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| **CHARACTERISTICS** | |
| Morphology | Gram-positive, spore-forming bacteria. Vegetative cells are rod shaped and arranged in pairs or short chains. Several species produce toxins. |
| Disease | Clostridial bacteremia, clostridial myonecrosis, necrotizing enterocolitis (NEC), toxic shock syndrome. |
| Zoonosis | None. |

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| **HEALTH HAZARDS** | |
| Host Range | Gastrointestinal tract of vertebrates and invertebrates. |
| Modes of Transmission | Contamination of wound sites and breaches in gastrointestinal tract. |
| Signs and Symptoms | Symptoms can vary greatly but will typically include fever, chills, and leukocytosis, NEC: ischemic necrosis of the intestinal mucosa. |
| Infectious Dose | Unknown. |
| Incubation Period | 6 hours to 3 days for clostridial myonecrosis. |

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| **MEDICAL PRECAUTIONS/TREATMENT** | |
| Prophylaxis | Cleaning any wound sites with an antiseptic; antibiotic may be prescribed. |
| Vaccines | None. |
| Treatment | Antibiotic treatment and surgical removal of infected tissue. |
| Surveillance | Monitor for symptoms. |
| MSU Requirements | Report any exposures. |

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| **LABORATORY HAZARDS** | |
| Laboratory Acquired Infections (LAIs) | At least six cases of laboratory-acquired infections with *Clostridium* spp. have been reported. |
| Sources | Blood, feces, or biopsy and/or wound samples, cultures, frozen stocks, other samples described in IBC protocol. |

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| **RISK GROUP & CONTAINMENT REQUIREMENTS** | |
| Risk Group 2 | Agents that are associated with human disease which is rarely serious and for which preventive or therapeutic interventions are often available. |
| BSL2 | For all procedures involving suspected or known infectious specimen or cultures. |
| ABSL2 | For all procedures utilizing infected animals. |

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| **VIABILITY** | |
| Disinfection | 2% aqueous glutaraldehyde within 3 hours, 8% formaldehyde, 20 ppm sodium hypochlorite. *Clostridium* spores are resistant to ethyl and propyl alcohols. |
| Inactivation | Inactivated by moist heat (60 minutes at 121oC) and dry heat (1 hour at 160-170oC). |
| Survival Outside Host | *Clostridium* spp. are able to form resistant endospores which are ubiquitous in the environment. |

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| **SUPPLEMENTAL REFERENCES** | |
| BMBL | <https://www.cdc.gov/labs/BMBL.html> |
| NIH Guidelines | <https://osp.od.nih.gov/wp-content/uploads/NIH_Guidelines.pdf> |
| Canada PSDS | <https://www.canada.ca/en/public-health/services/laboratory-biosafety-biosecurity/pathogen-safety-data-sheets-risk-assessment/clostridium.html> |

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| **SPILL PROCEDURES** | |
| Small | Notify others working in the lab. Remove PPE and don new PPE. Cover area of the spill with absorbent material and add fresh 1:10 bleach:water. Allow 20 minutes (or as directed) of contact time. After 20 minutes, cleanup and dispose of materials. |
| Large | * Immediately notify all personnel in the lab and clear all personnel from the area. Remove any contaminated PPE/clothing and leave the lab. * Secure the area by locking doors, posting signage and guarding the area to keep people out of the space.   For assistance, contact MSU's Biosafety Officer (406-994-6733) or Safety and Risk Management (406-994-2711). |

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| **EXPOSURE PROCEDURES** | |
| Mucous membrane | Flush eyes, mouth, or nose for 5 minutes at eyewash station. |
| Other Exposures | Wash area with soap and water for 5 minutes. |
| Reporting | Immediately report incident to supervisor, complete a [First Report of Injury](https://firstreportinjury.mus.edu/) form, and submit to Safety and Risk Management. |
| Medical Follow-up | **During business hours:**  Bridger Occupational Health 3400 Laramie Drive Weekdays 8am -6pm. Weekends 9am-5pm  406-577-7674  **After business hours:**  Bozeman Deaconess Hospital Emergency Room  915 Highland Blvd |

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| **PERSONAL PROTECTIVE EQUIPMENT (PPE)** | |
| Minimum PPE Requirements | Lab coat, disposable gloves, safety glasses, closed toed shoes, long pants |
| Additional Precautions | Additional PPE may be required depending on lab specific SOPs and IBC Protocol. |