Salmonella spp. (excluding S. typhi, S. choleraesuis, and S. paratyphi)...
with specific animal reservoir

ZOONOSIS: Yes - direct or indirect contact with animals (most are via ingestion); pets especially birds, reptiles, turtles tortoises

VECTORS: None

SECTION IV - VIABILITY

DRUG SUSCEPTIBILITY: Sensitive to ampicillin, amoxicillin, TMP-SMX, chloramphenicol, fluoroquinolones; many strains are antibiotic, or multi-drug resistant; drug susceptibility testing must be performed

SUSCEPTIBILITY TO DISINFECTANTS: Susceptible to many disinfectants - 1% sodium hypochlorite, 70% ethanol, 2% glutaraldehyde, iodines, phenolics, formaldehyde

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: Survives for long periods in the environment

SECTION V - MEDICAL

SURVEILLANCE: Monitor for gastrointestinal symptoms; confirm by stool culture, isolation from blood during acute stages

FIRST AID/TREATMENT: For enterocolitis - rehydration and electrolyte replacement; for enteric fever or septicemia - antibiotic therapy

IMMUNIZATION: None

PROPHYLAXIS: Not usually administered

SECTION VI - LABORATORY HAZARDS

LABORATORY-ACQUIRED INFECTIONS: 48 reported laboratory infections with Salmonella spp.

SOURCES/SPECIMENS: Feces, blood, urine; food, feed and environmental materials

PRIMARY HAZARDS: Ingestion, parenteral inoculation; importance of aerosol exposure not known

SPECIAL HAZARDS: None

SECTION VII - RECOMMENDED PRECAUTIONS

CONTAINMENT REQUIREMENTS: Biosafety level 2 practices, containment equipment and facilities for activities with clinical materials known or potentially infected and cultures

PROTECTIVE CLOTHING: Laboratory coat; gloves when contact with infected materials is unavoidable

OTHER PRECAUTIONS: Good personal hygiene and frequent hand washing

SECTION VIII - HANDLING INFORMATION

SPILLS: Allow aerosols to settle; wearing 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 labelled

SECTION IX - MISCELLANEOUS INFORMATION

Date prepared: March, 2001

Prepared by: Office of Laboratory Security, PHAC

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Last Updated: 2001-05-15

Important Notices
MATERIAL SAFETY DATA SHEET - INFECTIOUS SUBSTANCES

SECTION I - INFECTIOUS AGENT

NAME: Salmonella typhi

SYNONYM OR CROSS REFERENCE: Typhoid fever, Enteric fever, Typhus abdominalis, Salmonella choleraesuis serotype typhi, Salmonella enterica serotype typhi

CHARACTERISTICS: Family Enterobacteriaceae; Gram negative rod; motile, aerobic and facultatively anaerobic; serological identification of somatic, flagellar and Vi antigens

SECTION II - HEALTH HAZARD

PATHOGENICITY: Generalized systemic enteric fever, headache, malaise, anorexia, enlarged spleen, and constipation followed by more severe abdominal symptoms; rose spots on trunk in 25% of Caucasian patients; complications include ulceration of Peyer's patches in ileum, can produce hemorrhage or perforation; Common enterocolitis may result without enteric fever; characterized by headache, abdominal pain, nausea, vomiting, diarrhea, dehydration may result; case fatality of 16% reduced to 1% with antibiotic therapy; mild and atypical infections occur

EPIDEMILOGY: Worldwide; sporadic cases in North America; most cases represent importation from endemic areas; multi-drug resistant strains have appeared in several areas of world

HOST RANGE: Humans

INFECTIOUS DOSE: 100,000 organisms - ingestion; variable with gastric acidity and size of inoculum

MODE OF TRANSMISSION: Person-to-person; by contaminated food or water; by food contaminated by hands of carriers; flies can infect foods in which the organisms may multiply to achieve an infective dose

INCUBATION PERIOD: Depends on size of infecting dose; usually 1-3 weeks

COMMUNICABILITY: Communicable as long as typhoid bacilli appear in excreta; usually 1st week throughout convalescence; 10% of patients discharge bacilli for 3 months after onset; 2-5% become chronic carriers, may shed bacteria for years

SECTION III - DISSEMINATION

RESERVOIR: Humans - patients with acute illness and chronic carriers

ZOONOSIS: None

VECTORS: Possibly flies (mechanical only)
SECTION IV - VIABILITY

DRUG SUSCEPTIBILITY: Susceptible to chloramphenicol, ampicillin, amoxicillin, TMP-SMX, fluoroquinolones; Multi-drug resistant (MDR) strains are on the rise; drug susceptibility testing is required

SUSCEPTIBILITY TO DISINFECTANTS: Susceptible to many disinfectants - 1% sodium hypochlorite, 70% ethanol, 2% glutaraldehyde, iodines, phenolics, formaldehyde

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: Ashes - 130 days; rabbit carcass - 17 days; dust - up to 30 days; feces - up to 62 days; linoleum floor - 10 hours; ice - 240 days; skin - 10-20 min

