

Chapter 7: Prevention and Environmental Control of VTEC

I. Introduction

The presence of VTEC in the environment places the human population at risk of potential infection. The natural reservoir of VTEC includes farm, wild and domestic animals.

The transmission of VTEC to humans can occur from the consumption of food, water or other material that has been directly contaminated by animal faeces. In the community setting, infection can also occur through direct person-to-person contact (e.g. children in childminding facilities), close contact with animals (e.g. agricultural workers, petting farms), the use of infected fresh or saltwater areas for recreational purposes, and the use of contaminated swimming pools.

Transmission routes for VTEC infection are discussed in detail in Chapter 1: “Clinical features and epidemiology of VTEC”.

Recommended measures for the control of VTEC in the wider environment, and in particular for the prevention and control of VTEC infection in the human population are set out below.

II. Ensuring Safe Food and Drinking Water

A Food

Food and water (3) (128) (31) are major routes of transmission for VTEC infection (95).

Current legislation places responsibility on the food industry to implement food safety management systems. This involves identifying each food safety hazard and its associated risk, and then implementing appropriate controls to eliminate the hazard or reduce it to a safe level. The transmission of VTEC to a consumer is a food safety hazard to which such a food safety system can be applied to great effect.

The prevention and control of VTEC in food was dealt with extensively in the FSAIs document *The prevention of VTEC infection. A shared responsibility* (11) and readers are referred to this document for detailed information on the control of VTEC infection by the foodborne route. The principal prevention and control recommendations from this document for each stage in the food chain are summarised in Appendix P

Specific recommendations to reduce the risk of VTEC exposure for consumers include:

- Persons in contact with livestock and farm environments, including agricultural workers and contractors working a farm temporarily should be aware of the need for hygiene and hand-washing (3).
- While the sale of unpasteurised milk in Ireland is prohibited, many farm families continue to consume unpasteurised milk (129). Consumption of raw milk is a risk for infection by a range of pathogens including *E. coli* O157 and should be discouraged.
- Consumers should be aware of that raw and cooked foods should be kept separate at all times (transport, storage and preparation) to prevent cross contamination.
- Consumers should ensure proper temperature control, in particular (i) cooking high risk meat products for at least 70°C for two minutes or equivalent and (ii) storing high risk meat products under the correct refrigeration or freezer temperatures (at or below 5°C and –18°C respectively).
- Consumers should be aware that fruit and vegetables should be thoroughly washed with potable water, especially if they will be consumed raw.
- Persons in risk groups who are VTEC cases or contacts of VTEC cases should comply with the relevant exclusion criteria (Table 5.1) as applied by public health professionals.
- Voluntary groups catering at functions should be aware of the importance of good food hygiene and food handling practices.
- Persons suffering from VTEC infection and their carers should receive detailed advice on personal hygiene and cooking procedures.

B Drinking Water

While micro-organisms such as *E. coli* O157 are not routinely monitored in water supplies, the presence of faecal coliforms indicates that the water has been contaminated with human and/or animal faeces. Water that is known to be contaminated with faecal coliforms could therefore also be contaminated with *E. coli* O157.

In general, the quality of water in public water supplies and ‘public’ group water schemes in Ireland is high, with 98.7% and 96.1% complying with the European Union’s maximum admissible concentration for faecal coliforms in drinking water of zero (63) in 2003. Moreover, no case of VTEC illness in Ireland has been associated with public water supplies.

Concern centres on private group schemes (63) and private wells, which serve a large proportion of households in rural communities (64). In 2003, 74.9% of private group schemes in Ireland complied with the EU’s maximum admissible concentration for faecal coliforms in drinking water (63). In 2004, two separate incidents were reported in Ireland where private wells contaminated with VTEC O157 were responsible between them for 6 confirmed cases of human VTEC illness.

Septic tanks, slurry pits, direct animal access to water sources, intensification of animal rearing and inappropriate spreading of animal manure have been identified as causes of pollution of group water schemes (130). In view of the fact that *E. coli* O157 can survive

in soil for more than 130 days (102), pollution from these animal and human sources could result in the contamination of the drinking water supply with VTEC in particular. In addition, private group water supplies have been found to be contaminated by adjoining septic tank systems, and also seepage has been known to occur into wells after heavy rain (131).

