

## Typhoid and paratyphoid

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### Key messages

- **Typhoid and paratyphoid (also known as enteric fevers) are infections acquired by the ingestion of food or water contaminated by *Salmonella Typhi* and *Salmonella Paratyphi A, B or C*.**
- **Most cases in England and Wales are seen in returning travellers from South Asia particularly India, Pakistan, and Bangladesh.**
- **Typhoid vaccination is recommended for travellers at increased risk for typhoid due to their planned activities and/or the incidence of disease in a country.**
- **Prevention of paratyphoid is through the use of good food and water hygiene precautions. There is no vaccine to prevent paratyphoid infection.**
- **Typhoid and paratyphoid infection can be treated with appropriate antibiotics. Antibiotic resistant infections are increasingly common; this can complicate and reduce treatment options.**

### Overview

Typhoid fever is a systemic disease acquired by the ingestion of food or water contaminated by the bacterium *Salmonella enterica* serovar Typhi. Paratyphoid is a [clinically similar illness](#), caused by *Salmonella enterica* serovar Paratyphi A, B or C. These organisms are usually referred to as *S. Typhi* and *S. Paratyphi A, B or C*.

### Risk areas

Typhoid and paratyphoid mainly affect low-income areas of the world, where sanitation and clean water are lacking. The World Health Organization (WHO) estimates between 11 and 21 million cases

of typhoid and approximately 128,000 to 161,000 typhoid related deaths occur each year [1]. The majority of typhoid cases occur in Asia, but it continues to be a public health concern in many other low-income countries in Africa and Central and South America [2].

## Risk for travellers

Travellers to countries where the burden of infection is high are at the greatest risk of infection [3]. In the Indian subcontinent (ISC), an area of high incidence, the rate of infection for travellers has been estimated at 1 to 10 per 100,000 journeys [3-6].

Further information about the [epidemiology of enteric fever in England Wales and Northern Ireland](#) is available from Public Health England.

## Transmission

Transmission occurs following the ingestion of food or water that has been heavily contaminated (10 or more organisms may be required to cause illness) by the bacterium *S. Typhi* or *S. Paratyphi*.

*S. Typhi* can be passed in the faeces of persons who are ill with typhoid fever or chronic carriers. The bacteria can then enter the food chain and water supply if personal hygiene and general sanitation is inadequate. Direct faecal-oral transmission also occurs.

Infection in overseas travellers is almost exclusively acquired through the ingestion of heavily contaminated food and water in regions of the world where sanitation is poor [7].

## Signs and symptoms

### Typhoid

The severity of typhoid disease is variable, but nearly all patients experience fever and headache. Young children may experience a mild illness, but they can also suffer from severe disease.

The incubation period for typhoid fever is usually 10-20 days, but can be shorter or longer depending upon how many bacteria are ingested. Symptoms include low-grade (mild) fever (which typically becomes higher as the illness progresses), chills, headache, myalgia (muscle ache), malaise, anorexia (loss of appetite) and nausea. There can be abdominal discomfort and constipation, and diarrhoea can occur early in the illness. In some cases, a macular rash (rose spots) consisting of pink lesions which fade on pressure under a glass, will appear on the trunk. The rash may be difficult to see in dark-skinned individuals.

Enlargement of the liver and/or spleen occurs in about 50 percent of cases.

Complications occur in 10-15 percent of all infections and are more likely in those who are not

treated or are late seeking medical help. Complications include intestinal haemorrhage (bleeding) and perforation, toxic myocarditis (inflammation of the heart muscle), pneumonia, seizures, typhoid encephalopathy, and meningitis (usually in young children).

Less than one percent of those treated promptly with antibiotics die. If untreated, the number can rise to as high as 20 percent.

Following recovery, convalescing patients may continue to excrete *S. Typhi* in their faeces. Between one and three percent will become long-term carriers, excreting the organism for more than one year after the initial illness [8]. This is more common with increasing age, women and those with biliary tract abnormality [9]. Chronic (long-term) carriers require prolonged courses of antibiotics to clear the organism.

## Paratyphoid fever

Paratyphoid has a shorter incubation period but is clinically similar to typhoid. In the literature, paratyphoid is considered to be typically milder than typhoid and of shorter duration [3, 7] but it can on occasion be equally as severe as typhoid [10].

