

McMaster Biosafety Lab Audit Full Reference (2017-08-14)

1. Laboratory area separated from administrative offices and public corridors by a door.

- CL1 (2.1.1) Laboratory work areas, large scale production areas, and animal work areas should be separated from public and administrative areas by a door.
- CL2 (3.1.1, 3.3.1) Containment zones to be separated from public and administrative areas by a door.
- PPC Basic (NA) NA
- PPC-1 (4.1.5.4) Keep doors closed to reduce the potential movement of plant pests.
- PPC-2 (4.1.5.4, 4.2.1.1, 4.2.5.2) Keep doors closed to reduce the potential movement of plant pests. Entry must be restricted to authorized laboratory and maintenance staff and other persons on official business. Laboratory doors must be kept closed as required by the facility design.
- AQC-1 (4.1.5.3) Doors to laboratories must remain shut (this does not apply to an open area within a laboratory).
- AQC-2 (3.5.1.1) Containment zone to be separated from public areas and offices by lockable doors. Doors to laboratories must remain shut (this does not apply to an open area within a laboratory).
- Local Implementation *Containment zones to be separated from public and administrative areas by a door. A dedicated paperwork or computer station, inside a containment zone, although referred to as an office, is to be considered applicable under CL1 2.1.2 and CL2 3.1.2. A room inside a laboratory is not considered to be accessible to the public or administrative areas, since all persons inside the laboratory are authorized users.*

2. Dedicated paperwork/computer areas segregated from lab work areas.

- CL1 (2.1.2) Dedicated paper/computer work stations should be segregated from work stations where RG1 biological material (e.g., samples, specimens) and animals are handled.
- CL2 (3.1.2) Dedicated paper/computer work stations within the containment zone to be segregated from laboratory work stations, animal rooms, animal cubicles, and post mortem rooms (PM rooms).
- PPC Basic (NA) NA
- PPC-1 (4.1.5.9) Keep all work areas within a containment zone, including dedicated clerical work stations, clean and tidy. Storage of materials should be minimized, and paperwork should be done outside of containment zones if this presents a risk of disseminating pests.
- PPC-2 (4.1.5.9) Keep all work areas within a containment zone, including dedicated clerical work stations, clean and tidy. Storage of materials should be minimized, and paperwork should be done outside of containment zones if this presents a risk of disseminating pests.
- AQC-1 (3.5.1.2) Dedicated paperwork stations within the containment zone to be located away from aquatic animal holding areas.
- AQC-2 (3.5.1.2) Dedicated paperwork stations within the containment zone to be located away from aquatic animal holding areas.
- Local Implementation *Paperwork and computer work areas (desk areas) are those desks and benches inside the laboratory that are reserved for this purpose. Segregation of these areas from laboratory work areas can be accomplished via signage. Laminated signage can be obtained from the Research Compliance Auditor (carte@mcmaster.ca) or can be downloaded from https://biosafety.mcmaster.ca/biosafety_SOPs.htm These areas can be worker desks inside labs or small rooms off of main lab areas. In these areas, biohazards, lab coats, gloves or any items potentially contaminated with biohazards, are prohibited. PPE including lab coats are not to be stored or worn in desk areas. Personal belongings are permissible. ****ALL of your waste containers will be inspected for evidence of improper disposal of wastes.**** To ensure all lab occupants are familiar with the dedicated areas within your containment zone, please complete a Lab Layout SOP, which can be found at https://biosafety.mcmaster.ca/biosafety_SOPs.htm. For mapping purposes, if you are on campus, you can find a map of your building here: <http://www.mcmaster.ca/uts/maps/> to use when drawing out dedicated areas within the lab. If you are in MUMC, request a screencap of your space from the Biosafety Office. Maps for off site hospitals may not be available.*

3. Windows and openings on containment barrier to be constructed and used according to function.

- CL1 (2.1.3) Windows that open to the outside should be equipped with basic pest control (e.g., installed with screens or kept closed at all times).
- CL2 (3.2.1, 3.2.3, 3.2.4, 3.2.5) Openable windows positioned on the containment barrier to include effective pest control and security. Basic pest control and security measures on windows that can open protect against the entry of small-sized animals and insects and prevent the release of infectious material out of the containment zone, especially where the window opens directly to the outdoors. This can be achieved by fitting windows with properly installed screens that are in good repair and by closing and locking windows to prevent unauthorized entry, in particular, when the containment zone is unoccupied. Windows on the animal containment barrier to be non-opening and sealed. Window glazing material on the animal containment barrier to provide the appropriate level

of security as determined by a biosecurity risk assessment. Windows on the animal containment barrier to be positioned to prevent public viewing into animal rooms, animal cubicles, and post mortem rooms (PM rooms).

- PPC Basic (NA) NA
- PPC-1 (3.7.3.7) Containment zone to be screened or sealed.
- PPC-2 (3.7.3.7) Containment zone to be screened or sealed.
- AQC-1 (NA) NA
- AQC-2 (NA) NA
- *Local Implementation* Openable windows should have screens that are intact. Windows on animal facility perimeter to be sealed, un-openable, prevent direct viewing of animals or procedures and provide security from the public. Any laboratory handling plant pests should be screened or sealed to prevent entry or exit of insects.

4. Space to be provided for storage of PPE.

- CL1 (2.1.4) Space should be provided for the storage of personal protective equipment (PPE) in use.
- CL2 (3.3.9) Space to be provided for the storage of PPE in use.
- PPC Basic (NA) NA
- PPC-1 (3.7.1.16) Recommended - Dedicated laboratory clothing and personal protective equipment are to be stored separately from street clothing.
- PPC-2 (3.7.1.16) Required - Dedicated laboratory clothing and personal protective equipment are to be stored separately from street clothing.
- AQC-1 (3.5.5.1) Hooks or lockers to be provided for clothing and personal protective equipment at facility entry/exit' street and facility clothing areas must remain separated.
- AQC-2 (3.5.5.1) Hooks or lockers to be provided for clothing and personal protective equipment at facility entry/exit' street and facility clothing areas must remain separated.
- *Local Implementation* PPE must be available and stored inside the lab. 'Dirty side' of PPE must not come into contact with street clothes or personal items. 3M command hooks are ideal way to provide storage for lab coats if a coat rack is not available. 3M command hook video here: <https://www.youtube.com/watch?v=kA1jruY-94o> Contaminated PPE must be decontaminated or disposed immediately and not stored with uncontaminated PPE. Lab coats are not to be stored over chairs as this creates potential cross contamination and a trip hazard. Lab coats are to be hung one per hook or hanger, right side out. Gloves and goggles are to be readily available. Cardboard boxes of PPE and PPE itself is to be stored away from areas where they can become contaminated with infectious materials. Evidence of proper storage and disposal is inspected.

5. Doors to the lab are lockable and locked when unoccupied, animal and arthropod room doors closed at all times.

- CL1 (3.2.9) Doors to laboratories and animal work areas (including PM rooms) should be kept closed.
- CL2 (3.3.1, 4.5.1) Doors to the containment zone to be lockable. Containment zone, animal room, animal cubicle, and post mortem room (PM room) doors to be kept closed.
- PPC Basic (NA) NA
- PPC-1 (3.7.1.3, 4.1.5.4) Entry to the containment zone is via self-closing and lockable doors. Keep doors closed to reduce the potential movement of plant pests. Laboratory doors must be kept closed as required by the facility design.
- PPC-2 (3.7.1.3, 4.1.5.4, 4.2.5.2) Entry to the containment zone is via self-closing and lockable doors. Keep doors closed to reduce the potential movement of plant pests. Laboratory doors must be kept closed as required by the facility design.
- AQC-1 (4.1.5.3, 4.2.5.2) Doors to laboratories must remain shut (this does not apply to an open area within a laboratory). Containment zone doors on the perimeter are to be kept closed as required by facility design.
- AQC-2 (4.1.5.3, 4.2.5.2) Doors to laboratories must remain shut (this does not apply to an open area within a laboratory). Containment zone doors on the perimeter are to be kept closed as required by facility design.
- *Local Implementation* Doors to laboratory areas where pathogens are stored should be kept closed from public corridors. A public corridor is one where there is no secured access (i.e. locks, keycards). Doors to laboratory areas where pathogens are stored are to be locked when unoccupied. These features should be documented in the biosecurity plan section of the BUP. Doors to the containment zone should be self-closing. If door hardware (locks, closers, sweeps, hinges or windows) is broken or missing or doors close improperly (door catches on the door frame or floor) or in an unsafe way (the back-check, swing or latch is too heavy or too fast), a work order/request needs to be placed. For hospital locations please contact the office of your area supervisor (i.e. Chair or senior manager) to place a work order, for campus locations please use the Online Service Request <http://facilities.mcmaster.ca/>

6. Controlled access to be provided for all animal and plant pest rooms.

- CL1 (BMBL 5th Ed, p65) The animal facility is separated from areas that are open to unrestricted personnel traffic within the building. External facility doors are self-closing and self-locking. Access to the animal facility is restricted. Doors to areas where infectious materials and/or animals are housed, open inward, are self-closing, are

kept closed when experimental animals are present, and should never be propped open. Doors to cubicles inside an animal room may open outward or slide horizontally or vertically.

- o CL2 (3.3.5, 3.3.7) Restricted access into the animal containment zone to be provided through a controlled access system.
- o PPC Basic (NA) NA
- o PPC-1 (3.7.1.4, 3.7.1.15, 4.1.1) Recommended - Restricted access to the containment zone is to be ensured through a controlled access system (e.g. electronic access card, code or equivalent). Recommended - Emergency exits are to be provided, where required, that open only from the inside, are alarmed, and display 'Emergency Exit Only' signage to deter unauthorized access. Limit access to containment zone and support areas to authorized personnel only.
- o PPC-2 (3.7.1.1, 3.7.1.4, 3.7.1.15, 4.1.1) Recommended - Appropriate security to be provided for the building (e.g. fencing, motion sensors, physical barriers, patrols). Required - Restricted access to the containment zone is to be ensured through a controlled access system (e.g. electronic access card, code or equivalent). Required - Emergency exits are to be provided, where required, that open only from the inside, are alarmed, and display 'Emergency Exit Only' signage to deter unauthorized access. Limit access to containment zone and support areas to authorized personnel only.
- o AQC-1 (4.1.5.12) Traffic flow patterns from clean to dirty areas must be established and adhered to (i.e., movement from least to most contaminated areas).
- o AQC-2 (4.1.5.12) Traffic flow patterns from clean to dirty areas must be established and adhered to (i.e., movement from least to most contaminated areas).
- o Local Implementation *Animal facility or plant pest facility perimeter must have controlled access. Individual animal or plant pest housing and procedure rooms outside of the main animal or plant pest facilities must be kept locked at all times if openable to a public corridor. Non-reproducible keys to be used when key-locks are used as the controlled access system. Buildings housing biohazard animal facilities or PPC2 plant pest laboratories must have emergency exit doors, openable only from the inside, are alarmed and display the text Emergency Exit Only. If building doors are found to be unsecure, damaged or do not display the appropriate signage, please report the defects to your local security office.*

7. Change area to be provided for entry into biohazard animal rooms.

- o CL1 (NA) NA
- o CL2 (3.3.10) Dedicated change area to be provided at personnel entry to the animal containment zone to allow for separation of personal clothing from dedicated containment zone clothing (i.e., clean change area separated from dirty change area).
- o PPC Basic (NA) NA
- o PPC-1 (NA) NA
- o PPC-2 (NA) NA
- o AQC-1 (NA) NA
- o AQC-2 (3.5.1.11) Entry to containment zone must have clothing change area designed to separate personal clothing from dedicated facility clothing for the zone (i.e., clean change area separated from dirty change area) in keeping with specific Personal Protective Equipment (PPE) requirements.
- o Local Implementation *Animal facilities to provide area for AF staff to change from personal to dedicated clothing. Research staff to leave excess personal clothing in their dedicated storage area before entering an animal containment zone or room. Storage of personal clothing in animal rooms and around animal room entry doors is prohibited and will be inspected.*

8. Anteroom to be provided at entry into biohazard animal rooms or plant pest rooms.

- o CL1 (NA) NA
- o CL2 (3.3.11) Anteroom(s) to be provided at the point(s) of entry into/exit from the animal containment zone.
- o PPC Basic (NA) NA
- o PPC-1 (NA) NA
- o PPC-2 (3.7.1.5, 3.7.1.7) Entry and exit is to be via anteroom. Where stipulated by building codes, anterooms that permit rapid emergency egress are to be placed at emergency exits. Corridors are acceptable as anterooms for non-arthropod PPC2 areas. Anteroom doors are to be self-closing and shall not open simultaneously (interlocking doors and audible or visual alarms are acceptable).
- o AQC-1 (NA) NA
- o AQC-2 (3.5.1.8) Entry to containment zone to be provided via an anteroom. [Not required for AQC2 in vitro work.]
- o Local Implementation *In animal facilities (AF), the AF secure hallways are the anteroom. In biohazard animal rooms outside the AF, the public corridor is the anteroom however storage of personal or research belongings in the public corridor is prohibited. In non-arthropod laboratories handling plant pests the corridor is the anteroom.*

9. Biohazard signage.

- CL1 (WHO 3rd Ed, p38) Laboratory to have proper signage.
- CL2 (3.3.2, 3.3.3, 4.5.8) Biohazard warning signage (including the international biohazard warning symbol, containment level, name and telephone number[s] of contact person, and entry requirements) to be posted at the containment zone point(s) of entry. Where unique hazards exist, project specific signage to be posted at the animal room, animal cubicle, and post mortem room (PM room) point(s) of entry. Current entry requirements to be posted at point(s) of entry to the containment zone, animal rooms, animal cubicles, and PM room.
- PPC Basic (NA) NA
- PPC-1 (3.7.1.2, 4.1.1) Recommended - Signage to be installed on entry doors within the containment zone indicating containment level, contact information and entry requirements. Required - Limit access to containment zone and support areas to authorized personnel only.
- PPC-2 (3.7.1.2, 4.1.1, 4.2.2.5) Signage to be installed on entry doors within the containment zone indicating containment level, contact information and entry requirements. Required - Limit access to containment zone and support areas to authorized personnel only. Appropriate signage indicating the nature of the plant pests/organisms being used (i.e. type and containment level) must be posted on the inner entry door to each laboratory. If there are special provisions for entry, the relevant information must be included on the sign; the contact information of the laboratory supervisor or other responsible person(s) must be listed.
- AQC-1 (3.5.1.7, 4.2.2.9) Signage to be installed on entry doors to the containment zone indicating containment level, contact information, and entry requirements. Appropriate signage indicating the nature of the aquatic animal pathogens being used (i.e., type and containment level) must be posted on the entry door to each laboratory. If there are special provisions for entry, the relevant information must be included on the sign' the contact information of the laboratory supervisor or other responsible person(s) must be listed.
- AQC-2 (3.5.1.7, 4.2.2.9) Signage to be installed on entry doors to the containment zone indicating containment level, contact information, and entry requirements. Appropriate signage indicating the nature of the aquatic animal pathogens being used (i.e., type and containment level) must be posted on the entry door to each laboratory. If there are special provisions for entry, the relevant information must be included on the sign' the contact information of the laboratory supervisor or other responsible person(s) must be listed.
- Local Implementation *Laminated biohazard door signs containing the prescribed information must be posted on all entry doors, provided by the Research Compliance Auditor (carte@mcmaster.ca). If there are any unique hazards within the containment zone, that hazard information must be included on the entry door signage. Anything that would require a special entry procedure or special PPE would be considered a unique hazard. Entry requirements for immunization, if any. Walk-in cold and warm rooms where biohazards are stored or handled to be labeled with the same signage as laboratory doors. All signs to contain the phrase 'Authorized Personnel Only'.*

10. Contact information present and current.

- CL1 (WHO 3rd Ed, p80) Emergency services: whom to contact. The telephone numbers and addresses of the following should be prominently displayed in the facility: 1. The institution or laboratory itself (the address and location may not be known in detail by the caller or the services called) 2. Director of the institution or laboratory 3. Laboratory supervisor 4. Biosafety officer 5. Fire services 6. Hospitals/ambulance services/medical staff (names of individual clinics, departments, and/or medical staff, if possible)
- CL2 (3.3.2) Biohazard warning signage (including the international biohazard warning symbol, containment level, name and telephone number[s] of contact person, and entry requirements) to be posted at the containment zone point(s) of entry.
- PPC Basic (NA) NA
- PPC-1 (3.7.1.2, 4.1.2.1) Recommended - Signage to be installed on entry doors within the containment zone indicating containment level, contact information and entry requirements. Designate and name a contact person for the facility, or one for each area or experiment.
- PPC-2 (3.7.1.2, 4.1.2.1, 4.2.2.5) Signage to be installed on entry doors within the containment zone indicating containment level, contact information and entry requirements. Designate and name a contact person for the facility, or one for each area or experiment. Appropriate signage indicating the nature of the plant pests/organisms being used (i.e. type and containment level) must be posted on the inner entry door to each laboratory. If there are special provisions for entry, the relevant information must be included on the sign; the contact information of the laboratory supervisor or other responsible person(s) must be listed.
- AQC-1 (3.5.1.7, 4.2.2.9) Signage to be installed on entry doors to the containment zone indicating containment level, contact information, and entry requirements. Appropriate signage indicating the nature of the aquatic animal pathogens being used (i.e., type and containment level) must be posted on the entry door to each laboratory. If there are special provisions for entry, the relevant information must be included on the sign' the contact information of the laboratory supervisor or other responsible person(s) must be listed.
- AQC-2 (3.5.1.7, 4.2.2.9) Signage to be installed on entry doors to the containment zone indicating containment level, contact information, and entry requirements. Appropriate signage indicating the nature of the aquatic

animal pathogens being used (i.e., type and containment level) must be posted on the entry door to each laboratory. If there are special provisions for entry, the relevant information must be included on the sign' the contact information of the laboratory supervisor or other responsible person(s) must be listed.