Rural group water schemes are in the process of being upgraded under the National Development Plan, 2000-2006 which includes capital investment, maintenance and the introduction of treatment systems (130). Agencies involved include the local authorities, the EPA, Dept. of the Environment, Heritage and Local Government and the National Federation of Group Water Schemes (131).

Measures to prevent the contamination of drinking water before and after treatment include:

- proper siting and maintenance of septic tanks.
- Safe agricultural practices in relation to the storage and disposal of animal waste.
- Protection of the area around water sources and treated reservoirs - For example, by preventing animals grazing in the area, or restricting direct access by animals to the water source.
- The effective treatment of water by local authorities and private group water schemes, using best practice and applying systems based on the principles of hazard analysis, risk assessment and implementation of control measures (17), (131).
- The continued monitoring of drinking water at all stages by the local authorities, health authorities and those carrying out the treatment.
- The proper maintenance of water storage tanks, both in the domestic setting or in institutions such as hospitals, schools and prisons.

III. Prevention and Control in the Community Setting

In this report, we consider community settings that pose particular concerns in relation to VTEC transmission. Guidance for prevention and control of VTEC infection in childcare facilities was dealt with in chapter 6. Prevention and control of VTEC in relation to open farms and recreational water use are considered here.

A Open Farms

Contact with livestock and their faeces has been shown to be strong risk factor for VTEC infection (Chapter 1).

Several guides have been produced for Open Farms to assist in risk identification on the farm and to provide some practical steps that can be taken to help minimise such risks. The following is a list of recommendations, based mainly on (97) and (98).

Recommendations for Opens Farms

The Farm Environment

- Public areas should be kept as clean as possible.
- Legible notices should indicate restricted areas, toilets, and handwashing facilities.
- Animal feed should not be accessible to visitors.
- Public access to dung, compost heaps, and areas of manure and waste disposal should be prohibited.
- Drainage should be well maintained.
- Measures should be taken to control pests, in particular rodents and flies.

Animal Health

- The health status of livestock should be checked by the attending veterinary surgeon; this applies particularly to new or imported animals.
- New livestock whose health is uncertain should be isolated from visitors.
- Sick animals, stressed animals and those which have just given birth or just been born should be isolated from visitors (97).
- Housing and pens should be secure.

Visitors to the Farm

- Close supervision of visitors, particularly children, is advisable if direct contact with animals is likely.
- Children should be advised not to put their fingers in their mouths.
- Visitors should be advised to wash their hands before eating and drinking, especially if they have handled the animals.
- Pregnant women should be advised not to handle lambs.
- Visitors should clean or change their footwear before leaving the farm (97).
- Visitors to report any illness (e.g. vomiting or diarrhoea), which occurs after visiting an open farm, to their GP. The GP to be advised of recent contact with the farm animals (97).

Catering Facilities

Some of the following aspects are covered by legislation. Any catering facility provided will require prior registration with the HSE Area. Farm shops are subject to inspection by Environmental Health Officers. Further information can be obtained by contacting the local Environmental Health Department of the HSE.

If food is served to visitors on the farm, ensure that:

- Foodhandlers are properly trained.
- There are adequate cooking facilities.
- There are adequate refrigeration facilities.
- Food is eaten only in designated areas.
- Picnic areas are fenced and gated to prevent access by farm and other animals.

With regard to drinking water, ensure that:

- Drinking water should be of a potable quality.
- Taps that dispense drinking water should be clearly labelled.
- Facilities should be provided to wash ground crops such as strawberries, particularly if they are to be eaten on site.

Toilet & Washing Facilities

Ensure that the following are provided:

- Adequate toilet facilities.
- Adequate handwashing / hand-drying facilities including hand soap, hot running water, and disposable towels/hot air dryers accessible to adults and children (children should be supervised by adults if possible).

General Measures

- More general measures include the availability of first aid boxes and ready access to telephone numbers of emergency services.
- Visitors should not be permitted to bag compost. If bagged compost is supplied for domestic use, consumers should be advised to wash their hands after using the compost (97).

