

**WELCOME**




**Enteric fever**

# Presented by –

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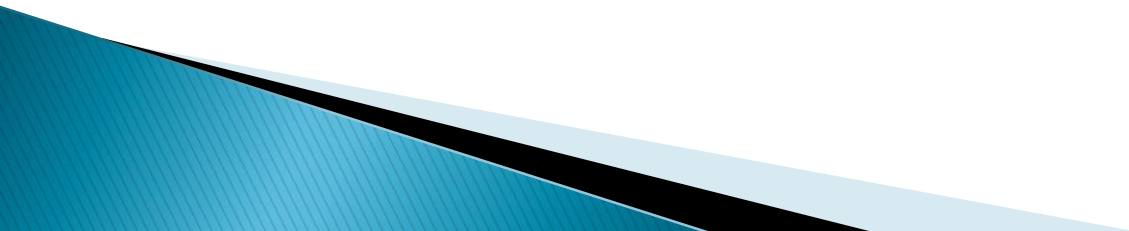
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# INTRODUCTION :

Enteric fever more commonly termed as Typhoid fever is a world wide illness, endemic in many developing countries.



Thomas Willis who is credited with the first description of typhoid fever in 1659.



FIG. 7

**Thomas Willis** (1621-1675).

The first description of epidemic typhoid in 1659.

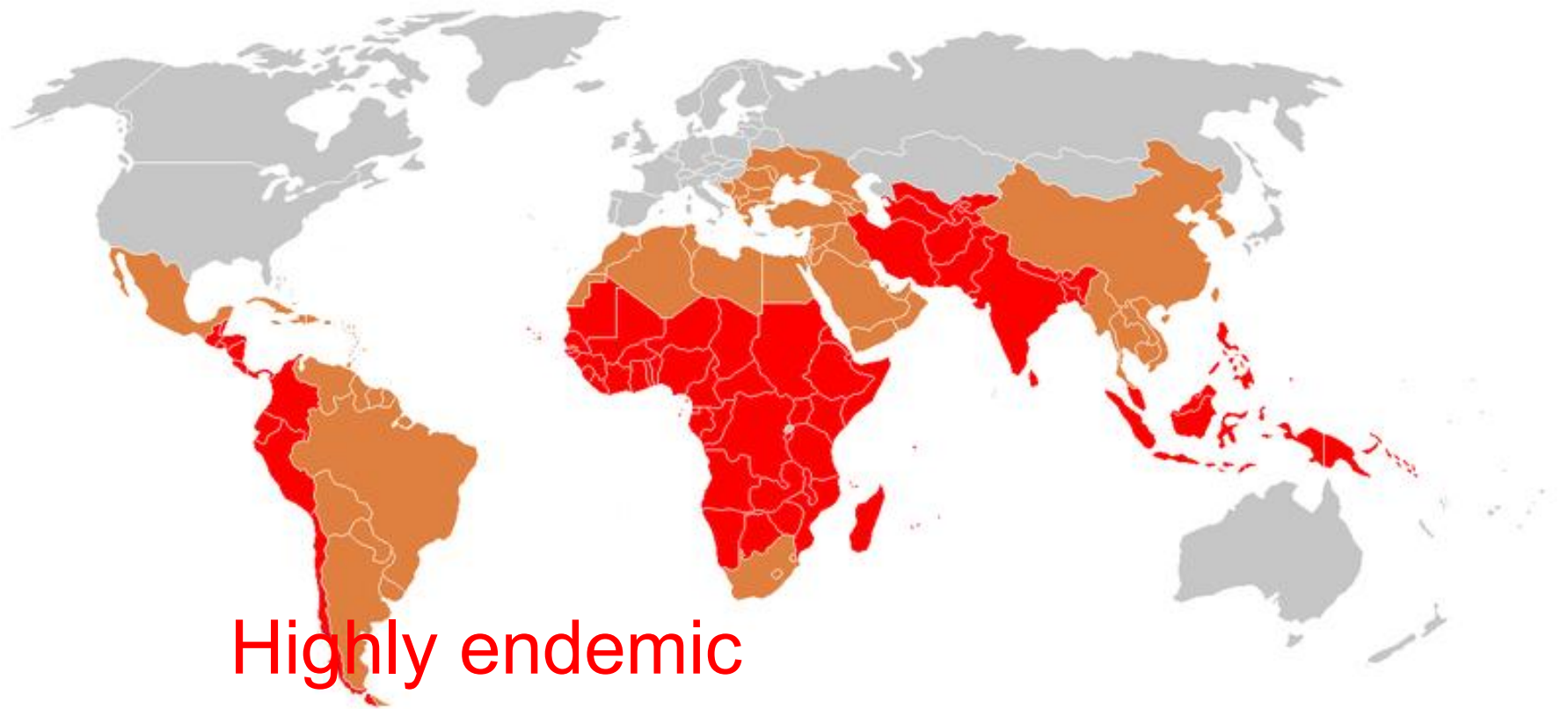
# EPIDEMIOLOGY :

