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Pathogen Safety Data Sheets: Infectious Substances – *Bacillus anthracis*

MATERIAL SAFETY DATA SHEET - INFECTIOUS SUBSTANCES

SECTION I - INFECTIOUS AGENT

NAME: *Bacillus anthracis*

SYNONYM OR CROSS REFERENCE: Anthrax, woolsorters' disease

CHARACTERISTICS: Aerobic, large Gram positive rods occurring in chains; non-motile; forms resistant spores

SECTION II - HEALTH HAZARD

PATHOGENICITY: Cutaneous anthrax - skin lesion becoming papular, then vesiculated and developing into a depressed eschar (5-20% case fatality in untreated cases); inhalation anthrax - respiratory distress, fever and shock with death shortly thereafter; intestinal anthrax - abdominal distress followed by fever, septicemia and death (rare); oropharyngeal form described

EPIDEMIOLOGY: Infrequent and sporadic in most industrial countries; occupational hazard of workers who process hides, hair, wool, bone and bone products; of laboratory workers and of veterinarians and agricultural workers who handle infected animals; endemic in agricultural regions where anthrax in animals is common (Africa, Asia and Middle East)

HOST RANGE: Humans, cattle, sheep, goats, horses, pigs

INFECTIOUS DOSE: 8,000 to 50,000 organisms by inhalation

MODE OF TRANSMISSION: Infection of skin by contact with infected animal tissues and possible by biting flies feeding on such animals, or by contaminated hair, wool, hides or products made from them; inhalation anthrax results from inhalation of spores in contaminated soil areas, dried or processed skins and hides of infected animals; intestinal anthrax from ingestion of contaminated undercooked meat

INCUBATION PERIOD: Within 7 days of exposure, usually 2 to 5

COMMUNICABILITY: Transmission from person to person is very rare

SECTION III - DISSEMINATION

RESERVOIR: Spores are resistant to adverse environmental conditions and remain viable for years in soil, dried or processed hides

ZOONOSIS: Yes - disease spreads among grazing animals through contaminated soil and feed and among omnivorous and carnivorous animals through contaminated meat, bone meal or other feed; vultures have been reported to spread the organism from one area to another

VECTORS: Infection of skin may possibly occur through biting flies which had fed on infected animals

SECTION IV - VIABILITY

DRUG SUSCEPTIBILITY: Susceptible to penicillin (except for inhalation anthrax in which the mortality remains high); ciprofloxacin, doxycycline, tetracyclines, erythromycin, chloramphenicol

SUSCEPTIBILITY TO DISINFECTANTS: Spores are resistant to many disinfectants; susceptible to 2% glutaraldehyde formaldehyde and 5% formalin (overnight soak preferable)

PHYSICAL INACTIVATION: Spores are highly resistant to drying, heat, and sunlight; adequate sterilization requires direct exposure to 121°C for at least 30 min

SURVIVAL OUTSIDE HOST: Spores remain viable in soil, skins and hides of infected animals and contaminated air and wool for decades; survival in milk - 10 years; dried on filter paper - 41 years; dried on silk threads - up to 71 years; pond water - 2 years

SECTION V - MEDICAL

SURVEILLANCE: Monitor for suspicious skin lesions and other symptoms; laboratory confirmation through direct microscopy, culture, immunological techniques

FIRST AID/TREATMENT: Prompt treatment with high-dose antibiotics

IMMUNIZATION: Vaccine available through the Centers for Disease Control and Prevention and is recommended for those workers with frequent exposure to clinical specimens and cultures; vaccination of cattle or other livestock may be justified in anthrax-endemic areas

PROPHYLAXIS: Antibiotic treatment (oral ciprofloxacin or doxycycline)

SECTION VI - LABORATORY HAZARDS

LABORATORY-ACQUIRED INFECTIONS: 45 cases with 5 deaths occurring primarily in facilities conducting anthrax research; 25 reported cases of cutaneous anthrax among armed forces personnel

SOURCES/SPECIMENS: Blood, skin lesion exudates, and rarely in urine and faeces; hides, hair, wool, bone and bone products, and tissues from infected animals

PRIMARY HAZARDS: Direct and indirect contact of skin with cultures and contaminated laboratory surfaces; accidental parenteral inoculation; exposure to infectious aerosols

SPECIAL HAZARDS: Naturally and experimentally infected animals pose a risk to laboratory and animal care personnel

SECTION VII - RECOMMENDED PRECAUTIONS

CONTAINMENT REQUIREMENTS: Biosafety level 3 practices and facilities are recommended for work with anthrax; Agriculture Canada may also require special conditions for the use or importation of this agent

PROTECTIVE CLOTHING: Use of adequate protective clothing (gloves, gowns with tight wrists and ties in back) and facilities for washing and changing clothes after work

OTHER PRECAUTIONS: Care of skin abrasions and proper handling of potentially contaminated articles is essential

SECTION VIII - HANDLING INFORMATION

SPILLS: Allow aerosols to settle; wearing protective clothing, gently cover spill with paper towels and apply suitable disinfectant (glutaraldehyde, formalin), starting at the perimeter and working towards the centre; allow sufficient contact time before clean up

DISPOSAL: Incineration or steam sterilization of cultures and infected materials; animals that have died from anthrax should be burned or deeply buried and covered with lime

STORAGE: In sealed containers that are appropriately labelled and secured in a level 3 facility

SECTION IX - MISCELLANEOUS INFORMATION

Date prepared: November 1999

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