

# ENTERIC FEVER

A top-down view of a doctor's hands. The left hand holds a silver stethoscope, and the right hand holds a black pen. Both hands are positioned over a clipboard with a white sheet of paper. The paper has the words 'TYPHOID FEVER' written in large, bold, black, hand-drawn letters. Below this, the names 'AUDI ADIBAH', 'NASHRIQ AIMAN', and 'NURUL HIDAYU' are printed in a smaller, black, sans-serif font. The doctor is wearing a white lab coat with a blue and white checkered cuff.

**TYPHOID  
FEVER**

AUDI ADIBAH  
NASHRIQ AIMAN  
NURUL HIDAYU

# 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.

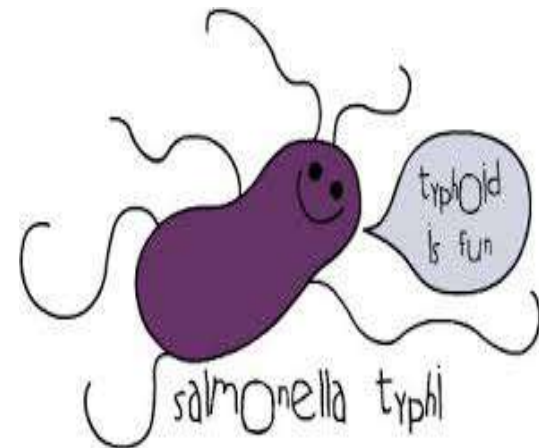
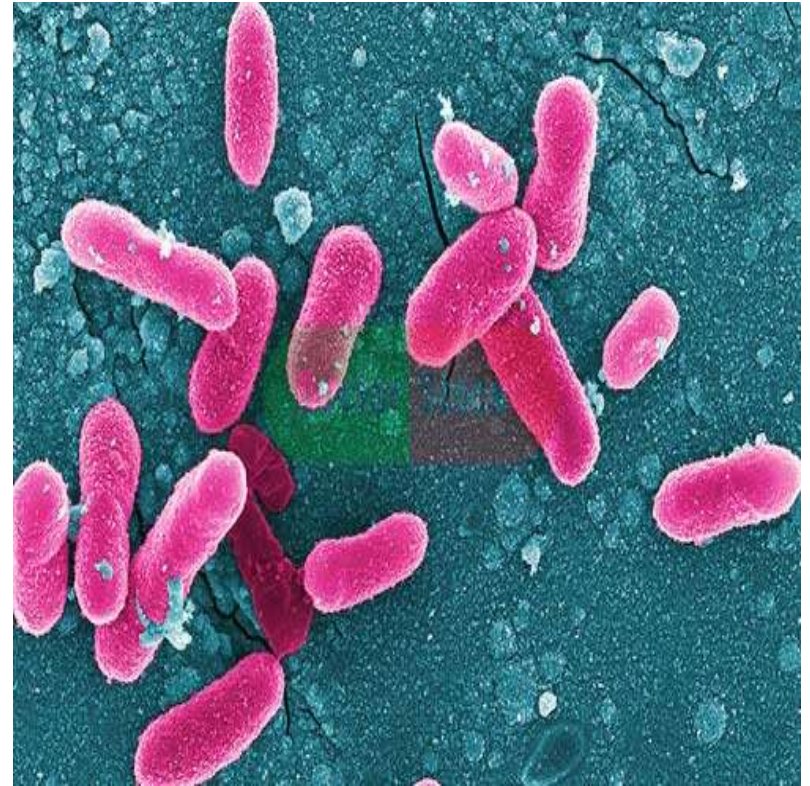
# CAUSE