Endemic in South East Asian countries.  
9 million new cases of typhoid fever annually detected, resulting in about 110000 deaths per year.

Bulletin WHO 2019







Highly endemic

Endemic

Sporadic

## Bangladesh scenario-

In Bangladesh,  
3.9 cases per 1000 population per year.  
18.7 cases per 1000 children(<5 years of age) per  
year .



## ETIOLOGY :

Enteric fever is caused by salmonella,

- A gram negative,

- Rod shaped bacilli,

- Non-spore forming,

- Motile,

- Facultative anaerobe.

The species of salmonella causing enteric fever are,

- S. Typhi - Typhoid fever

- S. Paratyphi A, B and C- Paratyphoid fever

# Prevalence of Typhoid Fever in Bangladesh-

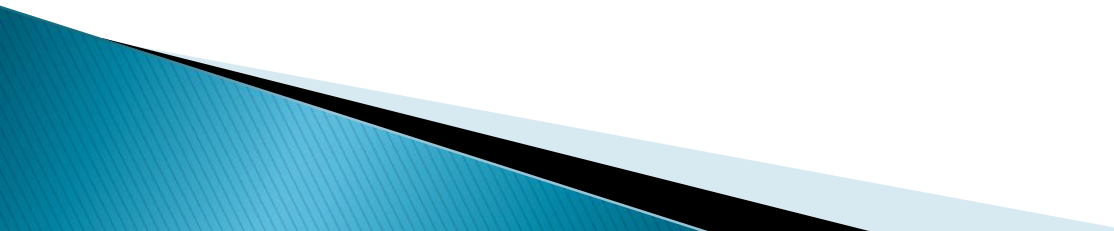
School going age group (66.67%)

Habituated with unsafe drinking water (58.33%)

Street foods (72.92%).

**(Ref:Prevalence of Typhoid fever among the Children in a Semi Urban Area of Bangladesh**

*AKMM Rahman, M Ahmad, RS Begum, MZ Hossain, SA Hoque, A Matin, L Yeasmin, MGS Manum)*