- *Local Implementation The outside of the lab entry door should contain local contact information. The inside of the lab entry door should either contain 24/7 contact information or the local security extension. If the latter is the case, this information should be given to McMaster Security Services or hospital-hosted security services. For on campus security, submit your emergency contact information to http://security.mcmaster.ca/emergency_contact_form.html*

11. Chairs and stools in laboratory work areas to be non-absorbent.

- CL1 (2.1.5) Floors, walls, benchtops, and furniture should be designed to be non-absorbent and resistant to scratches, moisture, and impact for ease of cleaning and decontamination, in accordance with function.
- CL2 (3.4.1) Surfaces and interior coatings, including, but not limited to, floors, ceilings, walls, doors, frames, casework, benchtops, and furniture, to be cleanable, non-absorbent, and resistant to scratches, stains, moisture, chemicals, heat, impact, repeated decontamination, and high pressure washing, in accordance with function.
- PPC Basic (NA) NA
- PPC-1 (4.1.5.17) Work surfaces that have become permeable (i.e., cracked, chipped, or loose) must be repaired, sealed or replaced.
- PPC-2 (4.1.5.17) Work surfaces that have become permeable (i.e., cracked, chipped, or loose) must be repaired, sealed or replaced.
- AQC-1 (3.5.2.1, 3.5.2.2, 3.5.2.3) Doors, frames, casework and bench-tops and all material supporting animal holding units (i.e., tanks and equivalent structures) to be non-absorbent (wood surfaces are not permitted). Surfaces to be scratch, stain, moisture, chemical and heat resistant in accordance with facility function. Surfaces to provide impact resistance in accordance with facility function.
- AQC-2 (3.5.2.1, 3.5.2.2, 3.5.2.3) Doors, frames, casework and bench-tops and all material supporting animal holding units (i.e., tanks and equivalent structures) to be non-absorbent (wood surfaces are not permitted). Surfaces to be scratch, stain, moisture, chemical and heat resistant in accordance with facility function. Surfaces to provide impact resistance in accordance with facility function.
- *Local Implementation Laboratory chairs and stools in the immediate work area, where biohazards are being handled, are to be non-absorbent. Chairs and stools to be covered with non-absorbent material, sealed, replaced or removed from the wet-work areas. Chair and stool surfaces will be inspected for rips, tears, fraying seams, rust, scratches and any damage that prevents or impairs proper decontamination. Recommended solutions include re-upholstering with non-absorbent material, covering damage with non-absorbent material, sanding and re-sealing wooden or rusted chairs, or swapping out appropriate chairs from another area where infectious materials are not handled. If your chair or stool contains seams, examine the chair to determine if biohazardous liquid was spilled on it, it would be able to be completely decontaminated effectively.*

12. All other laboratory work area surfaces to be non-absorbent.

- CL1 (2.1.5) Floors, walls, benchtops, and furniture should be designed to be non-absorbent and resistant to scratches, moisture, and impact for ease of cleaning and decontamination, in accordance with function.
- CL2 (3.4.1) Surfaces and interior coatings, including, but not limited to, floors, ceilings, walls, doors, frames, casework, benchtops, and furniture, to be cleanable, non-absorbent, and resistant to scratches, stains, moisture, chemicals, heat, impact, repeated decontamination, and high pressure washing, in accordance with function.
- PPC Basic (NA) NA
- PPC-1 (4.1.5.17) Work surfaces that have become permeable (i.e., cracked, chipped, or loose) must be repaired, sealed or replaced.
- PPC-2 (3.7.2.3, 4.1.5.17) Interior coatings are to be easy to clean and resistant to gas and chemicals, as well as to repeated disinfection in accordance with function (e.g. will withstand disinfection, fumigation). Work surfaces that have become permeable (i.e., cracked, chipped, or loose) must be repaired, sealed or replaced.
- AQC-1 (3.5.2.1, 3.5.2.2, 3.5.2.3) Doors, frames, casework and bench-tops and all material supporting animal holding units (i.e., tanks and equivalent structures) to be non-absorbent (wood surfaces are not permitted). Surfaces to be scratch, stain, moisture, chemical and heat resistant in accordance with facility function. Surfaces to provide impact resistance in accordance with facility function.
- AQC-2 (3.5.2.1, 3.5.2.2, 3.5.2.3) Doors, frames, casework and bench-tops and all material supporting animal holding units (i.e., tanks and equivalent structures) to be non-absorbent (wood surfaces are not permitted). Surfaces to be scratch, stain, moisture, chemical and heat resistant in accordance with facility function. Surfaces to provide impact resistance in accordance with facility function.
- *Local Implementation All laboratory other surfaces and flooring, in the immediate work area, where biohazards are being handled, to be non-absorbent. For repairs or replacement, a work request / work order needs to be*

submitted. For hospital locations please contact the office of your area supervisor (i.e. Chair or senior manager) to place a work order, for campus locations please use the Online Service Request <http://facilities.mcmaster.ca/>

13. Work surfaces to be non-absorbent and easily cleanable.

- o CL1 (2.1.5) Floors, walls, benchtops, and furniture should be designed to be non-absorbent and resistant to scratches, moisture, and impact for ease of cleaning and decontamination, in accordance with function.
- o CL2 (3.4.1) Surfaces and interior coatings, including, but not limited to, floors, ceilings, walls, doors, frames, casework, benchtops, and furniture, to be cleanable, non-absorbent, and resistant to scratches, stains, moisture, chemicals, heat, impact, repeated decontamination, and high pressure washing, in accordance with function.
- o PPC Basic (NA) NA
- o PPC-1 (3.7.2.4, 4.1.5.17) Benchtops to be non-absorptive, impervious to water, and resistant to acids, alkalis, organic solvents and moderate heat. Backsplashes to be installed tight to wall and sealed at the wall-bench junction. Work surfaces that have become permeable (i.e., cracked, chipped, or loose) must be repaired, sealed or replaced.
- o PPC-2 (3.7.2.4, 4.1.5.17) Benchtops to be non-absorptive, impervious to water, and resistant to acids, alkalis, organic solvents and moderate heat. Backsplashes to be installed tight to wall and sealed at the wall-bench junction. Work surfaces that have become permeable (i.e., cracked, chipped, or loose) must be repaired, sealed or replaced.
- o AQC-1 (3.5.2.1, 3.5.2.2, 3.5.2.3) Doors, frames, casework and bench-tops and all material supporting animal holding units (i.e., tanks and equivalent structures) to be non-absorbent (wood surfaces are not permitted). Surfaces to be scratch, stain, moisture, chemical and heat resistant in accordance with facility function. Surfaces to provide impact resistance in accordance with facility function.
- o AQC-2 (3.5.2.1, 3.5.2.2, 3.5.2.3) Doors, frames, casework and bench-tops and all material supporting animal holding units (i.e., tanks and equivalent structures) to be non-absorbent (wood surfaces are not permitted). Surfaces to be scratch, stain, moisture, chemical and heat resistant in accordance with facility function. Surfaces to provide impact resistance in accordance with facility function.
- o Local Implementation *Work surfaces (i.e. benching, BSC work surfaces, tables) that have been damaged in such a way as to allow moisture penetration to be repaired and or resealed by submitting a work request / work order. For hospital locations please use Work Requests <https://fhs.mcmaster.ca/corporate/engineering.html> for campus locations please use the Online Service Request <http://facilities.mcmaster.ca/>. For hospital locations please contact the office of your area supervisor (i.e. Chair or senior manager) to place a work order, for campus locations please use the Online Service Request <http://facilities.mcmaster.ca/>. Until a repair can be made, such damaged work surfaces to be covered with bench-coat or diapers to absorb any spills or splashes.*

14. Seams to be sealed.

- o CL1 (2.1.6) Benchtops and other work surfaces should not have open seams.
- o CL2 (3.4.2) Surfaces to be continuous with adjacent and overlapping materials.
- o PPC Basic (NA) NA
- o PPC-1 (NA) NA
- o PPC-2 (NA) NA
- o AQC-1 (3.5.2.4) Surfaces to be continuous and compatible with adjacent and overlapping materials (i.e., to maintain adhesion and a continuous perimeter).
- o AQC-2 (3.5.2.4) Surfaces to be continuous and compatible with adjacent and overlapping materials (i.e., to maintain adhesion and a continuous perimeter).
- o Local Implementation *Seams in work surfaces, floors and around sinks to be sealed, in order to prevent penetration of contaminated liquids between, behind and under work surfaces. Any surface that requires to be non-absorbent and is constructed of multiple assembled parts must have all seams sealed with waterproof sealant. A work order is required. For hospital locations please contact the office of your area supervisor (i.e. Chair or senior manager) to place a work order, for campus locations please use the Online Service Request <http://facilities.mcmaster.ca/>*

15. Backsplash to be continuous and sealed.

- o CL1 (2.1.7) Backsplashes should be sealed at the wall-bench junction for ease of cleaning and decontamination.
- o CL2 (3.4.4) Backsplashes, when installed tight to the wall, to be sealed at the wall-bench junction and continuous with work surfaces.
- o PPC Basic (NA) NA
- o PPC-1 (3.7.2.4) Recommended - Benchtops to be non-absorptive, impervious to water, and resistant to acids, alkalis, organic solvents and moderate heat. Backsplashes to be installed tight to wall and sealed at the wall-bench junction.
- o PPC-2 (3.7.2.4) Recommended - Benchtops to be non-absorptive, impervious to water, and resistant to acids, alkalis, organic solvents and moderate heat. Backsplashes to be installed tight to wall and sealed at the wall-bench junction.

- o AQC-1 (3.5.2.9) Backsplashes, if installed tight to wall, to be sealed at wall-bench junction.
- o AQC-2 (3.5.2.9) Backsplashes, if installed tight to wall, to be sealed at wall-bench junction.
- o Local Implementation Backsplashes to be sealed to prevent contaminated liquid penetration behind and under benching and other work areas. A work order is required for repairs. For hospital locations please contact the office of your area supervisor (i.e. Chair or senior manager) to place a work order, for campus locations please use the Online Service Request <http://facilities.mcmaster.ca/>

16. Floors to be slip resistant.

- o CL1 (2.1.8) Floors should be slip-resistant in accordance with function.
- o CL2 (3.4.5) Floors to be slip-resistant in accordance with function.
- o PPC Basic (NA) NA
- o PPC-1 (NA) NA
- o PPC-2 (3.7.2.2) Floors to be slip resistant in wet areas.
- o AQC-1 (3.5.2.7) Floors to be slip-resistant.
- o AQC-2 (3.5.2.7) Floors to be slip-resistant.
- o Local Implementation Flooring areas in the immediate work area, where biohazards or plant pests are handled, to be slip-resistant in accordance with function. Cracked and missing tiles to be replaced or repaired. Pitted, cracked and lifting laminate to be replaced or repaired. Concrete flooring to be completely sealed. A work order may be required. For hospital locations please contact the office of your area supervisor (i.e. Chair or senior manager) to place a work order, for campus locations please use the Online Service Request <http://facilities.mcmaster.ca/>

17. Floors and surfaces to withstand repeated washing if required.

- o CL1 (2.2.4) Floors and walls should be resistant to repeated decontamination and high pressure washing, in accordance with function.
- o CL2 (3.4.1) Surfaces and interior coatings, including, but not limited to, floors, ceilings, walls, doors, frames, casework, benchtops, and furniture, to be cleanable, non-absorbent, and resistant to scratches, stains, moisture, chemicals, heat, impact, repeated decontamination, and high pressure washing, in accordance with function.
- o PPC Basic (NA) NA
- o PPC-1 (NA) NA
- o PPC-2 (3.7.2.3) Interior coatings are to be easy to clean, and resistant to gas and chemicals as well as to repeated disinfection in accordance with function (e.g. will withstand disinfection and fumigation).
- o AQC-1 (3.5.2.5) Interior coatings to be cleanable and resistant to chemicals, as well as to repeated disinfection in accordance with function (e.g., will withstand disinfection or fumigation).
- o AQC-2 (3.5.2.5) Interior coatings to be cleanable and resistant to chemicals, as well as to repeated disinfection in accordance with function (e.g., will withstand disinfection or fumigation).
- o Local Implementation Surfaces to be able to withstand repeated washings or high-pressure washings as appropriate' this applies to areas where pathogens, infectious animals or plant pests are directly being handled. For repairs, a work order is required. For hospital locations please contact the office of your area supervisor (i.e. Chair or senior manager) to place a work order, for campus locations please use the Online Service Request <http://facilities.mcmaster.ca/>

18. Junction between floor and walls to be continuous in biohazard animal rooms.

- o CL1 (NA) NA
- o CL2 (3.4.7) In animal rooms, continuity of seal to be maintained between the floor and wall.
- o PPC Basic (NA) NA
- o PPC-1 (NA) NA
- o PPC-2 (NA) NA
- o AQC-1 (NA) NA
- o AQC-2 (3.5.2.6) Continuity of seal to be maintained between the floor and wall (a continuous cove floor finish up the wall is recommended).
- o Local Implementation In animal rooms, where infectious animals are housed, the flooring material must be sealed or continuous between the floor and the wall. This is to withstand hosing of the floors. In areas were infectious animals are housed outside of an animal facility, floors must be mopped or cleaned by hand. If not continuous, a work order is required. For hospital locations please contact the office of your area supervisor (i.e. Chair or senior manager) to place a work order, for campus locations please use the Online Service Request <http://facilities.mcmaster.ca/>

19. Emergency eyewash to be provided.

- o CL1 (2.1.10) Emergency eyewash system should be provided in accordance with work activities.
- o CL2 (3.6.6) Emergency eyewash and shower equipment to be provided in accordance with containment zone activities.
- o PPC Basic (NA) NA

- PPC-1 (3.7.5.4) Emergency eyewash facilities to be provided in the laboratory containment zone in accordance with activities and applicable regulations (i.e. ANSI Z358.1-1998).
- PPC-2 (3.7.5.4) Emergency eyewash facilities to be provided in the laboratory containment zone in accordance with activities and applicable regulations (i.e. ANSI Z358.1-1998).
- AQC-1 (3.5.5.7) Emergency eyewash facilities to be provided in the containment zone in accordance with facility activities and applicable regulations (i.e. ANSI Z358.1-2004).
- AQC-2 (3.5.5.7) Emergency eyewash facilities to be provided in the containment zone in accordance with facility activities and applicable regulations (i.e. ANSI Z358.1-2004).
- Local Implementation *Emergency eyewash to be provided and be verified functional. All emergency eyewashes are to be equipped with inspection tags. Please report non-functioning, malfunctioning eyewashes or missing inspection tags to the office of your area supervisor (i.e. Chair or senior manager) and a work order is required. For hospital locations please contact the office of your area supervisor (i.e. Chair or senior manager) to place a work order, for campus locations please use the Online Service Request <http://facilities.mcmaster.ca/>. Emergency eyewashes are maintained annually by facility services or engineering for your building. Laboratory occupants are also required to activate or flush emergency eyewash stations weekly. http://www.ccohs.ca/oshanswers/safety_haz/emer_showers.html*

20. Emergency eyewash to be flushed weekly.

- CL1 (2.1.10) Emergency eyewash system should be provided in accordance with work activities.
- CL2 (3.6.6) Emergency eyewash and shower equipment to be provided in accordance with containment zone activities.
- PPC Basic (NA) NA
- PPC-1 (3.7.5.4) Emergency eyewash facilities to be provided in the laboratory containment zone in accordance with activities and applicable regulations (i.e. ANSI Z358.1-1998).
- PPC-2 (3.7.5.4) Emergency eyewash facilities to be provided in the laboratory containment zone in accordance with activities and applicable regulations (i.e. ANSI Z358.1-1998).
- AQC-1 (3.5.5.7) Emergency eyewash facilities to be provided in the containment zone in accordance with facility activities and applicable regulations (i.e. ANSI Z358.1-2004).
- AQC-2 (3.5.5.7) Emergency eyewash facilities to be provided in the containment zone in accordance with facility activities and applicable regulations (i.e. ANSI Z358.1-2004).
- Local Implementation *Emergency eyewash to be provided and be verified functional. All emergency eyewashes are to be equipped with inspection tags. Please report non-functioning, malfunctioning eyewashes or missing inspection tags to the office of your area supervisor (i.e. Chair or senior manager) and a work order is required. For hospital locations please contact the office of your area supervisor (i.e. Chair or senior manager) to place a work order, for campus locations please use the Online Service Request <http://facilities.mcmaster.ca/>. Emergency eyewashes are maintained annually by facility services or engineering for your building. Laboratory occupants are also required to activate or flush emergency eyewash stations weekly. http://www.ccohs.ca/oshanswers/safety_haz/emer_showers.html*

21. Handwashing sink to be provided.

- CL1 (2.1.9) Sinks should be provided for handwashing.
- CL2 (3.6.4) Sinks to be provided and located to facilitate handwashing upon exit from the containment zone.
- PPC Basic (NA) NA
- PPC-1 (3.7.5.1) Recommended - A handwashing sink (or, if required, a sink and a shower) to be located within the containment zone and near the point of exit.
- PPC-2 (3.7.5.1, 3.7.5.2) A handwashing sink (or, if required, a sink and a shower) to be located within the containment zone and near the point of exit. Recommended - Handwashing sinks to be provided with 'hands-free' capability.
- AQC-1 (3.5.5.2, 3.5.5.3) Hand washing sinks to be located near the point of exit (either near the exit from the facility and/or on the dirty side of the anteroom). Hand washing sinks to be [recommended] provided with hands free capability.
- AQC-2 (3.5.5.2, 3.5.5.3) Hand washing sinks to be located near the point of exit (either near the exit from the facility and/or on the dirty side of the anteroom). Hand washing sinks to be [recommended] provided with hands free capability.
- Local Implementation *Hands are to be washed after handling biohazards to prevent cross-contamination. Handwashing sinks are to be provided. If this requirement is unable to be met, due to infrastructure constraints, an alternative to a handwashing sink is the provision of hand sanitizer. It is recommended that after sanitizing, hands be washed at the next closest handwashing sink. Availability of handwashing soap and paper towels or hand sanitizer is inspected.*

22. Exposed piping and conduits in biohazard animal rooms to be mounted and easily cleanable.

- o CL1 (NA) NA
- o CL2 (3.6.1) Exposed conduits, piping, and other services to be mounted to allow for decontamination of all surfaces.
- o PPC Basic (NA) NA
- o PPC-1 (NA) NA
- o PPC-2 (NA) NA
- o AQC-1 (NA) NA
- o AQC-2 (CL2-3.6.1) Exposed conduits, piping, and other services to be mounted to allow for decontamination of all surfaces.
- o Local Implementation *Piping, electrical conduits and any other facility services exposed inside the biohazard animal room to be securely mounted and coated or of such material to ensure ease of cleaning and decontamination. Under no circumstances shall these protrusions be used for hanging or storage of items. If repairs are to be made, a work order is required. For hospital locations please contact the office of your area supervisor (i.e. Chair or senior manager) to place a work order, for campus locations please use the Online Service Request <http://facilities.mcmaster.ca/>*

23. Services and equipment in biohazard rooms, critical to maintaining containment and biosecurity, to be supported by emergency power.

- o CL1 (NA) NA
- o CL2 (3.6.18) Services and equipment in animal rooms, critical to maintaining containment and biosecurity to be supported by emergency power.
- o PPC Basic (NA) NA
- o PPC-1 (NA) NA
- o PPC-2 (3.7.5.16) Emergency power system to be provided for HVAC, lighting, BSCs, essential equipment and other safety systems.
- o AQC-1 (NA) NA
- o AQC-2 (3.5.5.19) Life-safety systems, lighting, BSCs and other critical equipment to be supported by emergency power.
- o Local Implementation *The continued operation of equipment critical for the containment and security of biohazards (e.g., BSCs, ventilated cage racks, electronic controlled access systems, autoclaves used for decontamination of waste or contaminated items) during power outages is crucial to maintain containment integrity and to safeguard the security of the zone. Emergency power can be provided through the building generator or a UPS system. For hospital locations please contact the office of your area supervisor (i.e. Chair or senior manager) to place a work order for emergency outlet installation, for campus locations please use the Online Service Request <http://facilities.mcmaster.ca/>*

24. Handwashing sinks in biohazard rooms to be hands-free.

- o CL1 (NA) NA
- o CL2 (3.6.5) Sinks provided for handwashing in animal rooms to be equipped with hands-free capability.
- o PPC Basic (NA) NA
- o PPC-1 (NA) NA
- o PPC-2 (3.7.5.2) Recommended - Handwashing sinks to be provided with “hands-free” capability.
- o AQC-1 (NA) NA
- o AQC-2 (3.5.5.3) Hand washing sinks to be provided with hands free capability. [recommended]
- o Local Implementation *Sinks provided for handwashing in biohazard animal rooms to be equipped with hands-free capability. If this requirement cannot be immediately met due to infrastructure constraints, cross-contamination of sink handles can be prevented using operational procedures until replacement or retrofitting. The SOP should be posted at the sink. For hospital locations please contact the office of your area supervisor (i.e. Chair or senior manager) to place a work order for replacement or retrofitting, for campus locations please use the Online Service Request <http://facilities.mcmaster.ca/>*

25. Emergency shower tested and flushed weekly.

- o CL1 (3.6.6) Emergency eyewash and shower equipment to be provided in accordance with containment zone activities.
- o CL2 (3.6.6) Emergency eyewash and shower equipment to be provided in accordance with containment zone activities.
- o PPC Basic (NA) NA
- o PPC-1 (3.7.5.5) Emergency shower equipment to be provided in the laboratory containment zone in accordance with activities and applicable regulations (i.e. ANSI Z358.1-1998).
- o PPC-2 (3.7.5.5) Emergency shower equipment to be provided in the laboratory containment zone in accordance with activities and applicable regulations (i.e. ANSI Z358.1-1998).

