

INTRODUCTION

- Enteric fever, also known as typhoid fever.
- Typhoid fever is an acute illness associated with fever caused by the *Salmonella typhi* bacteria. It can also be caused by *Salmonella paratyphi*, a related bacterium that usually causes a less severe illness.
- Major cause morbidity and mortality.
- Food water borne disease.

The bacteria are deposited in water or food by a human carrier and then spread to other people.

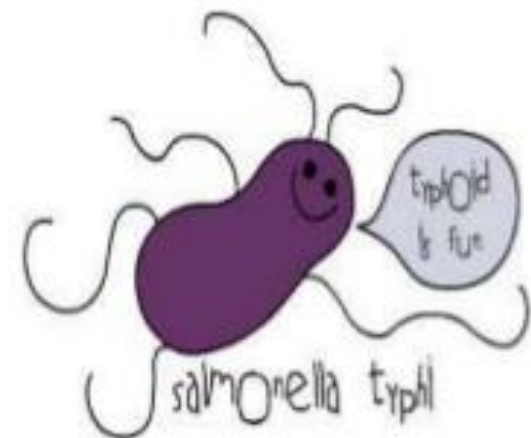
CAUSE

BACTERIA

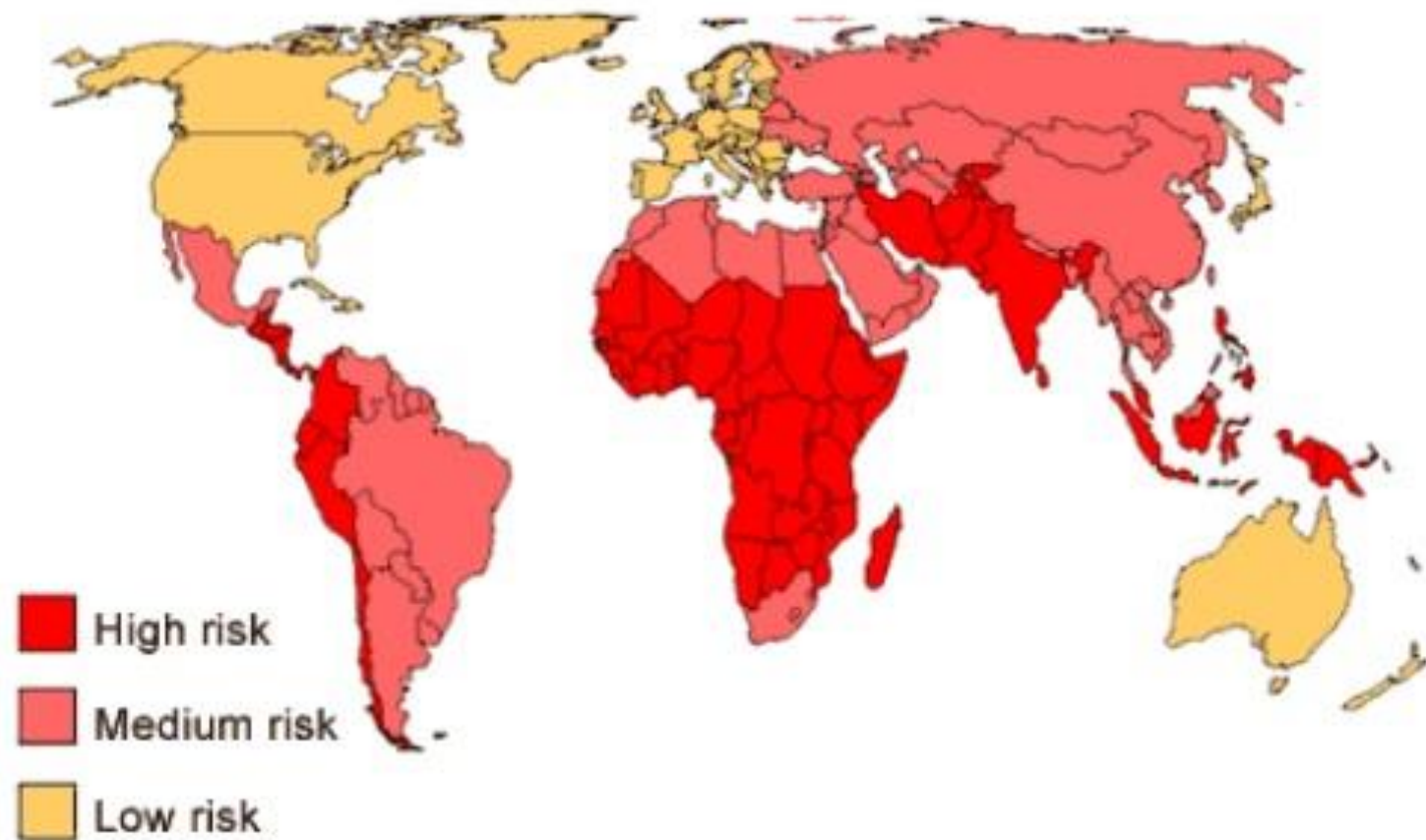
- Cause by Bacteria -Salmonella Typhi.
- Family-Enterobacteriaceae.
- Gram negative bacilli.
- Best grows at 37 C.