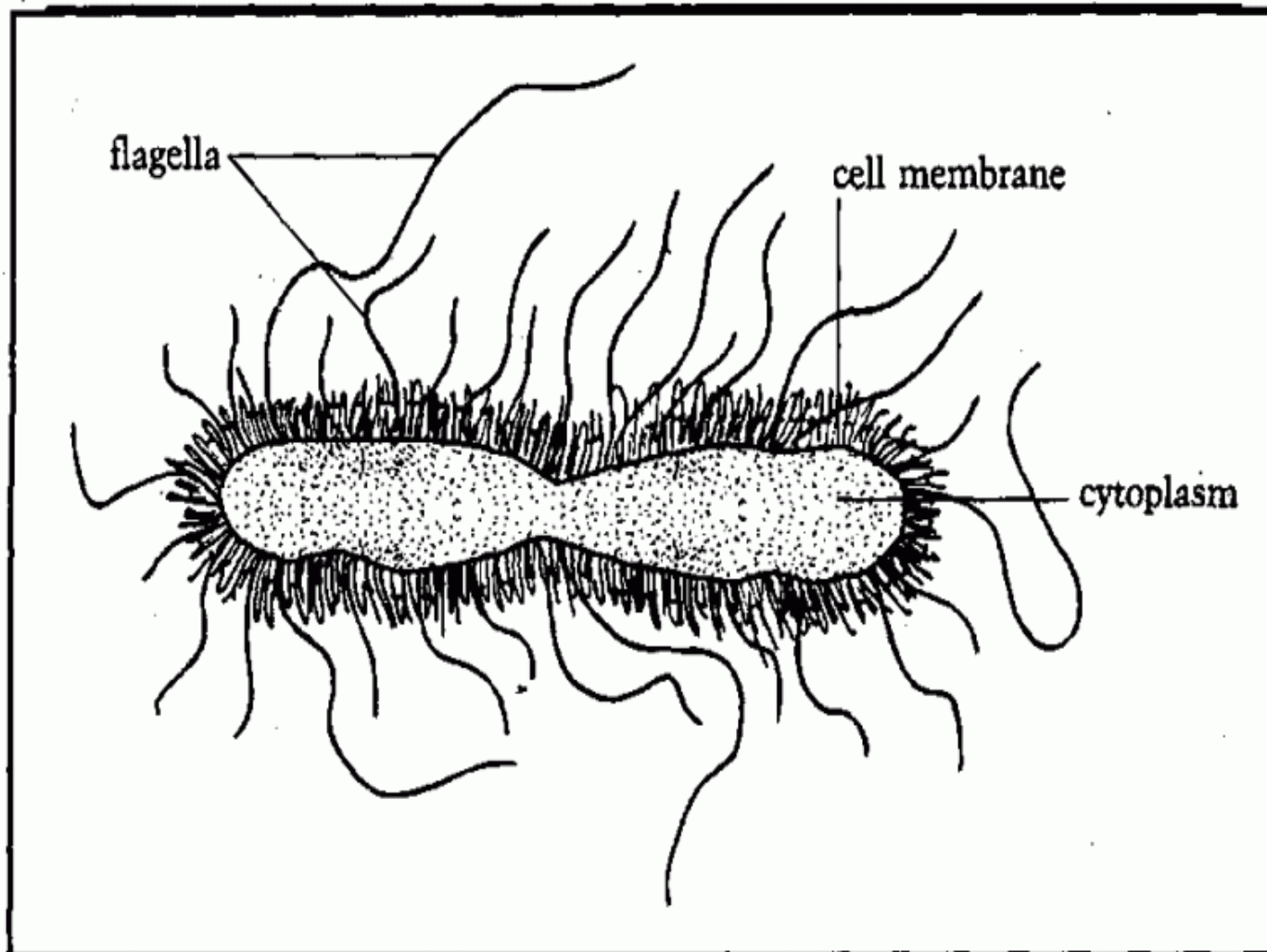


Carl Joseph Eberth who discovered the typhoid bacillus in 1880.



FIG. 9

Carl Joseph Eberth (1835-1926).  
Discoverer of the typhoid bacillus in 1880.



**Fig 5.7 : Salmonella typhi (Typhoid bacteria)**

# Risk factors of Typhoid Fever

- Unplanned urbanization
- Poor sanitation
- Overcrowding
- Unhealthy environment
- Lack of safe water supply
- Drinking unboiled water
- Poor public health measures
- Intake of street food

(Ref: Risk factors for typhoid fever in a slum in Dhaka, Bangladesh  
P. K. RAM , A. NAHEED , W. A. BROOKS , M. A. HOSSAIN , E. D. MINTZ , R.  
F. BREIMAN and S. P. LUBY)

# Street food





















# PATHOGENESIS:

Mode of transmission- Feco-oral.

