbial practice and actively seek to minimise loss of containment, including aerosol production.
- Be aware of local emergency procedures and know the location of emergency showers/eyewashes and evacuation assembly points.
- Maintain a high standard of hygiene at all times.
- Always adhere to applicable cleaning and decontamination procedures.
- Observe safety signage at all times.
- Follow safe work procedures when using laboratory equipment and working with hazardous chemicals and biologicals (including GMOs).
- Report all incidents, unsafe practices and accidents to your Operational Leader and assist with any subsequent investigation.

7. Definitions

Defines any key terms and acronyms relating to the process where they apply.

Term / acronym	Definition
AQIS	Australian Quarantine and Inspection Service
Biosafety	Procedures or measures designed to protect people and the environment from harmful biological or biochemical substances.
Containment	Containment refers to the use of several physical barriers to guard against the unintentional spread of an infectious agent: • Primary Barrier (e.g. Biological Safety Cabinet) • Secondary Barrier (e.g. Physical Containment laboratory) • Tertiary Barrier (e.g. building surrounding the laboratory).
Contamination	Containment refers to the use of several physical barriers to guard against the unintentional spread of an infectious agent: • Primary Barrier (e.g. Biological Safety Cabinet) • Secondary Barrier (e.g. Physical Containment laboratory) • Tertiary Barrier (e.g. building surrounding the laboratory).

Term / acronym	Definition
Contamination	Contamination refers to the presence of an infectious agent on a surface including people, clothes, laboratory equipment, and other inanimate articles or substances including food and drinks.
Cytotoxic Waste	Any material which is, or may be, contaminated with a cytotoxic drug, created during the preparation, transport or administration of cytotoxic therapy or during laboratory experimental procedures.
Dangerous Substance	Substances that are classified based on their immediate physical or chemical properties. These substances may be corrosive, flammable, explosive, toxic, oxidising, water-reactive etc.
Decontamination	Physical or chemical process that removes, kills or renders a biological agent non-viable. For example, heat-based treatment using an autoclave. Decontamination does not necessarily result in sterility.
Executive Leaders	Heads of School, Deans, Senior Managers, Executive Deans, Managers of Resources & Planning
GMOs	Genetically Modified Organisms
Hazardous Substances	Substances that have the potential to harm human health and are classified in terms of immediate or long-term health effects. For instance, exposure could result in poisoning, irritation, chemical burns, etc.
HSW	Health, Safety and Wellbeing
Infectious Waste	Waste that contains infectious biological agents, such as: waste associated with patients requiring communicable disease isolation; waste generated from microbiological investigations; and animal carcasses known or suspected to be contaminated with pathogenic organisms.
Laboratory Acquired Infection (LAI)	Refers to any infection acquired through exposure to a laboratory or laboratory-related activities. Within laboratories dealing with biological materials, the risk of LAI's is significantly increased due to the exposure of laboratory staff to potentially hazardous microorganisms. Exposure might be direct or indirect.
OGTR	Office of the Gene Technology Regulator.
Operational Leaders	Any staff member of RMIT who: • Plans, organises or supervises the activities of other staff, students, contractors, volunteers, visitors and clients on behalf of RMIT; or • Designs or organises the design, maintenance or refurbishment of facilities on behalf of RMIT.
Physical Containment (PC)	PC1-PC4 refers to the level of physical containment required to reduce the risks associated with working with biological organisms.
Personal Protective Equipment (PPE)	Safety clothing or equipment that is necessary for personal protection of the wearer whilst exposed to hazards in the workplace.
Personnel	Includes Staff, Students and Contractors
Radioactive Waste	Any material contaminated with a radioisotope which arises from the medical, research or teaching use of radionuclides.
Safety Data Sheet (SDS)	Document prepared by the manufacture for any dangerous of hazardous material. Contains all relevant safety data for the chemical.

Term / acronym	Definition
Senior Leaders	Council
Sterilisation	Rendering an item free of all living organisms.

8. Supporting Documents

Lists the supporting and related Processes and Guidance Material, Legislative references, Australian and International Standards etc. that may be useful references for process users

- Working Alone Process
- HR - HSW-PR09 - HSW Risk Management
- Safety Signage Guidance (HSW-PR38-WI01)
- HR - HSW-PR06 - HSW Training, Competence & Awareness
- Legal Register (HSW-PR01-RG01)
- Safety in Laboratories (AS/NZ 2243)
- Biological Safety Cabinets (AS/NZ 2647)