- o AQC-1 (3.5.5.8) Emergency shower equipment to be provided in the containment zone in accordance with facility activities and applicable regulations (i.e., ANSI Z358.1-2004).
- o AQC-2 (3.5.5.8) Emergency shower equipment to be provided in the containment zone in accordance with facility activities and applicable regulations (i.e., ANSI Z358.1-2004).
- o Local Implementation *Annual testing to ANSI standard to be provided by facility services or engineering and logged on the inspection tag. Emergency showers are maintained by facility services or engineering for your building. Please report non-functioning, malfunctioning showers, missing inspection tags or un-inspected showers to the office of your area supervisor (Chair or senior manager) to place a work order for hospital locations, for campus locations please use the Online Service Request <http://facilities.mcmaster.ca/> Information on emergency showers can be found here: https://www.ccohs.ca/oshanswers/safety_haz/emerg_showers.html*

26. Emergency shower to be provided.

- o CL1 (WHO 3rd Ed, p13) Safety systems should cover fire, electrical emergencies, emergency shower and eyewash facilities.
- o CL2 (3.6.6) Emergency eyewash and shower equipment to be provided in accordance with containment zone activities.
- o PPC Basic (NA) NA
- o PPC-1 (3.7.5.5) Emergency shower equipment to be provided in the laboratory containment zone in accordance with activities and applicable regulations (i.e. ANSI Z358.1-1998).
- o PPC-2 (3.7.5.5) Emergency shower equipment to be provided in the laboratory containment zone in accordance with activities and applicable regulations (i.e. ANSI Z358.1-1998).
- o AQC-1 (3.5.5.8) Emergency shower equipment to be provided in the containment zone in accordance with facility activities and applicable regulations (i.e., ANSI Z358.1-2004).
- o AQC-2 (3.5.5.8) Emergency shower equipment to be provided in the containment zone in accordance with facility activities and applicable regulations (i.e., ANSI Z358.1-2004).
- o Local Implementation *Emergency shower to be provided and be verified functional. All emergency showers are to be equipped with inspection tags. Please report missing, non-functioning, malfunctioning showers, missing inspection tags or un-inspected showers to the office of your area supervisor (Chair or senior manager) to place a work order for hospital locations, for campus locations please use the Online Service Request <http://facilities.mcmaster.ca/> Emergency showers are tested to ANSI standards once annually by facility services or engineering for your building.*

27. Animal and arthropod caging or containers to provide containment and prevent escape.

- o CL1 (2.2.2) Animal cages and rooms where animals are housed should be designed to prevent animal escape.
- o CL2 (3.7.8, 3.7.10, 4.7.2) Primary containment caging to be provided to house infected animals. Primary containment caging housing infected animals to be identified with labels. Animal cages and animal cubicles to be designed to prevent animal escape.
- o PPC Basic (NA) NA
- o PPC-1 (4.1.5.14) Where practical, confine all arthropods in cages or other containers that prevent escape.
- o PPC-2 (4.1.5.14) Where practical, confine all arthropods in cages or other containers that prevent escape.
- o AQC-1 (NA) NA
- o AQC-2 (NA) NA
- o Local Implementation *Biohazard animal cages and biohazard animal cubicles to be designed to prevent animal escape. Modifications to containment caging provided by the animal facilities is prohibited without express consent from the University Veterinarian and the Biosafety Manager. Ventracks are to be used for housing of animals infected with risk group 2 materials or any material otherwise regulated by the Canadian Food Inspection Agency, which includes risk group 1 materials infectious to plants, risk group 1 materials infectious to aquatic animals or any material that is a foreign animal disease agent. Contact the animal facility for purchasing instructions.*

28. Waste packaged securely for disposal.

- o CL1 (LBG 3.1.1.20) All contaminated material, solid or liquid, must be decontaminated before disposal or reuse' the material must be contained in such a way as to prevent the release of contaminated contents during removal - centralized autoclaving facilities are to follow the applicable containment level 2 requirements.
- o CL2 (3.7.11) Decontamination technologies for the decontamination of materials to be provided within the containment zone, or standard operating procedures (SOPs) to be in place to safely and securely move or transport waste out of the containment zone to a designated decontamination area.
- o PPC Basic (NA) NA
- o PPC-1 (3.7.3.1) Autoclave or other validated and acceptable means of waste treatment and disposal are to be located within the containment zone, or if not available in the containment zone, then procedures must be in place to safely transport waste for treatment and disposal elsewhere.

- PPC-2 (3.7.3.1) Autoclave or other validated and acceptable means of waste treatment and disposal are to be located within the containment zone, or if not available in the containment zone, then procedures must be in place to safely transport waste for treatment and disposal elsewhere.
- AQC-1 (4.1.5.11, 4.2.5.5) Leak-proof containers are to be used for the transport of pathogenic materials within facilities (e.g., between laboratories in the same facility). Prior to removal from the containment zone, all contaminated liquid and solid waste (gloves, pipettes, culture media, sample material, etc.) must be decontaminated or procedures must be in place for transporting waste securely to the decontamination area.
- AQC-2 (3.5.3.1, 4.1.5.11, 4.2.5.5) Autoclave or other validated and acceptable means of waste decontamination to be located within the containment zone. If not available in the containment zone, then strict waste control procedures must be implemented for the transport of waste in leak-proof and impact-resistant containers to a suitable autoclave within the facility or off site to a certified waste disposal facility. Leak-proof containers are to be used for the transport of pathogenic materials within facilities (e.g., between laboratories in the same facility). Prior to removal from the containment zone, all contaminated liquid and solid waste (gloves, pipettes, culture media, sample material, etc.) must be decontaminated or procedures must be in place for transporting waste securely to the decontamination area.
- Local Implementation *Biohazardous waste is to be packaged securely for pickup and disposal by a certified waste company. Disposal refers to the final processing step (autoclaving or incineration by Stericycle/Daniels) just prior to landfill. SOPs must include collection, packaging and transport of biohazardous waste. Refer to RMM 502 for guidance <http://www.workingatmcmaster.ca/med/document/RMM-502-Hazardous-Waste-Management-Program-1-36.pdf> Regular laboratory waste containers to be free of any waste described in C-4 Guidelines for the Management of Biomedical Waste in Ontario at <https://www.ontario.ca/document/management-biomedical-waste-ontario> Office waste containers to be free of any regular laboratory waste or biohazardous waste. ALL of your waste containers will be inspected for evidence of improper disposal of wastes. ***ALL of your waste containers will be inspected for evidence of eating in the laboratory.****

29. BSCs and primary containment enclosures must be certified.

- CL1 (NA) A BSC or primary containment enclosure used for BSL1 or lower purposes must be certified upon installation, repair or movement.
- CL2 (3.7.1, 4.6.14, 4.6.15, 4.6.24) BSCs, when present, to be certified upon initial installation, annually, and after any repairs, modification, or relocation. A certified BSC to be used for procedures involving open vessels of infectious material or toxins that: may produce infectious aerosols or aerosolized toxins, when aerosol generation cannot be contained through other methods' involve high concentrations of infectious material or toxins' or involve large volumes of infectious material or toxins. (This is also to include primary containment enclosures)
- PPC Basic (NA) NA
- PPC-1 (3.7.5.3) Recommended - Appropriate primary containment devices to be available (e.g. BSCs), as required, to minimize the potential contamination of the containment zone.
- PPC-2 (3.7.5.3) Appropriate primary containment devices to be available (e.g. BSCs), as required, to minimize the potential contamination of the containment zone.
- AQC-1 (NA) Class I and II BSCs [when used] to be tested in situ in accordance with NSF/ANSI 49-2008.
- AQC-2 (3.5.5.6) Class I and II BSCs to be tested in situ in accordance with NSF/ANSI 49-2008.
- Local Implementation *BSL1 and BSL2 BSCs and primary containment enclosures must be certified upon installation, movement and repair. BSL2 BSCs and primary containment enclosures must also be certified annually. Certification can arranged by the Research Compliance Auditor (carte@mcmaster.ca). For BSCs that are used at Level 1 or Clean, the pressure readings must be monitored to determine if flow is compromised or leaks are present. An SOP for this process is found on the Biosafety Website SOPs page https://biosafety.mcmaster.ca/biosafety_SOPs.htm*

30. BSCs and primary containment enclosures to be used for BSL2, large volumes or aerosol generation. Recommended for use as a sterile field when handling BSL1 or lower cultures.

- CL1 (NA) Although not strictly required, it is recommended that a BSC or primary containment enclosure be used when requiring sterile conditions in which to handle BSL1 or lower cultures.
- CL2 (3.7.1, 4.6.24) Certified BSCs and other primary containment devices to be provided, based on work activities.
- PPC Basic (NA) NA
- PPC-1 (3.7.5.3) Recommended - Appropriate primary containment devices to be available (e.g. BSCs), as required, to minimize the potential contamination of the containment zone.
- PPC-2 (3.7.5.3, 4.2.4.3, 4.2.5.5) Appropriate primary containment devices to be available (e.g. BSCs), as required, to minimize the potential contamination of the containment zone. Where appropriate, BSCs or other primary containment devices are to be used for procedures involving potential allergens and for procedures that involve high concentrations or large volumes of plant pests or their propagules. Packages of pests from foreign sources must be opened in a BSC or a sleeved cage, as appropriate, and packaging material must be decontaminated as soon as possible.

- AQC-1 (NA) Although not strictly required, it is recommended that a BSC or primary containment enclosure be used when requiring sterile conditions in which to handle BSL1 or lower cultures.
- AQC-2 (3.5.5.5, 4.2.5.10) Appropriate primary containment devices to be available (e.g., BSCs), as required, to minimize potential contamination of the containment zone. Primary containment devices (i.e., BSCs) must be used for procedures that may produce aerosols and that involve high concentrations or large volumes of aquatic animal pathogens.
- Local Implementation BSCs or primary containment enclosures are to be used for handling of BSL2 biohazards, when handling large volumes of any BSL infectious material or when aerosol generation is unavoidable. Use of a BSC or primary containment enclosure is recommended when sterile conditions are desired for manipulation of BSL1 or lower cultures. All BSCs and primary containment enclosures are to be registered with the Research Compliance Auditor (carte@mcmaster.ca).

31. Decontamination technologies, to be provided with monitoring and recording devices that capture operational parameters.

- CL1 (NA) NA
- CL2 (3.7.14) Decontamination technologies, to be provided with monitoring and recording devices that capture operational parameters.
- PPC Basic ()
- PPC-1 (3.7.3.1, 3.7.3.3) Autoclave or other validated and acceptable means of waste treatment and disposal are to be located within the containment zone, or if not available in the containment zone, then procedures must be in place to safely transport waste for treatment and disposal elsewhere. Recommended - Autoclave to be equipped with cycle log recorder to record time, temperature and pressure.
- PPC-2 (3.7.3.1, 3.7.3.3) Autoclave or other validated and acceptable means of waste treatment and disposal are to be located within the containment zone, or if not available in the containment zone, then procedures must be in place to safely transport waste for treatment and disposal elsewhere. Autoclave to be equipped with cycle log recorder to record time, temperature and pressure.
- AQC-1 (NA) NA
- AQC-2 (3.5.3.4, 3.5.3.5) Autoclave to be equipped with a cycle log recorder to record time, temperature, and pressure. Waste decontamination processes (heat, chemical, etc.) must be equipped with an appropriate monitoring and recording system in order to capture critical operational parameters such as date, cycle number, time, temperature, chemical concentration and pressure.
- Local Implementation Equipment used for decontamination of wastes or contaminated items must be equipped with monitoring devices such as thermal and pressure probes, where real time results are captured digitally or via printout. Cycle log or pressure and temperature indicator on the autoclave is operational. Biological indicator test log available and maintained. SOPs available and followed. Kettle or pressure-cooker style autoclaves which do not have these, cannot be used for this purpose.

32. Decontamination by autoclaving must be validated.

- CL1 (NA) NA
- CL2 (3.7.15, 4.8.10, 4.8.11, 4.10.9, 5.1.4) An autoclave, where present, to be capable of operating at the appropriate temperature for decontamination, as determined by validation. Decontamination technologies and processes to be validated prior to initial use and when significant changes to the processes are implemented or new pathogens are introduced. Decontamination technologies and processes to be routinely verified, as described in SOPs. Frequency of verification to be determined by a local risk assessment (LRA). Decontamination technology and processes to be validated through the use of representative loads in conjunction with application-specific biological indicators, chemical integrators, and/or parametric monitoring devices consistent with the technology/method. Records of validation and routine verification of decontamination technologies and processes to be kept on file.
- PPC Basic (NA) NA
- PPC-1 (3.7.3.1, 4.1.5.18) Autoclave or other validated and acceptable means of waste treatment and disposal are to be located within the containment zone, or if not available in the containment zone, then procedures must be in place to safely transport waste for treatment and disposal elsewhere. Regularly monitor autoclaves used for decontamination using biological indicators to ensure efficacy (e.g. consider weekly or monthly monitoring, depending on the frequency of use of the autoclave). Monitoring records must be kept for three years.
- PPC-2 (3.7.3.1, 4.1.5.18) Autoclave or other validated and acceptable means of waste treatment and disposal are to be located within the containment zone, or if not available in the containment zone, then procedures must be in place to safely transport waste for treatment and disposal elsewhere. Regularly monitor autoclaves used for decontamination using biological indicators to ensure efficacy (e.g. consider weekly or monthly monitoring, depending on the frequency of use of the autoclave). Monitoring records must be kept for three years.

- AQC-1 (4.2.5.6) Autoclaves and other decontamination processes are to be verified to ensure appropriate operation and validated using representative loads with appropriate biological indicators.
- AQC-2 (4.2.5.6) Autoclaves and other decontamination processes are to be verified to ensure appropriate operation and validated using representative loads with appropriate biological indicators.
- Local Implementation *If biohazardous waste, as defined by <https://www.ontario.ca/document/management-biomedical-waste-ontario> is to be decontaminated on-site, there must be a validated decontamination process in place. Validation requires annual autoclave calibration, the use of monitoring devices and biological indicators. Biological indicator test log available and maintained. Calibration documentation to be available and maintained. Validation is reviewed by the Research Compliance Auditor (carte@mcmaster.ca). Biohazardous waste cannot be discarded in regular waste streams unless the specific criteria and municipal permissions have been met. Otherwise, biohazardous waste is to be discarded per RMM502. Refer to RMM 502 for guidance <http://www.workingatmcmaster.ca/med/document/RMM-502-Hazardous-Waste-Management-Program-1-36.pdf>*

33. Vacuum lines equipped with inline HEPA filters. Drains fitted with soil traps.

- CL1 (NA) Although not strictly required, it is recommended that any vacuum system be fitted with in-line HEPA filters to protect the equipment against liquid aerosols of any kind, regardless of infectious state.
- CL2 (3.7.17, 4.6.39, 5.1.3) Vacuum systems to be equipped with a mechanism that prevents internal contamination. An acceptable mechanism to be utilized for the safe removal of high efficiency particulate air (HEPA) filters. Visual inspections of small in-line filters to be conducted and filters to be replaced in accordance with maintenance schedules or as necessary to maintain function.
- PPC Basic (NA) NA
- PPC-1 (3.7.5.9, 3.7.5.17) Required - Soil traps to be installed in drains as required. Recommended - Vacuum pump contamination to be minimized by filtration of vacuum line and use of disinfectant traps.
- PPC-2 (3.7.5.9, 3.7.5.17) Required - Soil traps to be installed in drains as required. Recommended - Vacuum pump contamination to be minimized by filtration of vacuum line and use of disinfectant traps.
- AQC-1 (NA) Although not strictly required, it is recommended that any vacuum system be fitted with in-line HEPA filters to protect the equipment against liquid aerosols of any kind, regardless of infectious state.
- AQC-2 (NA) Although not strictly required, it is recommended that any vacuum system be fitted with in-line HEPA filters to protect the equipment against liquid aerosols of any kind, regardless of infectious state.
- Local Implementation *All vacuum and exhaust lines on BSL2 process or containment equipment must be equipped with in-line HEPA filters. HEPA filters must be replaced as needed at a minimum, annually and when there is any evidence of deficiencies (filter blockage, failure, wetness, change of colour). Filters to be discarded as solid biohazardous waste. Dates to be written on inline HEPA filters or changed on a schedule appropriate for their use as noted above. HEPA filters should be 0.2um to filter aerosols. Syringe or other filters that are 0.02um are not appropriate for use and may damage equipment. In-line HEPA filters are not required, but are recommended for BSL1 or lower use. SOP for proper removal and disposal of such filters is inspected. Any laboratory working with soil must have all laboratory drains fitted with soil traps. This prevents blockage of plumbing over time. If soil traps are required, contact the office of your area supervisor (i.e. Chair or senior manager) to place a work order for hospital locations, for campus locations please use the Online Service Request <http://facilities.mcmaster.ca/>*

34. Two-way communication to be provided if lab entry and exit procedures are restrictive.

- CL1 (NA) NA
- CL2 (3.7.18) Two-way communication system(s) to be provided inside the containment barrier that allows communication between inside the containment barrier to outside the containment zone, in accordance with function.
- PPC Basic (NA) NA
- PPC-1 (NA) NA
- PPC-2 (NA) NA
- AQC-1 (NA) NA
- AQC-2 (NA) NA
- Local Implementation *A means of communication between inside containment zone and outside containment zone is to be provided if the entry and exit requirements to the room/zone are too restrictive or cumbersome. Examples include the walkie-talkie system used in the animal facilities or phones used in biohazard and nonbiohazard clean rooms.*

35. Proper installation and use of Class II B2 BSCs.

- CL1 (NA) NA
- CL2 (3.7.3) Class II B2 BSCs, where present, to be installed and set-up in a manner to eliminate reversal of airflow from the face of the BSC (i.e., puff-back) during a failure of the heating, ventilation, and air conditioning (HVAC) system or the BSC exhaust fan' where elimination of puff-back cannot be achieved, the risk associated with puff-back to be mitigated through physical and operational means.

- o PPC Basic (NA) NA
- o PPC-1 (NA) NA
- o PPC-2 (NA) NA
- o AQC-1 (NA) NA
- o AQC-2 (NA) NA
- o Local Implementation *Class II B2 BSCs require anti-puffback capabilities. Read your BSC manual to determine which type of BSC you are using.*

36. Process equipment, closed systems, and other primary containment devices to be designed to prevent the release of infectious material or toxins.

- o CL1 (NA) NA
- o CL2 (3.7.4) Process equipment, closed systems, and other primary containment devices to be designed to prevent the release of infectious material or toxins.
- o PPC Basic (NA) NA
- o PPC-1 (NA) NA
- o PPC-2 (NA) NA
- o AQC-1 (NA) NA
- o AQC-2 (CL2-3.7.4) Process equipment, closed systems, and other primary containment devices to be designed to prevent the release of infectious material or toxins.
- o Local Implementation *Any specialized piece of equipment used to process biohazards to be designed in such a way as to prevent the release of the infectious material. The instrument may be a 100% sealed, flow-through system where the infectious waste is captured into a container with disinfectant, or the instrument may be housed in a primary containment enclosure. Prior to purchase of equipment for BSL2 or higher use, contact the Biosafety Manager for consult (robertjv@mcmaster.ca).*

37. BSCs or primary containment enclosures are to be installed away from sources of air movement.

- o CL1 (NA) Where a BSC or primary containment enclosure is used, it is to be installed away from sources of air movement.
- o CL2 (3.7.6) BSCs, where present, to be located as far as possible from high traffic areas, doors, openable windows, and air supply/exhaust diffusers. (This is also to include primary containment enclosures)
- o PPC Basic (NA) NA
- o PPC-1 (NA) NA
- o PPC-2 (NA) NA
- o AQC-1 (NA) Where a BSC or primary containment enclosure is used, it is to be installed away from sources of air movement.
- o AQC-2 (CL2-3.7.6) BSCs, where present, to be located as far as possible from high traffic areas, doors, openable windows, and air supply/exhaust diffusers. (This is also to include primary containment enclosures)
- o Local Implementation *BSCs and primary containment enclosures must not be installed in locations where air is turbulent. The BSC or primary containment enclosure must pass certification in the location. If the turbulence is caused by the routine activities within the laboratory, an SOP must be created and followed to mitigate the risk of aerosol escape and personal exposure.*

38. Centrifuges used for BSL2 materials require safety cups.

- o CL1 (NA) NA
- o CL2 (4.6.28) Centrifugation of infectious material where inhalation is the primary route of infection to be carried out in sealed safety cups (or rotors) that are unloaded in a BSC.
- o PPC Basic (NA) NA
- o PPC-1 (NA) NA
- o PPC-2 (NA) NA
- o AQC-1 (NA) NA
- o AQC-2 (CL2-4.6.28) Centrifugation of infectious material where inhalation is the primary route of infection to be carried out in sealed safety cups (or rotors) that are unloaded in a BSC.
- o Local Implementation *Centrifuges used for BSL2 materials or those organisms infectious via inhalation are to come equipped with safety cups or rotors. Safety cups or rotors must be unloaded in the BSC. Spills in safety cups or rotors must be cleaned. The spill SOP to include spill cleanup in centrifuges and account for safety cup and rotor decontamination and cleanup. For a centrifuge spill SOP, please refer to https://biosafety.mcmaster.ca/documents/doc105_phac_spill_procedures.pdf*

39. BSCs and primary containment enclosures to be properly used.

- o CL1 (NA) Where a BSC or primary containment enclosure is used, it must be kept uncluttered, work must be from clean to dirty, single person use at any time and storage of materials on top of the unit is prohibited.