TRANSMISSION

- faecal-oral route.
- close contact with patients or carriers.
- contaminated water and food.
- flies and cockroaches.



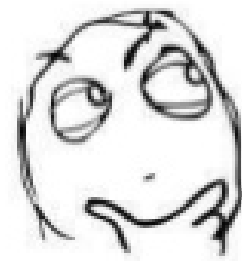
Typhoid



This map shows which countries are at greatest risk for contracting Typhoid Fever.

- Current estimates from the WHO suggest that the worldwide incidence of TF is approximately 16 million cases annually with >600,000 deaths!

Is typhoid contagious?



- Typhoid fever is highly **contagious**. An infected person can pass the bacteria out of their body in their stools (faeces) or, less commonly, in their urine.
- Contamination of the water supply can, in turn, taint the food supply. The bacteria can survive for weeks in water or dried sewage.

How Do People Get Typhoid Fever?

- Work in or travel to area where typhoid fever is endemic
- Work as a clinical microbiologist handling *Salmonella typhi* bacteria
- Have close contact with someone who is infected or has recently been infected with typhoid fever
- Drink water contaminated by sewage that contains *S. typhi*

How Long Is a Person With Typhoid Fever Contagious?

- A person with typhoid fever is contagious anywhere from **days to years** (if they become a chronic carrier); some researchers suggest a few individuals may be contagious indefinitely.
- About **3%-5%** of people become **carriers of the bacteria** after the acute illness.
- **Others suffer a very mild illness that goes unrecognized.** These people may become long-term carriers of the bacteria -- even though they have no symptoms -- and be the source of new outbreaks of typhoid fever for many years.

Mary Mallon
(wearing glasses)
photographed
with
bacteriologist
Emma Sherman
on North Brother
Island in 1931 or
1932, over 15
years after she
had been
quarantined there
permanently.