## BACTERIA

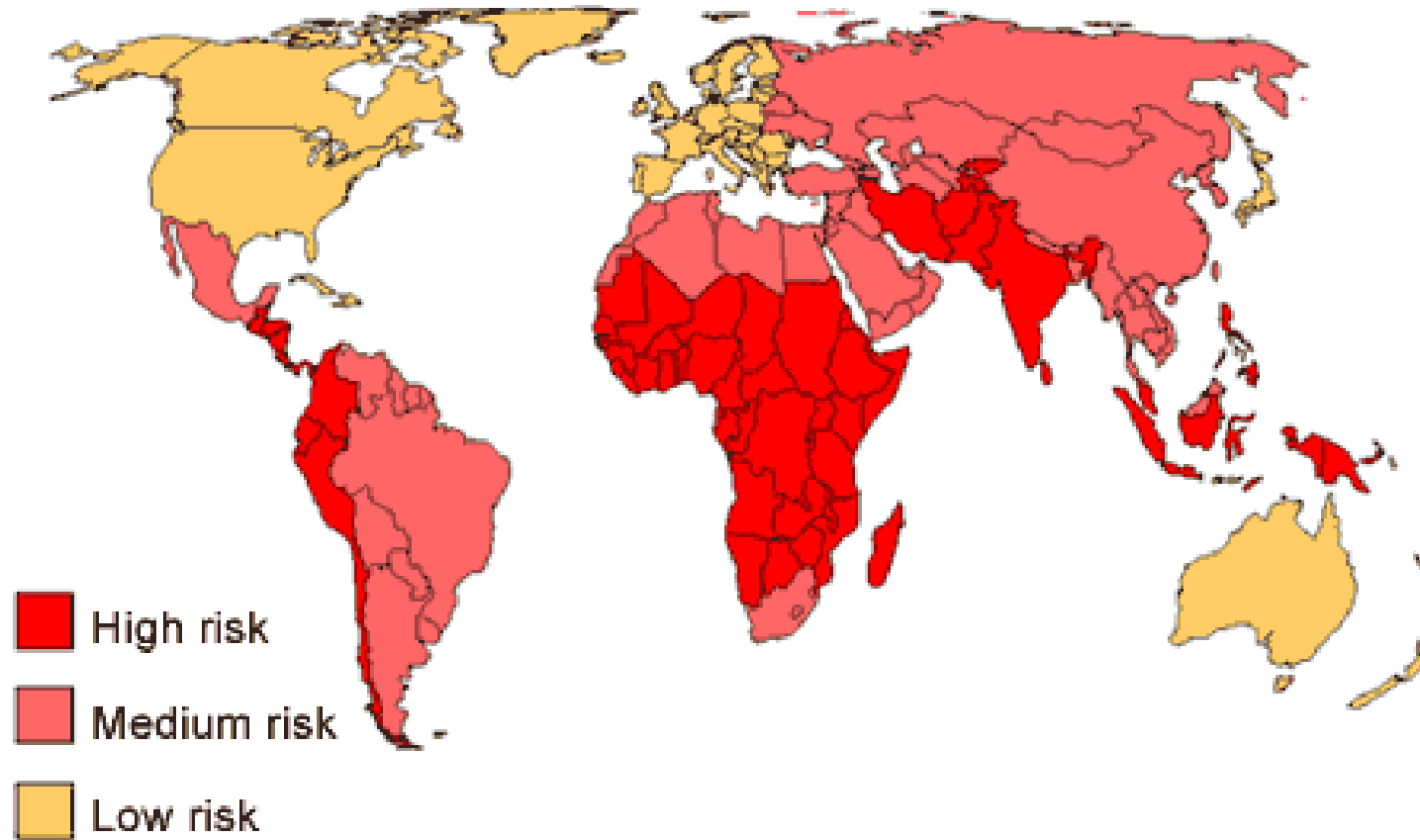
- Cause by Bacteria -Salmonella Typhi.
- Family-Enterobacteriaceae.
- Gram negative bacilli.
- Best grows at 37 C.

## TRANSMISSION

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



# Typhoid



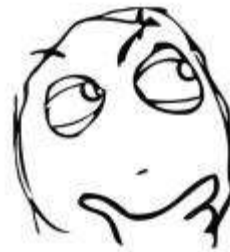
This map shows which countries are at greatest risk for contracting Typhoid Fever.

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

- From the Kelantan State's Public Health Department registry, 1394 records of confirmed typhoid fever patients admitted to various hospitals within the state from year 2004 to 2009 were retrieved
- The distribution of typhoid patients by demographic variables were
  - ❑ Malay 98.1% (n=1367)
  - ❑ Females 50.9% (n=709)
  - ❑ District of Kota Bharu 71.8% (n=1001).
  - ❑ An important observation here was the predominance of males in the age groups 5-14 and females in the age group 20-35 and 45-60
  - ❑ The overall male to female ratio was 1:1.