SECTION V - MEDICAL

SURVEILLANCE: Monitor for symptoms; bacteriological examination of blood, excreta; serology not effective

FIRST AID/TREATMENT: Antibiotic therapy for enteric fever; determine appropriate antibiotic with drug susceptibility testing

IMMUNIZATION: Two typhoid vaccines licensed in Canada, one injectable one oral; vaccine administered for occupational exposure or travel to endemic areas for greater than 4 weeks; does not offer complete protection, immunity may be overwhelmed by large inoculum; oral vaccine is contraindicated in immunocompromised and pregnant individuals

PROPHYLAXIS: Antibiotic prophylaxis

SECTION VI - LABORATORY HAZARDS

LABORATORY-ACQUIRED INFECTIONS: Typhoid is the second most commonly reported laboratory infection; at least 258 reported cases with 20 deaths

SOURCES/SPECIMENS: Feces, urine, bile, blood

PRIMARY HAZARDS: Ingestion, parenteral inoculation; importance of aerosol exposure not known

SPECIAL HAZARDS: None

SECTION VII - RECOMMENDED PRECAUTIONS

CONTAINMENT REQUIREMENTS: Biosafety level 2 practices, containment equipment, and facilities for all activities utilizing known or potentially infectious clinical materials and cultures

PROTECTIVE CLOTHING: Laboratory coat; gloves when contact with infected materials is unavoidable

OTHER PRECAUTIONS: Good personal hygiene and frequent hand washing; vaccination for those regularly working with S. typhi cultures or clinical materials

SECTION VIII - HANDLING INFORMATION

SPILLS: Allow aerosols to settle; wearing 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 labelled

**SECTION IX - MISCELLANEOUS INFORMATION**

**Date prepared:** March, 2001

**Prepared by:** Office of Laboratory Security, PHAC

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[Important Notices]
MATERIAL SAFETY DATA SHEET - INFECTIOUS SUBSTANCES

SECTION I - INFECTIOUS AGENT

NAME: Salmonella paratyphi

SYNONYM OR CROSS REFERENCE: Enteric fever, Paratyphoid fever, S. paratyphi type A, B and C; S. choleraesuis serotype paratyphi; S. enterica serotype paratyphoid A, B and C

CHARACTERISTICS: Family Enterobacteriaceae; Gram negative rod; motile, aerobic and facultatively anaerobic; serological identification of somatic and flagellar antigens

SECTION II - HEALTH HAZARD

PATHOGENICITY: Bacterial enteric fever with abrupt onset, continued fever, malaise, headache, anorexia, enlargement of spleen, bradycardia, rose spots on trunk occur on approximately 25% of Caucasians, constipation is more common than diarrhea in adults; complications include perforation/hemorrhage/ulceration of the intestines, less frequently psychosis, hepatitis, cholecystitis, pneumonitis, and pericarditis; clinically similar to typhoid fever but milder with lower case fatality rate; Common enterocolitis may result without enteric fever; characterized by headache, abdominal pain, nausea, vomiting, diarrhea, dehydration may result; mild and asymptomatic infections occur

EPIDEMIOLOGY: Sporadically or in limited outbreaks; infrequently identified in North America; probably more frequent than reported; serotype B is most common, A less frequent, and C extremely rare

HOST RANGE: Humans

INFECTION DOSE: usually >1,000 organisms - ingestion; may be reduced by buffered gastric acidity

MODE OF TRANSMISSION: Direct or indirect contact with feces or rarely urine of patient or carrier; contaminated food, especially milk, milk products, shellfish, may be contaminated by hands of a carrier; flies may be a possible vector; a few outbreaks related to water supplies have been documented

INCUBATION PERIOD: One to 3 weeks for enteric fever; 1-10 days for gastroenteritis; varies with dose ingested

COMMUNICABILITY: Communicable as long as agent persists in excreta throughout illness and for periods up to several weeks or months following; commonly 1-2 weeks after recovery; some are chronic carriers, may persist for years

SECTION III - DISSEMINATION

RESERVOIR: Humans; patients with acute disease and chronic carriers
ZOONOSIS: None

VECTORS: Possibly flies (mechanical only)

SECTION IV - VIABILITY

DRUG SUSCEPTIBILITY: Susceptible to chloramphenicol, ampicillin, TMP-SMX, fluoroquinolones; Multi-drug resistant (MDR) strains are increasing, drug susceptibility is required

SUSCEPTIBILITY TO DISINFECTANTS: Susceptible to many disinfectants - 1% sodium hypochlorite, 70% ethanol, 2% glutaraldehyde, iodines, phenolics, formaldehyde

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: Butter - 55 days; raw milk - 11 days; bed bugs - 21 days; melon juice - 48 hours; flies - 10 days; some salmonella strains can survive in the environment for years

SECTION V - MEDICAL

SURVEILLANCE: Monitor for symptoms; bacteriological examination of blood, feces; examine contaminated food for cases of enterocolitis; serology is not effective

FIRST AID/TREATMENT: Antibiotic therapy following drug susceptibility testing for cases of enteric fever; hydration therapy

