

# ***Enteric Fever in India – A Retrospective Review of Existing Hospital Based Data***

Surveillance for Enteric Fever in Asia Project (SEAP)

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# ***Overview and Objectives***

- **India lacks a nationally representative database on enteric fever – extensive under-reporting**
- **Community based studies show 2-5/1000 person years. Highest in children < 15 yrs**
- **Morbidity and mortality of intestinal perforation not linked to enteric fever**
- **Objectives:**
  - **To estimate the burden of hospitalized (severe) enteric fever cases in India**
  - **Inform policy makers on development of effective policies for prevention and control**
  - **Promote new vaccine development and utilization**

# ***Methods***

- **Study period: 2014-2015**
- **Retrospective data collection**
- **Case Definitions**
  - **Laboratory-confirmed case: Patient with a positive blood culture for *Salmonella* Typhi or Paratyphi**
  - **Surgical case: Patient with intestinal perforation, regardless of culture status**
- **Data sources**
  - **Electronic laboratory data**
    - **Organism, demographics**
  - **Inpatient charts**
    - **Clinical manifestations, complications, antimicrobial resistance**
  - **Intestinal perforation surgical charts**

# *Study Hospitals*

**5 hospitals situated across different regions of India:**

- 1. Postgraduate Institute of Medical Sciences – Chandigarh**
- 2. Medanta Hospital – Gurgaon**
- 3. Apollo Hospital – Kolkata**
- 4. Christian Medical College – Vellore**
- 5. Kasturba Medical College, Manipal University – Manipal**



