



PROVIDENCE HEALTH & SERVICES
CATHOLIC HEALTH INITIATIVES

TEST UPDATE

Quick Facts

- ▶ **Shiga toxin-producing *Escherichia coli* (STEC) are a leading cause of bacterial enteric infections.**
- ▶ **Most reported STEC infections are caused by *E. coli* O157:H7.**
- ▶ **Non-O157 STEC bacteria also are important causes of diarrheal illness.**
- ▶ **Approximately 8% of persons with O157 STEC infection develop hemolytic uremic syndrome.**
- ▶ **Simultaneous culture and EIA testing is more sensitive for detecting STEC infections than the use of either technique alone.**
- ▶ **Rapid detection of O157 STEC enables assessment of the patient’s risk for severe disease and initiation of measures to prevent serious complications.**
- ▶ **Applies to order codes CECST, CSTLST and CSTLYS.**

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Detection of Shiga Toxin-Producing *Escherichia coli* Infections

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CLINICAL APPLICATION

The 2009 CDC guidelines for laboratory identification of Shiga toxin-producing *Escherichia coli* (STEC) infections include the recommendation that all stools submitted for routine testing from patients with acute community-acquired diarrhea be simultaneously cultured for *E. coli* O157:H7 (O157 STEC) and tested with an enzyme immunoassay (EIA) assay that detects Shiga toxins to identify non-O157 STEC. Simultaneous culture and EIA testing is more sensitive for detecting STEC infections than the use of either technique alone. In addition, immediate culture permits detection of O157 STEC bacteria within 24 hours of initiating testing; however, culture media are not available for non-O157 STEC. Recently, the increased use of EIA or polymerase chain reaction (PCR) testing to detect Shiga toxin or the genes that encode the toxins has improved the diagnosis of both O157 and non-O157 STEC infections. Although EIA and other non-culture tests are useful tools for diagnosing STEC infection, they cannot replace culture, since a pure culture of the organism is needed for serotyping and molecular characterization, in order to detect, investigate, and control STEC outbreaks.

CLINICAL BACKGROUND

Shiga toxin-producing *Escherichia coli* (STEC) are a leading cause of bacterial enteric infections in the United States, causing approximately 100,000 illnesses, 3,000 hospitalizations, and 90 deaths annually. Most reported STEC infections in the U.S. are caused by *E. coli* O157:H7, with an estimated 73,000 cases occurring each year. Non-O157 STEC bacteria also are important causes of diarrheal illness in the U.S. Data suggest that STEC may be detected as frequently as other bacterial enteric pathogens. In U.S. studies, STEC were detected in 0 - 4.1% of stools submitted for laboratory testing, rates similar to those of *Salmonella*, *Shigella*, and *Campylobacter*. STEC infection causes acute, often bloody, diarrhea. Approximately 8% of persons who receive a diagnosis of O157 STEC infection develop hemolytic uremic syndrome (HUS), a life-threatening condition characterized by thrombocytopenia, hemolytic anemia, and renal failure. Although most persons with diarrhea-associated HUS have an O157 STEC infection, some non-O157 STEC strains also can lead to HUS. STEC infections and HUS occur in persons of all ages, but the incidence of both is highest in children less than 5 years old.

CLINICAL MANAGEMENT

Time has a crucial impact on the diagnosis of Shiga toxin-producing *Escherichia coli* (STEC) infections, patient management, and the recognition and control of outbreaks of STEC. Therefore, performing culture for O157 STEC while simultaneously performing EIA testing for all STEC serotypes is critical. Detection of O157 STEC within 24 hours after specimen submission to the laboratory enables physicians to rapidly assess the patient’s risk for severe disease and initiate measures to prevent serious complications, such as renal damage and death. Appropriate treatment with parenteral volume expansion early in the course of infection may decrease the risk for serious complications, such as renal damage, and improve overall patient outcome. Conversely, some treatments can worsen patient outcomes. For example, antibiotics may increase the risk for hemolytic uremic syndrome (HUS) in patients infected with O157 STEC, and anti-diarrheal medications may worsen the illness. Early diagnosis of STEC infection also may prevent unnecessary procedures or treatments.

Rapid laboratory diagnosis and sub-typing of STEC isolates permits quicker detection of outbreaks and timelier public health responses and control measures. Rapid identification of the infecting organism helps the public health system to quickly initiate measures to detect outbreaks and control the spread of infection. Delayed diagnosis of STEC infections can lead to secondary transmission in homes, child-care settings, nursing homes, and food service establishments and could delay the detection of multi-state outbreaks related to widely distributed foods.

Test Information on back

Test Information

DESCRIPTION	CULTURE, E COLI 0157 WITH SHIGA TOXIN TEST (REFLEXIVE)
METHOD	Culture and Immunochromographic
ORDER CODE	CECST
CPT CODE	87081, 87015, 87899 x 2
SPECIMEN REQUIREMENTS	Collect stool sample in a clean, leakproof plastic container. If transportation time will exceed 2 hours from time of collection, specimen should be refrigerated or placed in enteric transport medium (Modified Cary-Blair). Store and transport refrigerated.
COMMENTS	1) Min Amt: 1 mL feces. 2) Unacceptable conditions: Cultures are not recommended from inpatients that have been in the hospital for 3 or more days. 3) Stability: Room Temp 2 hours / Refrigerated 1 day / Frozen (-20°C) Unacceptable
RANGES	Negative for <i>E. coli</i> 0157 and Shiga Toxin

DESCRIPTION	CULTURE, STOOL, WITH SHIGA TOXIN TEST (REFLEXIVE)
METHOD	Culture and Immunochromographic
ORDER CODE	CSTLST
CPT CODE	87045, 87046 x 2, 87015, 87899 x 2
SPECIMEN REQUIREMENTS	Collect stool sample in a clean, leakproof plastic container. If transportation time will exceed 2 hours from time of collection, specimen should be refrigerated or placed in enteric transport medium (Modified Cary-Blair). Store and transport refrigerated.
COMMENTS	1) Min Amt: 1 mL feces. 2) Unacceptable conditions: Cultures are not recommended for inpatients that have been hospitalized for 3 or more days. 3) Stability: Room Temp 2 hours / Refrigerated 1 day
RANGES	Negative for <i>Salmonella</i> , <i>Shigella</i> , <i>Campylobacter</i> , <i>E. coli</i> 0157 and Shiga Toxin

DESCRIPTION	CULTURE, STOOL WITH YERSINIA AND SHIGA TOXIN (REFLEXIVE)
METHOD	Culture and Immunochromographic
ORDER CODE	CSTLYS
CPT CODE	87045, 87046 x 3, 87015, 87899 x 2
SPECIMEN REQUIREMENTS	Collect stool sample in a clean, leakproof plastic container. If transportation time will exceed 2 hours from time of collection, specimen should be refrigerated or placed in enteric transport medium (Modified Cary-Blair). This test may reflex to additional tests depending upon the results of this test. An additional fee may be added. Store and transport refrigerated.
COMMENTS	1) Min Amt: 1 mL feces. 2) Unacceptable conditions: Cultures are not recommended for inpatients that have been hospitalized for 3 or more days. 3) Stability: Room Temp 2 hours / Refrigerated 1 day
RANGES	Negative for <i>Salmonella</i> , <i>Shigella</i> , <i>Campylobacter</i> , <i>Yersinia enterocolitica</i> , <i>E. coli</i> 0157 and Shiga Toxin

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