

IN THIS ISSUE: TYPHOID AND PARATYPHOID FEVER

Enteric Fever

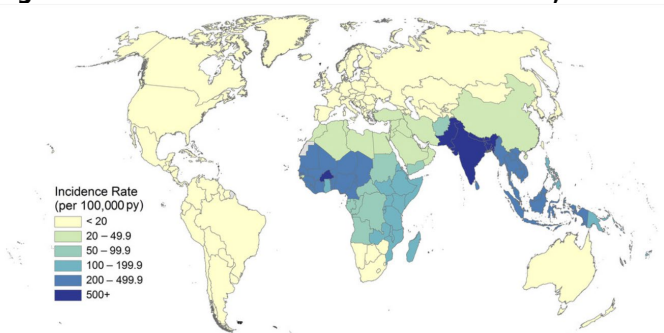
Introduction

Typhoid fever and paratyphoid fever are bacteremic infections collectively known as enteric fever. An estimated 11 to 26 million cases of typhoid fever and 5 million cases of paratyphoid fever occur each year, resulting in 215,000 deaths worldwide.<sup>1,2</sup> Infections in the United States are mainly associated with foreign travel.<sup>1</sup>

Epidemiology

Typhoid and paratyphoid fever are caused by *Salmonella enterica* serovar Typhi (*S*Typhi) and Paratyphi A, B, and C. Humans are the only known reservoir for the bacteria and transmission occurs through the fecal-oral route.<sup>2,3</sup> Exposure can occur through consumption of water or food that has been contaminated by feces of an acutely infected or convalescent person or from a chronic, asymptomatic carrier. Risk for infection is high in low- and middle-income countries with endemic disease and poor access to safe food, clean water, and sanitation. These countries are mostly in Southern Asia, Southeast Asia, and sub-Saharan Africa.<sup>2,3</sup>

Figure 1: Estimated Incidence of Enteric Fever, 2015



Source: The American Journal of Tropic Medicine and Hygiene 99, 3\_Suppl; [10.4269/ajtmh.18-0032](https://doi.org/10.4269/ajtmh.18-0032)

In 2016, there were 349 typhoid fever cases and 80 paratyphoid cases reported in the United States. Nevada reported an aggregate of seven (7) typhoid cases over a five-year timespan (2012-2016). Nationally, approximately 87% of the typhoid cases reported traveling or living outside of the United States in the 30 days prior to symptom onset. Cases reported visiting several different countries

however, over half (59%) reported visiting India prior to getting sick.<sup>4</sup>

Prevention

The Advisory Committee on Immunization Practices (APIC) recommends the typhoid vaccine for travelers to areas where enteric fevers are endemic. Vaccines should be administered at least 2 weeks before traveling and being revaccinated after 2 to 5 years due to waning vaccine efficacy.<sup>2,3</sup> There are two types of conjugated typhoid vaccines available in the United States:

- VI capsular polysaccharide vaccines (ViCPS) for intramuscular use
- Oral live attenuated vaccine<sup>2,3</sup>

Please see [CDC](https://www.cdc.gov) for basic vaccination information. Both vaccines are 50%-80% effective. There are no vaccines available for paratyphoid fever.<sup>2,3</sup>

Other precautions to consider when traveling abroad:

- Eat prepackaged foods or foods that are served hot. Avoid any raw foods (including pre-cut fruits and vegetables). Do not consume any bushmeat (e.g., bats, monkeys, or rodents).
- Avoid drinking any tap water, fountain drinks, use of ice in drinks, and freshly squeezed juices.

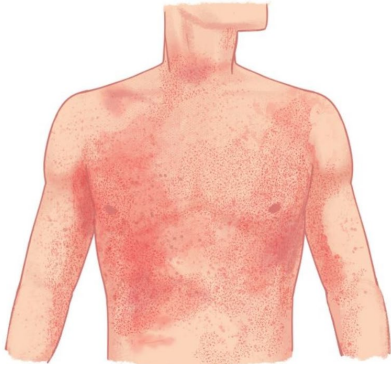
Drink from unopened, factory-sealed bottles or cans. Hot coffee or tea should be safe if served steaming hot. Avoid drinking any unpasteurized milk or milk stored in open containers.<sup>5,6,7</sup>