Infecting dose-  $10^5$  -  $10^9$  Organism.

Incubation period - 7-14 days.



Ingestion of organism.



Terminal illium.



Invade gut mucosa through M cell.



Organism crosses the intestinal mucosal barrier & reside in an intracellular vacuole.

Mesenteric lymphoid system



Blood stream via lymphatics - primary bacteremia



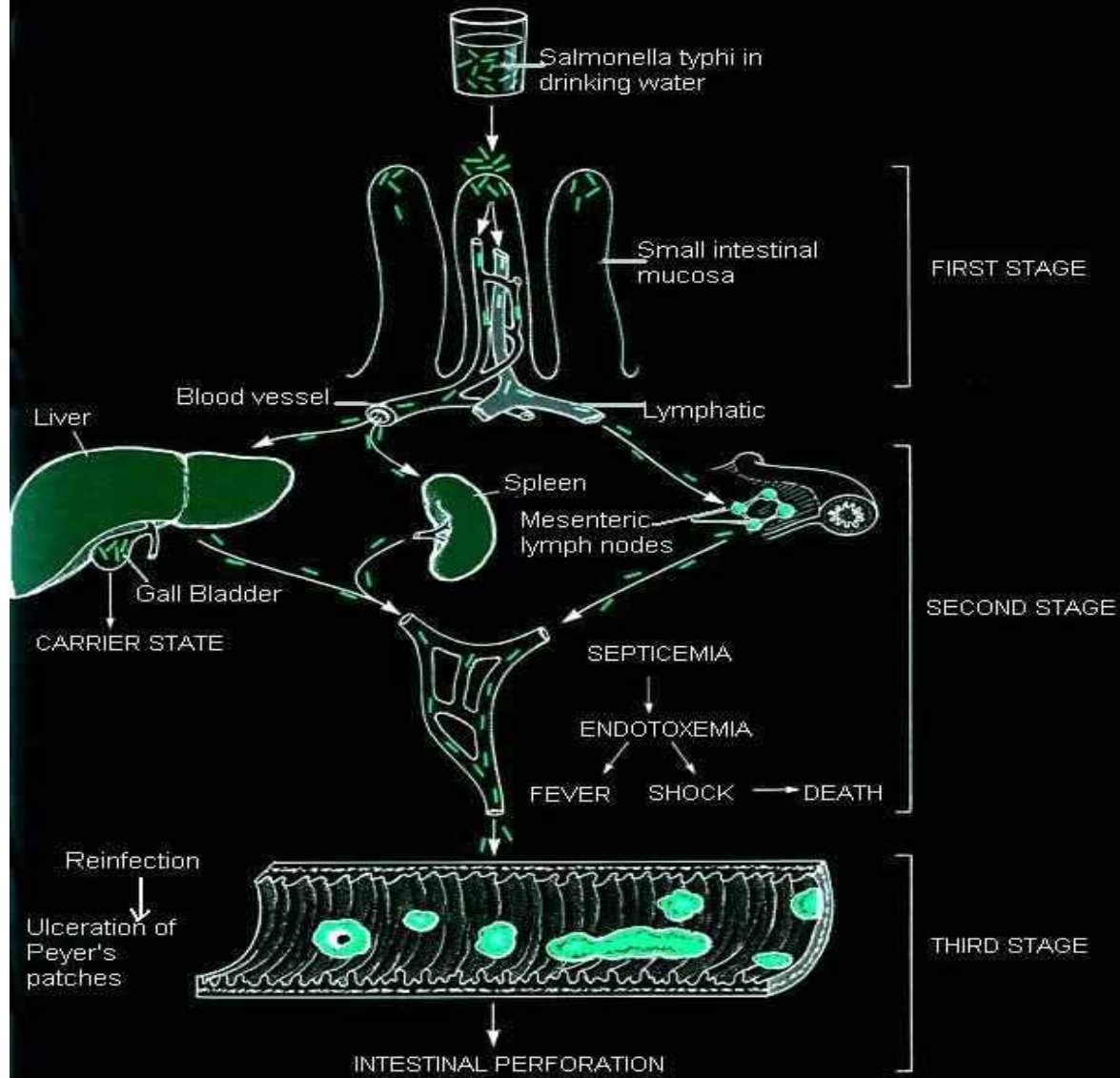
Colonize in the reticulo-endothelium system