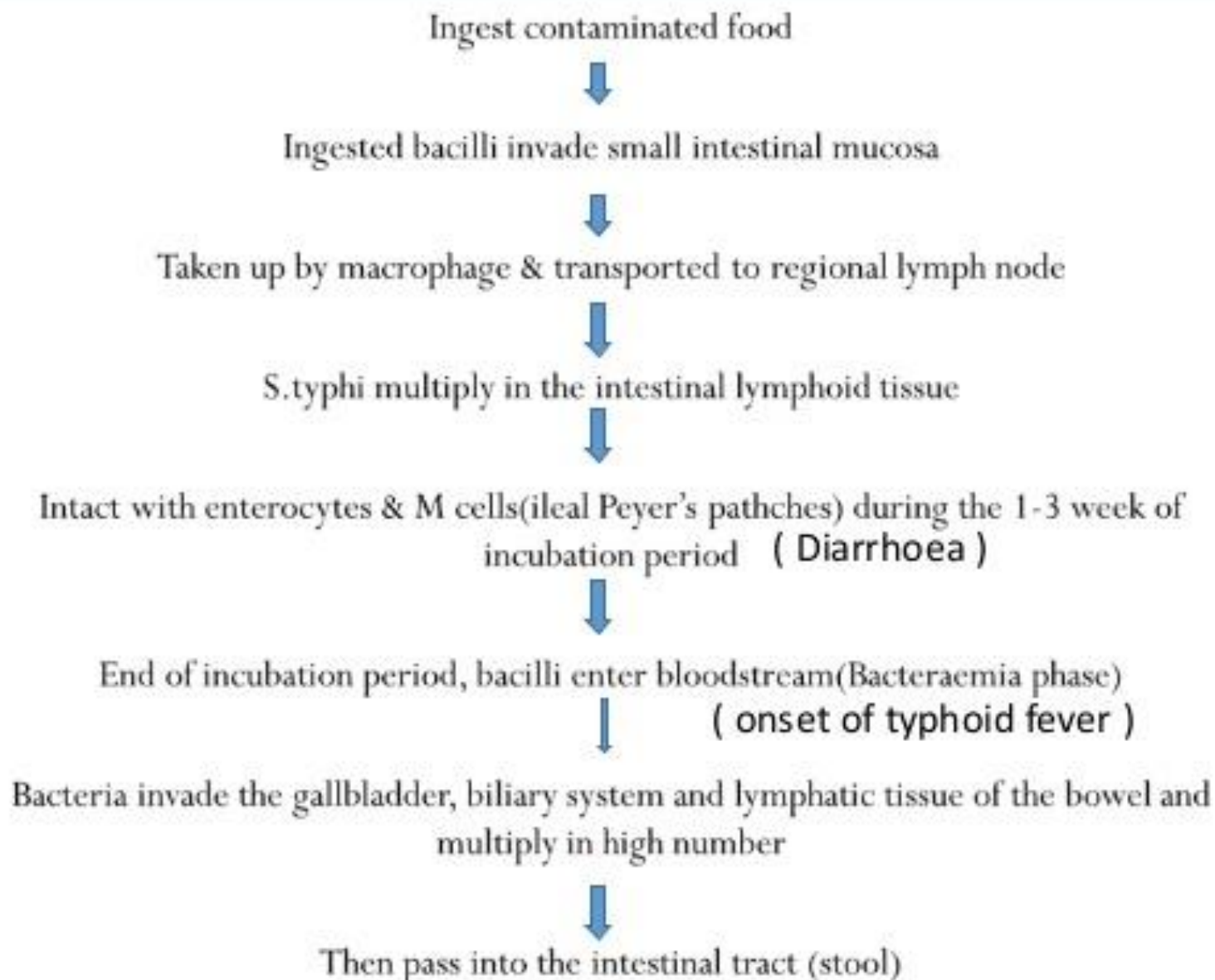


- Mary Mallon was a cook in Oyster Bay, New York in early 1900s.
- Gave rise to more than 1300 cases in her life time.
- She died of pneumonia after 26 years in quarantine.

What Is the Prognosis of Typhoid Fever?