## Diagnosis and treatment

From its introduction in 1948, chloramphenicol was the drug of choice to treat typhoid [11], but in the early 1970s, chloramphenicol-resistant strains of *S. Typhi* began to emerge. Large outbreaks of resistant *S. Typhi* occurred in Mexico and India, and resistant *S. Typhi* became endemic in many countries of South and Southeast Asia [12]. Other antibiotics such as ampicillin and co-trimoxazole have been used to treat typhoid, but resistance to multiple antibiotics has developed since 1987 in endemic regions such as China, Southeast Asia and the ISC [11]. Drug-resistant strains have been seen in the UK in returned travellers and extensively drug resistant strain has been reported in Pakistan [13, 14].

Typhoid can be successfully treated with appropriate antibiotics. [Guidelines for the diagnosis and management of enteric fever in England](#) are available from the British Infection Association. Clinicians with a patient whom they suspect may have typhoid or paratyphoid should obtain advice from the local consultant microbiologist or infectious disease physician. Antibiotic resistance is increasingly common, thus it is essential to ensure appropriate therapy and confirm antibiotic sensitivity [3].

Relapse will occur in less than 10 percent of patients treated with antibiotics. Relapse illness is usually milder than the original illness [9].

## Preventing typhoid and paratyphoid

All travellers should practice [food and water hygiene precautions](#).

## Typhoid

Typhoid vaccination is recommended for travellers visiting endemic countries taking into account their planned activities and/or the incidence of disease in a country.

## Paratyphoid

There is currently no vaccine available against paratyphoid.

## Vaccine information

Typhoid vaccine information is available at the [electronic medicines compendium \(emc\)](#)

## Availability of typhoid vaccine

Vaccine	Schedule	Length of protection	Age range
<a href="#">Typhim Vi</a>	Single dose	3 years	Adults & children from 2 years of age*
<a href="#">Typherix</a> [discontinued]	Single dose	3 years	Adults & children from 2 years of age*
<a href="#">Vivotif**</a>	3 capsules 1st on day 0, 2nd day 2, 3rd day 4	3 years	Adults and children from 5 years of age**
<a href="#">ViATIM</a> [discontinued] (combined hepatitis A and typhoid vaccine)	Single dose of combined vaccine	<b>Typhoid</b> 3 years  <b>Hepatitis A</b> 1 year Booster dose at 6-12 months after first dose	Adults from 16 years of age
<a href="#">Hepatyrix</a> [discontinued] (combined hepatitis A and typhoid vaccine)	Single dose of combined vaccine	<b>Typhoid</b> 3 years  <b>Hepatitis A</b> 1 year	From 15 years of age

		Booster dose at 6-12 months after first dose	
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\*Children between the ages of 12 months and two years should be immunised off-license if following a detailed risk assessment the risk of typhoid fever is considered high [3]. Immunisation is not recommended for children under one year of age. When children are too young to benefit fully from typhoid vaccination, scrupulous attention to personal, food and water hygiene measures should be exercised by the caregiver [3].

\*\*Vivotif is a live vaccine, the vaccine capsules should not be chewed and should be swallowed whole as soon as possible after placing in the mouth.

## Resources

- [Public Health England: Advice on typhoid and paratyphoid in Bengali, English, Gujarati, Punjabi and Urdu](#)
- [World Health Organization: Typhoid](#)
- [Public Health Operational Guidelines for Typhoid and Paratyphoid \(Enteric Fever\)](#)
- [Mogasale V, Maskery B, Ochiai R L et al. Burden of typhoid fever in low-income and middle-income countries: a systematic literature based update with risk factor adjustment. Lancet Glob Health 2014; 2: e570-80](#)
- [Als D, Radhakrishnan A, Arora P et al. 2018. Global Trends in Typhoidal Salmonellosis: A Systematic Review. Am. J. Trop. Med. Hyg., 99 \(Suppl 3\), 10-19.](#)
- [British Infection Association: Guidelines for the Diagnosis and Management of Enteric Fever in England, January 2022](#)
- [Public Health England and Chartered Institute of Environmental Health Interim - Public Health Operational Guidelines for Typhoid and Paratyphoid \(Enteric Fever\), May 2017](#)

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