

THIS CPD/CEU EXERCISE IS PRESENTED UNDER THE THISTLE QA SERVICE PROVIDER NO : MT00025. IT IS DESIGNED TO TAKE PLACE WITHIN YOUR OWN LABORATORY AS A SMALL GROUP ACTIVITY LASTING APPROXIMATELY ONE HOUR. PLEASE ENSURE THAT YOU KEEP A REGISTER OF THOSE TAKING PART IN THIS EXERCISE AND SUBMIT YOUR APPLICATION FOR 1 CEU POINT ON THE APPROPRIATE HPCSA FORM, ALONG WITH THE RELEVANT THISTLE QA PARTICIPATION CERTIFICATE SENT TO YOUR LAB WITH YOUR EQA KIT AND INSTRUCTIONS.

Cycle 19 Organism 2

The causative organism was Escherichia coli O157:H7

Introduction

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.^[1,2] As many as 8% to 18% of victims go on to develop hemolytic uremic syndrome (HUS).^[1-3] 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.^[2,4]

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.^[5] 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 that laboratories vary widely in their stool culture protocols and their ability to reliably isolate and correctly identify this organism.^[6,7]

Results

A study was conducted in the USA with regard to the percentage of laboratories that were screening stool specimens for *E. coli* O157:H7. There were 420 laboratories enrolled in this program of which 128 (53%) correctly identified the organism as *E. coli* O157:H7. The other laboratories incorrectly reported that there were no pathogens isolated (27%) and the others either referred the isolates for identification or the responses were not acceptable.

Discussion

All bloody stools should be screened for *E. coli* O157:H7 and the laboratories should have protocols to ensure reliable detection of this organism. The laboratories should examine and update their practices in 3 areas:

- a) Protocols and policies regarding which stool specimens to screen for *E. coli* O157:H7 strains should be set up
- b) Procedures for isolating and identifying these organisms, and
- c) Mechanisms for informing physicians about stool culture practices.

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The 2 most common reasons given for not routinely screening specimens for *E. coli* O157 are that the local incidence is too low or that the cost of screening is too high.^[6] The perception that the local incidence of *E. coli* O157:H7 is low may well be false because surveys have consistently shown a greater incidence of *E. coli* O157:H7 in areas of the country with higher screening rates.^[6,7] Although the cost of screening does add to the cost of performing a stool culture, this expense must be weighed against the expense of failing to correctly diagnose this infection. Patients infected with *E. coli* O157:H7 have undergone unnecessary exploratory surgeries, colonoscopies, barium enemas, and appendectomies.^[6] Also, failure to quickly diagnose this infection could make it more difficult and costly to manage an outbreak associated with contaminated food or water.

To screen for *E. coli* O157:H7 and other O157 strains, laboratories should at least plate stool specimens on Sorbitol-MacConkey agar (SMAC) and examine for growth of non sorbitol-fermenting colonies. Non sorbitol-fermenting colonies should then be further tested, either on site or at a state or reference laboratory. Confirmation that a non-sorbitol-fermenting organism is a strain of *E. coli* O157 requires 2 steps: detection of the O157 antigen with O157 antiserum or latex reagent and biochemical confirmation that the organism is *E. coli*.^[1,6] Definitive identification as *E. coli* O157:H7 requires further testing for the H7 antigen; most laboratories use a reference laboratory for this step.

Finally, informing physicians about stool culture practices is crucial to ensure detection of *E. coli* O157. A survey comparing physicians' beliefs about laboratory stool culture practices to actual practices reported by the laboratories showed that most physicians either did not know their laboratory's stool culture protocol or mistakenly assumed the laboratory routinely screened all specimens for *E. coli* O157 strains.^[8] As a direct result of this misunderstanding, many specimens from patients with bloody diarrhea were not screened for *E. coli* O157.^[8] To avoid confusion, the laboratory report should explicitly state the organisms for which the stool was examined.^[8-10]

Conclusion

The results of this study support the contention of many public health officials that infection with *E. coli* O157:H7 and other STEC strains continues to be underreported and misdiagnosed. Solving the problem will require the coordinated efforts of clinical laboratories, physicians, and public health officials. Education and surveillance through laboratory proficiency testing programs can contribute to this effort by raising awareness of critical issues in protecting the public health.

References

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In place of CPD questions, please complete the questionnaire below and return to Thistle by 23 December 2005 on fax number (011) 463-3036.

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