- CL2 (4.6.7, 4.6.35) Traffic flow patterns from areas of lower contamination (i.e., clean) to areas of higher contamination (i.e., dirty) to be established and followed, as determined by a local risk assessment (LRA). Containment zone (including floors) to be kept clean, free from obstructions, and free from materials that are in excess, not required, or that cannot be easily decontaminated.
- PPC Basic (NA) NA
- PPC-1 (3.7.5.3) Recommended - Appropriate primary containment devices to be available (e.g. BSCs), as required, to minimize the potential contamination of the containment zone.
- PPC-2 (3.7.5.3) Recommended - Appropriate primary containment devices to be available (e.g. BSCs), as required, to minimize the potential contamination of the containment zone.
- AQC-1 (NA) Where a BSC or primary containment enclosure is used, it must be kept uncluttered, work must be from clean to dirty, single person use at any time and storage of materials on top of the unit is prohibited.
- AQC-2 (CL-24.6.7, 4.6.35) Traffic flow patterns from areas of lower contamination (i.e., clean) to areas of higher contamination (i.e., dirty) to be established and followed, as determined by a local risk assessment (LRA). Containment zone (including floors) to be kept clean, free from obstructions, and free from materials that are in excess, not required, or that cannot be easily decontaminated.
- Local Implementation *One person to be working in the BSC at a time. Working inside the BSC should be from clean to dirty. All materials are handled and disposed appropriately. Materials are not to be stored on top of the BSC. Front and back grilles of the BSC must not be blocked. The BSC work area must be free from materials that are in excess or otherwise not required. BSCs and containment devices will be inspected for evidence of proper use.*

40. NSF49 certification is required for BSCs and manufacturer's specs for other primary containment devices.

- CL1 (NA) Where a BSC is used, it is to be NSF49 certified, where possible.
- CL2 (5.1.5, 5.1.6, 5.1.7) Class II biological safety cabinets (BSCs) to be certified in accordance with NSF or ANSI 49, where possible. Verification of the following manufacturer's specifications to be demonstrated, where the design of a BSC or custom ventilated enclosure does not permit certification in accordance with NSF/ANSI 49: integrity of the high efficiency particulate air (HEPA) filters to be tested in accordance with the HEPA filter test method IEST-RP-CC034.3 or equivalent' maintenance of a minimum average inflow velocity of 0.38 m/s (75 ft/min) through the front opening during normal operation to be verified' airflow pattern inside the cabinet and at access opening to ensure no back streaming of air to be demonstrated' integrity of BSCs designed with positive-pressure plenums to be demonstrated by determining that exterior surfaces of all plenums, welds, gaskets, and plenum penetrations or seals, are free of leaks (to be performed during initial installation, if any panels are removed, or if the cabinet is relocated)' and alarms to be demonstrated to function as intended. Integrity of primary containment devices other than BSCs (e.g., process equipment, closed systems, primary containment caging) to be tested in accordance with testing procedures and acceptance criteria appropriate for the equipment and design.
- PPC Basic (NA) NA
- PPC-1 (6.3.4) Testing and certification of BSCs shall be performed in accordance with CSA Z316.3-95 or the applicable NSF Standard. Interlocks (i.e. Class II Type B2 BSC internal cabinet supply fan and exhaust fan) are to be tested in accordance with the applicable NSF standard. Manufacturer's requirements for airflows for BSCs must be met.
- PPC-2 (6.3.4) Testing and certification of BSCs shall be performed in accordance with CSA Z316.3-95 or the applicable NSF Standard. Interlocks (i.e. Class II Type B2 BSC internal cabinet supply fan and exhaust fan) are to be tested in accordance with the applicable NSF standard. Manufacturer's requirements for airflows for BSCs must be met.
- AQC-1 (NA) Where a BSC is used, it is to be NSF49 certified, where possible.
- AQC-2 (3.5.5.6) Class I and II BSCs to be tested in situ in accordance with NSF/ANSI 49-2008.
- Local Implementation *BSCs are to be installed and certified according to NSF49 standards, otherwise by manufacturer's specifications. Certification documentation and BSC history is maintained by the Research Compliance Auditor (carte@mcmaster.ca).*

41. A biosafety program is implemented per RMM600.

- CL1 (3.2.1) A biosafety program that meets the facility's specific biosafety needs should be in place to oversee safety practices. This may be included with, or incorporated into, other safety programs (e.g., occupational health and safety, chemical safety, radiation safety).
- CL2 (4.1.1) A biosafety program to be in place for the oversight of safety and containment practices.
- PPC Basic (NA) A biosafety program is implemented per RMM600.
- PPC-1 (NA) A biosafety program is implemented per RMM600.
- PPC-2 (NA) A biosafety program is implemented per RMM600.
- AQC-1 (NA) The Laboratory Director or the Director's designate(s) is responsible for: aquatic animal pathogens that enter, are held within, or leave the containment zone' compliance with all regulatory requirements' provision of employee training' maintenance of SOPs and the Biosafety Manual' compliance with SOPs and the Biosafety

Manual' determining who is authorized to work in the facility. A BSO or biosafety representative with the authority to oversee biosafety and biosecurity practices must be designated for the containment facility' a biological safety committee may be used to assist the safety program.

- AQC-2 (4.2.2.7, 4.2.2.10) The Laboratory Director or the Director's designate(s) is responsible for: aquatic animal pathogens that enter, are held within, or leave the containment zone' compliance with all regulatory requirements' provision of employee training' maintenance of SOPs and the Biosafety Manual' compliance with SOPs and the Biosafety Manual' determining who is authorized to work in the facility. A BSO or biosafety representative with the authority to oversee biosafety and biosecurity practices must be designated for the containment facility' a biological safety committee may be used to assist the safety program.
- Local Implementation *A biosafety program to be in place for the oversight of safety and containment practices at the individual lab level. Evidence that the policy is implemented is inspected. Refer to RMM 600 for guidance <http://www.workingatmcmaster.ca/med/document/RMM-600-Biosafety-Program-1-36.pdf>*

42. A BUP is completed, up to date and approved.

- CL1 (3.2.1) A biosafety program that meets the facility's specific biosafety needs should be in place to oversee safety practices. This may be included with, or incorporated into, other safety programs (e.g., occupational health and safety, chemical safety, radiation safety).
- CL2 (4.1.3, 4.1.4, 4.1.6, 4.1.7, 4.1.8, 4.1.9) Multiple assessments of risk are required to implement a functioning local biosafety program. A BUP captures all of the required risk assessments.
- PPC Basic ()
- PPC-1 (4.1.2.1, 4.1.5.7) Designate and name a contact person for the facility, or one for each area or experiment. Treat all pests and materials in a containment zone in accordance with the highest containment requirement for that area (e.g. if PPC-1 and PPC-2 pests are in the same room, PPC-2 practices must be followed).
- PPC-2 (4.1.2.1, 4.1.5.7, 4.2.2.3) Designate and name a contact person for the facility, or one for each area or experiment. Designate and name a contact person for the facility, or one for each area or experiment. Treat all pests and materials in a containment zone in accordance with the highest containment requirement for that area (e.g. if PPC-1 and PPC-2 pests are in the same room, PPC-2 practices must be followed). The Laboratory Director or the Director's designate(s) such as supervisors are responsible for: organisms that enter, are held within, or leave the containment zone; compliance with all regulatory requirements; maintenance of SOPs and the Procedures Manual; compliance with SOPs and the Procedures Manual; and determining who is authorized to work in the facility.
- AQC-1 (4.2.2.6) An assessment of hazards for the proposed activities is to be provided. Mitigation and management strategies for the hazards identified are to be incorporated into operational and physical requirements where applicable.
- AQC-2 (4.2.2.6) An assessment of hazards for the proposed activities is to be provided. Mitigation and management strategies for the hazards identified are to be incorporated into operational and physical requirements where applicable.
- Local Implementation *Determine if your laboratory requires a Biohazard Utilization Protocol. Use the applicability tool found here: https://biosafety.mcmaster.ca/documents/doc132_assessment_for_biosafety_program_applicability.pdf Multiple assessments of risk are required to implement a functioning local biosafety program. A BUP captures all of the required risk assessments. BUP queries should be directed to hainesk@mcmaster.ca or visit https://biosafety.mcmaster.ca/biosafety_bup.htm*

43. SOPs are accessible and up to date.

- CL1 (3.2.2) Biosafety policies and procedures should be developed, kept up to date, and incorporated into the facility's existing safety manual, and should include: institutional biosafety policies, programs, and plans, in response to the hazards and appropriate mitigation strategies identified by an overarching risk assessment' safe work practices for each task involving RG1 biological material, based on the hazards identified by LRAs' and SOPs for safe work practices.
- CL2 (4.1.10) A Biosafety Manual to be developed, implemented, kept up to date, made available to personnel inside and outside of containment zone, and to contain institutional biosafety policies, programs, and plans, based on an overarching risk assessment and LRAs. The Biosafety Manual to include: the program intent' a brief description of the physical design and operation of the containment zone and systems' a description of the: biosafety program' biosecurity plan' medical surveillance program' training program' emergency response plan (ERP) and incident reporting procedures' housekeeping program' facility and equipment maintenance program for components of the containment zone, including integrity testing of primary containment devices' and SOPs for safe work practices specific to the containment zone.
- PPC Basic (NA) SOPs are accessible and up to date.
- PPC-1 (NA) SOPs are accessible and up to date.

- PPC-2 (4.2.2.1) A Procedures Manual covering safety and general laboratory and greenhouse operations, including entry and exit protocols and cleaning schedules, must be available to all staff, and its requirements followed; it must be reviewed and updated regularly. The Procedures Manual may consist of a series of Standard Operating Procedures.
- AQC-1 (4.1.2.1, 4.2.2.2) A Biosafety Manual that covers basic safety and general laboratory operations relating to biosafety and biosecurity protocols must be available to all staff in the facility. Entry/exit protocols for persons, animals, equipment, samples, waste, hazardous components, etc., must be written, and followed' general protocols must be supplemented with protocols specific to each project in progress.
- AQC-2 (4.1.2.1, 4.2.2.2) A Biosafety Manual that covers basic safety and general laboratory operations relating to biosafety and biosecurity protocols must be available to all staff in the facility. Entry/exit protocols for persons, animals, equipment, samples, waste, hazardous components, etc., must be written, and followed' general protocols must be supplemented with protocols specific to each project in progress.
- Local Implementation Required SOPs are to be accessible (digital or paper) in the laboratory and kept up to date. SOPs to be reviewed on a specified schedule as declared in the SOPs or otherwise reviewed annually. Review to be documented and dated. If multi-level lab, a schematic of layout of zones to be created and included in orientation SOPs. SOPs policy can be found here: <http://www.workingatmcmaster.ca/med/document/RMM-301-Standard-Operating-Procedures-SOPs-Program-1-36.pdf>

44. SOPs are developed for the work in progress.

- CL1 (3.2.2) Biosafety policies and procedures should be developed, kept up to date, and incorporated into the facility's existing safety manual, and should include: institutional biosafety policies, programs, and plans, in response to the hazards and appropriate mitigation strategies identified by an overarching risk assessment' safe work practices for each task involving RG1 biological material, based on the hazards identified by LRAs' and SOPs for safe work practices.
- CL2 (4.1.10, 4.1.15) A Biosafety Manual to be developed, implemented, kept up to date, made available to personnel inside and outside of containment zone, and to contain institutional biosafety policies, programs, and plans, based on an overarching risk assessment and LRAs. The Biosafety Manual to include: the program intent' a brief description of the physical design and operation of the containment zone and systems' a description of the: biosafety program' biosecurity plan' medical surveillance program' training program' emergency response plan (ERP) and incident reporting procedures' housekeeping program' facility and equipment maintenance program for components of the containment zone, including integrity testing of primary containment devices' and SOPs for safe work practices specific to the containment zone. --- SOPs specific to the nature of the work being conducted in the containment zone to be developed and documented, including: personal protective equipment (PPE) requirements' entry/exit procedures for personnel, animals, and materials' use of primary containment devices' animal work considerations' decontamination and waste management' the safe and secure movement and transportation of infectious material and toxins, and any procedure or task involving infectious material, toxins, and/or infected animals, as determined by an LRA.
- PPC Basic (NA) SOPs are developed for the work in progress.
- PPC-1 (NA) SOPs are developed for the work in progress.
- PPC-2 (4.2.2.1) A Procedures Manual covering safety and general laboratory and greenhouse operations, including entry and exit protocols and cleaning schedules, must be available to all staff, and its requirements followed; it must be reviewed and updated regularly. The Procedures Manual may consist of a series of Standard Operating Procedures.
- AQC-1 (4.1.2.1, 4.2.2.1, 4.2.2.5) A Biosafety Manual that covers basic safety and general laboratory operations relating to biosafety and biosecurity protocols must be available to all staff in the facility. A documented Biosafety Manual must be available for all staff and adhered to' it must be reviewed and updated regularly. This manual must include a brief description of the containment zones and how they operate as well as the containment facility SOPs describing the entire chain of events from receipt of infectious material (e.g., samples, specimens and animals) to decontamination and disposal. Topics covered in SOPs should include staff training, document archiving, entry/exit, spill clean-up, air handling/biosafety cabinet failure, effluent treatment, fire, animal escape and other emergencies, waste treatment, biohazard storage and disposal, etc. Procedures must be in place for the decontamination of exposed surfaces following splashing or spillage of contaminated water or debris in laboratory and live animal holding areas. Procedures must include prevention of release of contaminated materials into drainage systems unless linked to a decontamination system.
- AQC-2 (4.1.2.1, 4.2.2.1, 4.2.2.5) A Biosafety Manual that covers basic safety and general laboratory operations relating to biosafety and biosecurity protocols must be available to all staff in the facility. A documented Biosafety Manual must be available for all staff and adhered to' it must be reviewed and updated regularly. This manual must include a brief description of the containment zones and how they operate as well as the containment facility SOPs describing the entire chain of events from receipt of infectious material (e.g., samples, specimens and

animals) to decontamination and disposal. Topics covered in SOPs should include staff training, document archiving, entry/exit, spill clean-up, air handling/biosafety cabinet failure, effluent treatment, fire, animal escape and other emergencies, waste treatment, biohazard storage and disposal, etc. Procedures must be in place for the decontamination of exposed surfaces following splashing or spillage of contaminated water or debris in laboratory and live animal holding areas. Procedures must include prevention of release of contaminated materials into drainage systems unless linked to a decontamination system.

- **Local Implementation** Each laboratory must have a Biosafety Manual. This manual may be in the form of multiple SOPs and policies, but all must be accessible. Topics include, but are not limited to, biosecurity and accountability for biohazards, emergency procedures, material movement and transport, waste disposal, lab-specific SOPs including equipment manuals and general SOPs to cover all activities undertaken in the laboratory which involve the use of biohazards. An SOP is required whenever there is a risk of harm in a procedure. Some are in the form of RMMs, some templates can be found on the biosafety website under SOPs Docs and Forms, the remainder are lab-specific SOPs generated by the supervisor. RMM for SOPs can be found here: <http://www.workingatmcmaster.ca/med/document/RMM-301-Standard-Operating-Procedures-SOPs-Program-1-36.pdf>

45. Biological inventory available and maintained.

- **CL1 (3.2.2)** Biosafety policies and procedures should be developed, kept up to date, and incorporated into the facility's existing safety manual, and should include: institutional biosafety policies, programs, and plans, in response to the hazards and appropriate mitigation strategies identified by an overarching risk assessment' safe work practices for each task involving RG1 biological material, based on the hazards identified by LRAs' and SOPs for safe work practices.
- **CL2 (4.10.2)** Inventory of pathogens, toxins, and other regulated infectious material in long-term storage to be maintained, including location and risk group(s). Inventory to include pathogens, toxins, and other regulated infectious material stored outside of the containment zone.
- **PPC Basic (NA)** Biological inventory available and maintained.
- **PPC-1 (4.1.2.2, 4.1.5.11)** Keep an up-to-date inventory of all imported plant material and plant pests. Cultures are to be stored in sealed, preferably break resistant, containers such as screw-top vials. Cultures are to be clearly identified and dated. Where possible, petri dish cultures of sporulating fungi should be sealed with stretch film.
- **PPC-2 (4.1.2.2, 4.1.5.11)** Keep an up-to-date inventory of all imported plant material and plant pests. Cultures are to be stored in sealed, preferably break resistant, containers such as screw-top vials. Cultures are to be clearly identified and dated. Where possible, petri dish cultures of sporulating fungi should be sealed with stretch film.
- **AQC-1 (4.2.2.1)** A documented Biosafety Manual must be available for all staff and adhered to' it must be reviewed and updated regularly. This manual must include a brief description of the containment zones and how they operate as well as the containment facility SOPs describing the entire chain of events from receipt of infectious material (e.g., samples, specimens and animals) to decontamination and disposal. Topics covered in SOPs should include staff training, document archiving, entry/exit, spill clean-up, air handling/biosafety cabinet failure, effluent treatment, fire, animal escape and other emergencies, waste treatment, biohazard storage and disposal, etc.
- **AQC-2 (4.2.2.1)** A documented Biosafety Manual must be available for all staff and adhered to' it must be reviewed and updated regularly. This manual must include a brief description of the containment zones and how they operate as well as the containment facility SOPs describing the entire chain of events from receipt of infectious material (e.g., samples, specimens and animals) to decontamination and disposal. Topics covered in SOPs should include staff training, document archiving, entry/exit, spill clean-up, air handling/biosafety cabinet failure, effluent treatment, fire, animal escape and other emergencies, waste treatment, biohazard storage and disposal, etc.
- **Local Implementation** Inventory to be kept for all items applicable under RMM 600. The inventory to have the following characteristics: to be able to identify the items, to be able to locate the items, to be able to determine if an item was lost or stolen.

46. Emergency response plan which incorporates select SOPs is available and used.

- **CL1 (3.2.5)** An ERP, based on an overarching risk assessment and LRAs, should be developed and kept up to date. The ERP should include the name and telephone number of the emergency contact person and describe emergency procedures in the work area for: accidents/incidents' medical emergencies' chemical/biological spills' animal escape (if applicable)' reporting of incidents to the appropriate internal authority' and incident follow-up and recommendations to mitigate future risks.
- **CL2 (4.1.16)** An ERP, based on an overarching risk assessment and LRAs, to be developed, implemented, and kept up to date.
- **PPC Basic (NA)** Emergency response plan which incorporates select SOPs is available and used.
- **PPC-1 (NA)** Emergency response plan which incorporates select SOPs is available and used.
- **PPC-2 (4.2.2.2)** An Emergency Response Plan must be available that describes emergency procedures, including those for accidents, fires, chemical spills, air handling failure, BSC failure, power loss and containment loss. Plans

must cover emergency entry/exit procedures, corrective actions and notification of key personnel and government officials.

- AQC-1 (4.1.2.2, 4.2.2.3, 4.2.2.4) A basic Emergency Response Plan (ERP) must be available that describes emergency procedures in the event of accidents, fires, spills, power loss, and other situations. Plans must cover emergency egress procedures, corrective actions and notification of key personnel. An ERP must be available that describes emergency procedures, including those for accidents, fires, chemical spills, air handling failure, BSC failure, power loss and containment loss. Plans must cover emergency entry/exit procedures, corrective actions and notification of key personnel and appropriate regulatory authorities. In the event of life-threatening emergencies, human health and safety are a priority' exit SOPs must be established whereby routine procedures may be bypassed' a reporting area must be identified where further steps are to be taken (e.g., disinfecting footwear, showering) prior to contact with the surrounding environment and aquatic resources.
- AQC-2 (4.1.2.2, 4.2.2.3, 4.2.2.4) A basic Emergency Response Plan (ERP) must be available that describes emergency procedures in the event of accidents, fires, spills, power loss, and other situations. Plans must cover emergency egress procedures, corrective actions and notification of key personnel. An ERP must be available that describes emergency procedures, including those for accidents, fires, chemical spills, air handling failure, BSC failure, power loss and containment loss. Plans must cover emergency entry/exit procedures, corrective actions and notification of key personnel and appropriate regulatory authorities. In the event of life-threatening emergencies, human health and safety are a priority' exit SOPs must be established whereby routine procedures may be bypassed' a reporting area must be identified where further steps are to be taken (e.g., disinfecting footwear, showering) prior to contact with the surrounding environment and aquatic resources.
- Local Implementation SOPs should be available for accidents and incidents' medical emergencies' chemical and biological spills' animal escape' reporting of incidents to appropriate authority' incident follow-up and recommendations to mitigate future risks. These are to be included in the lab's emergency response plan (ERP). For a description of an ERP, please visit <http://canadianbiosafetystandards.collaboration.gc.ca/cbs-ncb/index-eng.php#a4.9> This and many other editable SOPs can be found on the biosafety website: https://biosafety.mcmaster.ca/biosafety_SOPs.htm

47. Training to be provided and completed for the work assigned.

- CL1 (3.2.6) A training program should be developed to educate personnel on all aspects relevant to the safe handling of RG1 biological materials (e.g., SOPs, potential hazards associated with the work involved, necessary precautions, and the correct use of laboratory equipment). Based on this program, personnel should fulfill all stipulated training requirements before working independently with RG1 biological material.
- CL2 (4.1.14, 4.3.1 to 4.3.10, 4.10.1) A training program, based on a training needs assessment, to be implemented, evaluated and improved as necessary, and kept up to date. Training and refresher training to be documented' records to be kept on file. Personnel to demonstrate knowledge of and proficiency in the SOPs on which they were trained. Trainees to be supervised by authorized personnel when engaging in activities with infectious material and toxins until they have fulfilled the training requirements.
- PPC Basic (NA) Training to be provided and completed for the work assigned.
- PPC-1 (4.1.3) Personnel must be provided with training on pest-associated hazards and the precautions necessary to prevent the release of contained pests. Personnel must show evidence that they know and understand the required precautions' training must be documented' and refresher and retraining programs must be implemented as appropriate.
- PPC-2 (4.1.3, 4.2.3.1) Personnel must be provided with training on pest-associated hazards and the precautions necessary to prevent the release of contained pests. Personnel must show evidence that they know and understand the required precautions' training must be documented' and refresher and retraining programs must be implemented as appropriate. Personnel working in the containment zone must be trained in, and follow, the Standard Operating Procedures for the area. Trainees must be supervised by a trained staff member. Visitors, maintenance staff, janitorial staff and others must be provided with training and/or supervision commensurate with their anticipated activities in the containment zone.
- AQC-1 (4.1.3, 4.2.3.2, 4.2.3.3) Personnel must be trained in, and follow, the SOPs for the area. Personnel must demonstrate that they know and understand the required precautions' training must be documented' and refresher and retraining programs must be implemented as appropriate. All persons (e.g., maintenance staff) entering the containment zone must receive training in the operational procedures for entry and exit' trainees must be accompanied by a trained staff member. Employees working in the containment zone must have general knowledge of the physical operation and design of the facility (filtration and decontamination systems, alarm systems, etc.).
- AQC-2 (4.1.3, 4.2.3.2, 4.2.3.3) Personnel must be trained in, and follow, the SOPs for the area. Personnel must demonstrate that they know and understand the required precautions' training must be documented' and refresher and retraining programs must be implemented as appropriate. All persons (e.g., maintenance staff)

entering the containment zone must receive training in the operational procedures for entry and exit' trainees must be accompanied by a trained staff member. Employees working in the containment zone must have general knowledge of the physical operation and design of the facility (filtration and decontamination systems, alarm systems, etc.).