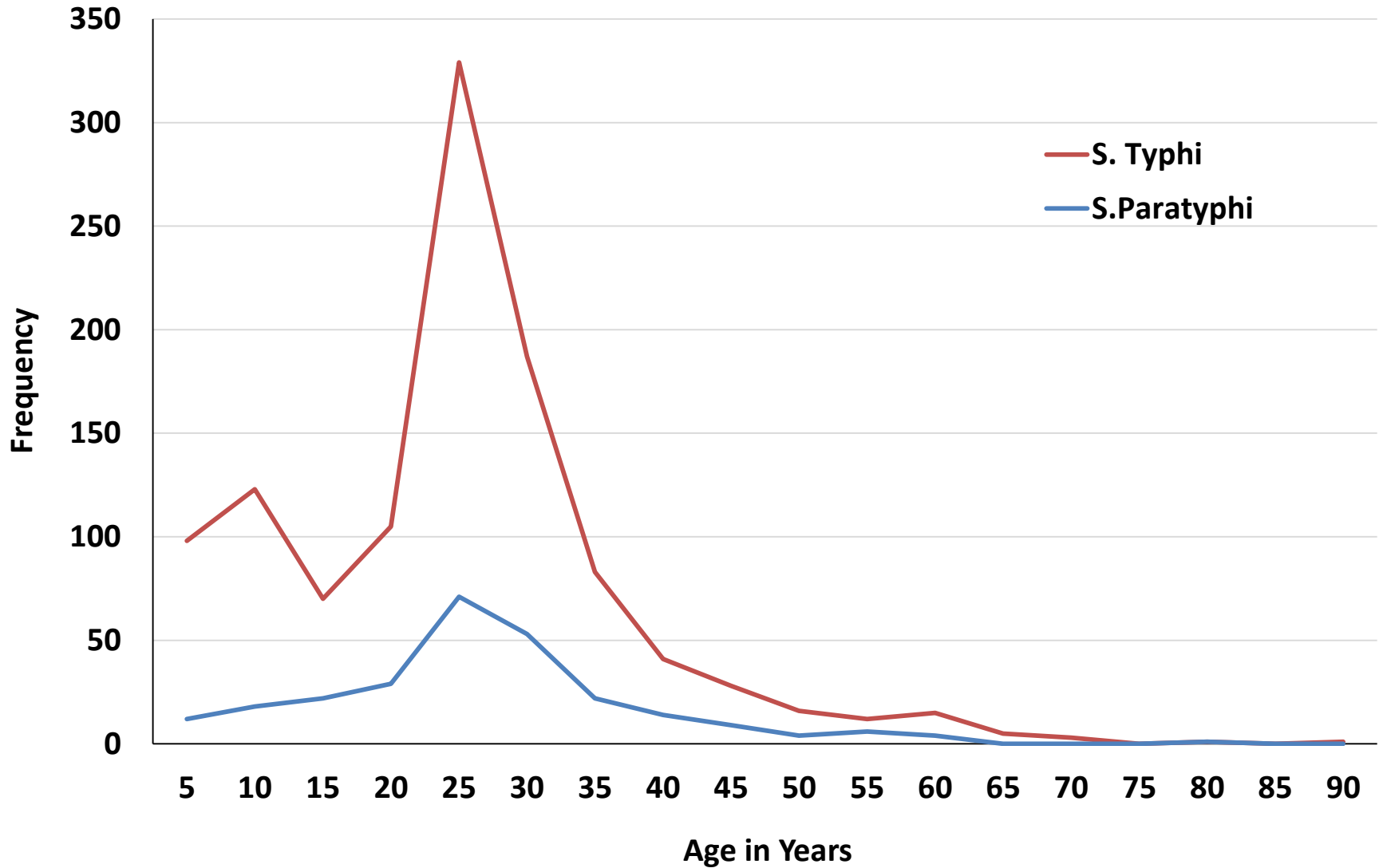
# Laboratory-Confirmed Cases

- Hospitals performed 267,536 total blood cultures
  - 1418 positive for enteric fever (0.53%)
    - 1147 positive for *S. Typhi* (81%)
    - 271 positive for *S. Paratyphi* (19%)

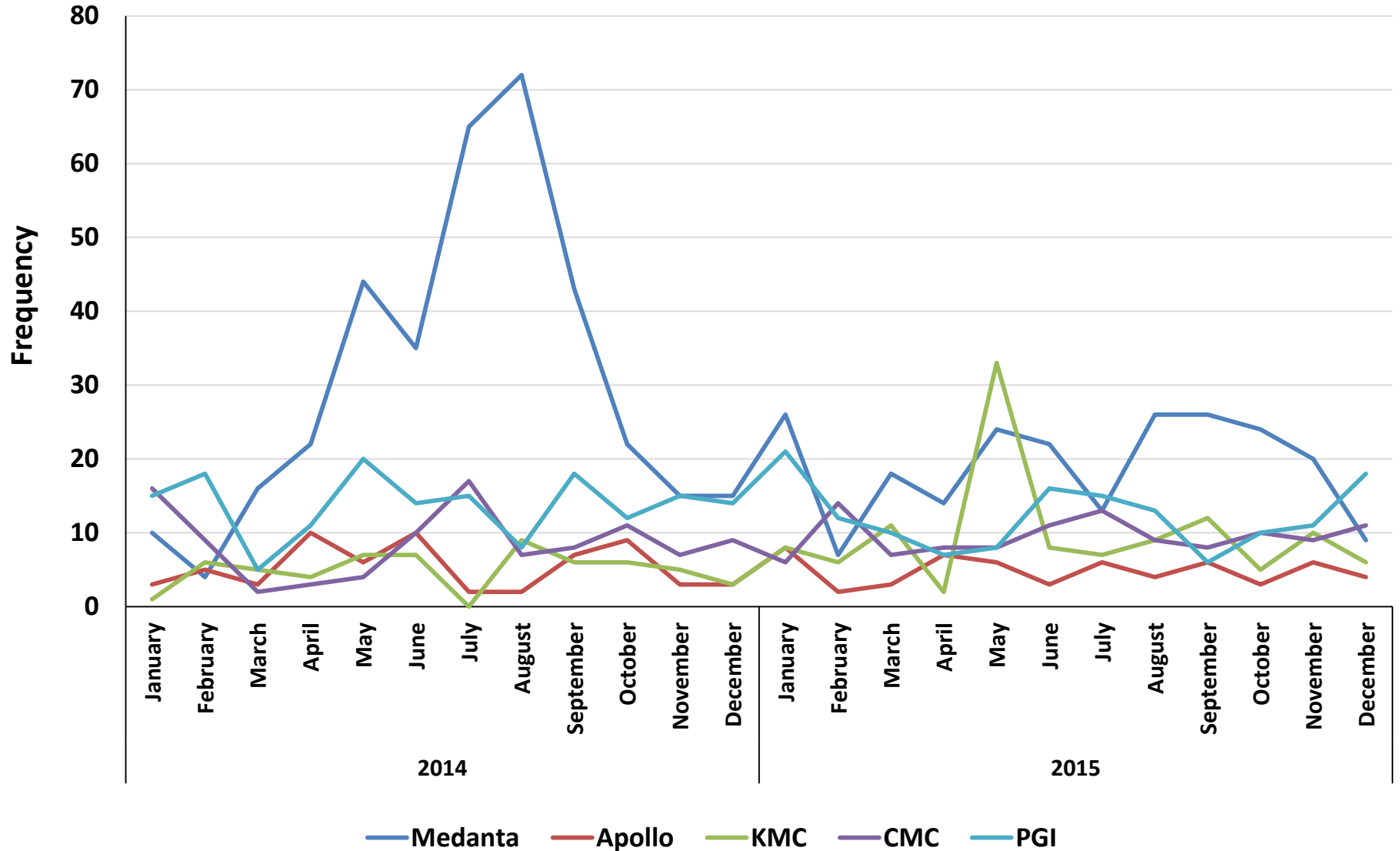
	<b>S. Typhi n=1147 (%)</b>	<b>S. Paratyphi n=271 (%)</b>
<b><u>Gender</u></b>		
Female	529/1114 (47)	112/265 (42)
Male	585/1114 (53)	153/265 (58)
<b><u>Age, median (IQR)</u></b>	24 (14-28)	24 (18-30)
<b><u>Department</u></b>		
Inpatient*	502 (44)	95 (35)
Outpatient	645 (56)	176 (65)