Again enter into blood - secondary bacteremia



Onset of clinical symptoms.

## STAGES OF TYPHOID FEVER





# Case definitions

## ▶ Confirmed case:

- Patient with fever (38C & above) that has lasted for at least 3 days, with a laboratory confirmed positive culture ( blood, bone marrow , bowel fluid)

## ▶ Probable case:

- Patient with fever (38C & above) that has lasted for at least 3 days, with a positive serodiagnosis or antigen detection test but without S.typhi isolation

## ▶ Chronic carrier:

- Excretion of S. typhi in stools or urine ( or repeated positive bile or duodenal string cultures ) for longer than one year after the onset of acute typhoid fever

# "TYPHOID MARY"

*The Extraordinary Predicament of Mary Mallon, a Prisoner on New York's Quarantine*

It is probable that Mary Mallon is a popular girl. She is said to have been a successful business woman, and her name is mentioned in connection with the story of her life. She is said to have been a successful business woman, and her name is mentioned in connection with the story of her life.

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By Dr. Wm. H. Park, New York Board of Health.

**M**ARY MALLON, the "Typhoid Mary," is a woman who has been the subject of much interest and discussion. She is a woman who has been the subject of much interest and discussion. She is a woman who has been the subject of much interest and discussion.



Mary Mallon, the Typhoid Mary, cooking in her cell in the Quarantine Ward.





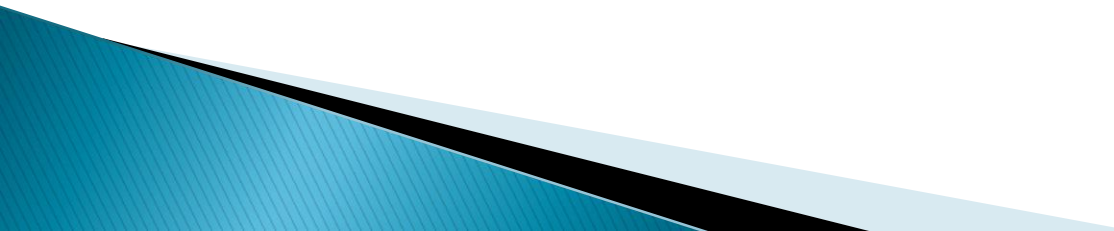
# CLINICAL FEATURES OF ENTERIC FEVER IN CHILDREN :

1.	High grade fever-	95%
2.	Coated tongue-	76%
3.	Anorexia-	70%
4.	Vomiting -	39%
5.	Hepatomegaly -	37%
6.	Diarrhoea -	36%
7.	Toxicity -	29%
8.	Abdominal pain -	21%
9.	Pallor -	20%
10.	Splenomegaly -	17%

- 11. Constipation - 7%
- 12. Headache - 4%
- 13. Jaundice - 2%
- 14. Obtundation - 2%
- 15. Ileus - 1%
- 16. Intestinal obstruction- 0.5%.



