Escherichia coli O157:H7 & SHIGA TOXIN PRODUCING *E. coli* (STEC) FACT SHEET

Agent: *Escherichia coli* serotype O157:H7 or other *E. coli* serotypes producing Shiga toxins. All are gram-negative rod-shaped bacteria that produce Shiga toxin(s).

Brief Description: An infection of variable severity characterized by diarrhea (often bloody) and abdominal cramps. The illness may be complicated by hemolytic uremic syndrome (HUS), in which red blood cells are destroyed and the kidneys fail. This is particularly a problem in children <5 years of age and the elderly. In the United States, hemolytic uremic syndrome is the principal cause of acute kidney failure in children, and most cases of hemolytic uremic syndrome are caused by *E. coli* O157:H7 or another STEC. Another complication is thrombotic thrombocytopenic purpura (TTP). Asymptomatic infections may also occur.

Reservoir: Cattle and possibly deer. Humans may also serve as a reservoir for person-to-person transmission.

Mode of Transmission: Ingestion of contaminated food (most often inadequately cooked ground beef) but also unpasteurized milk and fruit or vegetables contaminated with feces. Direct person-to-person spread also takes place within families, daycare centers, and institutions. Waterborne transmission can occur after swimming in or drinking sewage-contaminated water.

Incubation Period: Ranging from 2 to 8 days, with a median of 3 to 4 days.

Laboratory Criteria for Diagnosis:

***E. coli* 0157:H7**

- Isolation of *Escherichia coli* O157:H7 from a specimen or
- Isolation of Shiga toxin producing *E. coli* O157:NM from a clinical specimen*

*Strains of *E. coli* O157:H7 that have lost the flagellar "H" antigen become nonmotile and are designated "NM"

Shiga Toxin Producing *E. coli*

- Positive Shiga toxin test (e.g., EIA)

Diagnostic Testing:

A. Culture
   1. Specimen: feces
   2. Outfit: Stool culture
   3. Lab Form: Form 3416
   4. Lab Test Performed: Bacterial isolation and identification. Tests for Shiga toxin I and II. PFGE.
   5. Lab: Georgia Public Health Laboratory (GPHL) in Decatur, Bacteriology

B. Antigen Typing
   1. Specimen: Pure culture
   2. Outfit: Culture referral
   3. Laboratory Form 3410
   4. Test performed: Flagella antigen typing
   5. Lab: GPHL in Decatur, Bacteriology

Case Classification:

- ***Suspected*:** A case of postdiarrheal HUS or TTP (see HUS case definition in the HUS fact sheet).
- ***Probable:***
  - A case with isolation of *E. coli* O157 from a clinical specimen, pending confirmation of H7 or Shiga toxin or
  - A clinically compatible case that is epidemiologically linked to a confirmed or probable case.
- ***Confirmed*:** A case that is laboratory confirmed.

Period of Communicability: Adults typically excrete the pathogen for a week or less, but one-third of children excretes for 3 weeks.

Treatment: Fluid and electrolyte replacement if dehydration occurs. Evidence exists that

treatment with certain antibiotics may precipitate complications such as HUS.

Investigation: The potential severity of the disease calls for early involvement of local health authorities to identify the source and apply appropriate specific preventive measures. It is important to interview the patient quickly so that they will recall exposures accurately to prevent secondary cases. Infected patients should not be employed to handle food or to provide child or patient care until two successive negative fecal samples or rectal swabs are obtained. The patient's isolate or stool culture should be forwarded to the Georgia Public Health Laboratory for subtyping and further testing. Some clinical laboratories only perform Shiga toxin tests and do not attempt to isolate organisms that produce Shiga toxin. For public health purposes it is important to have the organism, so you would need to send the stool from the clinical lab or a fresh stool from the patient to the Georgia Public Health Laboratory for culture. Family members should be advised of the necessity for frequent hand washing with soap and water, especially after using the toilet and diaper changes. **Prophylactic use of antibiotics is not recommended.**

Reporting: Report all confirmed cases **IMMEDIATELY** by phone to the local health department, District Health Office, or the Epidemiology Branch at 404-657-2588. If calling after regular business hours, it is very important to report cases to the Epidemiology Branch answering service. After a verbal report has been made, please transmit the case information electronically through the State Electronic Notifiable Disease Surveillance System (SENDSS) at http://sendss.state.ga.us, or complete and mail a GA Notifiable Disease Report Form (#3095). Please conduct a case interview immediately using the ***Escherichia coli*: Form for Case Follow-up** to detect outbreaks and identify vehicles of infection, and fax it to the Epidemiology Branch at 404-657-7517 as soon as possible. If a cluster of cases is linked to a food item, notify the Epidemiology Branch and complete CDC Form 52.13, "Investigation of a Foodborne Outbreak."

Reported Cases of E. *coli 0157:H7* in Georgia, 1993-1999

Year	Number of cases
1993	15
1994	26
1995	29
1996	39
1997	46
1998	84
1999	43

References and Further Reading:

1. Centers for Disease Control and Prevention. Outbreak of *Escherichia coli* O157:H7 and *Campylobacter* Among Attendees of the Washington County Fair — New York, 1999. *MMWR* 1999; 48(36): 803.
2. Centers for Disease Control and Prevention. Case Definitions for Infectious Conditions under Public Health Surveillance. *MMWR* 1997; 46(RR10): 1-55.
3. Centers for Disease Control and Prevention. Enhanced Detection of Sporadic *Escherichia coli* O157:H7 Infections - New Jersey, July 1994. *MMWR* 1995; 44(22): 417-418.
4. Centers for Disease Control and Prevention. *Escherichia coli* O157:H7 Outbreak at a Summer Camp - Virginia, 1994. *MMWR* 1995; 44(22): 419-421.
5. Centers for Disease Control and Prevention. Outbreaks of *Escherichia coli* O157:H7 Infection and Cryptosporidiosis Associated with Drinking Unpasteurized Apple Cider - Connecticut and New York, October 1996. *MMWR* 1997; 46(1): 4-8.
6. Chin J, ed. Diarrhea caused by *Escherichia coli*. I. Diarrhea caused by Enterohemorrhagic Strains. In: Control of Communicable Diseases Manual. 17th ed. Washington, DC: American Public Health Association, 2000: 155-158.

7. Mahon BE, Griffin PM, Mead PS, Tauxe RV. Hemolytic uremic syndrome surveillance to monitor trends in infection with *Escherichia coli* O157:H7 and other shiga-toxin-producing *E.coli*. Emerg Infect Dis 1997; 3:409-12.
8. Slutsker L, Ries AA, Greene KD, et al. *Escherichia coli* O157:H7 diarrhea in the United States: clinical and epidemiologic features. Ann Intern Med 1997; 126:505-13.

Links:

- USDA Food Safety and Inspection Service – http://www.fsis.usda.gov
- USDA Cooking ground beef safely – http://www.fsis.usda.gov/OA/topics/gb.htm
- CDC *Escherichia coli* O157:H7 fact sheet – http://www.cdc.gov/ncidod/dbmd/diseaseinfo/escherichiacoli_g.htm
- CDC Pulsenet – http://www.cdc.gov/ncidod/dbmd/pulsenet/pulsenet.htm
- CDC Foodnet – http://www.cdc.gov/ncidod/dbmd/foodnet/default.htm