Source: Epidemiological Analysis of typhoid fever in Kelantan from a retrieved registry - Malaysian Journal of Microbiology, Vol9(2),2013,pp. 147-151

# 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?

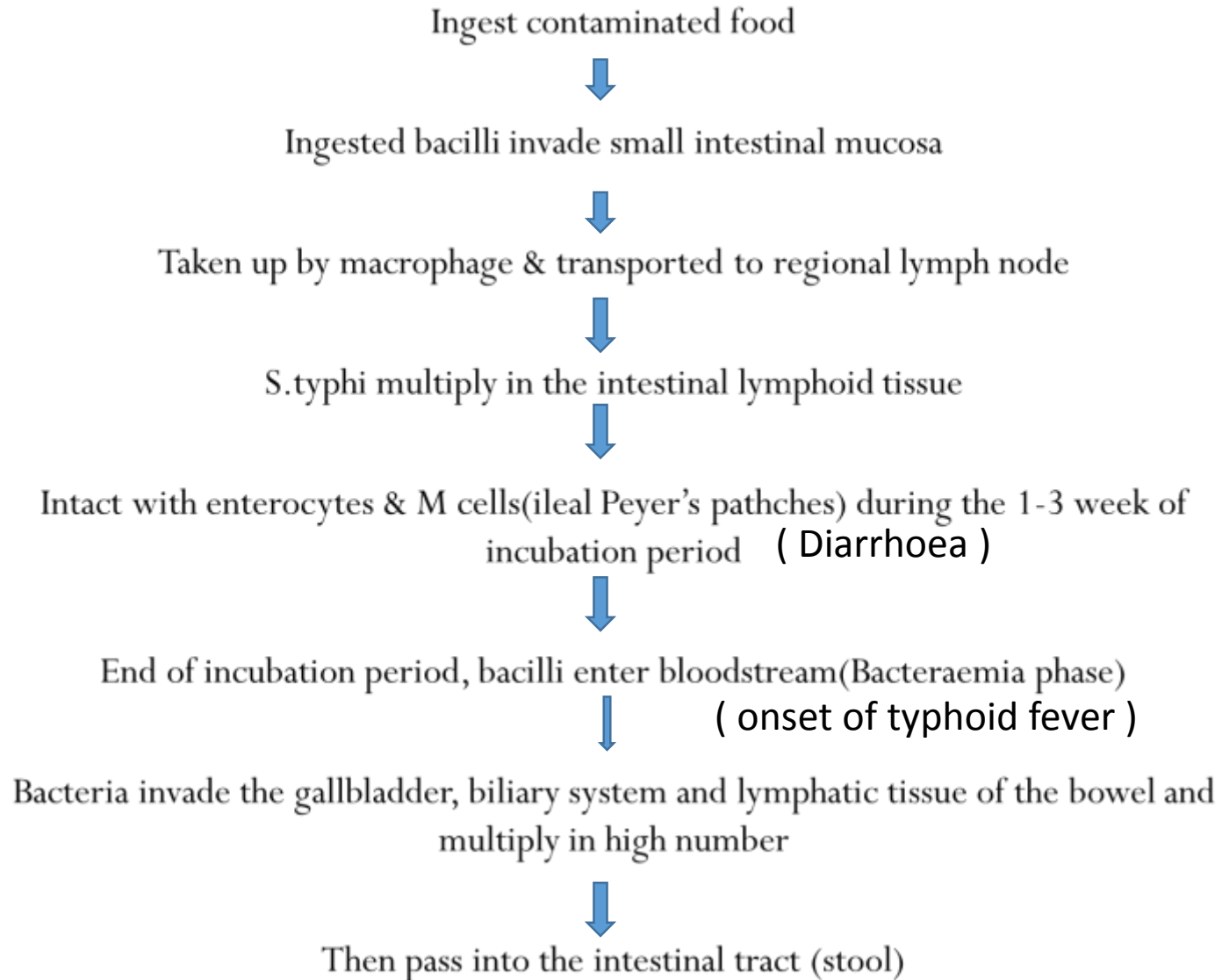
- A person with typhoid fever is contagious anywhere from **days to years** (if they become a chronic carrier); some researchers suggest a few individuals may be contagious indefinitely.
- About **3%-5%** of people become **carriers of the bacteria** after the acute illness.
- **Others suffer a very 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.