- Local Implementation Workers to be trained and proficient to undertake their assigned work safely. The supervisor to determine method to evaluate proficiency SOP signoff and training records to reflect that the worker has both knowledge and proficiency in the tasks assigned. SOP signoff sheet example provided at: https://biosafety.mcmaster.ca/documents/doc214_sop_signoff_sheet.xlsx

48. Respiratory protection program to be in place.

- CL1 (NA) NA
- CL2 (4.1.13) A respiratory protection program to be in place when respirators are in use.
- PPC Basic ()
- PPC-1 ()
- PPC-2 ()
- AQC-1 (NA) NA
- AQC-2 (NA) NA
- Local Implementation Where respirators are used, RMM 311 is to be implemented. Program implementation is inspected. Refer to RMM 311 for guidance <http://www.workingatmcmaster.ca/med/document/RMM-311-Respiratory-Protection-Program-1-36.pdf>

49. Medical surveillance program available.

- CL1 (WHO 3rd Ed, p16) Health and medical surveillance: The employing authority, through the laboratory director, is responsible for ensuring that there is adequate surveillance of the health of laboratory personnel. The objective of such surveillance is to monitor for occupationally acquired diseases. Appropriate activities to achieve these objectives are: 1. Provision of active or passive immunization where indicated (see Annex 2) 2. Facilitation of the early detection of laboratory-acquired infections 3. Exclusion of highly susceptible individuals (e.g. pregnant women or immunocompromised individuals) from highly hazardous laboratory work 4. Provision of effective personal protective equipment and procedures.
- CL2 (4.1.12) A medical surveillance program, based on an overarching risk assessment and LRAs, to be developed, implemented, and kept up to date.
- PPC Basic (NA) NA
- PPC-1 (NA) NA
- PPC-2 (NA) NA
- AQC-1 (NA) NA
- AQC-2 (NA) NA
- Local Implementation Medical surveillance to be carried out in all laboratories. All personnel to be informed of the signs and symptoms of infection with the organisms or biohazards in use and self-monitor for symptoms from a potential exposure, (i.e. review of PSDS). Local risk assessment to be performed for persons at-risk or heightened risk of development of disease or increased disease severity to determine risk mitigation and accommodation strategies (i.e. EHS consult for employees or SAS consult for students). If unavailable, PSDS and SDS sheets are to be generated by the supervisor using the PHAC or SDS required headings. Refer to RMM 501 for guidance <http://www.workingatmcmaster.ca/med/document/RMM-501-Hazardous-Materials-Management-1-36.pdf> Not required for facilities only handling organisms that are NOT infectious to humans.

50. Biosecurity plan in place.

- CL1 (NA) NA
- CL2 (4.1.11) A biosecurity plan, based on a biosecurity risk assessment, to be developed, implemented, evaluated and improved as necessary, and kept up to date. The biosecurity plan to include mitigation strategies for the risks associated with: physical security' personnel suitability and reliability' accountability for pathogens, toxins, and other regulated infectious material' inventory' incident and emergency response' and information management.
- PPC Basic (NA) NA
- PPC-1 (NA) NA
- PPC-2 (NA) NA
- AQC-1 (NA) NA
- AQC-2 (CL2-4.1.11) A biosecurity plan, based on a biosecurity risk assessment, to be developed, implemented, evaluated and improved as necessary, and kept up to date. The biosecurity plan to include mitigation strategies for the risks associated with: physical security' personnel suitability and reliability' accountability for pathogens, toxins, and other regulated infectious material' inventory' incident and emergency response' and information management.

- *Local Implementation* Using the biosecurity section of the BUP and further assessment of the work, the workers and the workplace, an overall biosecurity plan is to be put in place. The plan or SOP to be updated regularly. A template is found here https://biosafety.mcmaster.ca/biosafety_SOPs.htm

51. PPE to be decontaminated prior to disposal or reuse.

- CL1 (3.1.13) All clothing and PPE should be decontaminated when a known or suspected exposure has occurred.
- CL2 (4.8.5) All clothing and personal protective equipment (PPE) to be decontaminated when a known or suspected exposure has occurred.
- PPC Basic (NA) PPE to be decontaminated prior to disposal or reuse.
- PPC-1 (NA) PPE to be decontaminated prior to disposal or reuse.
- PPC-2 (4.2.5.7) If there is a risk of disseminating pests in clothing known to be or suspected of being contaminated, such clothing must be decontaminated (e.g. heat-treated, frozen, autoclaved or soaked in a 5% bleach solution) before laundering. Clothing does not need to be decontaminated if there are laundering facilities within the containment zone and the facilities have been proven to be effective in killing the pests in use.
- AQC-1 (4.1.4.3) Gloves must be worn to avoid inadvertent contamination of samples and work areas' gloves are to be removed when leaving the laboratory and decontaminated prior to disposal.
- AQC-2 (4.1.4.3) Gloves must be worn to avoid inadvertent contamination of samples and work areas' gloves are to be removed when leaving the laboratory and decontaminated prior to disposal.
- *Local Implementation* Contaminated reusable PPE to be decontaminated prior to cleaning and re-use. Contaminated disposable PPE to be discarded as solid biohazardous waste. Lab coats suspected of being contaminated must be decontaminated and dried prior to laundering or otherwise discarded as solid biohazardous waste. Contaminated lab coats are not to be submitted for autoclaving unless an Autoclave Validation program is in place (contact the Research Compliance Auditor carte@mcmaster.ca). Lab coats to be labeled to ensure proper routing and return to the laboratory from the laundering services contractors. Contact the Research Compliance Auditor (carte@mcmaster.ca) for the most current information related to lab coat laundering. Refer to RMM 320 for guidance <http://www.workingatmcmaster.ca/med/document/RMM-320-Personal-Protective-Equipment-Program-1-36.pdf>

52. Lab coats and other PPE are to be available and used appropriately.

- CL1 (3.1.7) All personnel, including visitors and trainees, should wear suitable footwear and PPE while inside the work area or while handling RG1 biological material, which may include: closed-toe and closed-heel shoes with no or low heels' dedicated PPE, such as lab coats, aprons, or coveralls worn and stored inside the work area' gloves when handling RG1 pathogens, animals infected with RG1 pathogens, and materials suspected of containing RG1 pathogens' protective eyewear, such as goggles, when there is a risk of exposure to splashes' and full face protection (e.g., face shield) when there is a risk of flying objects.
- CL2 (4.4.1) Appropriate dedicated PPE specific to each containment zone, to be donned in accordance with entry procedures and to be exclusively worn and stored in the containment zone.
- PPC Basic (NA) Lab coats and other PPE are to be available and used appropriately.
- PPC-1 (4.1.4.1) Appropriate protective clothing, properly fastened, must be worn by all personnel, as well as by visitors, trainees and others when working in the facility, to ensure that pests are not inadvertently transported outside of the facility on street clothing.
- PPC-2 (4.1.4.1, 4.2.4.1) Appropriate protective clothing, properly fastened, must be worn by all personnel, as well as by visitors, trainees and others when working in the facility, to ensure that pests are not inadvertently transported outside of the facility on street clothing. Personnel entering the containment zone may need to wear protective clothing up to and including full coverage protective clothing. All protective clothing must be removed prior to exiting the containment zone.
- AQC-1 (4.1.4.1, 4.2.4.1) Appropriate protective clothing, properly fastened, must be worn by all personnel, as well as by visitors, trainees and others, when working in the facility. Persons entering the containment zone must have access to and wear appropriate dedicated protective gear such as gloves, lab coats, boots, coveralls, respirator, and eye protection when required.
- AQC-2 (4.1.4.1, 4.2.4.1) Appropriate protective clothing, properly fastened, must be worn by all personnel, as well as by visitors, trainees and others, when working in the facility. Persons entering the containment zone must have access to and wear appropriate dedicated protective gear such as gloves, lab coats, boots, coveralls, respirator, and eye protection when required.
- *Local Implementation* Lab coats are to be available to both workers and visitors within the laboratory, worn when handling biohazards, decontaminated or discarded appropriately when contaminated and never worn outside of the laboratory. Refer to RMM 320 for guidance <http://www.workingatmcmaster.ca/med/document/RMM-320-Personal-Protective-Equipment-Program-1-36.pdf>

53. Face and eye protection to be available and used where appropriate.

- CL1 (3.1.7) All personnel, including visitors and trainees, should wear suitable footwear and PPE while inside the work area or while handling RG1 biological material, which may include: closed-toe and closed-heel shoes with no or low heels' dedicated PPE, such as lab coats, aprons, or coveralls worn and stored inside the work area' gloves when handling RG1 pathogens, animals infected with RG1 pathogens, and materials suspected of containing RG1 pathogens' protective eyewear, such as goggles, when there is a risk of exposure to splashes' and full face protection (e.g., face shield) when there is a risk of flying objects.
- CL2 (4.4.2) Face protection to be used where there is a risk of exposure to splashes or flying objects.
- PPC Basic (NA) Face and eye protection to be available and used where appropriate.
- PPC-1 (NA) Face and eye protection to be available and used where appropriate.
- PPC-2 (4.2.4.1) Personnel entering the containment zone may need to wear protective clothing up to and including full coverage protective clothing. All protective clothing must be removed prior to exiting the containment zone.
- AQC-1 (4.1.4.1, 4.2.4.1) Appropriate protective clothing, properly fastened, must be worn by all personnel, as well as by visitors, trainees and others, when working in the facility. Persons entering the containment zone must have access to and wear appropriate dedicated protective gear such as gloves, lab coats, boots, coveralls, respirator, and eye protection when required.
- AQC-2 (4.1.4.1, 4.2.4.1) Appropriate protective clothing, properly fastened, must be worn by all personnel, as well as by visitors, trainees and others, when working in the facility. Persons entering the containment zone must have access to and wear appropriate dedicated protective gear such as gloves, lab coats, boots, coveralls, respirator, and eye protection when required.
- Local Implementation *Goggles, glasses and/or face shields are to be available in the laboratory where there is a risk of exposure to splashes or flying objects. Working with liquid nitrogen requires full face protection. Refer to RMM 310 for guidance <http://www.workingatmcmaster.ca/med/document/RMM-310-Eye-Protection-Program-1-36.pdf>*

54. **Gloves are to be available and used appropriately.**

- CL1 (3.1.7, 3.1.12) All personnel, including visitors and trainees, should wear suitable footwear and PPE while inside the work area or while handling RG1 biological material, which may include: closed-toe and closed-heel shoes with no or low heels' dedicated PPE, such as lab coats, aprons, or coveralls worn and stored inside the work area' gloves when handling RG1 pathogens, animals infected with RG1 pathogens, and materials suspected of containing RG1 pathogens' protective eyewear, such as goggles, when there is a risk of exposure to splashes' and full face protection (e.g., face shield) when there is a risk of flying objects.
- CL2 (4.4.4) Gloves to be worn when handling infectious material, toxins, or infected animals.
- PPC Basic (NA) Gloves are to be available and used appropriately.
- PPC-1 (4.1.4.3) Gloves can be worn, as appropriate, to avoid inadvertent contamination of samples and work areas' gloves are to be removed when leaving the containment zone and decontaminated, as appropriate, along with other laboratory wastes prior to disposal.
- PPC-2 (4.1.4.3, 4.2.4.1) Gloves can be worn, as appropriate, to avoid inadvertent contamination of samples and work areas' gloves are to be removed when leaving the containment zone and decontaminated, as appropriate, along with other laboratory wastes prior to disposal. Personnel entering the containment zone may need to wear protective clothing up to and including full coverage protective clothing. All protective clothing must be removed prior to exiting the containment zone.
- AQC-1 (4.1.4.3, 4.2.4.1) Gloves must be worn to avoid inadvertent contamination of samples and work areas' gloves are to be removed when leaving the laboratory and decontaminated prior to disposal. Persons entering the containment zone must have access to and wear appropriate dedicated protective gear such as gloves, lab coats, boots, coveralls, respirator, and eye protection when required.
- AQC-2 (4.1.4.3, 4.2.4.1) Gloves must be worn to avoid inadvertent contamination of samples and work areas' gloves are to be removed when leaving the laboratory and decontaminated prior to disposal. Persons entering the containment zone must have access to and wear appropriate dedicated protective gear such as gloves, lab coats, boots, coveralls, respirator, and eye protection when required.
- Local Implementation *Appropriately selected gloves are to be available within the laboratory, worn when handling biohazards, chemicals or physical hazards such as hot and cold items. Special thermal gloves to be worn when unloading autoclaves or handling liquid nitrogen. Gloves, if disposable, are to be discarded appropriately when contaminated and never worn outside of the laboratory. Refer to RMM 321 for guidance <http://www.workingatmcmaster.ca/med/document/RMM-321-Hand-Protection-Program-1-36.pdf>*

55. **Gloves to be removed and disposed properly prior to exit.**

- CL1 (3.1.12) Disposable gloves used when handling RG1 biological material should be discarded after use.
- CL2 (4.5.14, 4.5.15) Personnel to doff dedicated PPE, in a manner that minimizes contamination of the skin and hair, when exiting the containment zone. Personnel to remove gloves and wash hands when exiting the containment zone, animal room, animal cubicle, or PM room.

- PPC Basic (NA) Gloves to be removed and disposed properly prior to exit.
- PPC-1 (4.1.4.3) Gloves can be worn, as appropriate, to avoid inadvertent contamination of samples and work areas' gloves are to be removed when leaving the containment zone and decontaminated, as appropriate, along with other laboratory wastes prior to disposal.
- PPC-2 (4.1.4.3, 4.2.4.1) Gloves can be worn, as appropriate, to avoid inadvertent contamination of samples and work areas' gloves are to be removed when leaving the containment zone and decontaminated, as appropriate, along with other laboratory wastes prior to disposal. Personnel entering the containment zone may need to wear protective clothing up to and including full coverage protective clothing. All protective clothing must be removed prior to exiting the containment zone.
- AQC-1 (4.1.4.3) Gloves must be worn to avoid inadvertent contamination of samples and work areas' gloves are to be removed when leaving the laboratory and decontaminated prior to disposal.
- AQC-2 (4.1.4.3) Gloves must be worn to avoid inadvertent contamination of samples and work areas' gloves are to be removed when leaving the laboratory and decontaminated prior to disposal.
- Local Implementation *Gloves to be removed and disposed properly prior to exit. Gloves are not to be worn or disposed outside the laboratory. Poster found here:*
https://www.publichealthontario.ca/en/eRepository/ECT_Steps_Gloves_Doffing_2013.pdf

56. PPE to be removed and stored or disposed properly.

- CL1 (3.1.14) Personnel should doff PPE in a manner that minimizes contamination of the skin and hair.
- CL2 (4.5.14) Personnel to doff dedicated PPE, in a manner that minimizes contamination of the skin and hair, when exiting the containment zone.
- PPC Basic ()
- PPC-1 (4.1.4.2) Potentially contaminated laboratory clothing must not be worn in non-laboratory, non-greenhouse, non-screen house areas if this presents a risk of inadvertently disseminating pests.
- PPC-2 (4.1.4.2) Potentially contaminated laboratory clothing must not be worn in non-laboratory, non-greenhouse, non-screen house areas if this presents a risk of inadvertently disseminating pests.
- AQC-1 (4.1.4.2, 4.1.4.3, 4.2.4.2) Laboratory clothing must not be worn in non-laboratory areas' laboratory clothing must be stored separately from street clothing. Gloves must be worn to avoid inadvertent contamination of samples and work areas' gloves are to be removed when leaving the laboratory and decontaminated prior to disposal. Personnel must remove all clothing dedicated to the containment zone before exiting. Contaminated clothing must be autoclaved prior to laundering (unless laundering facilities are located within the containment perimeter and have been proven to be effective in decontamination). Some activities and/or projects may require more thorough entry and/or exit procedures.
- AQC-2 (4.1.4.2, 4.1.4.3, 4.2.4.2) Laboratory clothing must not be worn in non-laboratory areas' laboratory clothing must be stored separately from street clothing. Gloves must be worn to avoid inadvertent contamination of samples and work areas' gloves are to be removed when leaving the laboratory and decontaminated prior to disposal. Personnel must remove all clothing dedicated to the containment zone before exiting. Contaminated clothing must be autoclaved prior to laundering (unless laundering facilities are located within the containment perimeter and have been proven to be effective in decontamination). Some activities and/or projects may require more thorough entry and/or exit procedures.
- Local Implementation *PPE to be removed and stored or disposed properly. SOP for proper donning and doffing of PPE to be available.*

57. Personal belongings stored appropriately.

- CL1 (3.1.8) Personal belongings (e.g., purses, backpacks, personal electronic devices) and street clothing (e.g., coats, scarves) should be stored separately from dedicated PPE and away from work stations where RG1 biological material is handled.
- CL2 (4.5.10, 4.5.11, 4.5.12) Personal clothing to be stored separately from dedicated PPE. Personal belongings to be kept separate from areas where infectious material or toxins are handled or stored. Personal belongings not required for work to be left outside the Small Animal containment zone or in change areas outside the Small Animal containment barrier.
- PPC Basic ()
- PPC-1 ()
- PPC-2 ()
- AQC-1 (4.1.4.2, 4.2.1.1, 4.2.5.1) Laboratory clothing must not be worn in non-laboratory areas' laboratory clothing must be stored separately from street clothing. Personnel may not bring unnecessary personal belongings (e.g., hats, coats, purses) into the containment zone.
- AQC-2 (4.1.4.2, 4.2.1.1, 4.2.5.1) Laboratory clothing must not be worn in non-laboratory areas' laboratory clothing must be stored separately from street clothing. Personnel may not bring unnecessary personal belongings (e.g., hats, coats, purses) into the containment zone.

