

### Please read this bit first

The HPCSA and the Med Tech Society have confirmed that this clinical case study, plus your routine review of your EQA reports from Thistle QA, should be documented as a "Journal Club" activity. This means that you must record those attending for CEU purposes. Thistle will **not** issue a certificate to cover these activities, nor send out "correct" answers to the CEU questions at the end of this case study.

The Thistle QA CEU No is: **MT00025**.

Each attendee should claim **THREE** CEU points for completing this Quality Control Journal Club exercise, and retain a copy of the relevant Thistle QA Participation Certificate as proof of registration on a Thistle QA EQA.

### Cycle 21 Organism 6:

## ***Escherichia coli O157:H7***

There are at least 4 categories of recognized diarrhoeagenic *E. coli*: Shiga toxin-producing *E. coli* (STEC), which is also referred to as enterohaemorrhagic *E. coli* (EHEC), enterotoxigenic *E. coli* (ETEC), enteropathogenic *E. coli* (EPEC), and enteroinvasive *E. coli* (EIEC). There are some other groups of pathogenic *E. coli* such as the enteroaggregative *E. coli* (EaggEC), but their role as enteric pathogens is not clear<sup>1</sup>.

*Escherichia coli* O157:H7 is now recognized as a significant cause of foodborne and waterborne illness in the industrialized world. Each year, *E. coli* O157:H7 and other Shiga toxin-producing *E. coli* strains (STEC) cause an estimated 73,000 cases of hemorrhagic colitis and 60 deaths in the United States.<sup>[1,2]</sup> As many as 8% to 18% of victims go on to develop hemolytic uremic syndrome (HUS)<sup>2, 3</sup>. These patients may require kidney dialysis and transfusions, and some are left with chronic renal failure and neurological damage; 3% to 5% of patients with HUS die.<sup>[2,4]</sup>

*The greatest threat to public health from E. coli O157:H7 is from unintentional contamination of food or water, but contamination could also be deliberate. Whether contamination of the food or water supply occurs accidentally or deliberately, clinical laboratories play a key role in the detection and surveillance of outbreaks.<sup>[5]</sup> To protect the public health, it is critical that they are able to identify or rule out pathogens such as E. coli O157:H7. However, surveys have shown*

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*that laboratories vary widely in their stool culture protocols and their ability to reliably isolate and correctly identify this organism.*<sup>[6,7]</sup>

As of 26 September 2006, a total of 183 persons infected with the outbreak strain of *E. coli* O157:H7 had been reported to CDC from 26 states in the USA. This was an ongoing multistate outbreak associated with the consumption of fresh spinach. Among the ill persons, 95 (52%) were hospitalized, 29 (16%) had hemolytic uremic syndrome (HUS), and one person died. The deaths of two other patients possibly related to this outbreak are under investigation<sup>6</sup>.

Isolation procedures for STEC – all stools for culture of bacterial enteric pathogens should be examined for 0157 STEC, especially those with bloody diarrhoea, or a history of bloody diarrhoea or with HUS. Because 0157 STEC strains ferment lactose, they are impossible to differentiate from other lactose fermenting organisms on lactose-containing media. Most 0157 STEC strains do not ferment D-sorbitol overnight, in contrast to 80% or more of other *E. coli* strains that rapidly ferment sorbitol. Sorbitol-containing MacConkey agar is used for the isolation of 0157 STEC. Colourless colonies should be identified by biochemical tests and tested with 0157 antiserum or latex reagent to confirm the identification. Test the positive reaction with a control reagent to rule out non-specific reactions.

Antimicrobial therapy for 0157 STEC diarrhoea or HUS has not been demonstrated to efficacious and safe. Most people recover without specific treatment within 5 to 10 days. Antibiotics should not be used to treat this infection, and it is thought that treatment with some antibiotics could lead to kidney complications. Antidiarrheal agents, such as loperamide (Imodium®), should also be avoided.

## References

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Ochoa TJ, Cleary TG. Epidemiology and spectrum of disease of *Escherichia coli* 0157. *Current Opinion in Infectious Diseases*. 2003; **16**: 259-263.  
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## Questions

1. How would you isolate and identify an *Escherichia coli* 0157:H7 (STEC) isolate?
2. What infections are caused by *Escherichia coli* 0157:H7 (STEC)?
3. How are infections caused by *Escherichia coli* 0157:H7 (STEC) treated?