Pathogen Safety Data Sheet

Section 1 - Infectious Agent

Agent Name: **Vibrio spp.**

Agent Type: Bacteria

Taxonomy:

Family: Vibrionaceae Genus: Vibrio

Species:

Subspecies/Strain/Clonal Isolate:

Synonym/Cross Reference
noncholera Vibrio; gastroenteritis

Characteristics

Brief Description: Vibrio species are Gram Stain negative, facultative anaerobes that test positive for oxidase and do not form spores. All members of the genus are motile and have polar flagella with sheaths. Vibrio species typically possess two chromosomes, which is unusual for bacteria. Each chromosome has a distinct and independent origin of replication, and are conserved together over time in the genus. Recent phylogenies have been constructed based on a suite of genes (multilocus sequence analysis).

Properties: Increased risk of infection due to climate warming.

Section 2 - Hazard Identification

Pathogenicity/Toxicity

Infections usually present in one of three major clinical syndromes: 60-80% of infections cause gastroenteritis, 34% wound infections, and 5% septicaemia. The most common presentation is gastroenteritis, with symptoms including diarrhea (sometimes bloody and watery) with abdominal cramps, nausea, vomiting, headache, chills, and low-grade fever. Infection is usually self-limiting and of moderate severity, lasting approximately 3 days in immunocompetent patients, and can be treated with oral rehydration alone. Wound infection and septicaemia can also results from exposure to the bacteria, and was the cause of 3 cases and 2 deaths in Louisiana and Mississippi after Hurricane Katrina in 2005. Fatal cases of septicaemia may occur in immunocompromised patients or those with a pre-existing medical condition (such as liver disease, cancer, heart disease, recent gastric surgery, antacid use, or diabetes)

Predisposing Factors: List of conditions or cofactors that may predispose to infection, disease, or more severe disease (e.g., pregnancy, immune status).

Communicability

Ingestion of contaminated raw or undercooked shellfish including clams, oyster, shrimp. Exposure of open wounds to contaminated seawater, shellfish, or finfish can cause infections and septicaemia. No person to person communicability.

Epidemiology

Worldwide – widely distributed in inshore marine waters, and has been found in seawater, sediments, and is a part of the natural flora of bivalve shellfish(2). The bacteria are most prevalent during warm summer seasons.

Host Range

Natural Host(s): Humans, finfish, seafood such as codfish, sardines, mackerel, flounder, clams, octopus, shrimp, crab, lobster, crawfish, scallops, and oysters

Other Host(s): Not applicable.

Infectious Dose
Infection can occur upon ingestion of 107 – 108 organisms

Incubation Period
Usually at 15 hours after infection, with a range of 4 – 96 hours.

Section 3 - Dissemination

Reservoir
Salty environments, such as seawater. Naturally and commonly found in warm marine and estuarine environments.

Vectors
None.

Zoonosis / Reverse Zoonosis
None.

Section 4 - Dissemination

Drug Susceptibility
Susceptibility has been shown for a range of antibiotics such as doxycycline, or ciprofloxacin, tetracycline, ceftriaxone, chloramphenicol, imipenem, ofloxacin, nitrofurantoin, meropenem, oxytetracycline, fluoroquinolones, third generation cephalosporins, and aminoglycosides. Erythromycin may be used by pregnant women and children.

Drug Resistance
Describe known drug resistance or multi-drug resistance.

Susceptibility to Disinfectants
Susceptible to 1% sodium hypochlorite, 70% ethanol, 2% glutaraldehyde, and formaldehyde

Physical Inactivation
Extremely sensitive to heat as cells are no longer detectable at 48 – 50 C after 5 minutes.

Survival Outside Host
Naturally and commonly found in warm marine and estuarine environments.

Section 5 - First Aid and Medical

Surveillance
A clinician may suspect vibriosis if a patient has watery diarrhea and has recently eaten raw or undercooked seafood, especially oysters, or when a wound infection occurs after exposure to seawater. Infection is diagnosed when Vibrio bacteria are found in the stool, wound, or blood of a patient who has symptoms of vibriosis.

First Aid / Treatment
Treatment is not necessary in mild cases, but patients should drink plenty of liquids to replace fluids lost through diarrhea. Although there is no evidence that antibiotics decrease the severity or duration of illness, they are sometimes used in severe or prolonged illnesses.

Immunization
None.

Prophylaxis
None

Section 6 - Laboratory Hazards

Laboratory Acquired Infections
The first laboratory-acquired infection was recorded in 1972 when a worker was subculturing different strains of the bacteria, and another infection was reported in 2002, and was caused through handling experimentally infected abalones.

Sources / Specimens
Stool samples, contaminated seawater and seafood.

Primary Hazards
Direct contact of infected specimens with parenteral inoculation and ingestion.

Special Hazards
Naturally and experimentally infected animals are potential sources of infection.

Section 7 - Exposure Controls and Personal Protection

Risk Group Classification

What is the Risk Group classification in humans and animals for the pathogen?

Human Risk Group Classification RG2 Animal Risk Group Classification RG1

Containment Requirements

Containment Level: CL2

Containment Zone Requirements:
Containment Level 2 facilities, equipment, and operational practices for work involving infectious or potentially infectious materials, animals, or cultures.

Protective Clothing
Lab coat. Gloves when direct skin contact with infected materials or animals is unavoidable. Eye protection must be used where there is a known or potential risk of exposure to splashes.
If there are no special hazards for this agent enter “none”.

Other Precautions
All procedures that may produce aerosols, or involve high concentrations or large volumes should be conducted in a biological safety cabinet (BSC). The use of needles, syringes, and other sharp objects should be strictly limited. Additional precautions should be considered with work involving animals or large scale activities.

Section 8 - Handling and Storage

Spills
Allow aerosols to settle. Wearing protective clothing, gently cover the spill with absorbent paper towel and apply suitable disinfectant, starting at the perimeter and working towards the centre. Allow sufficient contact time before clean up.

Disposal
Decontaminate all wastes that contain or have come in contact with the infectious organism by autoclave, chemical disinfection, gamma irradiation, or incineration before disposing.

Storage
The infectious agent should be stored in appropriately labelled leak-proof containers in a locked area. Containers of infectious material or toxins stored outside the containment zone must be labelled, leakproof, impact resistant, and kept either in locked storage equipment or within an area with limited access.

Section 9 - Regulatory Information

The import, transport, and use of pathogens in Canada is regulated under many regulatory bodies, including the Public Health Agency of Canada, Health Canada, Canadian Food Inspection Agency, Environment Canada, and Transport Canada. Users are responsible for ensuring they are compliant with all relevant acts, regulations, guidelines, and standards.

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References

Risk Group determination from "PHAC Biological Agent Search".

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Baker-Austin, C. et. al. (2017). Non-Cholera Vibrios: The Microbial Barometer of Climage Change. Trends in Microbiology. 25(1): 76-84.