B Recreational Use of Farmland

The following advice is adapted from the Scottish Task Force Report Annex 7 ‘Guidance for the Recreational Use of Animal Pasture’ (7) which is addressed to organisations that arrange camping or picnicking for children, and farmers and landowners who permit animal pasture to be used for such purposes.

- Ideally, to completely avoid risk of infection by VTEC from this source, fields used for grazing or stockholding of animals should not be used for camping, picnicking, and play areas, especially where these involve children.

However, as with everyday life, these risks can be greatly reduced by adopting the following sensible precautions:

- Keep farm animals off the fields for the preceding 3 weeks prior to use.
- Keep farm animals off fields during use.
- Remove any visible droppings, ideally at the beginning of the 3-week period.
- Mow the grass, keep it short and remove the clippings before the fields are used for recreation.
- Always wash hands before eating, drinking and smoking i.e., use soap, clean towels and, preferably, hot and running water.
- Ensure that water from streams is treated before drinking.
- Ensure adequate supervision of children, particularly those under 5 years of age.

These precautions, taken together, will greatly reduce the risk of VTEC and other infections from this source, and allow your camping or sports to continue in greater safety.

C Water Used For Recreation & Water Sports

Between 1982 and 2002 there were 7 recorded outbreaks of *E. coli* O157 associated with swimming pools in the US (51). Contamination by an infected child with diarrhoea was the route of transmission for at least 2 of these outbreaks (31).

Swimming in contaminated freshwater lakes has also been associated with several outbreaks of *E. coli* O157 (51), as has swimming at an infected estuarine beach (31). In the latter cases, several possible sources of contamination were identified. These include direct contamination of the water-body concerned by infected swimmers and/or animals, as well as the contamination of the water as a result of faecal material being washed down into lakes and estuaries from surrounding land (31).

Swimming pools, whirlpools, spa pools & similar multi-user pools:

In the absence of legislation in Ireland, operators of multi-user pools should adhere to the Environmental Health Officers' Association's (EHOA) guide to good practice, "Environmental Health Standards for Swimming Pools, Spa Pools, Hydrotherapy Pools and other Multi-user Pools" (132). This document sets out best practice in relation to disinfection, cleaning and maintenance programmes, as well as the general management of multi-user pools.

Control measures specifically relating to VTEC, some of which are additional to the above EHOA guidelines (132), are set out below:

- Limit and monitor the number and type of people using the pool. If young children or others who might result in greater contamination of the water are using the pool, then the turnover should be as short as possible, and disinfectant residuals should be at the top of the scale.
- Animals must not be permitted in bathing pools.
- Particular areas require attention by pool operators, in order to reduce the growth of pathogens including VTEC:
 - Oily deposits and scum from bathers skin should be cleaned from the side of whirlpools and spas,
 - Filters should be maintained regularly and must not be allowed to become clogged and
 - Scale should be removed from the sides and bottom of pools.
- Since outdoor pools are subject to greater contamination, greater disinfection and shorter water turnover may be required. Debris must be removed regularly.
- Regular sampling of pool water by pool operators is essential.
- Monitoring of the operation of multi-user pools and the monitoring of water quality by Environmental Health Officers is desirable.
- Pools to be closed and appropriate remedial action taken if they are known to be, or are suspected to be the source of an outbreak, or if VTEC is isolated.

Rivers, lakes, canals, bays and estuaries used for water sports

- It is essential that farmers play their part in reducing the risk of waters becoming faecally contaminated by cattle, sheep, goat and deer, by employing good

agricultural practices, as outlined in above, in relation to the storage and spreading of slurry.

- Appropriate agencies should ensure adequate monitoring of water quality e.g. HSE Areas, local authorities, Environmental Protection Agency. It is essential that relevant information is shared between these agencies.
- Those engaged in water sports should be made aware of the risks associated with natural bodies of water (through leaflets/signage/advertisements) and should ensure that they always wash immediately after engaging in water sports.
- Erect appropriate signage and / or close the affected area for water sports if excessive levels of VTEC, indicating a major incident of water pollution or contamination, are isolated from a body of water, or if such a major incident is known to have occurred.

Paddling pools

- The public should be educated as to the safe and proper use of paddling pools.
- Only clean water should be used to fill paddling pools.
- Water must be changed regularly, depending on the number and age of children using the pool.
- Animals must not be permitted in paddling pools.