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VIBRIO CHOLEREA, SEROGROUP O1, SEROGROUP O139 (BENGAL) - MATERIAL SAFETY DATA SHEETS (MSDS)

MATERIAL SAFETY DATA SHEET - INFECTIOUS SUBSTANCES

SECTION I - INFECTIOUS AGENT

NAME: Vibrio cholerae, serogroup O1, serogroup O139 (Bengal)
SYNONYM OR CROSS REFERENCE: Cholera
CHARACTERISTICS: Gram negative, non-spore forming rod, facultative aenerobe, oxidase +, serogroup O1 includes serologically indistinguishable classical and El Tor biotypes, produces a heat labile enterotoxin (CT toxin); non O1/O139 strains do not produce CT but may produce other toxins

SECTION II - HEALTH HAZARD

PATHOGENICITY: Symptoms range from asymptomatic to cholera gravis. Acute bacterial enteric disease with sudden onset, profuse watery stools, occasional vomiting, rapid dehydration, acidosis and circulatory collapse; in severe untreated cases, death may occur within a few hours, case fatality rate exceed 50%; with proper treatment rate is below 1%; pathogenic non O1/O139 strains produce a self-limiting gastroenteritis

EPIDEMIOLOGY: Pandemic cholera spread from India throughout the world in 19th century; spread from Indonesia through Asia into Europe, Africa; some outbreaks in Japan and South Pacific; few sporadic cases in North America; recent outbreak in South America

HOST RANGE: Humans
INFECTIOUS DOSE: $10^6$-$10^{11}$ organisms in healthy individual by ingestion route; varies with gastric acidity
MODE OF TRANSMISSION: Primarily through ingestion of water contaminated with feces or vomitus of patients; ingestion of food which had been contaminated by dirty water, feces, soiled hands or flies
INCUBATION PERIOD: From a few hours to 5 days; usually 2-3 days
COMMUNICABILITY: Communicable for the duration of the stool-positive stage, usually only a few days after recovery; carrier state may exist for several months

SECTION III - DISSEMINATION

RESERVOIR: Humans; environmental reservoirs - waters may be associated with copepods or other zooplankton
ZOOONOSIS: None
VECTORS: None

SECTION IV - VIABILITY

**DRUG SUSCEPTIBILITY:** Generally susceptible to antibiotics tetracycline being the drug of choice; resistance is increasing; resistant to polymyxin antibiotics; some outbreaks have become resistant to antibiotics through the acquisition of R Factors (however, not in North America); strains with multi drug resistance, transmissible by plasmid, have been isolated

**SUSCEPTIBILITY TO DISINFECTANTS:** Susceptible to many disinfectants - 70% ethanol, iodines; 2% glutaraldehyde, 8% formaldehyde, 0.05% sodium hypochlorite and 10% hydrogen peroxide provide> 6 log reduction with a contact time of 30 min at 20° C

**PHYSICAL INACTIVATION:** Very sensitive to the cold temperatures

**SURVIVAL OUTSIDE HOST:** Dust - 3 to 16 days; feces - up to 50 days; glass - up to 30 days; metal coins - 7 days; finger tip - 1 to 2 hours; soil - 16 days; survives well in waters (depends on temperature etc.)

**SECTION V - MEDICAL**

**SURVEILLANCE:** Monitor for symptoms; confirm by bacteriological examination of feces

**FIRST AID/TREATMENT:** Rehydration therapy; adequate amounts of fluid allow most patients to recover; tetracycline given in 4 equal portions of 40-50 mg/kg body weight each day for 2 days, reduces the duration and volume of diarrhea and rapidly removes the organism from the stool

**IMMUNIZATION:** Vaccination is not recommended for most travelers, hygiene and proper handling of food and water being adequate. Parenteral inactivated virus vaccines show limited efficacy and are not recommended. An oral live vaccine with an effective period of 3-6 months has been approved for use in Canada which may benefit those with increased risks, such as laboratory workers and health care workers in affected areas

**PROPHYLAXIS:** Chemoprophylaxis with tetracycline

**SECTION VI - LABORATORY HAZARDS**

**LABORATORY-ACQUIRED INFECTIONS:** 12 cases of infection with 4 deaths reported in a worldwide study up to 1979 (cases associated with mouth pipetting, contact with contaminated feces, contamination of fingers with pure culture and indirect contact with contaminated laboratory laundry); 1 case reported in Britain in 1984 (associated with freeze drying a culture)

**SOURCES/SPECIMENS:** Feces; naturally and experimentally infected animals

**PRIMARY HAZARDS:** Ingestion; importance of aerosol hazards not known

**SPECIAL HAZARDS:** The risk of infection following oral exposure may be increased in achlorhydric individuals

**SECTION VII - RECOMMENDED PRECAUTIONS**

**CONTAINMENT REQUIREMENTS:** Biosafety level 2 practices, containment equipment and facilities for activities with cultures or potentially infectious clinical materials; animal biosafety level 2 practices and facilities for activities with infected animals

**PROTECTIVE CLOTHING:** Laboratory coat; gloves when direct contact with infectious materials is unavoidable

**OTHER PRECAUTIONS:** Good personal hygiene and frequent hand washing is particularly important

**SECTION VIII - HANDLING INFORMATION**

**SPILLS:** Allow aerosols to settle; wear protective clothing; gently cover spill with paper towels and apply 1% sodium hypochlorite, starting at perimeter and working towards the centre; allow sufficient contact time (30 min) before clean up

**DISPOSAL:** Decontaminate before disposal; steam sterilization, chemical disinfection
STORAGE: In sealed containers that are appropriately identified

SECTION IX - MISCELLANEOUS INFORMATION

Date prepared: February, 2001

Prepared by: Office of Laboratory Security, PHAC

Although the information, opinions and recommendations contained in this Material Safety Data Sheet are compiled from sources believed to be reliable, we accept no responsibility for the accuracy, sufficiency, or reliability or for any loss or injury resulting from the use of the information. Newly discovered hazards are frequent and this information may not be completely up to date.

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