# TYPICAL FORM OF TYPHOID FEVER :

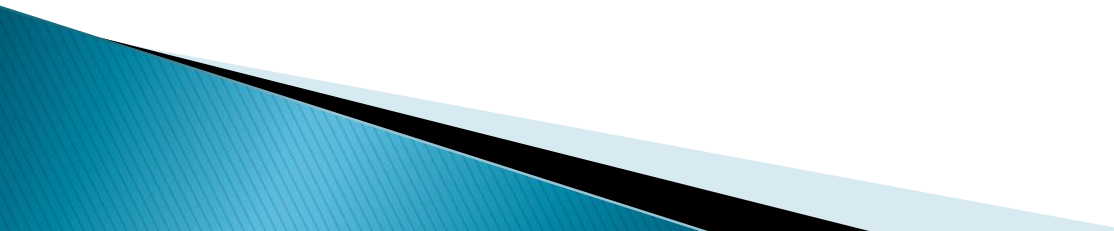
- On set is insidious with headache being a prominent symptom.
  - Temperature rises in step-ladder fashion over 4-5 days. In young children fever is often irregular and having no typical pattern.
  - Cough, sore throat and altered behavior.
  - Tongue is coated in center and clear at the margin. Tip of tongue is often fiery red.
  - Constipation is usually present initially and diarrhoea only occurs late in disease.
- 



## ROSE SPOT :



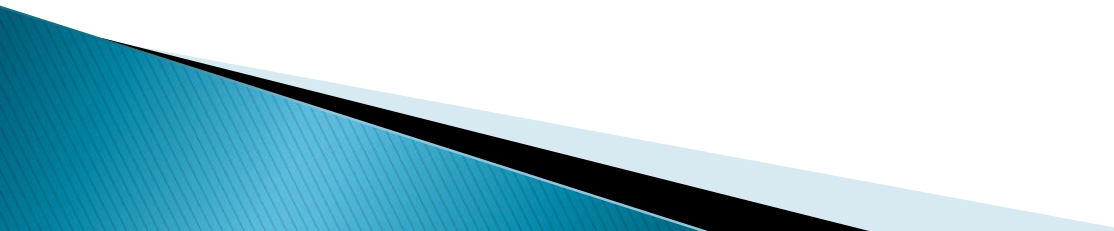
# INVESTIGATIONS :

1. CBC
  2. Blood culture.
  3. Widal test
  4. Stool culture
  5. Urine culture
  6. Culture from Rose spot by punch biopsy.
  7. S.typhy -specific Ag detected in serum.  
S.typhy Vi Ag in urine.
  8. PCR
  9. Latex agglutination test.
  10. Fluroscent Ab test.
- 


## WIDAL TEST:

Serial two fold dilution of unknown serum are tested against various antigens ,particularly H, O, Vi .

### Interpretation:

- No single titre is diagnostic, it may be presumptive.
  - A rising titre is important. A four fold rise is said to be diagnostic.
  - High anti-O & low anti -H suggest active infection.
  - High anti-H & low anti -O suggest Anamnestic reaction.
  - High anti Vi antigen suggests carrier state.
- 

# TREATMENT :

1. Majority of children with typhoid can be managed at home with oral antibiotics and close medical follow up for complications or failure to respond to therapy.
  2. Indications of hospitalization:
    - a. Persistent vomiting.
    - b. Severe diarrhoea.
    - c. Abdominal distension.
  3. General principle of management:
    - a. Adequate rest
    - b. Hydration,
    - c. Correction of fluid- electrolytes imbalance.
    - d. Antipyretic therapy should be provided as required.
- 

#### 4. Specific treatment:

##### Uncomplicated typhoid fever

##### Optimal therapy-

Susceptibility	Antibiotic	Daily dose	Days
Fully sensitive	Chloramphenicol Amoxicillin	50–75mg/kg/day 75–100mg/kg/day	14–21 14
MDR	Fluoroquinolone or, Cefixime	15mg/kg/day 15–20mg/kg/day	5–7 7–14
Quinolone resistant	Azithomycin or, Ceftriaxone	8–10mg/kg/day 75mg/kg/day	7 10–14

