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# Typhoid – caused by *Salmonella* Typhi

## Frequently Asked Questions

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### 1. What is typhoid?

Typhoid fever, also called enteric fever, or simply ‘typhoid’, is a systemic illness caused by a bacterial infection with *Salmonella enterica* subspecies *enterica* serotype Typhi or serotypes Paratyphi A, B or C. In the pre-antibiotic era, typhoid carried a mortality of 5-20%. However there are currently very effective antibiotics for treatment. In South Africa, typhoid is a notifiable condition, as it has outbreak potential.

### 2. Who can get typhoid?

Any person who ingests typhoid organisms, and who is not immune can get typhoid. Children acquire typhoid more frequently than adults. Because typhoid is spread by faeco-oral contact, or through contaminated food or water, persons who have typhoid may spread typhoid to others if sanitation is poor. Chronic carriers of typhoid, especially those who are food-handlers, may be responsible for ongoing typhoid transmission.

### 3. Where does typhoid occur in South Africa?

Typhoid is endemic within South Africa, and sporadic cases are reported in all provinces every year. In addition to sporadic endemic disease, clusters and outbreaks may occur. There is ongoing risk of typhoid fever in any area where water quality and sanitation is not optimal. Contamination of water supplies has resulted in numerous large-scale outbreaks; for example, Delmas (Mpumalanga Province) has experienced repeated outbreaks of typhoid fever, with over 1000 cases during 1993, and over 400 suspected cases and three deaths in 2005. In Harare, Zimbabwe, a typhoid outbreak that began in 2012, associated with contaminated water sources, is ongoing. A number of South African cases are linked to this outbreak.

### 4. How is typhoid transmitted?

Typhoid is spread via faeco-oral transmission. The infective dose (the minimum number of organisms required to cause infection) is relatively high at around 100,000 organisms. Typhoid may be spread from person-to-person by direct contact, or through ingestion of contaminated food or water. Infection becomes apparent after an incubation period of 10-14 days (range 5-21 days).

### 5. How does typhoid affect animals?

Typhoid does not infect animals. It is an exclusively human infection.

## 6. What are the signs and symptoms of typhoid?

Typhoid fever is a systemic illness characterised by: 1) fever that is intermittent during the first week, but becomes sustained (lasting > 48 hours) thereafter; 2) headache (43-90%), 3) gastrointestinal symptoms such as abdominal pain/cramps, nausea and vomiting, constipation or diarrhoea. Other uncommon clinical signs include a relative bradycardia (a lower heart rate than would be expected in the presence of fever and illness), a skin rash ('rose spots') which are faint-pink spots 2-4cm in diameter which develop on the chest, abdomen and back, hepatosplenomegaly (enlarged liver and spleen). The symptoms of typhoid overlap with a number of other infectious diseases important in the region notably malaria. Malaria must be considered first in all persons residing in or with a history of travel to malaria transmission areas who present with fever or a 'flu-like' illness. Since malaria is rapidly progressive but responds well to early treatment, malaria blood tests must be done as a matter of urgency and treatment provided rapidly.

## 7. How is typhoid diagnosed?

Typhoid is diagnosed when *Salmonella Typhi* is identified in a culture of blood, bone marrow, stool or other tissue. Stool cultures may only become positive after the first week of illness. Ideally, blood and stool cultures should be submitted simultaneously. Culture of bone marrow is useful as it may remain positive even after 5 days of antibiotic treatment. Positive cultures are confirmed by agglutination with specific typhoid anti-sera, including the Vi antigen. The Widal test which looks for antibodies to *S. Typhi* may be suggestive of the diagnosis but not confirmatory. The Widal test also does not supply information on antibiotic resistance, which is important to guide treatment.

## 8. How is typhoid treated?

Ciprofloxacin is the drug of choice for treatment of typhoid. Advantages of treatment with ciprofloxacin include twice-daily dosing with rapid resolution of symptoms, and frequent eradication of carriage post treatment. Alternative treatment includes 3<sup>rd</sup> generation cephalosporins (ceftriaxone). About 30% of South African *S. Typhi* strains are resistant to ampicillin and cotrimoxazole. No high level resistance to ciprofloxacin in *Salmonellae* in SA has been detected at present.

## 9. How can typhoid be prevented?

The three most effective methods of preventing typhoid are: adherence to strict hand washing with soap and water after using the toilet and before handling food; the provision of safe water, and adequate sanitation. Patients with typhoid fever should pay strict attention to hand hygiene and should not be involved in food preparation until they have been shown to be free of infection.

## 10. Where can I find out more information?

Members of the public are advised to seek care from their local health care providers if they experience symptoms described above. The NICD website carries limited epidemiological information about typhoid isolates in South Africa over the last two years ([www.nicd.ac.za](http://www.nicd.ac.za)).