- Local Implementation *Personal items to be stored outside the laboratory or in designated non-biohazard areas (desk areas) inside the laboratory. No personal items allowed in the animal facilities.*

58. Laboratory area restricted to authorized personnel.

- CL1 (3.2.10) Access to work areas should be limited to authorized personnel and authorized visitors.
- CL2 (4.5.2) Access to containment zone to be limited to authorized personnel and authorized visitors.
- PPC Basic ()
- PPC-1 ()
- PPC-2 ()
- AQC-1 (4.1.1) Access to laboratory and support areas is limited to authorized personnel. Entry must be limited to facility staff, maintenance staff and personnel with the appropriate training. Visitors and any untrained personnel must be escorted by trained staff in order to work in the containment facility.
- AQC-2 (3.5.1.5) Access limited to authorized personnel. Entry must be limited to facility staff, maintenance staff and personnel with the appropriate training. Visitors and any untrained personnel must be escorted by trained staff in order to work in the containment facility.
- Local Implementation *Laboratory area restricted to authorized personnel. Door signage to include the words Authorized Personnel Only. Laminated door signage provided by the Research Compliance Auditor (carte@mcmaster.ca) Workers section of BUP to be kept updated.*

59. Visitors log to be kept.

- CL1 (3.2.10) Access to work areas should be limited to authorized personnel and authorized visitors.
- CL2 (4.5.2) Access to containment zone to be limited to authorized personnel and authorized visitors.
- PPC Basic ()
- PPC-1 ()
- PPC-2 ()
- AQC-1 (4.2.1.1) Entry must be limited to facility staff, maintenance staff and personnel with the appropriate training. Visitors and any untrained personnel must be escorted by trained staff in order to work in the containment facility.
- AQC-2 (4.2.1.1) Entry must be limited to facility staff, maintenance staff and personnel with the appropriate training. Visitors and any untrained personnel must be escorted by trained staff in order to work in the containment facility.
- Local Implementation *A visitor is an untrained person who is present in the laboratory for observational purposes and does not participate in any hazardous work activities. Logs of visitors to the laboratory to be kept and maintained. One log per lab is sufficient, a per-room log is not necessary.
https://biosafety.mcmaster.ca/documents/doc177_visitor_log.docx*

60. Open flames to be avoided.

- CL1 (3.1.0) In the event that work with RG1 biological material is performed inside a biological safety cabinet (BSC), the use of open flames inside the BSC should be avoided so that the protective airflow patterns of the BSC are not disrupted, or the BSC and its filters are not damaged by the flames.
- CL2 (4.6.30) Use of on-demand open flames in a BSC to be strictly limited and avoided when suitable alternatives are available' sustained open flames to be prohibited in a BSC.
- PPC Basic ()
- PPC-1 ()
- PPC-2 ()
- AQC-1 (CL1-3.1.0) In the event that work with RG1 biological material is performed inside a biological safety cabinet (BSC), the use of open flames inside the BSC should be avoided so that the protective airflow patterns of the BSC are not disrupted, or the BSC and its filters are not damaged by the flames.
- AQC-2 (CL2-4.6.30) Use of on-demand open flames in a BSC to be strictly limited and avoided when suitable alternatives are available' sustained open flames to be prohibited in a BSC.
- Local Implementation *Use of open flames in a BSC to be avoided wherever possible. Micro incinerators and disposable loops preferred. Refer to poster Procedures to Minimize Aerosols supplied by the Research Compliance Auditor (carte@mcmaster.ca) or downloaded from here
https://biosafety.mcmaster.ca/documents/doc047_PHAC_procedures_to_minimize_aerosol_hazards.pdf*

61. Oral pipetting prohibited.

- CL1 (3.1.1) Oral pipetting should be strictly prohibited.
- CL2 (4.6.5) Oral pipetting of any substance to be prohibited.
- PPC Basic ()
- PPC-1 ()
- PPC-2 ()
- AQC-1 (4.1.5.13) Oral pipetting of any substance is prohibited in containment areas.

- o AQC-2 (4.1.5.13) Oral pipetting of any substance is prohibited in containment areas.
- o Local Implementation *Oral pipetting is prohibited. This and other good practices are found in the poster Biosafety in the Laboratory. A laminated copy is provided by the Research Compliance Auditor (carte@mcmaster.ca) or can be downloaded here https://biosafety.mcmaster.ca/documents/doc012_biosafety_in_the_laboratory_PHAC.pdf*

62. Work surfaces to be decontaminated after every use.

- o CL1 (3.1.10) After work with RG1 biological material is complete, work surfaces should be cleaned and disinfected using an appropriate disinfectant and contact time. All items that have come in contact with biological material, including liquid and solid waste, should be decontaminated after use or prior to disposal.
- o CL2 (4.6.11) Work surfaces to be cleaned and decontaminated with a disinfectant effective against the pathogen(s) in use, or a neutralizing chemical effective against the toxin(s) in use, at a frequency to minimize the potential of exposure to infectious material or toxins.
- o PPC Basic ()
- o PPC-1 ()
- o PPC-2 ()
- o AQC-1 (4.1.5.10) Contaminated work surfaces must be decontaminated with an appropriate disinfectant.
- o AQC-2 (4.1.5.10) Contaminated work surfaces must be decontaminated with an appropriate disinfectant.
- o Local Implementation *Work surfaces are to be decontaminated after use or a spill. Disinfectants to be available in the work area. Work surfaces and immediate work areas (benching, BSC catchbasin, floors by benching, BSC, incubators and freezers) inspected for evidence of a spill. Requirement for work surface decontamination is included in the PHAC poster Biosafety In The Laboratory (https://biosafety.mcmaster.ca/documents/doc012_biosafety_in_the_laboratory_PHAC.pdf) provided by the Research Compliance Auditor (carte@mcmaster.ca).*

63. Hands to be washed after removing gloves, after handling infectious materials and prior to exit of the laboratory.

- o CL1 (3.1.11) Hands should be washed with soap and water for 30-45 seconds after handling RG1 biological material (if gloves are not worn), immediately after removing gloves, and before leaving the work area.
- o CL2 (4.6.27) Personnel to remove gloves and wash hands when exiting the containment zone, animal room, animal cubicle, or PM room. Personnel to wash hands after completing tasks that involve the handling of infectious material or toxins and before undertaking other tasks in the containment zone.
- o PPC Basic ()
- o PPC-1 ()
- o PPC-2 ()
- o AQC-1 (4.1.5.6) Hands must be washed after removing gloves and before leaving the containment zone.
- o AQC-2 (4.1.5.6) Hands must be washed after removing gloves and before leaving the containment zone.
- o Local Implementation *Hands to be washed after handling biohazards and prior to exit of the laboratory. Soap and paper towels or hand dryer to be available. Hand sanitizer acceptable alternative until an appropriate handwashing sink can be reached. Laminated handwashing poster to be posted and provided by the Research Compliance Auditor (carte@mcmaster.ca).*

64. Sharps to be used appropriately.

- o CL1 (3.1.15) Safe work practices for handling sharps should be developed and strictly followed, and should include: actively avoiding the use of needles, syringes, and other sharps' wherever possible, safe alternatives or safety-engineered sharps devices should be used to prevent injury' refraining from bending, shearing, breaking, or recapping needles, or removing needles from their syringes' collecting and removing sharp objects (e.g., broken glassware) with a brush and dustpan, or tongs' and discarding used sharps (e.g., scalpel blades, syringes) and other sharp objects (e.g., broken glassware, pipette tips, broken pipettes) in appropriate puncture-resistant sharps containers.
- o CL2 (4.6.9, 4.6.10) Use of needles, syringes, and other sharp objects to be strictly limited and avoided when suitable alternatives are available. Bending, shearing, re-capping, or removing needles from syringes to be avoided, and, when necessary, performed only as specified in SOPs.
- o PPC Basic ()
- o PPC-1 ()
- o PPC-2 ()
- o AQC-1 (4.1.5.14) The use of needles, syringes and other sharp objects should be limited to where necessary.
- o AQC-2 (4.1.5.14) The use of needles, syringes and other sharp objects should be limited to where necessary.
- o Local Implementation *Proper use of sharps container to be evident. Proper disposal of sharps to be evident. Improper use of sharps will be inspected. Recapped needles in sharps containers will be inspected. BSC catchbasin will be inspected for sharps. Sharps-related information to be posted in labs. SOP for sharps can be based on <http://fhs.mcmaster.ca/safetyoffice/documents/NeedlesandSharpsandoutpage.pdf> Sharps poster:*

<http://www.workingatmcmaster.ca/med/document/Sharps-Poster-1-36.pdf> Poster including disposal of sharps
https://biosafety.mcmaster.ca/documents/doc097_culture_room_signs.pdf

65. Eating and drinking is prohibited in the laboratory work area where infectious materials are handled or stored.

- CL1 (3.1.2) Eating, drinking, smoking, storing food and utensils, applying cosmetics, or handling contact lenses should be strictly prohibited in work areas.
- CL2 (4.6.1) Contact of the face or mucous membranes with items contaminated or potentially contaminated with pathogens or toxins to be prohibited.
- PPC Basic ()
- PPC-1 (4.1.5.5) Eating, chewing gum, drinking, smoking, storing of food and utensils, storing of personal belongings, applying cosmetics and inserting and removing contact lenses should not occur in the containment zone. The wearing of contact lenses is recommended only when other forms of corrective eyewear are not suitable.
- PPC-2 (4.1.5.5) Eating, chewing gum, drinking, smoking, storing of food and utensils, storing of personal belongings, applying cosmetics and inserting and removing contact lenses should not occur in the containment zone. The wearing of contact lenses is recommended only when other forms of corrective eyewear are not suitable.
- AQC-1 (4.1.5.4) Eating, chewing gum, drinking, smoking, storing of food and utensils, storing of personal belongings, applying cosmetics, and inserting or removing contact lenses is not to occur in the laboratory or containment zone. The wearing of contact lenses is recommended only when other forms of corrective eyewear are not suitable.
- AQC-2 (4.1.5.4) Eating, chewing gum, drinking, smoking, storing of food and utensils, storing of personal belongings, applying cosmetics, and inserting or removing contact lenses is not to occur in the laboratory or containment zone. The wearing of contact lenses is recommended only when other forms of corrective eyewear are not suitable.
- Local Implementation *Eating, drinking, inserting or removing contact lenses or applying makeup is prohibited in work areas. This and other good practices are found in the poster Biosafety in the Laboratory. A laminated copy is provided by the Research Compliance Auditor (carte@mcmaster.ca) or can be downloaded here https://biosafety.mcmaster.ca/documents/doc012_biosafety_in_the_laboratory_PHAC.pdf*

66. Long hair to be restrained.

- CL1 (3.1.3) Hair (including beards) should be restrained (e.g., hair tied or clipped back) or covered to prevent contact with specimens, containers, or equipment when working with RG1 biological material
- CL2 (4.6.2) Hair that may become contaminated when working in the containment zone to be restrained or covered.
- PPC Basic ()
- PPC-1 (4.1.5.6) Long hair is to be tied back or restrained so that it cannot come into contact with hands, specimens, containers or equipment in view of the potential for disseminating pests.
- PPC-2 (4.1.5.6) Long hair is to be tied back or restrained so that it cannot come into contact with hands, specimens, containers or equipment in view of the potential for disseminating pests.
- AQC-1 (4.1.5.5) Long hair is to be tied back or restrained so that it cannot come into contact with hands, specimens, containers or equipment.
- AQC-2 (4.1.5.5) Long hair is to be tied back or restrained so that it cannot come into contact with hands, specimens, containers or equipment.
- Local Implementation *Long hair is to be restrained or covered when working with biohazards. Ensure the poster Biosafety in the Laboratory is posted in the laboratory. Laminated copies can be obtained from the Research Compliance Auditor (carte@mcmaster.ca) or downloaded from here https://biosafety.mcmaster.ca/documents/doc012_biosafety_in_the_laboratory_PHAC.pdf*

67. Jewelry to be removed where its use creates a risk of exposure.

- CL1 (3.1.4) Jewelry that may come in contact with biological material being handled (e.g., rings or long necklaces) or puncture protective gloves should not be worn while handling RG1 biological material.
- CL2 (4.6.4) Personnel to remove jewelry before entering the containment zone where prions are handled.
- PPC Basic ()
- PPC-1 ()
- PPC-2 ()
- AQC-1 (NA) Jewelry to be removed if it interferes with the PPE or the safety procedures. This and other good practices are found in the poster Biosafety in the Laboratory. A laminated copy is provided by the Research Compliance Auditor (carte@mcmaster.ca) or can be downloaded here: https://biosafety.mcmaster.ca/documents/doc012_biosafety_in_the_laboratory_PHAC.pdf

- AQC-2 (NA) Jewelry to be removed if it interferes with the PPE or the safety procedures. This and other good practices are found in the poster Biosafety in the Laboratory. A laminated copy is provided by the Research Compliance Auditor (carte@mcmaster.ca) or can be downloaded here:
https://biosafety.mcmaster.ca/documents/doc012_biosafety_in_the_laboratory_PHAC.pdf
- Local Implementation Jewelry to be removed if it interferes with the PPE or the safety procedures. This and other good practices are found in the poster Biosafety in the Laboratory. A laminated copy is provided by the Research Compliance Auditor (carte@mcmaster.ca) or can be downloaded here:
https://biosafety.mcmaster.ca/documents/doc012_biosafety_in_the_laboratory_PHAC.pdf

68. Open wounds to be covered with waterproof dressings.

- CL1 (3.1.5) Open wounds, cuts, scratches, and grazes should be covered with waterproof dressings.
- CL2 (4.6.6) Open wounds, cuts, scratches, and grazes to be covered with waterproof dressings.
- PPC Basic ()
- PPC-1 ()
- PPC-2 ()
- AQC-1 (4.1.5.15) Open wounds, cuts, scratches and grazes should be covered with waterproof dressings.
- AQC-2 (4.1.5.15) Open wounds, cuts, scratches and grazes should be covered with waterproof dressings.
- Local Implementation Open wounds to be completely covered with waterproof dressings. A waterproof dressing is any (1) bandage that is labelled as waterproof or (2) any dressing completely covered by waterproof tape. This and other good practices are found in the poster Biosafety in the Laboratory. A laminated copy is provided by the Research Compliance Auditor (carte@mcmaster.ca) or can be downloaded here:
https://biosafety.mcmaster.ca/documents/doc012_biosafety_in_the_laboratory_PHAC.pdf

69. Laboratory working areas to be uncluttered.

- CL1 (3.1.6) Work stations (e.g., benchtops) should be kept clean and uncluttered to avoid cross-contamination and facilitate cleaning and disinfection.
- CL2 (4.6.35) Containment zone (including floors) to be kept clean, free from obstructions, and free from materials that are in excess, not required, or that cannot be easily decontaminated.
- PPC Basic ()
- PPC-1 ()
- PPC-2 ()
- AQC-1 (CL1-3.1.6) Work stations (e.g., benchtops) should be kept clean and uncluttered to avoid cross-contamination and facilitate cleaning and disinfection.
- AQC-2 (CL2-4.6.35) Containment zone (including floors) to be kept clean, free from obstructions, and free from materials that are in excess, not required, or that cannot be easily decontaminated.
- Local Implementation Clutter in the BSC reduces the ability of the protective air curtain to stay intact. Clutter in the laboratory aisles creates a trip hazard. Clutter in and around equipment blocks heat exhaust grilles and decreases the life or may even damage equipment. Clutter on work surfaces leads to errors, accidents and cross-contamination and potentially exposure. Discard unnecessary items. Cardboard storage boxes in laboratories, especially around work areas where biohazards are handled, can easily become contaminated and cannot be decontaminated. It is strongly recommended that cardboard storage boxes be reduced as much as possible and stored on shelves, not on floors. Cardboard in walk-in cold rooms is prohibited as it encourages the growth of mold. Any kits in cardboard boxes are to be stored inside closeable plastic containers or bags. In the laboratory, it is recognized that cardboard biohazard boxes are stored on the floor in the immediate area where infectious materials are handled. In this case, in the event of contamination, (1) the bag must be closed and surface decontaminated, (2) the bag must be placed into a new biohazard bag/box and (3) the contaminated biohazard box must be broken down safely and discarded as biohazardous solid waste.

70. Appropriate footwear to be worn.

- CL1 (3.1.7) All personnel, including visitors and trainees, should wear suitable footwear and PPE while inside the work area or while handling RG1 biological material, which may include: closed-toe and closed-heel shoes with no or low heels' dedicated PPE, such as lab coats, aprons, or coveralls worn and stored inside the work area' gloves when handling RG1 pathogens, animals infected with RG1 pathogens, and materials suspected of containing RG1 pathogens' protective eyewear, such as goggles, when there is a risk of exposure to splashes' and full face protection (e.g., face shield) when there is a risk of flying objects.
- CL2 (4.6.3) Type of footwear worn to be selected to prevent injuries and incidents, in accordance with containment zone function.
- PPC Basic ()
- PPC-1 ()
- PPC-2 ()

- AQC-1 (4.1.4.4) Only completely enclosed (toes and heels) footwear with low heels must be worn in containment areas.
- AQC-2 (4.1.4.4) Only completely enclosed (toes and heels) footwear with low heels must be worn in containment areas.
- Local Implementation *Completely enclosed footwear prevents exposure, contamination, or injury to the feet. Non-slip footwear, with low or no heels, prevents slipping or tripping and enhances personnel safety. Choice of protective footwear is to be chosen according to the work function. Door signage to include requirement for appropriate footwear in the laboratory. Refer to RMM 312*
<http://www.workingatmcmaster.ca/med/document/RMM-312-Foot-Protection-Program-1-36.pdf>

71. Procedures to prevent a spill or loss of a containment while working with or transporting biohazards, infectious animals or plant pests to be implemented.

- CL1 (3.1.9) The following practices should be used to establish aseptic technique: clean and disinfect work surfaces before handling RG1 biological material and after any spills' perform work close to a flame (e.g., Bunsen burner) while vessels of RG1 biological material are opened on a benchtop' flame the neck of bottles or tubes to create an airflow that is outwards from the vessel upon opening' and procedures should be performed in a manner that minimizes the risk of producing splashes and aerosols.
- CL2 (4.6.31) Procedures, as determined by an LRA, to be in place to prevent a leak, drop, spill, or similar event during the movement of infectious material or toxins within the containment zone or between containment zones within a building.
- PPC Basic ()
- PPC-1 (4.1.5.3) Employ good laboratory practices to prevent the escape of pests.
- PPC-2 (4.1.5.3) Employ good laboratory practices to prevent the escape of pests.
- AQC-1 (4.1.5.7, 4.1.5.11, 4.2.5.8) All handling procedures must be designed and carried out to minimize the creation of aerosols. Leak-proof containers are to be used for the transport of pathogenic materials within facilities (e.g., between laboratories in the same facility). Leak-proof containers are to be used for the transport of infectious materials within facilities (e.g., between laboratories in the same facility). Infectious materials to be transported from the facility must be done in accordance and compliance with the appropriate regulatory authority (e.g., Transportation of Dangerous Goods Regulations).
- AQC-2 (4.1.5.7, 4.1.5.11, 4.2.5.8) All handling procedures must be designed and carried out to minimize the creation of aerosols. Leak-proof containers are to be used for the transport of pathogenic materials within facilities (e.g., between laboratories in the same facility). Leak-proof containers are to be used for the transport of infectious materials within facilities (e.g., between laboratories in the same facility). Infectious materials to be transported from the facility must be done in accordance and compliance with the appropriate regulatory authority (e.g., Transportation of Dangerous Goods Regulations).
- Local Implementation *Procedures for handling and transporting biohazards, infectious animals and plant pests to be implemented to prevent a spill. Work surfaces, inside centrifuges, BSC work surfaces, BSC catchbasin, flooring around BSCs, incubators and shakers are all inspected for evidence of a spill. Please ensure all workers have watched this video: <https://www.youtube.com/watch?v=fnGy8rCjNu4> It is recommended that the catchbasin of the BSC be cleaned every few months. SOP for cleaning catchbasin is found here https://biosafety.mcmaster.ca/documents/biosafety_sop_0010_cleaning_bsc_catchbasin.docx SOP for transporting biohazardous samples is found here https://biosafety.mcmaster.ca/documents/biosafety_sop_0005_transportation_and_movement_of_biohazards.docx Arthropod laboratories will be inspected for arthropod carcasses and evidence of escape.*

72. Appropriate sample storage outside containment zone

- CL1 (3.2.10) Access to work areas should be limited to authorized personnel and authorized visitors. (It is assumed that this implies access to the biohazards within the work areas and by consequence biohazards outside the work areas.)
- CL2 (4.6.19, 4.6.20) Samples of pathogens, toxins, or other regulated infectious material to be opened only in containment zones that meet the containment level requirements to which that infectious material or toxin has been assigned. Containers of pathogens, toxins, or other regulated infectious material stored outside the containment zone to be labelled, leak-proof, impact resistant, and kept either in locked storage equipment or within an area with limited access.
- PPC Basic ()
- PPC-1 ()
- PPC-2 ()
- AQC-1 (CL1-3.2.10) Access to work areas should be limited to authorized personnel and authorized visitors. It is assumed that access implies access to the biohazards within the work areas. Therefore any biohazardous items

stored outside the laboratory are to be labelled with the biohazard symbol and kept locked or kept in a locked room. to prevent unauthorized access to the materials.

