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|--------------------|---|-----------------|--------------------|
| Title:             | <b>Biological Containment Levels</b>  |                 |                    |
| Document Type:     | Procedure   | Document #:     | UHT0001942         |
| Program:           | Research Facilities   | Effective Date: | January 1, 2015    |
| Executive Sponsor: | Vice President, Research and Innovation   | Last Reviewed:  | January 1, 2019    |
| Owner/Lead:        | Director Research Facilities, Research Biosafety Officer<br>Research Facilities   | Last Revised:   | September 30, 2022 |
| Approval Body:     | Director Research Facilities  | Review Cycle:   | 3 year             |
| Applicable Sites:  | <input type="checkbox"/> <b>Unity Health</b> <input type="checkbox"/> <b>Providence</b> <input type="checkbox"/> <b>St. Joseph's</b> <input checked="" type="checkbox"/> <b>St. Michael's</b> |                 |                    |
| Keyword(s):        | Biosafety, containment  |                 |                    |

## 1.0 PURPOSE

**Containment level** describes the minimum physical containment and operational practices required for the safe handling of infectious material or toxins in a laboratory setting. The containment system guidelines are regulated by the PHAC or the CFIA. **The maximum containment level authorization in the Keenan Research Centre for Biomedical Science is Containment Level 2 (CL2).**

## 2.0 PROCEDURE

Classifying pathogens into Risk Groups does not provide instructions on handling the organism in the laboratory. The concept of the Containment Level has been devised to provide the worker with a description of the minimum engineering, operational, technical, and physical requirements necessary for safely handling a pathogen within the laboratory setting. Four containment levels exist and are described as follows:

### ***Containment Level 1 (CL1)***

CL1 requires no special design elements beyond those required in a functional laboratory. Work can be carried out on open bench tops, with containment being achieved through good laboratory practice. Work with RG1 biological material is often described as CL1.

### ***Containment Level 2 (CL2)***

Work with pathogens whose primary route of exposure is via ingestion, inoculation, mucosal membrane or bioaerosols requires CL2. Physical containment is achieved by facility design (e.g., location of laboratory, surface finishes, access control) and biosafety equipment, such as Biological Safety Cabinets (BSCs) and aerosol-proof centrifugation. Operational practices for CL2 include administrative controls and procedures (e.g., training, work practices, personal protective equipment use, and decontamination

procedures) to mitigate the risks associated with the activities conducted within the zone. **All wet bench areas in the KRCBS are certified and registered as CL-2.**

**Containment Level 3 (CL3)**

This applies to a laboratory handling pathogens that can cause serious or life threatening disease at low doses and may be transmitted via the airborne route. CL3 requires stringent facility design and engineering controls as well as specialized biosafety equipment to minimize the release of infectious material outside the containment zone, or the environment.

**Containment Level 4 (CL4)**

This applies to a laboratory handling pathogens that have a high risk of being transmitted via aerosols, have a very low dose of infection and often produce lethal diseases, with little or no effective treatment. CL4 is the highest level of containment available and requires a highly complex self-contained facility design. It includes enhanced engineering controls (e.g., HEPA filtration of exhaust and supply air), specialized biosafety equipment (e.g., Class III BSC, effluent decontamination systems), and redundant biosafety features (e.g., two stages of HEPA filtration of exhaust air). CL4 requires the maximum level of operational practices (e.g., PPE use, positive-pressure suits, work practices, medical surveillance).

**3.0 DEFINITIONS**

| Term/Acronym | Definition                                   |
|--------------|--|
| PPE          | Personal Protective Equipment                |
| CL           | Containment Level                            |
| BSC          | Biosafety cabinet                            |
| HEPA         | High Efficiency Particulate Absorbing filter |
| RG           | Risk Group                                   |

**4.0 REFERENCES**

Government of Canada. (2015). Canadian Biosafety Standard (2nd ed.). Ottawa, ON, Canada: Government of Canada.

| Version | Approval/Sub-approval body   | Approval date      |
|---------|------------------------------|--------------------|
| 01      | Research Biosafety Committee | January 1, 2015    |
| 02      | Research Biosafety Committee | January 1, 2016    |
| 03      | Research Biosafety Committee | January 1, 2019    |
| 04      | Director Research Facilities | September 30, 2022 |
| 05      |                              |                    |

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