# 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.

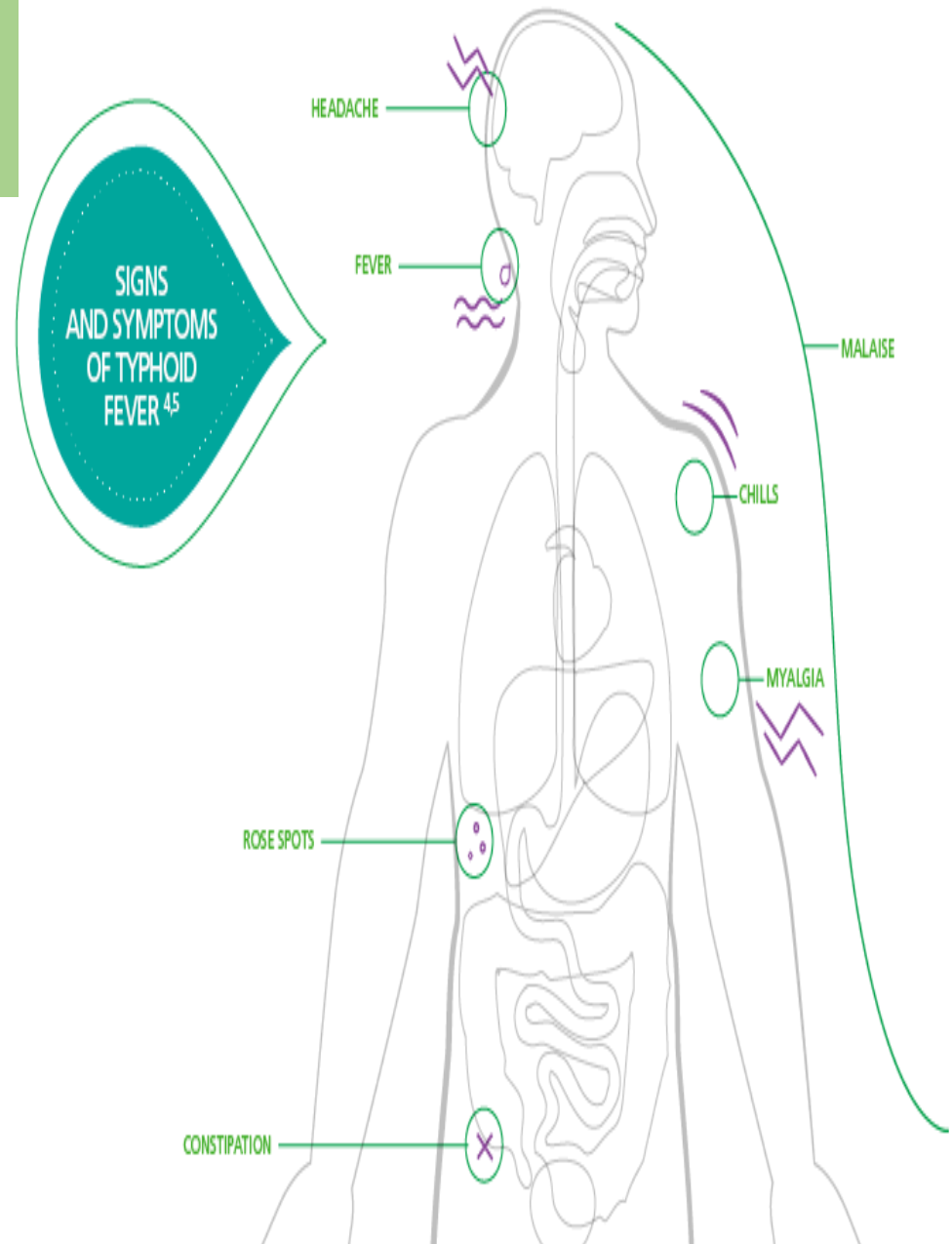


# PATHOPHYSIOLOGY



# 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 (1<sup>ST</sup> WEEK)

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

## Stage 2 (2<sup>ND</sup> WEEK)

- Signs and symptoms of 1<sup>st</sup> week progress

## End of 2<sup>ND</sup> WEEK

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

## End of 1<sup>ST</sup> 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

### Stage 3 (3<sup>RD</sup> 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 (4<sup>TH</sup> 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.