- AQC-2 (CL2-4.6.19, 4.6.20) Samples of pathogens, toxins, or other regulated infectious material to be opened only in containment zones that meet the containment level requirements to which that infectious material or toxin has been assigned. Containers of pathogens, toxins, or other regulated infectious material stored outside the containment zone to be labelled, leak-proof, impact resistant, and kept either in locked storage equipment or within an area with limited access.
- Local Implementation *Hallway freezers/fridges and walk-in cold/warm rooms containing risk group 2 materials, or any items legally requiring secure storage, must be secured at all times if located in an unsecured area. All biohazard hallway freezer/fridges, irrespective of contents, to be registered and signed with appropriate biohazard signage provided by carte@mcmaster.ca and added to your BUP. Signage to include biohazard symbol, local contact information and the phrase 'authorized personnel only'. If storing plants, seeds, plant pests or organisms infectious to plants or aquatic animals, please verify federal or provincial biosecurity requirements for storage. Please download the Environmental Room Security SOP from https://biosafety.mcmaster.ca/biosafety_SOPs.htm*

73. Samples to be transported securely.

- CL1 (3.2.3) Procedures should be in place and include precautions (e.g., use of cart, closed containers), as determined by an LRA, to prevent a leak, drop, spill, or similar event during the movement of biological material within the work area, to other parts of the building, or between buildings.
- CL2 (4.6.31) Procedures, as determined by an LRA, to be in place to prevent a leak, drop, spill, or similar event during the movement of infectious material or toxins within the containment zone or between containment zones within a building.
- PPC Basic ()
- PPC-1 (4.1.5.11) Cultures are to be stored in sealed, preferably break-resistant, containers such as screw-top vials. Cultures are to be clearly identified and dated. Where possible, petri dish cultures of sporulating fungi should be sealed with stretch film.
- PPC-2 (4.1.5.11) Cultures are to be stored in sealed, preferably break-resistant, containers such as screw-top vials. Cultures are to be clearly identified and dated. Where possible, petri dish cultures of sporulating fungi should be sealed with stretch film.
- AQC-1 (4.1.5.11, 4.2.5.8) Leak-proof containers are to be used for the transport of pathogenic materials within facilities (e.g., between laboratories in the same facility). Leak-proof containers are to be used for the transport of infectious materials within facilities (e.g., between laboratories in the same facility). Infectious materials to be transported from the facility must be done in accordance and compliance with the appropriate regulatory authority (e.g., Transportation of Dangerous Goods Regulations).
- AQC-2 (4.1.5.11, 4.2.5.8) Leak-proof containers are to be used for the transport of pathogenic materials within facilities (e.g., between laboratories in the same facility). Leak-proof containers are to be used for the transport of infectious materials within facilities (e.g., between laboratories in the same facility). Infectious materials to be transported from the facility must be done in accordance and compliance with the appropriate regulatory authority (e.g., Transportation of Dangerous Goods Regulations).
- Local Implementation *Movement and transport of biohazards to be carried out appropriately. Secondary container to be provided and in working condition. SOP template for movement and transport can be found here: https://biosafety.mcmaster.ca/documents/doc169_sop_movement_transport_biohazards.docx*

74. Cross contamination to be prevented through good microbiological practices.

- CL1 (3.2.4) Traffic flow patterns from areas of lower contamination (i.e., clean) to areas of higher contamination (i.e., dirty) should be established and followed, as determined by an LRA.
- CL2 (4.6.7, 4.6.18, 4.6.26, 4.6.33) Traffic flow patterns from areas of lower contamination (i.e., clean) to areas of higher contamination (i.e., dirty) to be established and followed, as determined by a local risk assessment (LRA). Good microbiological laboratory practices to be employed. Procedures to be followed to prevent the inadvertent spread of contamination from items removed from the BSC after handling infectious material or toxins. Collecting samples, adding materials, or transferring culture fluids from one closed system to another to be performed in a manner that prevents the release of aerosols or the contamination of exposed surfaces.
- PPC Basic ()
- PPC-1 (4.1.5.10, 4.1.5.16) Keep workplace exposure to any plant pest at the lowest practical level and avoid the generation of aerosols when manipulating pests or inoculating plants. Sanitation practices should be implemented when working with plants and plant pests.
- PPC-2 (3.7.5.13, 4.1.5.10, 4.1.5.16) Recommended - Laboratory to be adequately equipped (e.g. BSCs, thermocyclers, ELISA plate readers, centrifuges and microscopes) to avoid moving equipment into or out of the containment zone. Required - Keep workplace exposure to any plant pest at the lowest practical level and avoid

the generation of aerosols when manipulating pests or inoculating plants. Sanitation practices should be implemented when working with plants and plant pests.

- AQC-1 (4.1.5.7, 4.1.5.9, 4.1.5.12) All handling procedures must be designed and carried out to minimize the creation of aerosols. Good microbiological laboratory practices intended to prevent the release of infectious agents must be employed (e.g., wearing protective clothing, washing hands, disinfecting work areas and decontamination of infectious tissue or waste before disposal' laboratories to be kept clean and tidy). Traffic flow patterns from clean to dirty areas must be established and adhered to (i.e., movement from least to most contaminated areas).
- AQC-2 (4.1.5.7, 4.1.5.9, 4.1.5.12) All handling procedures must be designed and carried out to minimize the creation of aerosols. Good microbiological laboratory practices intended to prevent the release of infectious agents must be employed (e.g., wearing protective clothing, washing hands, disinfecting work areas and decontamination of infectious tissue or waste before disposal' laboratories to be kept clean and tidy). Traffic flow patterns from clean to dirty areas must be established and adhered to (i.e., movement from least to most contaminated areas).
- Local Implementation *Traffic flow patterns of people are mainly used in the animal facilities and plant pest laboratories where there are clean and dirty corridors. In laboratories, biohazard work takes place in the same BSC as sterile work. A clean-to-dirty setup is required to maintain aseptic technique when working with cultures irrespective of their infectious state. Posters for proper procedures for working in a BSC and for controlling aerosols are provided by the Biosafety Office. Contact the Research Compliance Auditor (carte@mcmaster.ca) for a laminated copy to post or download it from here https://biosafety.mcmaster.ca/documents/doc104_phac_bsc_safe_use.pdf and https://biosafety.mcmaster.ca/documents/doc047_PHAC_procedures_to_minimize_aerosol_hazards.pdf Sanitation practices recommended by the CFIA are found at https://biosafety.mcmaster.ca/documents/doc235_sanitation_practices_cfia_plants.pdf and are to be used when handling plants, soil and plant pests to prevent cross contamination and escape. Excessive entry and exit to use equipment can lead to cross contamination of equipment, samples, PPE and personnel. Recommended to equip the containment zone to reduce traffic flow.*

75. Vermin control to be available.

- CL1 (3.2.7) An effective rodent and insect control program should be maintained.
- CL2 (4.6.37) An effective rodent and insect control program to be maintained.
- PPC Basic ()
- PPC-1 (4.1.5.13) Render non-viable all unintentionally introduced pests, including those contaminating cultures, as soon as they are detected.
- PPC-2 (4.1.5.13) Render non-viable all unintentionally introduced pests, including those contaminating cultures, as soon as they are detected.
- AQC-1 (4.1.5.17) An effective rodent and insect control program must be maintained.
- AQC-2 (3.5.3.8, 4.1.5.17) Containment zone to be proofed against entry or exit of vermin and insects. An effective rodent and insect control program must be maintained.
- Local Implementation *Laboratory to be free of vermin. Vermin control SOP to be in place. Presence of vermin in the laboratory to be reported immediately to the office of your area supervisor (i.e. Chair or senior manager) to place a work order for hospital locations, for campus locations please use the Online Service Request <http://facilities.mcmaster.ca/>. Pest control SOP can be found at https://biosafety.mcmaster.ca/documents/biosafety_sop_0015_pest_control.docx*

76. Storage space for materials to be provided.

- CL1 (3.2.8) Work areas, including floors, should be kept free of clutter and obstructions in order to facilitate cleaning and disinfection. Excess or extraneous materials should be stored outside of the work area, and use of materials that are difficult to decontaminate should be avoided.
- CL2 (4.6.35) Containment zone (including floors) to be kept clean, free from obstructions, and free from materials that are in excess, not required, or that cannot be easily decontaminated.
- PPC Basic ()
- PPC-1 ()
- PPC-2 ()
- AQC-1 (CL1-3.2.8) Work areas, including floors, should be kept free of clutter and obstructions in order to facilitate cleaning and disinfection. Excess or extraneous materials should be stored outside of the work area, and use of materials that are difficult to decontaminate should be avoided.
- AQC-2 (CL2-4.6.35) Containment zone (including floors) to be kept clean, free from obstructions, and free from materials that are in excess, not required, or that cannot be easily decontaminated.

- o *Local Implementation Shelving, cabinets and other storage units to be provided in the laboratory to enable work materials to be stored. If you require storage, please first contact the office of your area supervisor (i.e. Chair or senior manager) to determine if used storage units are available before purchasing.*

77. Animal areas routinely decontaminated.

- o CL1 (3.4.6) Animal work areas, PM rooms, and associated corridors, when present, should be decontaminated routinely and when grossly contaminated.
- o CL2 (4.6.11) Work surfaces to be cleaned and decontaminated with a disinfectant effective against the pathogen(s) in use, or a neutralizing chemical effective against the toxin(s) in use, at a frequency to minimize the potential of exposure to infectious material or toxins.
- o PPC Basic ()
- o PPC-1 ()
- o PPC-2 ()
- o AQC-1 (NA) NA
- o AQC-2 (NA) NA
- o *Local Implementation Biohazard laboratory and small animal work areas are to be cleaned and decontaminated on a regular basis. This and other good practices are found in the poster Biosafety in the Laboratory. A laminated copy is provided by the Research Compliance Auditor (carte@mcmaster.ca) or can be downloaded here: https://biosafety.mcmaster.ca/documents/doc012_biosafety_in_the_laboratory_PHAC.pdf*

78. Infection of autologous (self) samples is prohibited.

- o CL1 (NA) NA
- o CL2 (4.6.34) Experimentally infecting cells or other specimens derived from the person conducting the experiment to be prohibited.
- o PPC Basic ()
- o PPC-1 ()
- o PPC-2 ()
- o AQC-1 (NA) NA
- o AQC-2 (NA) NA
- o *Local Implementation Since autologous cells (i.e., cells derived from an individual's own body) are not recognized as foreign by the immune system, the experimental infection of one's own cells may place the individual at a greater risk of infection in the event of an exposure. Inventory records will be inspected for indications of collection of primary specimens from laboratory occupants.*

79. Paperwork to be done in segregated area.

- o CL1 (NA) Paperwork i.e. desk areas are to be segregated from laboratory work areas.
- o CL2 (4.6.8) Dedicated paper/computer work areas to be utilized for paperwork and report writing.
- o PPC Basic ()
- o PPC-1 ()
- o PPC-2 ()
- o AQC-1 (3.5.1.2) Dedicated paperwork stations within the containment zone to be located away from aquatic animal holding areas.
- o AQC-2 (3.5.1.2) Dedicated paperwork stations within the containment zone to be located away from aquatic animal holding areas.
- o *Local Implementation Paperwork to be done at dedicated desk areas. A laminated desk area sign is available by contacting the Research Compliance Auditor (carte@mcmaster.ca). Evidence of paperwork done in lab work areas, including inside BSCs, will be inspected.*

80. Storage units to be labeled with the biohazard symbol.

- o CL1 (WHO 3rd Ed, p38) Laboratory equipment, fridges, freezers and cold rooms to be labeled with the biohazard symbol if containing infectious materials.
- o CL2 (4.6.19, 4.6.20) Containers of pathogens, toxins, or other regulated infectious material stored outside the containment zone to be labeled, leak-proof, impact resistant, and kept either in locked storage equipment or within an area with limited access.
- o PPC Basic ()
- o PPC-1 ()
- o PPC-2 ()
- o AQC-1 (WHO 3rd Ed, p38) Laboratory equipment, fridges, freezers and cold rooms to be labeled with the biohazard symbol if containing infectious materials.
- o AQC-2 (CL2-4.6.19, 4.6.20) Containers of pathogens, toxins, or other regulated infectious material stored outside the containment zone to be labeled, leak-proof, impact resistant, and kept either in locked storage equipment or within an area with limited access.

- *Local Implementation* All incubators, freezers, fridges, liquid nitrogen dewars and cold/warm rooms to be labeled with the biohazard symbol and emergency contact information. Walk-in cold and warm rooms to be labeled with the same signage as laboratory doors. Signage and stickers can be obtained by contacting the Research Compliance Auditor (carte@mcmaster.ca).

81. Proper animal restraint methods used.

- CL1 (3.4.1) Proper methods of restraint should be used to minimize scratches, bites, kicks, crushing injuries, and accidental self-inoculation.
- CL2 (4.3.5, 4.7.1) Personnel working with animals to be trained in restraint and handling techniques. Proper methods of restraint to be used to minimize scratches, bites, kicks, crushing injuries, and accidental self-inoculation.
- PPC Basic ()
- PPC-1 ()
- PPC-2 ()
- AQC-1 (NA) NA
- AQC-2 (NA) NA
- *Local Implementation* Personnel working with biohazard animals to be trained in restraint and handling techniques.

82. Biohazard, infectious animal and plant pest work to be performed an appropriate containment level.

- CL1 (3.4.4) Inoculation, surgical, and necropsy procedures should be designed and carried out to prevent injuries to personnel and minimize the creation of aerosols.
- CL2 (4.7.7) Inoculation, surgical, and necropsy procedures to be designed and carried out to prevent injuries to personnel and minimize the creation of aerosols.
- PPC Basic ()
- PPC-1 (4.1.5.7, 4.1.5.8) Treat all pests and materials in a containment zone in accordance with the highest containment requirement for that area (e.g. if PPC1 and PPC2 pests are in the same room, PPC2 practices must be followed). All pests and material that is infested or suspected of being infested with a pest must be moved or transported in containers that are secure, leak-proof and not easily broken, in order to prevent the accidental release or escape of a pest. The containers may only be opened within a facility that provides the appropriate containment level for the pest in question.
- PPC-2 (4.1.5.7, 4.1.5.8) Treat all pests and materials in a containment zone in accordance with the highest containment requirement for that area (e.g. if PPC1 and PPC2 pests are in the same room, PPC2 practices must be followed). All pests and material that is infested or suspected of being infested with a pest must be moved or transported in containers that are secure, leak-proof and not easily broken, in order to prevent the accidental release or escape of a pest. The containers may only be opened within a facility that provides the appropriate containment level for the pest in question.
- AQC-1 (4.1.5.7) All handling procedures must be designed and carried out to minimize the creation of aerosols.
- AQC-2 (4.1.5.7) All handling procedures must be designed and carried out to minimize the creation of aerosols.
- *Local Implementation* Biohazards, infectious animals and plant pests are to be housed and handled at the appropriate containment level.

83. Transport of infected animals is secure and maintains containment

- CL1 (3.4.5) Infected animals and carcasses should be securely moved into, out of, and within the animal work area.
- CL2 (4.7.5) Animals and carcasses to be securely moved into, out of, and within the containment zone.
- PPC Basic ()
- PPC-1 (4.1.5.8) All pests and material that is infested or suspected of being infested with a pest must be moved or transported in containers that are secure, leak-proof and not easily broken, in order to prevent the accidental release or escape of a pest. The containers may only be opened within a facility that provides the appropriate containment level for the pest in question.
- PPC-2 (4.1.5.8) All pests and material that is infested or suspected of being infested with a pest must be moved or transported in containers that are secure, leak-proof and not easily broken, in order to prevent the accidental release or escape of a pest. The containers may only be opened within a facility that provides the appropriate containment level for the pest in question.
- AQC-1 (4.1.5.11, 4.2.5.7, 4.2.5.8) Leak-proof containers are to be used for the transport of pathogenic materials within facilities (e.g., between laboratories in the same facility). Aquatic animal carcasses and tissues must be incinerated or processed using technology proven to effectively decontaminate all tissues. Where such materials must be transported for decontamination outside the containment perimeter, this must be done using leak-proof and impact resistant containers labelled appropriately. Leak-proof containers are to be used for the transport of infectious materials within facilities (e.g., between laboratories in the same facility). Infectious materials to be

transported from the facility must be done in accordance and compliance with the appropriate regulatory authority (e.g., Transportation of Dangerous Goods Regulations).

- AQC-2 (4.1.5.11, 4.2.5.7, 4.2.5.8) Leak-proof containers are to be used for the transport of pathogenic materials within facilities (e.g., between laboratories in the same facility). Aquatic animal carcasses and tissues must be incinerated or processed using technology proven to effectively decontaminate all tissues. Where such materials must be transported for decontamination outside the containment perimeter, this must be done using leak-proof and impact resistant containers labelled appropriately. Leak-proof containers are to be used for the transport of infectious materials within facilities (e.g., between laboratories in the same facility). Infectious materials to be transported from the facility must be done in accordance and compliance with the appropriate regulatory authority (e.g., Transportation of Dangerous Goods Regulations).
- Local Implementation SOPs and equipment available to indicate that secure movement of biohazard animals is occurring.

84. Proper disposal of sharps.

- CL1 (3.1.15) Safe work practices for handling sharps should be developed and strictly followed, and should include: actively avoiding the use of needles, syringes, and other sharps' wherever possible, safe alternatives or safety-engineered sharps devices should be used to prevent injury' refraining from bending, shearing, breaking, or recapping needles, or removing needles from their syringes' collecting and removing sharp objects (e.g., broken glassware) with a brush and dustpan, or tongs' and - discarding used sharps (e.g., scalpel blades, syringes) and other sharp objects (e.g., broken glassware, pipette tips, broken pipettes) in appropriate puncture-resistant sharps containers.
- CL2 (4.8.3) Sharps to be discarded in containers that are leak-proof, puncture-resistant, and fitted with lids, or specially constructed for the disposal of sharps waste.
- PPC Basic ()
- PPC-1 ()
- PPC-2 ()
- AQC-1 (CL1-3.1.15) Safe work practices for handling sharps should be developed and strictly followed, and should include: actively avoiding the use of needles, syringes, and other sharps' wherever possible, safe alternatives or safety-engineered sharps devices should be used to prevent injury' refraining from bending, shearing, breaking, or recapping needles, or removing needles from their syringes' collecting and removing sharp objects (e.g., broken glassware) with a brush and dustpan, or tongs' and - discarding used sharps (e.g., scalpel blades, syringes) and other sharp objects (e.g., broken glassware, pipette tips, broken pipettes) in appropriate puncture-resistant sharps containers.
- AQC-2 (CL2-4.8.3) Sharps to be discarded in containers that are leak-proof, puncture-resistant, and fitted with lids, or specially constructed for the disposal of sharps waste.
- Local Implementation Sharps containers must be available where sharps are used. Containers must be used appropriately. Containers must be closed and discarded when 3/4 full. Container type and fullness will be inspected.

85. Removal of gross contamination from surfaces and equipment.

- CL1 (3.3.1) Gross contamination should be removed prior to decontamination of surfaces and equipment, and disposed of in accordance with SOPs.
- CL2 (4.8.1) Gross contamination to be removed prior to decontamination of surfaces and equipment, and disposed of accordingly.
- PPC Basic ()
- PPC-1 ()
- PPC-2 ()
- AQC-1 (CL1-3.3.1) Gross contamination should be removed prior to decontamination of surfaces and equipment, and disposed of in accordance with SOPs.
- AQC-2 (CL2-4.8.1) Gross contamination to be removed prior to decontamination of surfaces and equipment, and disposed of accordingly.
- Local Implementation Gross contamination should be removed prior to decontamination of surfaces and equipment, and disposed of in accordance with SOPs.