Signs & Symptoms

The incubation period is typically between 6-30 days for typhoid and between 1-10 days for paratyphoid. Symptoms can include worsening fatigue and fever that can spike as high as 102°F - 104°F by the third or fourth day of illness.<sup>2,3</sup> Other common symptoms include abdominal pain, diarrhea, constipation,

myalgias, dry cough, and sore throat. Vomiting and diarrhea are more common in children. Hepatosplenomegaly can often be detected. A transient, maculopapular rose-colored rash may also be present on the trunk.<sup>2,3</sup>

**Figure 2: Typhoid Rash**



Source: <https://healthand.com/us/topic/general-report/typhoid-fever>

Clinical presentation of typhoid can be confused with malaria. Typhoid fever should be suspected in persons with travel history to endemic countries who are not responding to antimalarial medication. Without treatment, typhoid fever can last for a month and has a case-fatality ratio of 10-30%. The case fatality for disease treated early is usually <1%.<sup>3, 4</sup> Typhoid fever can cause serious complications typically among hospitalized cases, about after 2-3 weeks of illness. These complications can include gastrointestinal hemorrhage, intestinal perforation, and encephalopathy.<sup>2,3</sup>

### Diagnosis & Testing

Blood cultures are gold standard if enteric fever is suspected. Bone marrow and bile can also be cultured for diagnosis. Multiple cultures may be needed to isolate the pathogen by increasing the sensitivity needed to make an accurate diagnosis. Bone marrow cultures increase the diagnostic yield to 80% of cases and is relatively unaffected by concurrent antibiotic use. Stool cultures are not recommended since the organisms are often absent during the first week of illness. Urine cultures have a lower diagnostic yield than stool for acute cases.<sup>2,3</sup>

The CDC does not recommend using serologic tests, such as the Widal test. These tests measure elevated antibody titers but may not accurately distinguish between acute and past infections. They are hard to interpret in endemic populations or with recent vaccinations. Serologic tests lack specificity and can result in false positive cases.<sup>2,3</sup>

### Treatment

Travel history can play a larger role in determining which antibiotic therapy to consider for treatment. Fluoroquinolones, such as ciprofloxacin, are used for the empiric treatment of enteric fever in adults with fluoroquinolone-susceptible infections. In the United States, most infections are acquired during travel abroad, particularly to regions where there is fluoroquinolone nonsusceptibility among Typhi and Paratyphi A isolates. Infections are also usually resistant to nalidixic acid and have been associated with treatment failure or delayed clinical response. These antibiotics should not be used in cases with recent travel to South Asia countries.<sup>2,3</sup>

There have also been multiple reported cases of extensively drug resistant (XDR) *S*Typhi with resistance to ceftriaxone, ampicillin, ciprofloxacin, and trimethoprim-sulfamethoxazole (TMP-SMX). Isolates have shown a susceptibility only to azithromycin and carbapenems. Clinicians are advised to check for updates on the outbreak of XDR typhoid fever when treating patients returning from Pakistan.<sup>2,3</sup>

Enteric fever caused by *S*Typhi that is known or likely to be multidrug resistant (but not XDR) should use the empiric therapy with a parenteral third-generation cephalosporin or azithromycin. Antibiotic choice, route of administration, and duration of therapy are contingent on the susceptibility of the organism. The optimal duration is unclear but experts state to treat at least 7 to 10 days for people with uncomplicated disease. Consult an infectious disease provider for management of severe and complicated cases.<sup>2,3</sup>

Relapse can occur in up to 17% of patients within four weeks. Immunocompromised patients may require longer treatment as well as retreatment. It is estimated that 1-4% of treated patients become asymptomatic chronic carriers and may continue to excrete bacteria in their stool for  $\geq 12$  months. Treatments usually include an additional four weeks of ciprofloxacin or norfloxacin. High-dose ampicillin can also be used. Corticosteroids may be used in severe cases of infection in children. Symptoms that indicate use are characterized by obtundation, stupor, coma, or shock. These should only be used in critically ill patients. High-dose dexamethasone, administered intravenously over a 48-hour period is recommended.<sup>2,3</sup>

Cholecystectomy followed by an additional course of antibiotic therapy may be needed for those that do not respond to initial treatments.<sup>2,3</sup>

## Reporting

The list of reportable communicable diseases and reporting forms can be found at:

<http://tinyurl.com/WashoeDiseaseReporting>

**Report communicable diseases to the Washoe County Health District. To report a communicable disease, please call 775-328-2447 or fax your report to the WCHD at 775-328-3764.**

## Acknowledgement

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