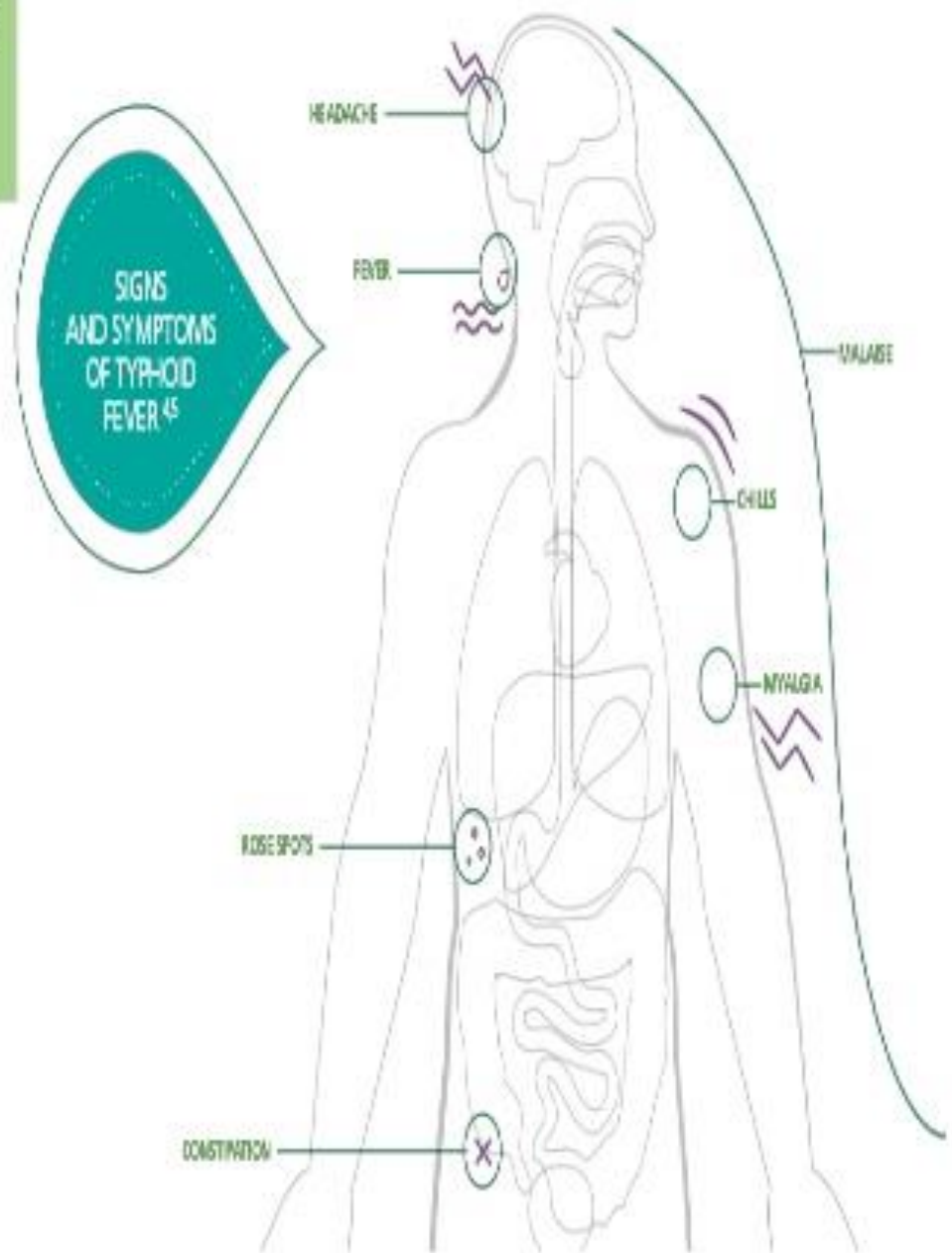
- ❑ With appropriate antibiotic therapy, most patients recover from the disease.
- ❑ However, **30% of people who do not receive therapy will die**. Annually, in the United States, there are about 300-400 cases and only one or two deaths each year.
- ❑ Most of those who got sick had failed to receive a vaccination prior to travel.
- ❑ Typhoid fever kills hundreds of thousands of people annually each year. Most deaths occur in developing countries where the disease is common. With adequate treatment, **less than 1% of victims should die**.
- ❑ There is a **concern that multi-antibiotic-resistant strains of bacteria** are becoming more common worldwide.

PATHOPHYSIOLOGY



What Are the Symptoms of Typhoid Fever?

- Incubation period is typically about 10-14 days but can be longer, and the onset may be insidious.
- Symptoms are often non-specific and clinically non-distinguishable from other febrile illnesses. However, clinical severity varies and severe cases may lead to serious complications or even death.



CLINICAL FEATURES

Stage 1 (1ST WEEK)

- Slowly rising (stepladder fashion) of temperature for 4-5 days
- Abdominal pain & myalgia
- Malaise
- Headache
- Constipation
- Relative bradycardia

Stage 2 (2ND WEEK)

- Signs and symptoms of 1st week progress

End of 2ND WEEK

- Delirium, complications, then coma & death (if untreated)

End of 1ST WEEK

- Rose spots may appear on the upper abdomen & on the back of sparse
- Cough
- Splenomegaly
- Abdominal distension with tenderness
- Diarrhea





ROSE SPOTS

Slightly raised, rose-red spots, which fade on pressure. It is usually visible only on white skin

ANAND

Stage 3 (3RD WEEK)

- Febrile become toxic & anorexic
- Significant weight loss
- Typhoid state (Apathy, confusion & psychosis)
- High risk (5-10%) of hemorrhage and perforation may cause death

Stage 4 (4TH WEEK)

Recovery period

- If the individual survives to the fourth week, the fever, mental state, and abdominal distension slowly improve over a few days.
- Intestinal and neurologic complications may still occur in surviving untreated individuals.
- Weight loss and debilitating weakness last months.
- Some survivors become asymptomatic *S typhi* carriers and have the potential to transmit the bacteria indefinitely.