86. Disinfectants effective and available.

- CL1 (3.3.2) Disinfectants or neutralizing chemicals effective against the RG1 biological material in use should be available and used in the work area.
- CL2 (4.8.2) Disinfectants effective against the pathogen(s) in use and neutralizing chemicals effective against the toxin(s) in use to be available and used in the containment zone.
- PPC Basic ()

- PPC-1 (4.1.5.15) Where applicable, disinfectants that are effective against the organisms in use must be available at all times when plant pests are handled or stored.
- PPC-2 (4.1.5.15) Where applicable, disinfectants that are effective against the organisms in use must be available at all times when plant pests are handled or stored.
- AQC-1 (5) Decontamination processes used for all contaminated or potentially contaminated materials must be in place. All decontamination and waste management procedures must be in accordance with applicable federal, provincial and municipal regulations. It is the facility's responsibility to ensure that the decontamination method used is effective against the microorganisms handled under the conditions present at that facility. Decontamination parameters, such as time, temperature and chemical concentration, must be clearly defined and must be effective against the microorganisms of concern. Validation of the selected decontamination process must be submitted to the OBCS for review. The decontamination process must also be monitored regularly to ensure its efficacy. Clear and strict procedures must be in place to support daily decontamination and monitoring.
- AQC-2 (5) Decontamination processes used for all contaminated or potentially contaminated materials must be in place. All decontamination and waste management procedures must be in accordance with applicable federal, provincial and municipal regulations. It is the facility's responsibility to ensure that the decontamination method used is effective against the microorganisms handled under the conditions present at that facility. Decontamination parameters, such as time, temperature and chemical concentration, must be clearly defined and must be effective against the microorganisms of concern. Validation of the selected decontamination process must be submitted to the OBCS for review. The decontamination process must also be monitored regularly to ensure its efficacy. Clear and strict procedures must be in place to support daily decontamination and monitoring.
- Local Implementation *Disinfectants effective and available. All disinfectant containers to be labelled according to WHMIS/GHS requirements. Stock container to include preparation or expiry date. Working containers to include statement: 'See prep or expiry date on stock container'. If disinfectants are prepared IN the working container, preparation or expiry date to be included on working container.*

87. Equipment decontaminated prior to removal from containment zone or prior to maintenance or disposal.

- CL1 (3.3.3) Equipment that has come in contact with RG1 biological material should be decontaminated prior to maintenance.
- CL2 (4.8.4) Primary containment devices to be decontaminated prior to maintenance
- PPC Basic ()
- PPC-1 (4.1.5.12) Contaminated materials and equipment must be properly cleaned and decontaminated before leaving the facility for servicing or disposal.
- PPC-2 (4.1.5.12) Contaminated materials and equipment must be properly cleaned and decontaminated before leaving the facility for servicing or disposal.
- AQC-1 (4.1.5.8) All contaminated materials and equipment must be decontaminated prior to disposal or cleaning for reuse.
- AQC-2 (4.1.5.8) All contaminated materials and equipment must be decontaminated prior to disposal or cleaning for reuse.
- Local Implementation *All equipment should be decontaminated prior to removal from the laboratory, maintenance by service personnel, sending for repair or disposal.*

88. Waste and equipment to be decontaminated prior to removal and/or disposal.

- CL1 (3.3.4) Solid and liquid waste, equipment, and other items that have come in contact with RG1 biological material should be decontaminated before disposal or removal from the work area.
- CL2 (4.8.7, 4.8.8) Contaminated liquids to be decontaminated prior to release to sanitary sewers. Contaminated equipment, materials, and waste to be: decontaminated and labeled as decontaminated prior to cleaning, disposal, or removal from the containment zone or prior to removal from the animal rooms, animal cubicles, or post mortem rooms (PM rooms), as described in SOPs' or placed in closed, labeled, and leak-proof containers that have been surface decontaminated prior to removal from the containment zone, animal rooms, animal cubicles, or PM rooms, as described in SOPs for the safe and secure movement or transportation to a designated decontamination area or storage outside of the containment zone.
- PPC Basic ()
- PPC-1 (4.1.5.2) Render all organisms non-viable prior to disposal.
- PPC-2 (4.1.5.2) Render all organisms non-viable prior to disposal.
- AQC-1 (4.1.5.8, 4.1.5.2) All contaminated materials and equipment must be decontaminated prior to disposal or cleaning for reuse. Render all organisms and contaminated waste non-viable prior to disposal.
- AQC-2 (4.1.5.8, 4.1.5.2) All contaminated materials and equipment must be decontaminated prior to disposal or cleaning for reuse. Render all organisms and contaminated waste non-viable prior to disposal.
- Local Implementation *Contaminated items for reuse are to be decontaminated. All biohazardous waste to be disposed in biohazard waste boxes. Additionally, all BSL2 waste items must be pre-packaged securely prior to*

removal from the BSC. Large or heavy items should be transported on carts and loaded in a manner that will prevent them from tipping. A cart designed with guard rails or raised edges can be considered to protect the items from falling off the cart during relocation. <http://canadianbiosafetystandards.collaboration.gc.ca/cbh-gcb/ch16-20-eng.php#s201>

89. Biohazard animal bedding to be decontaminated prior to disposal.

- o CL1 (NA) NA
- o CL2 (4.8.13) Contaminated bedding to be: removed at a ventilated cage changing station or within a certified biological safety cabinet (BSC) prior to decontamination' or decontaminated within containment cages.
- o PPC Basic ()
- o PPC-1 ()
- o PPC-2 ()
- o AQC-1 (4.1.5.8) All contaminated materials and equipment must be decontaminated prior to disposal or cleaning for reuse.
- o AQC-2 (4.1.5.8) All contaminated materials and equipment must be decontaminated prior to disposal or cleaning for reuse.
- o Local Implementation *Biohazard animal bedding to be contained securely for autoclaving prior to disposal per facility SOPs.*

90. ERP to include infectious materials stored outside laboratory.

- o CL1 (3.2.10) Access to work areas should be limited to authorized personnel and authorized visitors. It is assumed that access implies access to the biohazards within the work areas. Therefore any biohazardous items stored outside the laboratory are to be included in the ERP.
- o CL2 (4.9.2) ERP to include procedures for any infectious material or toxins stored outside the containment zone.
- o PPC Basic ()
- o PPC-1 ()
- o PPC-2 ()
- o AQC-1 (4.1.2.2) A basic Emergency Response Plan (ERP) must be available that describes emergency procedures in the event of accidents, fires, spills, power loss, and other situations. Plans must cover emergency egress procedures, corrective actions and notification of key personnel.
- o AQC-2 (4.1.2.2) A basic Emergency Response Plan (ERP) must be available that describes emergency procedures in the event of accidents, fires, spills, power loss, and other situations. Plans must cover emergency egress procedures, corrective actions and notification of key personnel.
- o Local Implementation *Emergency response plan to include steps to address biohazards stored outside the laboratory. Steps may include post-emergency inspection of storage units.*

91. Fire extinguisher locally available and inspected.

- o CL1 (3.2.5) An ERP, based on an overarching risk assessment and LRAs, should be developed and kept up to date. The ERP should include the name and telephone number of the emergency contact person and describe emergency procedures in the work area for: accidents/incidents' medical emergencies' chemical/biological spills' animal escape (if applicable)' reporting of incidents to the appropriate internal authority' and incident follow-up and recommendations to mitigate future risks.
- o CL2 (4.9.1) The ERP is to describe emergency procedures applicable to the containment zone for: accidents/incidents' medical emergencies' fires' chemical/biological spills (small/large' inside/outside BSC and centrifuge)' power failure' animal escape (if applicable)' failure of primary containment devices' puff-back from class II B2 BSCs, where present' loss of containment' emergency egress' notification of key personnel and relevant federal regulatory agency (or agencies)' natural disasters' and incident follow-up and recommendations to mitigate future risks.
- o PPC Basic ()
- o PPC-1 ()
- o PPC-2 ()
- o AQC-1 (4.1.2.2) A basic Emergency Response Plan (ERP) must be available that describes emergency procedures in the event of accidents, fires, spills, power loss, and other situations. Plans must cover emergency egress procedures, corrective actions and notification of key personnel.
- o AQC-2 (4.1.2.2) A basic Emergency Response Plan (ERP) must be available that describes emergency procedures in the event of accidents, fires, spills, power loss, and other situations. Plans must cover emergency egress procedures, corrective actions and notification of key personnel.
- o Local Implementation *Fire extinguisher locally available and inspected. If unavailable or not up to date on inspections, for hospital locations please contact the office of your area supervisor (i.e. Chair or senior manager) to place a work order or to contact local security services, for campus locations please use the Online Service Request <http://facilities.mcmaster.ca/> or contact local security services.*

92. Fire alarms are audible within the laboratory.

- o CL1 (3.2.5) An ERP, based on an overarching risk assessment and LRAs, should be developed and kept up to date. The ERP should include the name and telephone number of the emergency contact person and describe emergency procedures in the work area for: accidents/incidents' medical emergencies' chemical/biological spills' animal escape (if applicable)' reporting of incidents to the appropriate internal authority' and incident follow-up and recommendations to mitigate future risks.
- o CL2 (4.9.1) The ERP is to describe emergency procedures applicable to the containment zone for: accidents/incidents' medical emergencies' fires' chemical/biological spills (small/large' inside/outside BSC and centrifuge)' power failure' animal escape (if applicable)' failure of primary containment devices' puff-back from class II B2 BSCs, where present' loss of containment' emergency egress' notification of key personnel and relevant federal regulatory agency (or agencies)' natural disasters' and incident follow-up and recommendations to mitigate future risks.
- o PPC Basic ()
- o PPC-1 ()
- o PPC-2 ()
- o AQC-1 (4.1.2.2) A basic Emergency Response Plan (ERP) must be available that describes emergency procedures in the event of accidents, fires, spills, power loss, and other situations. Plans must cover emergency egress procedures, corrective actions and notification of key personnel.
- o AQC-2 (4.1.2.2) A basic Emergency Response Plan (ERP) must be available that describes emergency procedures in the event of accidents, fires, spills, power loss, and other situations. Plans must cover emergency egress procedures, corrective actions and notification of key personnel.
- o Local Implementation *Fire alarms are audible within the laboratory. If alarms are not audible within the laboratory, contact the office of your area supervisor (i.e. Chair or senior manager) to place a work order for alarm repair or installation for hospital locations, for campus locations please use the Online Service Request <http://facilities.mcmaster.ca/>*

93. Injury and incident reporting program to be implemented.

- o CL1 (3.2.5) An ERP, based on an overarching risk assessment and LRAs, should be developed and kept up to date. The ERP should include the name and telephone number of the emergency contact person and describe emergency procedures in the work area for: _ accidents/incidents' medical emergencies' chemical/biological spills' animal escape (if applicable)' reporting of incidents to the appropriate internal authority' and incident follow-up and recommendations to mitigate future risks.
- o CL2 (4.9.7, 4.9.8) Incidents involving pathogens, toxins, other regulated infectious material, infected animals, or involving failure of containment systems or control systems to be reported immediately to the appropriate internal authority. Incident investigation to be conducted and documented for any incident involving pathogens, toxins, other regulated infectious material, infected animals, or failure of containment systems or control systems, in order to determine the root cause(s).
- o PPC Basic ()
- o PPC-1 ()
- o PPC-2 ()
- o AQC-1 (4.1.2.2, 4.1.5.16, 4.2.2.11) A basic Emergency Response Plan (ERP) must be available that describes emergency procedures in the event of accidents, fires, spills, power loss, and other situations. Plans must cover emergency egress procedures, corrective actions and notification of key personnel. All spills, accidents and overt or potential exposures to infectious materials must be reported immediately to the laboratory supervisor' written records of such incidents must be kept. All spills, accidents and overt or potential exposures to infectious materials, as well as containment failures (e.g. pump-failure and backflow), must be reported immediately to the laboratory supervisor, the BSO, and the appropriate regulatory authorities' written records of such incidents must be maintained for five years.
- o AQC-2 (4.1.2.2, 4.1.5.16, 4.2.2.11) A basic Emergency Response Plan (ERP) must be available that describes emergency procedures in the event of accidents, fires, spills, power loss, and other situations. Plans must cover emergency egress procedures, corrective actions and notification of key All spills, accidents and overt or potential exposures to infectious materials must be reported immediately to the laboratory supervisor' written records of such incidents must be kept. All spills, accidents and overt or potential exposures to infectious materials, as well as containment failures (e.g. pump-failure and backflow), must be reported immediately to the laboratory supervisor, the BSO, and the appropriate regulatory authorities' written records of such incidents must be maintained for five years.
- o Local Implementation *Injury and incident reporting program to be implemented. Refer to RMM1000 for guidance <http://www.workingatmcmaster.ca/med/document/RMM-1000-Reporting-and-Investigating-Injury-Incident-Occupational-Disease-Program-1-36.pdf> Policy sign-off by workers will be inspected. SOP for emergency response*

plan can be found here

https://biosafety.mcmaster.ca/documents/biosafety_sop_0016_emergency_response_plan.docx

94. Any inspection, preventative maintenance, calibration, repair or certification records related to primary containment equipment to be kept on file.

- CL1 (3.2.12) Records of regular inspections of the work area and corrective actions should be kept on file.
- CL2 (4.10.5, 4.10.6) Records of regular inspections of the containment zone and corrective actions to be kept on file. Records of building and equipment maintenance, repair, inspection, testing, or certification, including performance verification and testing records, in accordance with containment zone function, to be kept on file.
- PPC Basic ()
- PPC-1 ()
- PPC-2 ()
- AQC-1 (4.2.2.8, 4.2.5.9) Records of activities carried out in the facility shall be kept for three years, including records of all building and equipment maintenance, inspection reports prepared by the internal Biosafety Officer (BSO), shipments received, dates of import, CFIA Permits to Import, associated imported aquatic pathogen material, associated organisms detected, decontamination of packaging materials and transfer of aquatic animal pathogens to other facilities where authorized by a CFIA inspector. Records shall also be kept of all movement of aquatic animal pathogens into or out of containment. Periodic inspections of the containment zone must be made by facility staff to check for inward directional airflow (if applicable), faults and deterioration (e.g., deteriorated door seals)' corrective action must be taken and records kept for three years.
- AQC-2 (4.2.2.8, 4.2.5.9) Records of activities carried out in the facility shall be kept for three years, including records of all building and equipment maintenance, inspection reports prepared by the internal Biosafety Officer (BSO), shipments received, dates of import, CFIA Permits to Import, associated imported aquatic pathogen material, associated organisms detected, decontamination of packaging materials and transfer of aquatic animal pathogens to other facilities where authorized by a CFIA inspector. Records shall also be kept of all movement of aquatic animal pathogens into or out of containment. Periodic inspections of the containment zone must be made by facility staff to check for inward directional airflow (if applicable), faults and deterioration (e.g., deteriorated door seals)' corrective action must be taken and records kept for three years.
- Local Implementation *Any inspection, preventative maintenance, calibration, repair or certification records related to primary containment devices (BSC, enclosures, centrifuges, ventilated racking systems, closed process equipment, autoclaves) to be kept on file. These pieces of equipment are designed to contain aerosols while samples are being manipulated or processed. It is important that regular maintenance of these devices be undertaken. Any incidents must be reported using the injury/incident reporting process. BSCs, enclosures, process equipment and ventilated caging systems containing HEPA filters must be registered with the Biosafety Office (carte@mcmaster.ca). In contrast, process equipment (i.e. FACS instrument) does not need to be registered with the Biosafety Office and any records related to repair, maintenance or safety should available for inspection. RMM for preventative maintenance program is here: <http://www.workingatmcmaster.ca/med/document/RMM-406-Preventive-Maintenance-Program-1-36.pdf> Additionally, for all locations, all pieces of electrical equipment, regardless of its purpose, is to be compliant with all safety requirements outlined in RMM 325 Process and Equipment Purchases and/or Modifications Program <http://www.workingatmcmaster.ca/med/document/RMM-325-Process-and-Equipment-Purchases-and-or-Modifications-1-36.pdf> It is recommended that UL or CSA sticker be identified on the equipment and noted on the front of the equipment.*

95. Import permits to be kept on file until 2 years past disposal/final transfer.

- CL1 (NA) Import permits required for BSL1 aquatic animal pathogens and plant pests must be retained, per import permit conditions.
- CL2 (4.10.10) Records and documentation pertaining to: license activities involving human pathogens and toxins to be kept on file for a minimum of 5 years' and animal pathogen import permit requirements for animal pathogens, toxins, and other regulated infectious material to be kept on file for a minimum of 2 years following the date of disposal, complete transfer, or inactivation of the imported material.
- PPC Basic ()
- PPC-1 (4.1.5.1, 4.2.2.4) Comply with all conditions stipulated on all Permits to Import.
- PPC-2 (4.1.5.1) Comply with all conditions stipulated on all Permits to Import.
- AQC-1 (4.1.5.1, 4.2.2.8) Comply with all conditions specified on Permits to Import, if applicable. Records of activities carried out in the facility shall be kept for three years, including records of all building and equipment maintenance, inspection reports prepared by the internal Biosafety Officer (BSO), shipments received, dates of import, CFIA Permits to Import, associated imported aquatic pathogen material, associated organisms detected, decontamination of packaging materials and transfer of aquatic animal pathogens to other facilities where authorized by a CFIA inspector. Records shall also be kept of all movement of aquatic animal pathogens into or out of containment.

- AQC-2 (4.1.5.1, 4.2.2.8) Comply with all conditions specified on Permits to Import, if applicable. Records of activities carried out in the facility shall be kept for three years, including records of all building and equipment maintenance, inspection reports prepared by the internal Biosafety Officer (BSO), shipments received, dates of import, CFIA Permits to Import, associated imported aquatic pathogen material, associated organisms detected, decontamination of packaging materials and transfer of aquatic animal pathogens to other facilities where authorized by a CFIA inspector. Records shall also be kept of all movement of aquatic animal pathogens into or out of containment.
- Local Implementation *Import permits to be kept on file. Copies are retained in the Biosafety Office (robertjv@mcmaster.ca)*

96. Personnel to be trained on the hazards of the infectious and non-infectious materials and their use.

- CL1 (WHO 3rd Ed, p107) Workers in microbiological laboratories are not only exposed to pathogenic microorganisms, but also to chemical hazards. It is important that they have proper knowledge of the toxic effects of these chemicals, the routes of exposure and the hazards that may be associated with handling and storage (see Annex 5). Material safety data sheets or other chemical hazard information are available from chemical manufacturers and/or suppliers. These should be accessible in laboratories where these chemicals are used, e.g. as part of a safety or operations manual.
- CL2 (4.3.2) Personnel to be trained on the potential hazards associated with the work involved, including the signs and symptoms of disease(s) caused by the infectious material or toxins in use and the necessary precautions to prevent exposure to, or release of, pathogens or toxins.
- PPC Basic ()
- PPC-1 ()
- PPC-2 ()
- AQC-1 (4.2.3.1) Personnel must receive training on the potential hazards associated with the work involved and the precautions required to prevent exposure to infectious substances and potential zoonotic agents' training records must be signed by both employee and supervisor.
- AQC-2 (4.2.3.1) Personnel must receive training on the potential hazards associated with the work involved and the precautions required to prevent exposure to infectious substances and potential zoonotic agents' training records must be signed by both employee and supervisor.
- Local Implementation *Laboratory personnel to be informed of signs and symptoms of infection and exposure to the materials they are handling. PSDS and SDS sheets (formerly MSDS sheets) are to be accessible to laboratory workers. If unavailable, PSDS and SDS sheets are to be generated by the supervisor using the PHAC or SDS required headings or some other method that communicates the hazardous attributes of the material. Refer to RMM 501 for guidance <http://www.workingatmcmaster.ca/med/document/RMM-501-Hazardous-Materials-Management-1-36.pdf> A PSDS for risk group 1 materials can be downloaded from the Biosafety Website, SOPs section.*

97. Visual inspections to be done, issues documented.

- CL1 (3.2.11) Personnel should conduct and document regular visual inspections of the work area to identify faults and/or deterioration (e.g., cracked or chipped walls or floors, chipped or worn benchtops, faulty equipment and lighting) when found, corrective actions should be taken.
- CL2 (5.1.2) Visual inspections of the containment zone to be conducted in order to identify faults and/or deterioration when found, corrective actions to be taken.
- PPC Basic ()
- PPC-1 ()
- PPC-2 ()
- AQC-1 (4.2.5.9) Periodic inspections of the containment zone must be made by facility staff to check for inward directional airflow (if applicable), faults and deterioration (e.g., deteriorated door seals) corrective action must be taken and records kept for three years.
- AQC-2 (4.2.5.9) Periodic inspections of the containment zone must be made by facility staff to check for inward directional airflow (if applicable), faults and deterioration (e.g., deteriorated door seals) corrective action must be taken and records kept for three years.
- Local Implementation *Visual inspections of the laboratory to be performed regularly. Issues and corrective actions to be documented. Documents to be accessible. These inspections can be workplace inspections required per RMM 302 <http://www.workingatmcmaster.ca/med/document/RMM-302-Safety-Audits-and-Inspections-Program-1-36.pdf>*

98. Safety alarms, where provided, to be armed at all times.

- CL1 (NA) BSC, ventalert, incubator, CO2 manifolds and other safety monitoring equipment to be alarmed at all times where an alarm function is present.
- CL2 (NA) BSC, ventalert, incubator, CO2 manifolds and other safety monitoring equipment to be alarmed at all times where an alarm function is present.

- PPC Basic ()
- PPC-1 ()
- PPC-2 ()
- AQC-1 (NA) BSC, ventalert, incubator, CO2 manifolds and other safety monitoring equipment to be alarmed at all times where an alarm function is present.
- AQC-2 (NA) BSC, ventalert, incubator, CO2 manifolds and other safety monitoring equipment to be alarmed at all times where an alarm function is present.
- Local Implementation BSC, ventalert, incubator, CO2 manifolds and other safety monitoring equipment to be alarmed at all times where an alarm function is present. Alarm tampering will be inspected.