TYPHOID FEVER

REPORTING INFORMATION

- Class A(2)
- Report by the end of the next business day
- Confidential Case Report Card (3812.11, rev 12/81), lab report (3833.11), or telephone
- Symptomatic and asymptomatic cases are reportable
- Requires completion of the Typhoid Fever Surveillance Report (CDC form 52.5). To be sent by the local health department to the Bureau of Infectious Disease Control, ODH, 246 N. High Street, PO Box 118, Columbus, OH 43266-0118
- The Enteric Case Report may be useful in follow-up of cases. Do not send this report to ODH. It is for local health department use only.

AGENT

Salmonella typhi is the agent of typhoid fever. (Note: this organism is different from *Salmonella typhimurium*).

Infectious Dose

A low infectious dose ($<10^3$ organisms) can cause disease.

CASE DEFINITION

Clinical description

An illness caused by *Salmonella typhi* that is often characterized by insidious onset of sustained fever, headache, malaise, anorexia, relative bradycardia, constipation or diarrhea, and nonproductive cough. However, many mild and atypical infections occur. Carriage of *S. typhi* may be prolonged.

Lab criteria for diagnosis

Isolation of *Salmonella typhi* from blood, stool, or other clinical specimen

Case classification

Probable: a clinically compatible case that is epidemiologically linked to a confirmed case in an outbreak.

Confirmed: a clinically compatible case that is laboratory confirmed; see **Comment** below.

Comment

Isolation of the organism is required for confirmation. Serologic evidence alone is not sufficient for diagnosis. Asymptomatic carriage will *not* be reported as typhoid fever to the CDC by ODH, however, **all lab-confirmed cases must be reported to the local health department and ODH**, regardless of symptoms.

SIGNS AND SYMPTOMS

A febrile illness with headache, malaise, anorexia, weakness, stomach pain, headache, non-productive cough. Rose spots on the trunk appear in 25% of cases. Constipation is more common than diarrhea. Many mild and atypical infections occur. Approximately 2-5% of typhoid fever patients become carriers.

DIAGNOSIS

Typhoid fever is diagnosed by isolating the organism from blood, stool, or other body fluid. Serology tests are not useful for diagnosis. Some hospital laboratories have the ability to identify *Salmonella typhi.* Confirmation of isolates is available free of charge at ODH Laboratory. Clinical labs are asked to send all *Salmonella typhi* isolates to ODH Lab for verification and PFGE analysis. In some cases, testing of cases or contacts can be done by the ODH Lab without charge. If testing is to be performed at the ODH Lab, use Cary Blair transport medium, available from ODH Lab. To obtain fee exemption, contact the Division of Prevention, Infectious Disease Investigation Section at (614) 466-0265 and provide the names of persons for whom this testing is being requested.

EPIDEMIOLOGY

Source

Humans are the reservoir of *Salmonella typhi.*

Occurrence

Typhoid fever occurs worldwide, except in the U.S., Canada, western Europe, Australia, Japan. Ohio reports ≤ 10 cases annually; most cases reported in Ohio are related to foreign travel.

Mode of transmission

By ingestion of food or water contaminated with feces or urine from patients with typhoid fever or carriers of *S. typhi*. Flies might help carry the bacteria from filth to food. Direct person-to-person transmission by the fecal-oral route can also occur, but is rare.

Period of communicability

The organism is shed in the stool during the acute illness and through the convalescence. Approximately 2%-5 % of typhoid fever patients become chronic carriers.

Incubation period

From 3 days to 3 months, usually 1-3 weeks.

PUBLIC HEALTH MANAGEMENT

Case

Investigation

Local health departments are asked to contact Infectious Disease Control, ODH on learning of a new case of typhoid fever to expedite the investigation and follow-up. Be certain that the *Salmonella typhi* isolate (bacterial culture) has been or will be sent to ODH Lab. All cases should be contacted to obtain demographic and epidemiologic data. All cases, regardless of their occupation, should have 3 stool specimens tested for *Salmonella typhi*. Three consecutive negative specimens are generally sufficient to rule out carriage. See Isolation and Follow-up Specimens, below, for additional information.

