



BIOHAZARDOUS AGENT REFERENCE DOCUMENT

Salmonella enterica Typhi

The Biohazardous Agent Reference Document (BARD) is a general guidance resource that reviews and summarizes the nature of a pathogen or biotoxin, and offers safety requirements for work with the agent in the laboratory. The BARD may replace the formal SOPs used in conjunction with some IBC registrations.

The BARD is provided as an additional guidance tool, and is not a substitute for a risk assessment, biosafety training, lab-specific training, or a formal [IBC master protocol registration](#). This document should be readily available in the laboratory, and it is the responsibility of the Laboratory Supervisor or Principal Investigator to ensure that all personnel have read, understood, and signed the document. The BARD is for informational purposes only, and is not intended to be a substitute for professional medical advice, diagnosis, or treatment. Please consult a health care provider for any medical questions or concerns.

INSTRUCTIONS

- 1. Review the information contained in this document.**
- 2. Add any necessary information that is specific to your work in the laboratory (such as strain-specific information). Please be sure that the track changes function is turned on to indicate any changes that you make.**
- 3. Instruct all personnel to review the BARD and sign the last page, indicating that they have read and understood the information.**
- 4. Submit the BARD along with your IBC master protocol registration, amendment, or continuing review.**

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CHARACTERISTICS

Morphology	Gram-negative, non-spore forming, motile, rod-shaped bacterium. Member of the family Enterobacteriaceae.
Strain Specific Characteristics	Typhi serotype is the causative agent of typhoid fever

HEALTH HAZARDS

Host Range	Humans
Modes of Transmission	Ingestion, contact with non-intact skin, mucous membrane contact. Aerosol transmission unknown.
Signs and Symptoms	Fever (within 72 hours after onset of illness), headache, slow heart rate, faint rash on chest or abdomen, anorexia, abdominal pain, muscle pain, malaise, diarrhea or constipation
Infectious Dose	100,000 organisms via ingestion
Incubation Period	3 – 60 days with most infections occurring 7 – 14 days after exposure

MEDICAL PRECAUTIONS / TREATMENT

Prophylaxis	None
Vaccines	Vaccines available in the US. The oral typhoid vaccine (live) is not given to pregnant women or immunosuppressed people. A capsular polysaccharide IM vaccine (Vi vaccine) is available for these groups.
Treatment	Fluid and electrolyte replacement, antibiotics. Chloramphenicol is the most commonly used.
Surveillance	Monitor for symptoms and test using serology, PCR, or microbiological isolation
UVM IBC Requirements	Report any exposures or signs and symptoms to your supervisor
Additional Medical Precautions	Very young, very old, and immunocompromised individuals are at an increased risk

LABORATORY HAZARDS

Laboratory Acquired Infections	Until 1974, 258 cases and 20 deaths due to laboratory-acquired typhoid fever were reported. 64 cases and 2 deaths due to <i>Salmonella</i> spp. infections were reported between 1979 and 2004, most of them associated with <i>S. Typhi</i>
Sources	Blood, urine, feces, and bile from infected humans, laboratory cultures, contaminated food & water

CONTAINMENT REQUIREMENTS

BSL - 2	Manipulation of known or potentially infected clinical samples and cultures of laboratory adapted strains (RG2)
BSL - 3	
ABSL - 2	Work with animals infected with risk group 2 strains
ABSL - 3	
Aerosol generating activities	Centrifugation, homogenizing, vortexing or stirring, changing of animal cages, animal surgeries, cell sorting, pipetting, pouring liquids, sonicating, loading syringes
Primary containment device (BSC)	Use for aerosol-generating activities, high concentrations, animal manipulations, or large volumes

EXPOSURE PROCEDURES

Mucous membranes	Flush eyes, mouth or nose for 15 minutes at eyewash station.
Other exposures	Wash area with soap and water for 15 minutes.
Medical Follow-Up	Contact UVMHC Infectious Disease Dept. directly at (802) 847-2700 for immediate assistance
Reporting	Report all exposures or near misses to: <ol style="list-style-type: none"> 1. Your immediate Supervisor 2. The UVM Biosafety Officer at (802) 777-9471 and Risk Management at 6-3242 3. Risk Management and Safety; https://www.uvm.edu/riskmanagement/incident-claim-reporting-procedures

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Minimum PPE Requirements	Nitrile gloves, lab coat, appropriate eye/face protection. Wash hands after removing gloves.
Additional Precautions	Risk assessment dependent

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VIABILITY

Disinfection	Susceptible to 1% sodium hypochlorite, 70% ethanol, 2-5% phenol, 4% formaldehyde, 2% glutaraldehyde, 3-6% hydrogen peroxide, quaternary ammonium compounds, iodophors. Contact time of 10 minutes.
Inactivation	Inactivated by autoclaving at 121°C for 15+ minutes, dry heat above 170°C for 1+ hour
Survival Outside Host	May survive for several months, can survive in soil for up to 231 days, in water for up to 152 days

SPILL CLEAN UP PROCEDURES

Small Spill	Notify others working in the lab. Allow aerosols to settle. Don appropriate PPE. Cover area of the spill with paper towels and apply approved disinfectant, working from the perimeter towards the center. Allow 30 minutes of contact time before clean up and disposal. Dispose in double biowaste bags and biobox.
Large Spill	Inside of a lab: Call UVM Service Operations at 656-2560 and press option 1 to speak to a dispatcher. Ask them to page Risk Management and Safety. Outside of a lab: Pull the nearest fire alarm and evacuate the building. Wait out front of the building for emergency responders to arrive.

REFERENCES

Canadian PSDS	https://www.canada.ca/en/public-health/services/laboratory-biosafety-biosecurity/pathogen-safety-data-sheets-risk-assessment/salmonella-enterica.html
BMBL	https://www.cdc.gov/biosafety/publications/bmbl5/
CDC Guidelines	https://www.cdc.gov/typhoid-fever/index.html

STUDENT / EMPLOYEE NAME

SIGNATURE

DATE

Biosafety Review:

Jeff LaBossiere, Biological Safety Officer

Date

Principal Investigator: _____

IBC Registration #: _____