

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**



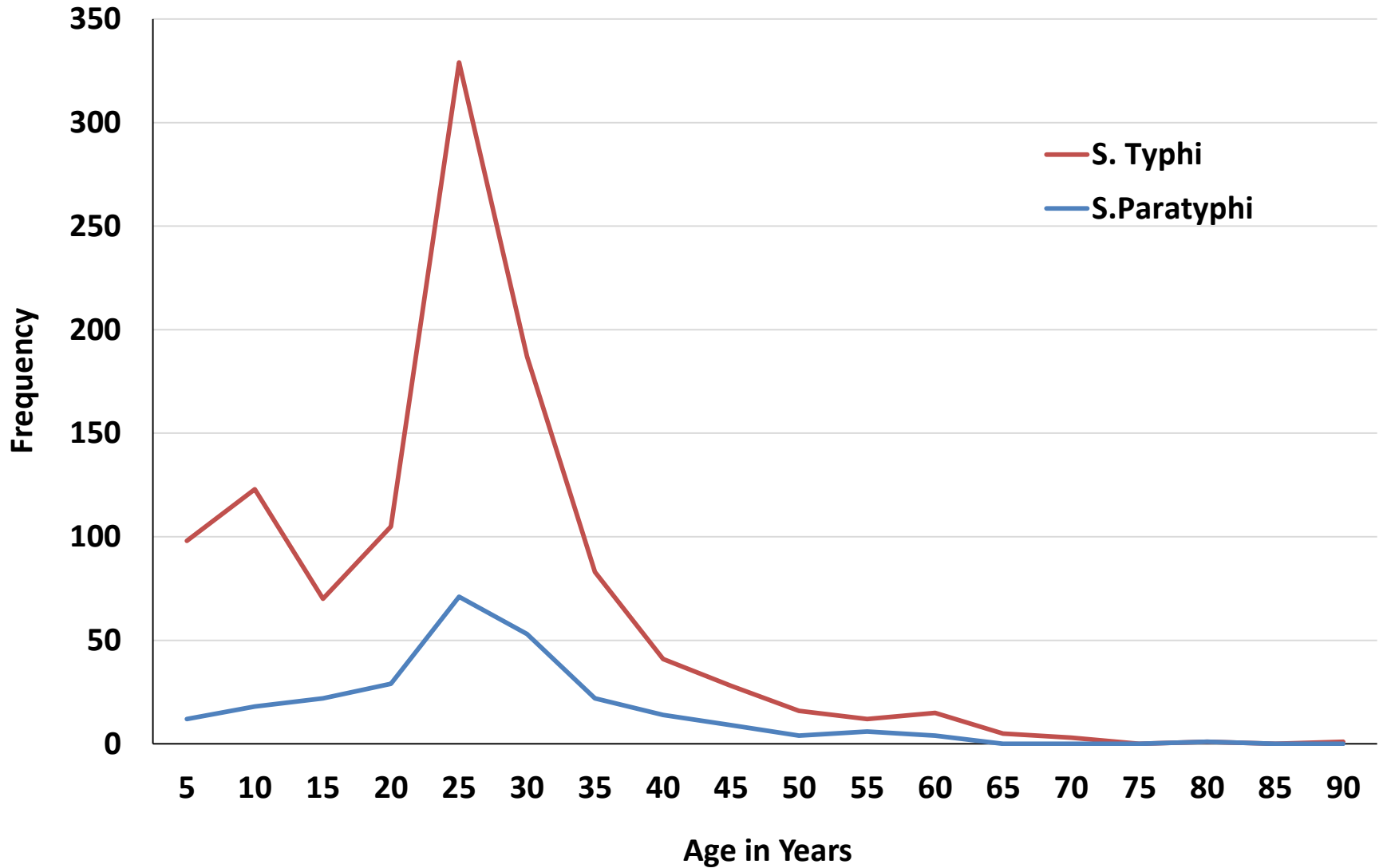
Laboratory-Confirmed Cases

- 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%)