IMMUNIZATION: Standard vaccines not proven to be effective - none

PROPHYLAXIS: Antibiotic prophylaxis

SECTION VI - LABORATORY HAZARDS

LABORATORY-ACQUIRED INFECTIONS: Typhoid is second most commonly reported laboratory infection (256 cases with 20 deaths); salmonellosis is also commonly reported (48 cases)

SOURCES/SPECIMENS: Feces, urine, bile, blood

PRIMARY HAZARDS: Ingestion, parenteral inoculation; importance of aerosol exposure not known

SPECIAL HAZARDS: None

SECTION VII - RECOMMENDED PRECAUTIONS

CONTAINMENT REQUIREMENTS: Biosafety level 2 practices, containment equipment and facilities for all activities utilizing known or potentially infectious clinical materials and cultures

PROTECTIVE CLOTHING: Laboratory coat; gloves when contact with infected materials is unavoidable

OTHER PRECAUTIONS: Good personal hygiene and frequent handwashing

SECTION VIII - HANDLING INFORMATION

SPILLS: Allow aerosols to settle; wearing 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 labelled

**SECTION IX - MISCELLANEOUS INFORMATION**

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MATERIAL SAFETY DATA SHEET - INFECTIOUS SUBSTANCES

SECTION I - INFECTIOUS AGENT

NAME: Salmonella choleraesuis

SYNONYM OR CROSS REFERENCE: Salmonellosis, Salmonella septicemia, hog cholera, hog typhoid, Salmonella choleraesuis serotype choleraesuis, Salmonella enterica serotype choleraesuis

CHARACTERISTICS: Family Enterobacteriaceae; Gram negative rod; motile, aerobic and facultatively anaerobic: serological identification of somatic and flagellar antigens

SECTION II - HEALTH HAZARD

PATHOGENICITY: Salmonellosis, an acute gastroenteritis with sudden onset of headache, abdominal pain, diarrhea, nausea and sometimes vomiting; may develop septicemia commonly with metastatic focal infections in any tissue of body, intravascular lesions, osteomyelitis, and meningitis; Fatality rate 2-3 times that of typhoid; food borne disease; few cases clinically recognized and reported; uncommon in humans, but important pathogen of swine; may cause typhoid like enteric fever

EPIDEMIOLOGY: Worldwide, more extensively in North America and Europe; higher incidence rate for infants and young children; small outbreaks in general population

HOST RANGE: Humans, animals - swine, other livestock

INFECTIOUS DOSE: > 1,000 organisms - ingestion; higher (10⁴-10¹⁰) in animals

MODE OF TRANSMISSION: By ingestion of food contaminated directly from infected animals or indirectly by infected animal or person; from animal feeds and fertilizers prepared from contaminated meat scraps; fecal-oral transmission from person to person

INCUBATION PERIOD: Six to 72 hours, usually about 12-36 hours

COMMUNICABILITY: Communicable throughout course of infection; variable several days to several weeks; temporary carriers can continue for several months; antibiotic therapy can prolong period of communicability; 1% of infected adults and 5% of infected children excrete organism for over 1 year

SECTION III - DISSEMINATION

RESERVOIR: Humans - patients and carriers, swine and other livestock

ZOONOSIS: Yes - contact with infected animals (livestock workers)

VECTORS: None
SECTION IV - VIABILITY

DRUG SUSCEPTIBILITY: Sensitive to ampicillin, amoxicillin, TMP-SMX, chloramphenicol, fluoroquinolones

SUSCEPTIBILITY TO DISINFECTANTS: Susceptible to many disinfectants - 1% sodium hypochlorite, 70% ethanol, 2% glutaraldehyde, iodines, phenolics, formaldehyde

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: Pig meat - up to 450 days; sludge - 38 days; several months in feces, slurry

SECTION V - MEDICAL

SURVEILLANCE: Monitor for symptoms; bacteriological examination of feces, blood

FIRST AID/TREATMENT: For enterocolitis - rehydration therapy and electrolyte replacement; for enteric fever or septicemia - antibiotic therapy

IMMUNIZATION: None

PROPHYLAXIS: Not usually administered

SECTION VI - LABORATORY HAZARDS

LABORATORY-ACQUIRED INFECTIONS: at least 48 reported laboratory infections with *Salmonella* spp.

SOURCES/SPECIMENS: Feces, blood, urine; food, feed and environmental materials

PRIMARY HAZARDS: Ingestion, parenteral inoculation; importance of aerosol exposure not known

SPECIAL HAZARDS: Natural or experimentally infected animals are a potential source of infection for laboratory and animal care personnel and for other animals

SECTION VII - RECOMMENDED PRECAUTIONS

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

PROTECTIVE CLOTHING: Laboratory coat; gloves when contact with infected materials is unavoidable

OTHER PRECAUTIONS: Good personal hygiene and frequent hand washing

SECTION VIII - HANDLING INFORMATION

SPILLS: Allow aerosols to settle; wearing protective clothing, gently cover spill with paper towels end 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

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