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# Pathogen Safety Data Sheets: Infectious Substances – Escherichia coli, enterohemorrhagic

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## PATHOGEN SAFETY DATA SHEET - INFECTIOUS SUBSTANCES

### SECTION I - INFECTIOUS AGENT

**NAME:** *Escherichia coli*, enterohemorrhagic

**SYNONYM OR CROSS REFERENCE:** Enterohemorrhagic *Escherichia coli* (EHEC), Verotoxin producing *Escherichia coli* (VTEC), Shiga toxin producing *Escherichia coli* (STEC)

**CHARACTERISTICS:** Gram negative rod; motile, aerobic; produce Vero / Shiga toxins (VT/STx), 2 types, VT1/Stx1 and VT2/Stx2; serotyping to determine somatic and flagellar antigens

### SECTION II - HEALTH HAZARD

**PATHOGENICITY:** Hemorrhagic colitis, intestinal disease accompanied by cramps and abdominal pain; initially watery, followed by bloody diarrhea; low grade fever; last about 8 days; 5-10% of hemorrhagic colitis victims may

develop hemolytic uremic syndrome (HUS); affects all ages, higher death rates occur in elderly and young; can cause thrombocytopenic purpura (TTP) in elderly

**EPIDEMIOLOGY:** Sporadic and in outbreaks of bloody diarrhea; associated with 15-30% of patients where no other pathogen has been identified; main EHEC serotype in North America from infections is E. coli O157:H7

**HOST RANGE:** Humans; animals (O157:H7 - piglets, calves and cattle)

**INFECTIOUS DOSE:** Appears to have low infectious dose, may be similar to that of *Shigella* spp., 10 organisms by ingestion

**MODE OF TRANSMISSION:** Ingestion of contaminated food (undercooked hamburger meat, unpasteurized milk); fecal-oral transmission; person-to-person transmission (extremely high)

**INCUBATION PERIOD:** 2-8 days (median of 3-4 days)

**COMMUNICABILITY:** Communicable for duration of fecal excretion (7-9 days); 3 weeks in one third of children

### SECTION III - DISSEMINATION

**RESERVOIR:** Infected persons, animals (sheep, goats, pigs, poultry, calves, cattle)

**ZOONOSIS:** Yes - direct or indirect contact with infected animal and waste

**VECTORS:** birds may be a vector

### SECTION IV - VIABILITY

**DRUG SUSCEPTIBILITY:** Sensitive to a wide spectrum of antibiotics

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

**PHYSICAL INACTIVATION:** Heat sensitive, inactivated by moist heat (121° C for at least 15 min) and dry heat (160-170° C for at least 1 hour)

**SURVIVAL OUTSIDE HOST:** Butter - up to 50 min; cream - 10 days; hamburger meat - survives well; does not survive long in slurry systems (innoculum of 108 cfu/mL became undetectable after 9 days); survives well in contaminated feces and soil, only small reduction in organism number over 2 months

## SECTION V - MEDICAL

**SURVEILLANCE:** Monitor for symptoms; confirm bacteriologically, DNA probe to detect Verotoxins VT1 and VT2

**FIRST AID/TREATMENT:** Electrolyte fluid therapy; antibiotics may be administered in very severe cases

**IMMUNIZATION:** None

**PROPHYLAXIS:** Not usually administered

## SECTION VI - LABORATORY HAZARDS

**LABORATORY-ACQUIRED INFECTIONS:** 4 reported cases of laboratory infections with *E. coli* since 1981

**SOURCES/SPECIMENS:** Contaminated food (raw milk, hamburger, apple juice and water); feces

**PRIMARY HAZARDS:** Ingestion

**SPECIAL HAZARDS:** None

## SECTION VII - RECOMMENDED PRECAUTIONS

**CONTAINMENT REQUIREMENTS:** Biosafety level 2 practices, containment equipment and facilities for activities involving cultures and infected clinical materials

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

**OTHER PRECAUTIONS:** Good personal hygiene and frequent handwashing essential

## 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

**STORAGE:** In sealed containers that are appropriately labelled

## SECTION IX - MISCELLANEOUS INFORMATION

**Date prepared:** January, 2001

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

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