MATERIAL SAFETY DATA SHEET - INFECTIOUS SUBSTANCES

SECTION I - INFECTIOUS AGENT

NAME: Streptococcus pyogenes

SYNONYM OR CROSS REFERENCE: Group A (Beta hemolytic) streptococci, streptococcal sore throat, scarlet fever, impetigo, erysipelas, puerperal fever, necrotizing fasciitis

CHARACTERISTICS: Gram-positive cocci occurring in pairs or chains, facultatively anaerobic, nonmotile, beta hemolysis on blood agar; 80 serologically distinct types

SECTION II - HEALTH HAZARD

PATHOGENICITY: Cause a variety of diseases; streptococcal sore throat (fever, exudative tonsillitis, pharyngitis), streptococcal skin infections (impetigo or pyoderma - usually superficial), scarlet fever (skin rash, fever, nausea, case fatality rate of 3%), puerperal fever (bacterial invasion of genital tract), septicemia, erysipelas (fever, leukocytosis, red spreading lesion), perianal cellulitis, mastoiditis, otitis media, pneumonia, peritonitis and wound infections; acute glomerulonephritis may result; acute rheumatic fever; toxic shock-like syndrome (hypotension, renal impairment, thrombocytopenia, disseminated intravascular coagulation, bilirubin elevation, adult respiratory distress syndrome, necrotizing fasciitis); necrotizing fasciitis is a serious, often fatal, rare infection of the skin and subcutaneous tissue characterized by swelling, appearance of violet colour, blister formation, fever; serious cases progress rapidly with high mortality

EPIDEMIOLOGY: Common in temperate zones, well recognized in semitropics and less frequently recognized in tropical climates; in North America, may be endemic, epidemic or sporadic; highest incidence during late winter and spring; 3-15 year age group most often affected; impetigo occurs in young children in late summer and fall in hot climates; erysipelas most common after 20 years of age and in infants (sporadic occurrence); Streptococcus pharyngitis is unusual under 3 years of age, peaks in age group 6-12

HOST RANGE: Humans

INFECTIOUS DOSE: Not known

MODE OF TRANSMISSION: Large respiratory droplets, direct or intimate contact with patient or carrier (especially nasal); rarely by indirect contact through objects or hands; organisms may be recovered from skin 1-2 weeks before impetigo lesions and same strain appears in throat late in course of skin infection; anal, vaginal, skin and pharyngeal carriers responsible for noscomial outbreaks of wound infections; dried streptococci in dust etc. viable but non-infectious for mucous membranes or intact skin; group A streptococci may be transmitted to cattle from human carriers then spread through raw milk from these cattle; ingestion of contaminated foods (milk products, eggs) may result in explosive outbreaks; necrotizing fasciitis more often begins with skin infection at site of minor wounds or punctures

INCUBATION PERIOD: Short; usually 1-3 days, rarely longer

COMMUNICABILITY: In untreated uncomplicated cases period of communicability is 10-21 days; in untreated conditions with purulent discharges, period may extend to weeks or months; with adequate treatment, transmissibility generally is terminated within 24-48 hours; streptococcal pharyngitis is contagious for 2-3 weeks if untreated

SECTION III - DISSEMINATION

RESERVOIR: Humans

ZOOONOSIS: None

VECTORS: None

SECTION IV - VIABILITY

DRUG SUSCEPTIBILITY: Sensitive to penicillin (benzathine penicillin G); clindamycin or a cephalosporin can be used when penicillin and erythromycin are contraindicated

DRUG RESISTANCE: Resistant to tetracyclines; macrolide-resistant strains in the increase

SUSCEPTIBILITY TO DISINFECTANTS: Susceptible to many disinfectants - 1% sodium hypochlorite, 70% ethanol, glutaraldehyde, formaldehyde, iodines

PHYSICAL INACTIVATION: Sensitive to moist heat (121° C for at least 15 min) and dry heat (160-170° C for at least 1 hour)

SURVIVAL OUTSIDE HOST: Dust - up to 195 days; flies caught in hospital carried organism on their feet; survives in milk at 20 to 37° C; cheese - up to 126 days; pus - up to 110 days; blankets - 120 days; rim of drinking glass - 2 days

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SECTION V - MEDICAL

SURVEILLANCE: Monitor for symptoms; confirm by bacteriological and serological testing

FIRST AID/TREATMENT: Antibiotic therapy with penicillin (erythromycin for penicillin-sensitive patients); necrotizing fasciitis - early medical treatment critical (penicillin along with aggressive surgical debridement), limb amputation may be necessary in advanced cases

IMMUNIZATION: None

PROPHYLAXIS: Administer penicillin (long-term prophylaxis with long-acting benzathine penicillin G for persons whom recurrent streptococcal infections constitutes a special risk)

SECTION VI - LABORATORY HAZARDS

LABORATORY-ACQUIRED INFECTIONS: 78 recorded cases with 4 deaths up to 1976; 5th most common laboratory acquired infection

SOURCES/SPECIMENS: Respiratory specimens, skin lesions, blood, urine, wound exudates (pus etc.)

PRIMARY HAZARDS: Inhalation of infectious aerosols; accidental parenteral inoculation; ingestion; direct contact of mucous membranes and skin lesions

SPECIAL HAZARDS: None

SECTION VII - RECOMMENDED PRECAUTIONS

CONTAINMENT REQUIREMENTS: Biosafety level 2 practices, containment equipment and facilities for all activities involving known or potentially infected clinical materials or cultures; animal biosafety level 2 facilities for studies utilizing infected animals

PROTECTIVE CLOTHING: Laboratory coat; gloves when contact with infectious materials in unavoidable

OTHER PRECAUTIONS: None

SECTION VIII - HANDLING INFORMATION

SPILLS: Allow aerosols to settle; wearing protective clothing, gently cover spill with absorbent paper towel 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, incineration

STORAGE: In sealed containers that are appropriately labelled

SECTION IX - MISCELLANEOUS INFORMATION

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Prepared by: Office of Laboratory Security, PHAC

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