

TYPHOID FEVER (TYPHOIDAL SALMONELLA)

Includes Paratyphoid Fever

Background

This case definition was developed by the Armed Forces Health Surveillance Center (AFHSC) for the purpose of epidemiological surveillance of a condition important to military-associated populations.

Clinical Description

Typhoid fever is a severe and occasionally life-threatening febrile illness caused by the bacterium *Salmonella enterica* serotype Typhi. Paratyphoid fever is a similar illness caused by serotype Paratyphi. Humans are the only source of these bacteria; as such the illness is usually spread via contact with an infected person or via food or water contaminated by the feces of an infected person. The onset of illness is insidious with gradually increasing fatigue and fever. Abdominal pain, headache, and loss of appetite are common as well as hepatosplenomegaly and a truncal rash. In clinically suspected cases definitive diagnosis is best achieved by simultaneous culture of blood, bone marrow, stool, and intestinal secretions. Serologic tests for the diagnosis of typhoid are only moderately sensitive and specific. Antibiotic therapy shortens the clinical course and reduces the risk of death. Typhoid vaccines are 50-80% effective and are recommended for travelers to areas where there is an increased risk of exposure.^{1,2}

Case Definition and Incidence Rules

For surveillance purposes, a case of typhoid fever is defined as:

- One record of a reportable medical event (RME) of a *confirmed* case of typhoid fever; or
- *One hospitalization or outpatient medical encounter* with any of the defining diagnoses of typhoid fever (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*.
- The incidence date is considered the date of onset documented in a reportable medical event report, or the first hospitalization or outpatient medical encounter that includes a defining diagnosis of typhoid fever.

Exclusions:

- None

¹ Centers for Disease Control and Prevention. Yellow Book: Chapter 3 Infectious Diseases Related To Travel, "Typhoid & Paratyphoid Fever. <http://wwwnc.cdc.gov/travel/yellowbook/2014/chapter-3-infectious-diseases-related-to-travel/typhoid-and-paratyphoid-fever>; accessed May 13, 2015

² Armed Forces Health Surveillance Center. Incidence of *Salmonella* Infections Among Service Members of the Active and Reserve Components of the U.S. Armed Forces and Among Other Beneficiaries of the Military Health System, 2000-2013. *Medical Surveillance Monthly Report (MSMR)*; 2015 January; Vol 22(1): 11-15.



Codes

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

Condition	ICD-10-CM Codes	ICD-9-CM Codes
Typhoid Fever	A01 (typhoid and paratyphoid fevers)	002 (typhoid and paratyphoid fevers)
	A01.0 (typhoid fever)	002.0 (typhoid fever)
	- A01.00 (typhoid fever, unspecified)	
	- A01.01 (typhoid meningitis)	
	- A01.02 (typhoid fever with heart involvement)	
	- A01.03 (typhoid pneumonia)	
	- A01.04 (typhoid arthritis)	
	- A01.05 (typhoid osteomyelitis)	
	A01.1 (paratyphoid fever A)	002.1 (paratyphoid fever A)
	A01.2 (paratyphoid fever B)	002.2 (paratyphoid fever B)
	A01.3 (paratyphoid fever C)	002.3 (paratyphoid fever C)
	A01.4 (paratyphoid fever, unspecified)	002.9 (paratyphoid fever, unspecified)

Development and Revisions

- In May of 2015 the case definition was updated to include ICD10 codes.
- This case definition for typhoid fever was developed in January 2015 by the Medical Surveillance Monthly Report (MSMR) staff for use in a MSMR article on *Salmonella* infections.³ The case definition was developed based on reviews of the ICD9 codes, the scientific literature, and previous AFHSC analyses.

Case Definition and Incidence Rule Rationale

- Case finding for this definition prioritizes reportable medical events over inpatient medical encounters over outpatient medical encounters.
- This case definition uses an absolute 180-day incidence rule in which an individual may be considered an incident case once every 180 days. Patients recovering from *Salmonella* infection can shed *S. typhi* in the stool for several months after symptoms resolve and relapse of infection occurs in up to 10% of patients.³ 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 typhoid fever). Use of this methodology presumes that medical encounters for typhoid fever that occur within 180 days of a previous such encounter constitute follow-up care of the previously diagnosed case. In

³ Mandell, G. (2010). Mandell, Douglas, and Bennett's principles and practice of infectious diseases (7th ed.). New York: Elsevier/Churchill Livingstone.



addition, the likelihood of acquiring a second, *de novo* infection in the U.S. within 180 days is low. In an endemic region, 180 day incident rule may be too restrictive.

- 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 typhoid fever identified using this criterion may represent cases based upon presumptive or epidemiologic diagnosis that are never confirmed. Investigators may want to consider using more specific case finding criteria for outpatient visits.

Reports

AFHSC reports on typhoid fever in the following reports:

- Monthly: AFHSC Reportable Events Monthly Report. Available on the AFHSC website at: <http://www.afhsc.mil>; see “Reports and Publications”.
- Weekly: DoD Communicable Disease Weekly Report; Summary of Communicable Reportable Events by Service; Available on the AFHSC website at: <http://www.afhsc.mil>; see “Reports and Publications”.

Review

Jun 2015	Case definition reviewed and adopted by the AFHSC Surveillance Methods and Standards (SMS) working group.
Jan 2015	Case definition developed by AFHSC MSMR staff.

Comments

Armed Forces Reportable Events: Typhoid fever is a reportable medical event in the Armed Forces Reportable Events surveillance system under “Gastrointestinal” disease.