##### Alternative therapy-

Susceptibility	Antibiotic	Daily dose	Days
Fully sensitive	Fluoroquinolone	15mg/kg/day	5–7
MDR	Azithromycin cefixime	20mg/kg/day 15–20mg/kg/day	7 7–14
Quinolone resistant	Cefixime	20mg/kg/day	7–14

## Severe typhoid fever :

### Optimal therapy-

Susceptibility	Antibiotic	Daily dose	Days
Fully sensitive	Ampicilin or Ceftriaxone	100mg/kg/day 60–75mg/kg/day	14 10–14
MDR	Fluoroquinolone	15mg/kg/day	10–14
Quinolone resistant	Ceftriaxone	60–75mg/kg/day	10–14

### Alternative therapy-

Susceptibility	Antibiotic	Daily dose	Days
Fully sensitive	Fluoroquinolone	15mg/kg/day	10–14
MDR	Ceftriaxone Cefotaxime	60mg/kg/day 80mg/kg/day	10–14
Quinolone resistant	Azithromycin Gatifloxacin	20mg/kg/day 10mg/kg/day	7

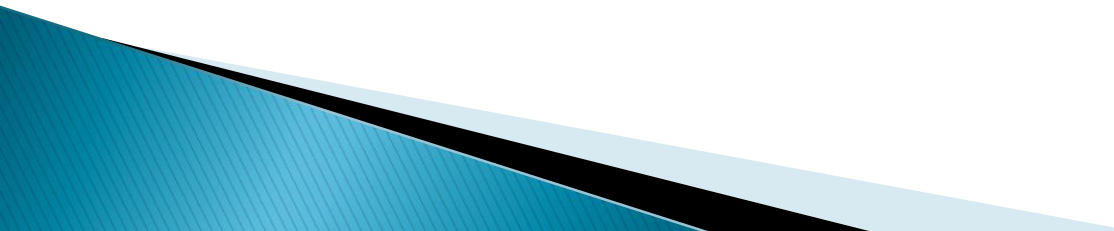
# MULTIDRUG RESISTANT TYPHOID FEVER:

Many strains of *Salmonella typhi* have developed plasmid mediated multidrug resistance to all three primary antimicrobials

- \* Ampicillin
- \* Chloramphenicol
- \* Trimethoprim-Sulfamethoxazole



# TREATMENT OF MDR TYPHOID:

1. Fluoroquinolones
  2. Cefixime.
  3. Ceftriaxone.
  4. Cefotaxime.
  5. Azithromycin.
- 

# TREATMENT OF CARRIER STATE:

1. High dose Ampicillin or Amoxicillin with Probenicid for 4-6 weeks.

or,

TMP-SMX

or,

Ciprofloxacin.

2. If billiary disease present ,eg-Cholecystitis or Cholelithiasis-Cholecystectomy is recommended within 14 days of antibiotic treatment.

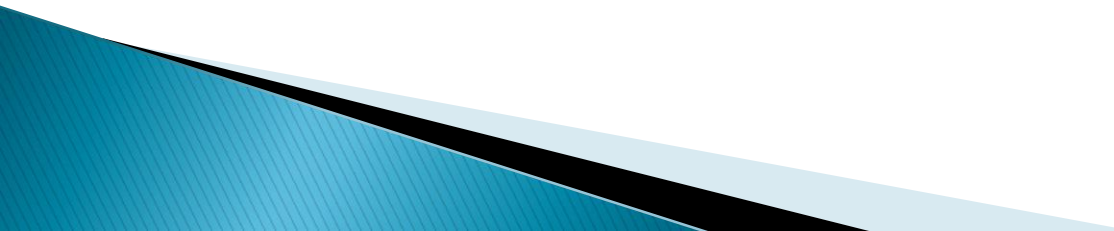
# INDICATIONS OF STEROID THERAPY:

1. Shock.
2. Obtundation.
3. Stupor.
4. Coma.


Dexamethasone is the drug of choice.

Dose - 3mg/kg stat.

And then 1mg/kg 6 hourly for 48 hours.