\* p < 0.05

## ***Distribution of Age in Years, 2014-2015, by Organism (n=1382)***



# Enteric Fever Cases over time, 2014-2015, by Hospital (n=1418)



# ***Clinical Features of Laboratory-Confirmed Inpatients***

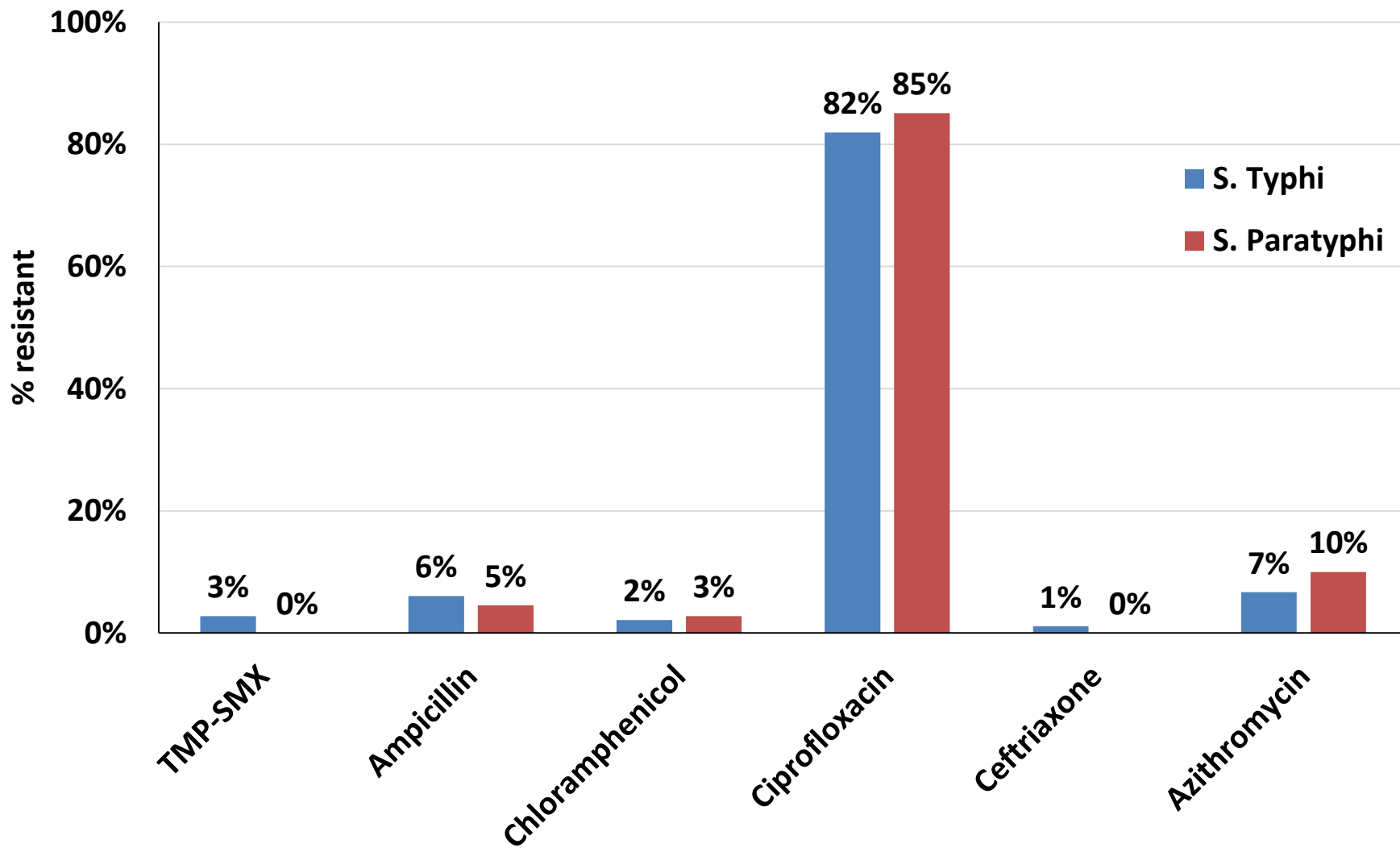
- Of 597 laboratory-confirmed inpatients, 429 charts were abstracted (72%)
  - 362 positive for *S. Typhi* (84%)
  - 67 positive for *S. Paratyphi* (16%)