## Typhoid fever symptoms



High fever



Headache



Weakness



Dry cough



Stomach pain



Constipation



Rashes

## Paratyphoid fever

The course tends to be shorter and milder than that of typhoid fever and the onset is often more abrupt with acute enteritis. The rash may be more abundant and the intestinal complications less frequent.

# Complications

## **BOWEL**

Perforation

Hemorrhage

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## **SEPTICAEMIC FOCI**

Bone and joint infection

Meningitis

Cholecystitis

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## **TOXIC PHENOMENA**

Myocarditis

Nephritis

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## **CHRONIC CARRIAGE**

Persistent Gallbladder Carriage

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# 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 (2<sup>nd</sup> & 3<sup>rd</sup> 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

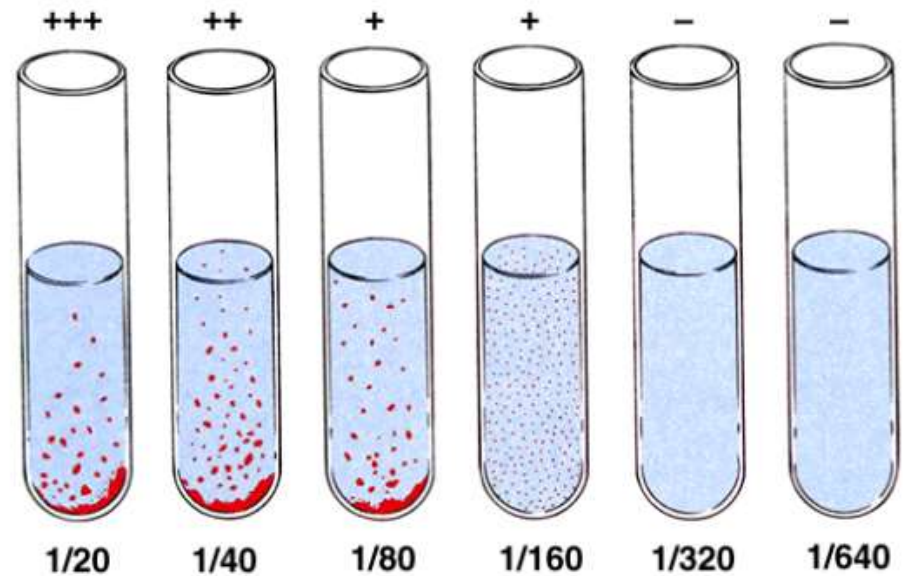




# Serology

- **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

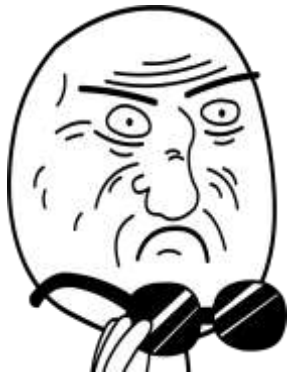


# Other non-specific lab studies

- Moderate anemic, increased ESR, thrombocytopenia, lymphopenia
- Slightly elevated PT and aPTT, decreased fibrinogen level
- Liver transaminases & bilirubin – increased 2x normal
- Mild hyponatremia & hypokalemia
- Serum ALT: LDH > 9:1 = viral hepatitis  
< 9:1 = typhoid hepatitis

## Specimens collection based on different phases of enteric fever

Duration of disease	Specimen examination	% positivity
1 <sup>st</sup> week	Blood culture	90
2 <sup>nd</sup> week	Blood culture Faeces culture Widal test	75 50 Low titre
3 <sup>rd</sup> week	Widal test Blood culture Faeces culture	80-100 60 80



## 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)
- 3<sup>rd</sup> 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

Lloyd Healthcare Pvt. Ltd.

   /lloydhealthcare



Wash hands



Drink boiled water



Clean fruits and vegetables



Get vaccinated

# Reference

- Davidson's Principle and Practice of Medicine 22<sup>nd</sup> Edition
- Hutchison's Clinical Methods 23<sup>rd</sup> Edition
- Medscape
- Mayo Clinic
- Emedicine Health
- Malaysian Journal of Microbiology

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