

E. coli (STEC) Info for Health Care Providers

This document has been developed to answer questions about E. coli O157:H7, other Shiga Toxin producing E. coli and enterohemorrhagic E. coli (collectively referred to as STEC), that are frequently asked by health care providers.

This document is not intended to guide the management of established hemolytic uremic syndrome (HUS), which is best managed by pediatricians or internists working in conjunction with nephrologists and infectious disease specialists (as appropriate).

What are STEC?

STEC are Shiga toxin producing *E. coli*. When identified in stool samples, STEC are considered to be pathogens that cause diarrhea, often bloody, and may lead to the development of Hemolytic Uremic Syndrome (HUS). While persons of any age can develop HUS, the greatest risk is in children and the elderly.

What are the sources for STEC?

E. coli infections are generally caused when a person eats food or drinks water that is contaminated with human or animal feces, or through direct contact with a person who is sick or animals that carry the bacteria. Source tracing is routinely performed by public health authorities who are notified automatically by laboratory personnel of all cases of STEC but often the source of sporadic cases is not identified.

How contagious is STEC?

Secondary spread is a significant concern. Families of affected individuals with diarrhea should exercise good hygiene which includes washing hands with hot, soapy water often, including after going to the washroom, before preparing food, after touching raw meat, and changing diapers. Other standard precautions to prevent primary acquisition continue to apply.

What is the incubation period?

The average incubation period of STEC is approximately 3 days, with a range between 1 and 12 days.

What are the symptoms?

Most cases have the following symptoms:

- Non-bloody diarrhea (usually > 5/day) progressing to bloody diarrhea (~85% of cases)
- Abdominal pain, often worse with defecation
- History of fever but often resolved by time of presentation for care
- Presence of vomiting is variable

Who should receive a stool culture?

Collect stool for bacterial culture as soon as possible in patients with:

- Acute bloody diarrhea
- Painful, non-bloody diarrhea
- Acute diarrhea in immune-compromised patients
- Diarrhea with fever (during outbreak situations)
- Diarrhea in a patient with a family member or other contacts with a positive stool culture for STEC

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How long does it take for cultures to identify STEC?

Usually STEC can be identified from stool cultures within 72 hours of incubation.

How should STEC patients be treated?

Antibiotics

Antibiotics should not routinely be provided to patients with STEC diarrhea. There are no data to support the notion that antibiotic administration can prevent an incubating infection. Antibiotics also do not hasten clearance. However antibiotics should not be withheld when clinically indicated for other reasons.

Anti-motility Agents

Patients with STEC should not take over-the-counter or prescription medications that slow the gut, including antimotility, antidiarrheal or anticholinergic agents, or narcotics, and NSAIDs. The latter is important as NSAIDS can diminish renal blood flow.

Fluid Therapy

Maintaining patients well hydrated may protect renal function. Oral rehydration and intravenous therapy should be considered in patients at risk of developing HUS.

Complicated/Hospitalized Cases

Early consultation with a nephrologist is strongly recommended for patients with *E. coli* positive diarrhea or suspected HUS who have evidence of renal involvement.

What percent of children with STEC infection develop HUS?

10-15% of children with STEC develop complete HUS (hematocrit < 30 percent, creatinine above upper limit of normal for age, platelet count < 150,000/mm³), one of the most common causes of acute kidney injury in childhood. A similar percentage of infected children develop partial HUS (two of these three criteria are met). The average age of children with HUS in North America is 4 years, but it can occur at any age. Approximately 6-8% of infected adults will progress to develop HUS (however the risk increases with increasing age). Patients with less severe diarrhea can still develop severe HUS.

What blood tests are needed?

In individuals with evidence of STEC infection or at high risk **and** whose last diarrheal stool was < 72 hours ago, the following tests should be performed as soon as possible (i.e. once informed of culture result):

- CBC with blood smear
- Urea
- Creatinine
- Electrolytes
- Lactate dehydrogenase (LDH)

What to look for and when should blood tests be repeated?

If any of the above tests are abnormal or if the patient is unwell, dehydrated or has history of oliguria, anuria or tea coloured urine, it is advised that the individual be referred for care at a centre with experience managing patients with HUS. Remote locations should consult a

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pediatrician, internist or nephrologist as appropriate to determine the need for transfer and guide interim management. Though some variables are associated with avoidance of HUS, no single test or intervention can completely exclude this outcome as often these tests are initially normal in individuals who later develop HUS; therefore all patients with STEC in their stool should have these tests repeated in 24-48 hours to assess trends. A decreasing platelet count and an increased LDH are usually the first abnormalities to be noticed in the progression to HUS, and the first abnormalities to correct.

If any of the following are noted, specialist consultation should be obtained:

- Creatinine above reference range or $\geq 25\%$ higher than recent value
- Platelets below reference range or $\geq 25\%$ lower than recent value
- Elevated LDH
- Anemia with evidence of schistocytes or anicystosis on peripheral blood film. In dehydrated patients, the CBC should be repeated after fluid resuscitation has been completed as the anemia can be masked by dehydration
- Dehydration or unwell appearance

What does one do with a patient who looks “good,” when the report of the stool culture becomes known?

Unfortunately, there is an imperfect relationship between the severity of the enteric disease and the development of HUS. We urge the same diagnostic and therapeutic precautions regardless of gastrointestinal symptom severity. However, patients whose diarrhea has resolved for 3 days without laboratory evidence of HUS are very unlikely to develop this complication.

When does HUS occur and when should testing be stopped?

Infected individuals should be closely followed (actively with repeat blood tests) until at least 3 days after the diarrhea has resolved.