	<b><i>S. Typhi</i> n=362 (%)</b>	<b><i>S. Paratyphi</i> n=67 (%)</b>
<b>Fever</b>	<b>351 (97)</b>	<b>67 (100)</b>
<b>Nausea/vomiting**</b>	<b>188 (52)</b>	<b>25 (37)</b>
<b>Weakness/malaise</b>	<b>133 (34)</b>	<b>31 (46)</b>
<b>Headache</b>	<b>123 (34)</b>	<b>27 (40)</b>
<b>Abdominal pain</b>	<b>116 (32)</b>	<b>20 (30)</b>
<b>Diarrhea**</b>	<b>115 (32)</b>	<b>11 (16)</b>
<b>Cough/difficulty in breathing</b>	<b>107 (30)</b>	<b>18 (27)</b>
<b>Skin rash/rose spots*</b>	<b>28 (8)</b>	<b>2 (3)</b>
<b>Decreased consciousness</b>	<b>15 (4)</b>	<b>3 (4)</b>
<b>Blood in stool*</b>	<b>15 (4)</b>	<b>0 (0)</b>
<b>Constipation</b>	<b>11 (3)</b>	<b>2 (3)</b>

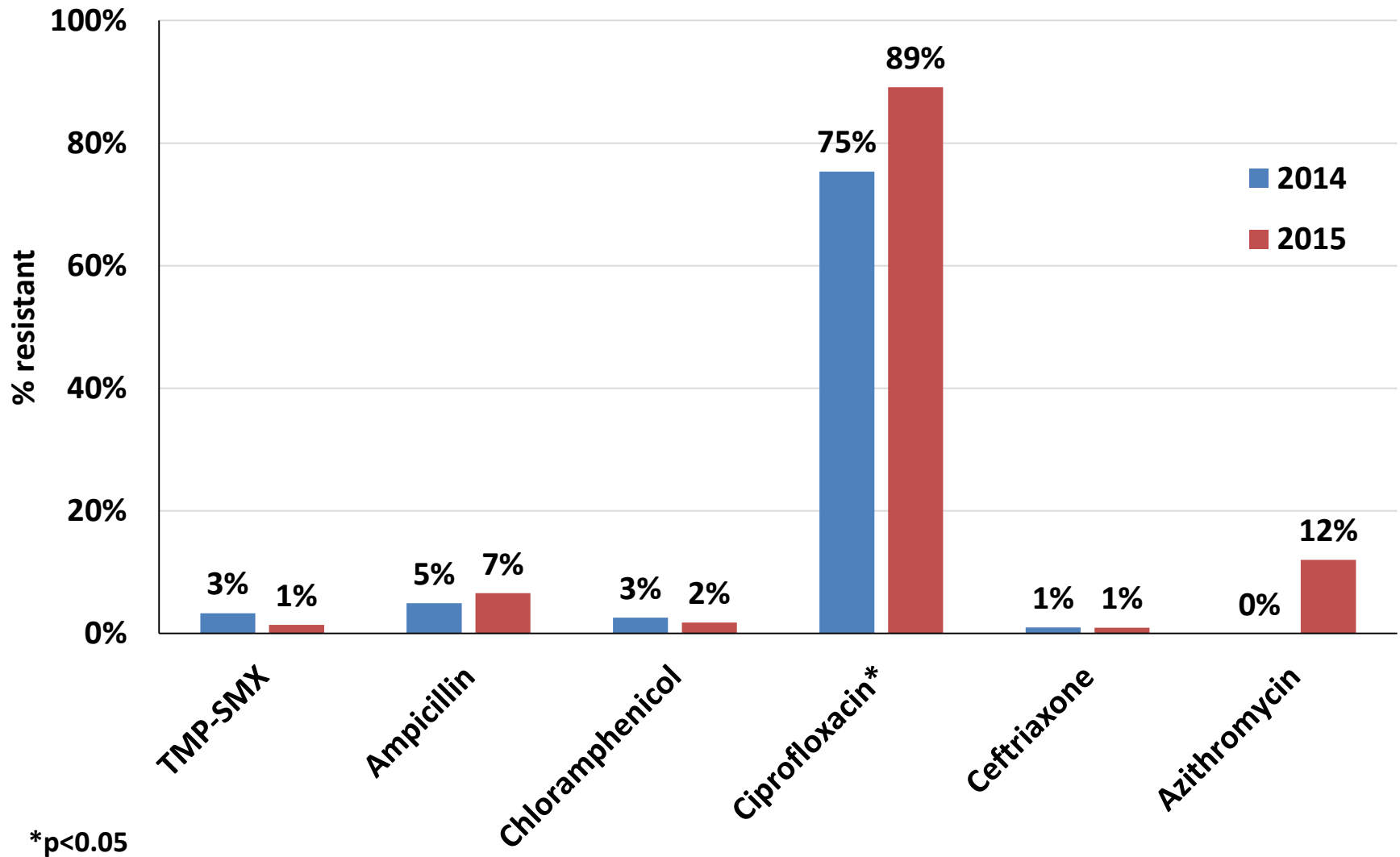
\* p < 0.1    \*\* p < 0.05



# Antimicrobial Resistance of Laboratory-Confirmed Inpatients by Organism, 2014-2015



# ***Antimicrobial Resistance of Enteric Fever Cases by Year, 2014-2015***



\*p<0.05

# ***Complications of Laboratory-Confirmed Inpatients***

	All cases n=429 (%)
<b>Hepatitis</b>	<b>26 (6)</b>
<b>Encephalopathy</b>	<b>11 (3)</b>
<b>Renal impairment</b>	<b>10 (2)</b>
<b>Shock</b>	<b>7 (2)</b>
<b>GI bleeding</b>	<b>6 (1)</b>
<b>Death</b>	<b>5 (1)</b>
<b>Intestinal perforation</b>	<b>3 (0.7)</b>
<b>Myocarditis</b>	<b>1 (0.2)</b>
<b>Other complications</b>	<b>31 (7)</b>

# Intestinal Perforations

- Abstracted 94 intestinal perforation charts
  - 13 with provisional or confirmed diagnosis of enteric fever (13.8%); 4 culture confirmed (30.8%)

	Provisional or Confirmed Diagnosis of Enteric Fever, n=13 (%)
<u>Sex, n (%)</u>	
Male	11 (85)
Female	2 (15)
<u>Median Age (IQR)</u>	24 (18-32)
<u>Symptoms, n (%)</u>	
Fever	10 (77)
Abdominal Pain	10 (77)
Vomit	7 (54)
General Weakness	6 (46)
Constipation	5 (38)
Diarrhea	3 (23)
<u>Prior antibiotics, n (%)</u>	9 (69)
<u>Median Days Hospitalized (IQR)</u>	10 (8-13)
<u>Complications, n (%)</u>	
Wound infection	3/11 (27)
Pulmonary Complications	2/11 (18)
Other	3/11 (27)
<u>Location of Perforation</u>	
Ileal	11/11 (100)
<u>Final Outcome, n (%)</u>	
Discharged	12 (92)
Death	1 (8)

# *Discussion*

- Corporate hospitals with high profile clientele, have also identified large number of enteric fever cases
- Age group most affected - 2 spikes < 10 yrs and 15-30 yrs
- Samples collected from sites of intestinal perforations – less specificity. Duodenal aspirates are preferred – which are usually not done.
- Antibiotic sensitivity - ceftriaxone and azithromycin (?) across the country
- Temporal distribution of cases at Medanta hospital in 2014 – indicates increased numbers from community
- This study will give an insight of magnitude of severe cases. Community based surveillance will be needed for assessing total burden of disease – for making policy decisions

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## Apollo Hospital

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