Treatment

Antibiotic treatment is usually indicated. Chloramphenicol, amoxicillin, or TMP-SMX have high efficacy for acute infections. All isolates should be evaluated for their antimicrobial susceptibility patterns. Antibiotic resistance, especially for ciprofloxacin, has been increasing for *Salmonella typhi* from the Indian subcontinent.

Isolation and Follow up Specimens

Section 3701-3-13 of the Ohio Administrative Code states:
"A person infected with one of the following specified diseases or conditions shall be isolated as set forth below:

> (AA) Typhoid fever, where the person works in a sensitive occupation or is a child in a child care center. Such a person shall be excluded from work or the child care center and may only return after he or she is asymptomatic and after three consecutive follow-up stool specimens are negative for *Salmonella typhi*."

Obtain the first stool specimen at least 48 hours after completion of antibiotic therapy. Obtain the remaining specimens at least 24 hours apart. If one or more of the first three follow-up specimens is positive, space subsequent specimens at one week intervals until a maximum of eight weeks after onset of illness. After eight weeks, obtain follow-up specimens at one month intervals for up to one year.

Note: the initial isolate identifying the case as typhoid fever is often from a blood culture. Regardless of the source of the initial isolate, follow-up cultures should always be from stool.

Contacts
All household members should be tested for *Salmonella typhi*, regardless of their symptoms or occupation.

Prevention and Control
Sanitary disposal of human waste, hand-washing, fly control, and provision of safe food and drinking water are important in the prevention and control of typhoid fever.

Foodhandlers
Symptomatic persons should be excluded from work. As detailed in Isolation, above, foodhandlers may only return to work when asymptomatic and with three consecutive follow-up stool specimens negative for *Salmonella typhi.*

The Food Service Operation rules also pertain. Typhoid fever is a disease which can be transmitted through food. Persons infected with a disease that is communicable by food are not permitted to work as a food handler (see OAC 3701-21-06, A).

Patient Care Workers, Child Care Workers, and Children who attend child care centers
Symptomatic persons should be excluded from work. As detailed in Isolation above, children who attend child care centers and persons who work in sensitive occupations may return when asymptomatic and when three consecutive follow-up stool specimens are negative for *Salmonella typhi.*

Child care center outbreak control
Whenever a case of typhoid fever has been identified in a child care center attendee or worker, **all** staff and children in the same classroom as the case should be cultured for *Salmonella typhi.* Arrangements to have this testing done at ODH Lab can be made by calling the Infectious Disease Investigation Section at (614) 466-0265.

Special Information
Travel to Asia, Africa and Latin America is especially risky for acquiring typhoid fever. The risk of acquiring typhoid fever while traveling overseas can be reduced by:
- getting vaccinated against typhoid fever
- avoiding risky food and drink.

Typhoid vaccines are not 100% effective. If you acquire a drug-resistant strain of typhoid and are not treated with effective antibiotics, a serious and prolonged illness can result. For these reasons, avoid risky food and drink. Bottled or boiled water is safe, as are hot, cooked foods. Avoid ice and raw fruits and vegetables that cannot be peeled. The adage "Boil it, cook it, peel it or forget it" applies! These precautions will also help the traveler avoid other diseases, such as dysentery and travelers diarrhea.

Vaccine
Routine typhoid vaccination is not recommended in the U.S. Vaccination is indicated for the following:
- travelers to areas with recognized risk, e.g., Asia, Africa, Latin America.
- close contacts to a typhoid carrier.
- microbiologists who work with *Salmonella typhi*.

Routine vaccination is not warranted for sewage workers in the U.S., summer camp attendees, or persons affected by floods or other natural disasters in the U.S.

Three different typhoid vaccines are available in the U.S.; two are injectable and one is oral. One to five weeks (depending on the vaccine) are needed prior to travel for the vaccines to take effect. Contact a travel clinic, local health department, or the ODH Immunization Unit (614) 466-4643 for additional information.