Diagnosis & Investigation

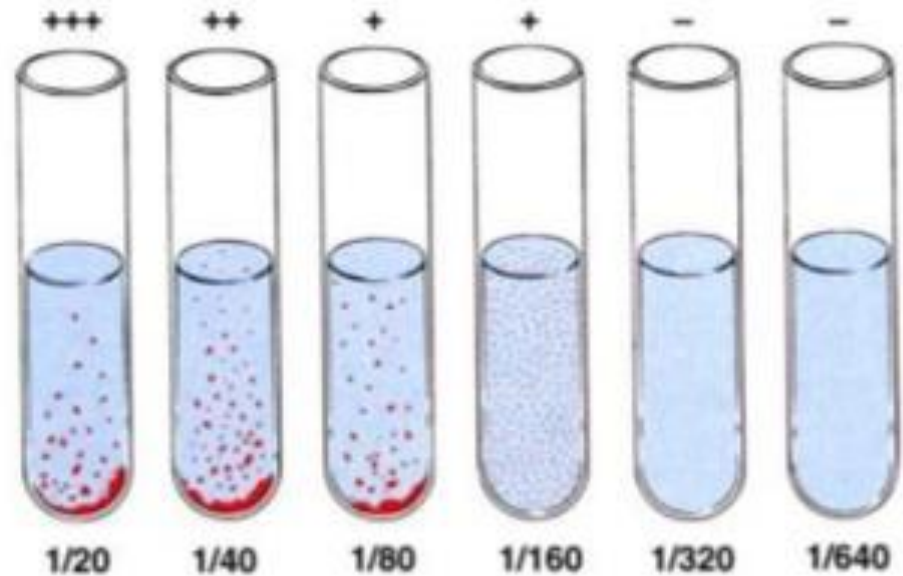
- **Blood culture**
- **Specific serologic test**
 - ❖ Identify *Salmonella* antibodies / antigens
[Fluorescent antibody study to look for substances that are specific to Typhoid bacteria]
 - ❖ Widal Test and ELISA
- **Urine and Stool Culture (2nd & 3rd week)**
- **Marrow Culture ***
 - 90% sensitive unless until after 5 days commencement of antibiotic
- **Punch-biopsy samples of rose spots Culture**
 - 63% sensitive
- **Clot culture**
- ***culture may be obtained from CSF, peritoneal fluid, mesenteric LNs, resected intestine, gallbladder, pharynx, tonsils, abscess, bone**

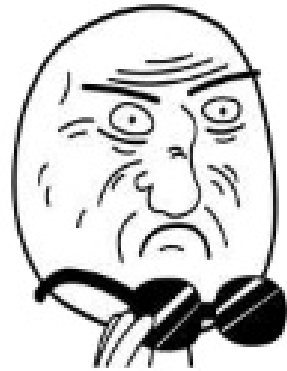


Serology

- **WIDAL Test** – Tube agglutination test.
- Detects O and H antibodies
- Diagnosis of Typhoid and Paratyphoid
- Testing for H agglutinins in Dryers tubes, a narrow tube floccules at the bottom
- Testing for O agglutinins in Felix tubes, Chalky
- Incubated at 37° c overnight

Widal test





TREATMENT

- Activity – rest is helpful
- Medical care
 - Antibiotic
 - Corticosteroids (for severe typhoid fever)
 - Antipyretics
- Diet - fluid and electrolytes should be monitored. Soft digestible diet is preferable in absence of abdominal distension and ileus
- Surgical care – in cases of intestinal perforation

Antibiotic

- Chloramphenicol (500mg qid)
- Ampicillin (750mg qid)
- Co-trimoxazole (2 tablets/ iv bds)

Resistance in many areas of the world, especially India & South-east Asia

- Fluoroquinolone (Drug of choice) – ciprofloxacin (500mg bds)
- 3rd generation cephalosporin – ceftriaxone, cefotaxime (alternative)
- Azithromycin (500mg once daily) alternative when fluoroquinolone resistant is present

Treatment should be continued for 14 days

- Chronic carriers were formerly treated for 4 weeks with ciprofloxacin but may require an alternative agent and duration, as guided by antimicrobial sensitivity testing.
- Cholecystectomy may be necessary.

Typhoid fever prevention

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Wash hands



Drink boiled water



Clean fruits and vegetables



Get vaccinated