E. COLI (ESCHERICHIA COLI); INTESTINAL

Background

This case definition was developed by the Armed Forces Health Surveillance Branch (AFHSB) for the purpose of epidemiological surveillance of an intestinal infection important to military-associated populations. In developing countries, *E.coli* is one of the most common causes of diarrheal disease among adults and children as well as among U.S. military personnel deployed to these areas.[1]

Clinical Description

Escherichia coli (E.coli) are a diverse group of gram-negative bacteria found in the environment and in the intestines of humans and animals. Contaminated food and water are the primary sources of *E.coli* infection. Six pathotypes are associated with diarrhea: enterotoxigenic *E. coli* (ETEC), Shiga toxin–producing *E. coli* (STEC), enteropathogenic *E. coli* (EPEC), enteroaggregative *E. coli* (EAEC), enteroinvasive *E. coli* (EIEC), and diffusely adhering *E. coli* (DAEC). The clinical manifestations vary by pathotype. Most infections cause stomach cramps, diarrhea (may be bloody or contain mucous), and vomiting. Fever (<101°F) may be present. Onset of symptoms is between 9 hours to 3-4 days following exposure with most infections resolving in 5 to 7 days.[2] Supportive care focused on fluid and electrolyte replacement is the mainstay of treatment. In severe cases, antibiotics may be required. Anti-diarrheal medication are contraindicated as these medications may make symptoms worse.

Case Definition and Incidence Rules

For surveillance purposes, a case of an intestinal *E.coli* infection is defined as:

- One record of a reportable medical event (RME) of a *confirmed* case of *E.coli*; or

- One laboratory report with a *confirmed* case of *E.coli* identified by culture from any clinical specimen; or

- *One hospitalization or outpatient medical encounter* with any of the defining diagnoses of *E.coli* (see ICD9 and ICD10 code lists below) in *any* diagnostic position.

Incidence rules:

For individuals who meet the case definition:

- An individual is considered an incident case only *once every 180 days.*

---

[1] Armed Forces Health Surveillance Branch. Incidence of *Escherichia coli* Intestinal Infections, Active Component, U.S. Armed Forces, 2007–2016. *Medical Surveillance Monthly Report (MSMR).* 2017; Vol 24(6): 20-25.

[2] Centers for Disease Control and Prevention. *E.coli (Escherichia coli).* https://www.cdc.gov/ecoli/index.html. Accessed June 2018.

Case Definition and Incidence Rules *(continued)*

- The incidence date is considered the date of onset documented in a reportable medical event report, the date of sample collection associated with a positive laboratory report, or the first hospitalization or outpatient medical encounter that includes a defining diagnosis of intestinal *E.coli* infection.

Exclusions:

- None

Codes

The following ICD9 and ICD10 codes are included in the case definition:

Condition	ICD-10-CM Codes	ICD-9-CM Codes
Escherichia coli (E coli); Intestinal	--	008.0 (intestinal infection due to Escherichia coli [*E.coli]*)
	- A04.0 (enteropathogenic *Escherichia coli* infection)	- 008.01 (intestinal infection due to enteropathogenic *E.coli*)
	- A04.1 (enterotoxigenic *Escherichia coli* infection)	- 008.02 (intestinal infection due to enterotoxigenic *E.coli*)
	- A04.2 (enteroinvasive *Escherichia coli* infection*)*	- 008.03 (intestinal infection due to enteroinvasivec *E.coli)*
	- A04.3 (enterohemorrhagic *Escherichia coli* infection)	- 008.04 (intestinal infection due to enterohemorrhagic *E.coli*)
	- A04.4 (other intestinal *Escherichia coli* infections)	- 008.09 (intestinal infection due to other intestinal *E.coli* infections)
		- 008.00 (intestinal infection due *E.coli*, unspecified)

Development and Revisions

- This case definition was created by the AFHSB *Medical Surveillance Monthly Report (MSMR)* staff for a June 2017 article on intestinal *E. coli* infections[.1] The case definition was developed based on reviews of the ICD9 and ICD10 codes, the scientific literature, and previous AFHSB analyses.

Case Definition and Incidence Rule Rationale

- This case definition uses an absolute 180-day incidence rule in which an individual may be considered an incident case no more often than every 180 days. Patients recovering from *E.coli*

infection may shed bacterium in the stool for several months after symptoms resolve. To allow for complete resolution of infection and to avoid counting current cases as newly incident, investigators may want to consider using a 180-day "gap in care" incidence rule, (e.g., an individual is considered a new incident case if *at least 180 days* have passed since the last medical encounter with a case defining diagnosis of *E.coli* infection). Use of this methodology presumes that medical encounters for *E.coli* that occur within 180 days of a previous such encounter constitute follow-up care of the previously diagnosed case.[3]

- The case finding criteria for this case definition use only one hospitalization or outpatient medical encounter with a case defining ICD9 or ICD10 code in any diagnostic position to define a case. As such, cases of *E.coli* identified using this criterion may represent cases based upon presumptive or epidemiologic diagnoses that are never confirmed. Investigators may want to consider using more specific case finding criteria for outpatient visits.

Reports

- Periodic *MSMR* reports

Review

Jun 2018   Case definition reviewed and adopted by the AFHSB Surveillance Methods and Standards (SMS) working group.

Jun 2017   Case definition developed by AFHSB *MSMR* staff.

Comments

- *Armed Forces Reportable Events:* Only enterohemorrhagic *E. coli* or STEC is a reportable medical event in the Armed Forces Reportable Events surveillance system. The other pathotypes (i.e., EPEC, EAEC, EIEC, and EAEC) are not reportable medical events, therefore, they will only be identified as a case if they meet at least one of the other case finding criteria outlined above.

- Per *RME Guidelines and Case Definitions* a suspected, probable, and confirmed case of enterohemorrhagic *E.coli* or STEC is defined by the following:

  Suspected:

  A case that meets the clinical description of the disease with any of the following:

  - Identification of Shiga toxin from any clinical specimen without culturing STEC; or
  - Post-diarrheal hemolytic uremic syndrome (HUS)

  Probable:

  A case that meets any of the following:

  - *E.coli* O157 identified by culture from any clinical specimen, without confirmation of H antigen or Shiga toxin production or
  - A case that meets the clinical description of the disease with any of the following:

---

[3] Mandell, G. (2015). Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases (8th ed.). New York: Elsevier/Churchill Livingstone.

      o   Epidemiologically linked to a confirmed or probable case or

      o   An elevated antibody titer against a known STEC serotype from serum

Confirmed:

STEC identified by culture from any clinical specimen

- *Centers for Disease Control and Prevention (CDC)* criteria for distinguishing a new case from an existing case: "A new case should be created when a positive laboratory result is received more than 180 days after the most recent positive laboratory result associated with a previously reported case in the same individual" (i.e., gap incidence rule).