Verotoxin- or Shiga toxin-producing *Escherichia coli* (VTEC/STEC)

**Epidemiology in New Zealand**

Since the first New Zealand case was detected in 1993, the incidence of verotoxin- or Shiga toxin-producing *Escherichia coli* (VTEC/STEC) has gradually increased.

More detailed epidemiological information is available on the Institute of Environmental Science and Research (ESR) surveillance website at www.surv.esr.cri.nz.

Further information on foodborne illness is available at www.foodsafety.govt.nz and www.mpi.govt.nz.

**Case definition**

**Clinical description**

Diarrhoea resulting from infection with VTEC/STEC may range from mild, watery and non-bloody to almost pure bloody diarrhoea with abdominal cramping. The disease is distinguishable from other causes of gastroenteritis by its high incidence of bloody diarrhoea (profuse rectal bleeding without fever sometimes clouds the diagnosis), severity (approximately 40 percent of cases are hospitalised) and frequency of complications.

Haemolytic uraemic syndrome (HUS) complicates 8–10 percent of VTEC/STEC infections in children; this syndrome includes haemolytic anaemia, thrombocytopenia and acute renal failure. Of children with HUS, 12–30 percent will have severe sequelae, including renal and cerebral impairment. Elderly patients with VTEC infections may suffer thrombotic thrombocytopenic purpura (TTP), which is similar to HUS but with greater neurological involvement.

**Laboratory tests for diagnosis**

**Laboratory confirmation requires** evidence of Shiga toxin, which comprises either:

- isolation of Shiga toxin-producing (verotoxin) *Escherichia coli*, OR
- detection of the genes associated with the production of Shiga toxin in *E. coli*. 
All isolates should be referred to the Enteric Reference Laboratory at ESR for further characterisation.

Isolates producing Shiga toxin 2 (Stx2) are more likely to cause serious human disease than isolates producing Shiga toxin 1 (Stx1) or both toxins together. Any positive toxin test should be reported as a confirmed case of VTEC/STEC.

Note: The eae and enterohaemolysin (hlyA) genes are accessory virulence factors strongly associated with enterohaemorrhagic E. coli (EHEC); however, finding these genes does not constitute a positive toxin test.

**Case classification**

- **Under investigation:** A case that has been notified, but information is not yet available to classify it as probable or confirmed.
- **Probable:** Not applicable.
- **Confirmed:** A clinically compatible illness that is laboratory confirmed.
- **Not a case:** A case that has been investigated and subsequently found not to meet the case definition. (Note: Asymptomatic people with positive laboratory results should be recorded under this category.)

**Spread of infection**

**Incubation period**

2–10 days; median 2–3 days.

**Mode of transmission**

In the majority of cases, by ingestion of food contaminated by ruminant faeces; outbreaks have been linked to contaminated hamburger and other meat products, unpasteurised milk, and produce (including melons, lettuce, coleslaw, apple cider and alfalfa sprouts). Outbreaks have also been linked to faeces-contaminated drinking and swimming pool water, direct contact with animals and person-to-person spread in households, early childhood services and custodial institutions.

**Period of communicability**

Faecal shedding persists for up to 1 week in adults and up to 3 weeks in children.

**Notification procedure**

Attending medical practitioners or laboratories must immediately notify the local medical officer of health of suspected cases. Notification should not await confirmation.
Separate hospital-based surveillance of paediatric admissions of HUS is provided through the New Zealand Paediatric Surveillance Unit. This surveillance service does not involve medical officers of health.

**Management of case**

**Investigation**

In consultation with the attending medical practitioner, obtain a history of ingestion of meat products, exposure to recreational water or untreated water, contact with ruminant animals or their faeces, possible human contacts and travel. Ensure laboratory confirmation by stool culture or rectal swab has been attempted. Inform the laboratory that VTEC is suspected.

**Restriction**

In a health care facility, only standard precautions are indicated in most cases; if the case is diapered or incontinent, apply contact precautions for the duration of the illness. For further details, refer to the exclusion and clearance criteria in Appendix 2: Enteric Disease.

**Counselling**

Advise the case and their caregivers of the nature of the infection and its mode of transmission. Educate about hygiene, especially hand cleaning.

**Management of contacts**

Identify contacts for investigation, restriction and counselling as appropriate.

**Definition**

All those with close (for example, household) contact with a case during the period of communicability or who have been exposed to the same contaminated food, water or other source in a common-source outbreak.

**Investigation**

For further details, refer to the exclusion and clearance criteria in Appendix 2: Enteric Disease.

**Prophylaxis**

Nil.
Counselling

Advise all contacts of the incubation period and typical symptoms of VTEC/STEC infection, and to seek early medical attention if symptoms develop. Educate about hygiene, especially hand cleaning.

Other control measures

Identification of source

Check for other cases in the community. Investigate potential food, water or animal sources of infection only if there is a cluster of cases or an apparent epidemiological link (for example, ground beef consumption).

If indicated, check the water supply for microbiological contamination and compliance with the latest New Zealand drinking-water standards (Ministry of Health 2008).

Disinfection

Clean and disinfect surfaces and articles soiled with stool. For further details, refer to Appendix 1: Disinfection.

Health education

Hand-cleaning facilities should be available and used after contact with animals. Young children should be supervised during contact with animals and during hand cleaning. Food-related activities should be separated from areas that house animals. Domestic animals with diarrhoea should be taken to a veterinarian for assessment and treatment.

If a water supply is involved, liaise with the local territorial authority to inform the public. Advise on the need to boil water.

In early childhood services or other institutional situations, ensure satisfactory facilities and practices regarding hand cleaning; nappy changing; toilet use and toilet training; preparation and handling of food; and cleaning of sleeping areas, toys and other surfaces.

Reporting

Ensure complete case information is entered into EpiSurv.

Liaise with the environmental health officer of the local territorial authority where food premises are thought to be involved. Liaise with the Ministry for Primary Industries if a contaminated commercial food source is thought to be involved.

If a cluster of cases occurs, contact the Ministry of Health Communicable Diseases Team and outbreak liaison staff at ESR, and complete the Outbreak Report Form.
References and further information