# DIFFERENTIAL DIAGNOSIS:

1. Malaria
  2. Acute gastroenteritis
  3. Bronchitis
  4. Bronchopneumonia
  5. Tuberculosis
  6. Brucellosis
  7. Tuleremia
  8. Leptospirosis
  9. Rickettsial diseases
  10. Dengue fever
  11. Acute hepatitis
  12. Infectious mononeucleosis.
- 

# COMPLICATIONS :


## Intestine–

- \* Ulceration
- \* Perforation
- \* Haemorrhage
- \* Peritonitis

## Hepato–biliary system–

- \* Hepatitis
- \* Cholecystitis.

## Cardiovascular system–

- \* Myocarditis
  - \* Endocarditis
  - \* Arrhythmias
  - \* Cardiogenic shock.
- 

## Bones and joints-

- \* Osteomyelitis
- \* Septic arthritis

## Pulmonary system-

- \* Pneumonia
- \* Empyema
- \* Broncho-pleural fistula

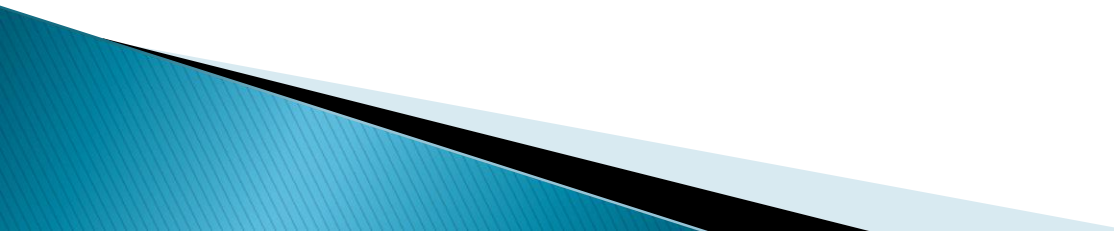
## Genito-urinary system-

- \* UTI
  - \* Renal abscess
  - \* Pelvic infections
  - \* Testicular abscess
  - \* Prostatitis
  - \* Epididymitis
- 

## Neurological-

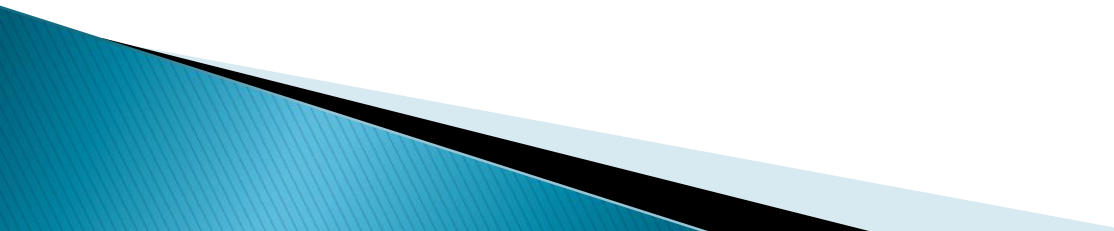
- \* Delirium
- \* Psychosis
- \* Raised intra-cranial pressure
- \* Acute cerebellar ataxia
- \* Chorea
- \* Deafness

## Others-

- \* Pyelonephritis
  - \* Nephrotic syndrome
  - \* Parotitis
  - \* Orchitis.
- 



# PREVENTION :

1. Sanitation and hygiene are the critical measures that can be taken to prevent enteric fever.
  2. Careful food presentation and hand washing are also very crucial.
  3. Vaccination.
- 



# Collection of pure drinking water







# VACCINES :

Vaccine name	How given	Number of Doses necessary	Time Between doses	Immunization Should be	Minimum age For vaccination	Booster Needed
Ty 21a	1 capsule by mouth	4	2days	1 week	6 years	Every 5 years
Vicps Typherix	Injection	1	N/A	2 weeks	2 years	2 years





***THANK YOU VERY MUCH***