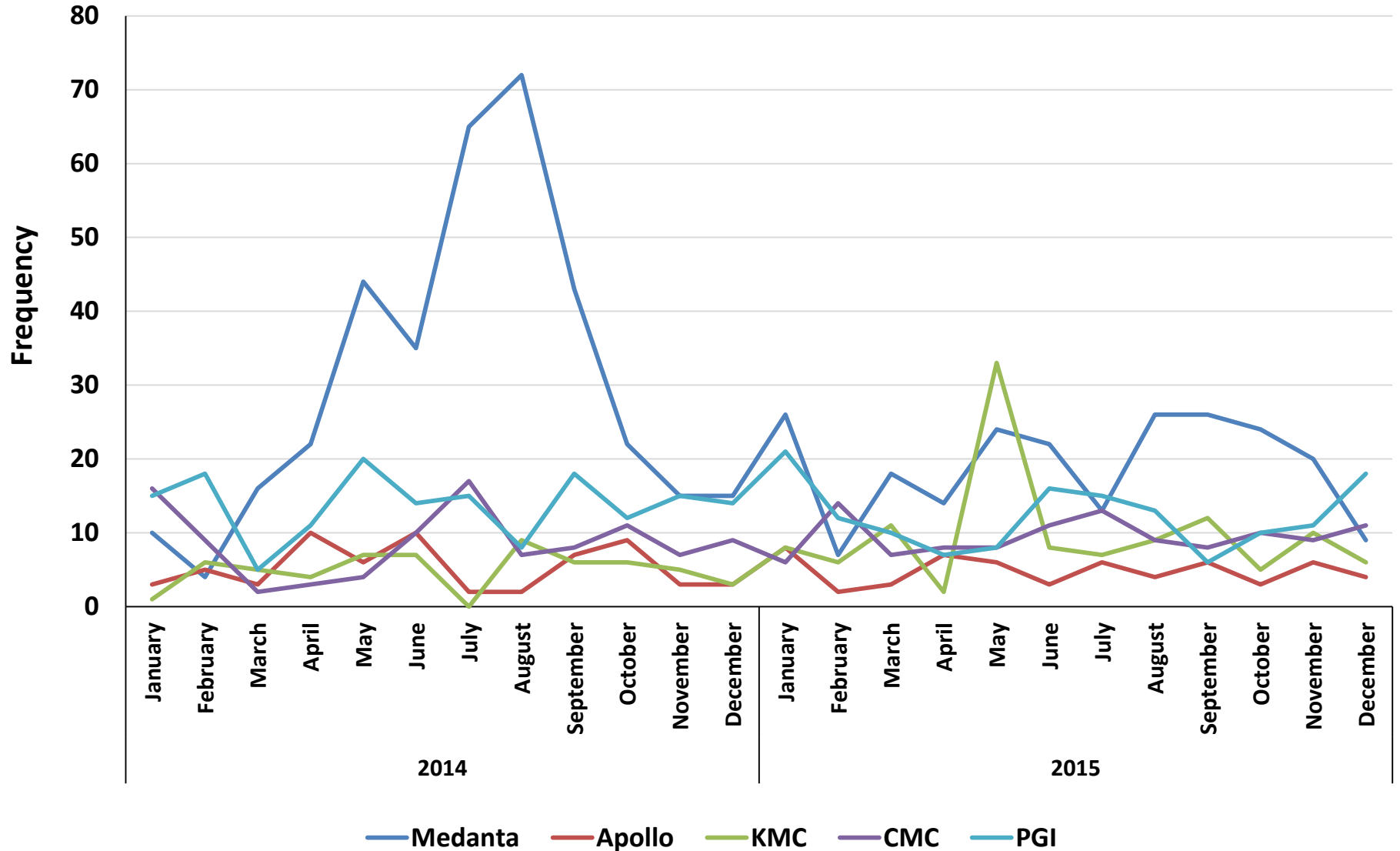
	S. Typhi n=1147 (%)	S. Paratyphi n=271 (%)
<u>Gender</u>		
Female	529/1114 (47)	112/265 (42)
Male	585/1114 (53)	153/265 (58)
<u>Age, median (IQR)</u>	24 (14-28)	24 (18-30)
<u>Department</u>		
Inpatient*	502 (44)	95 (35)
Outpatient	645 (56)	176 (65)

* 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)



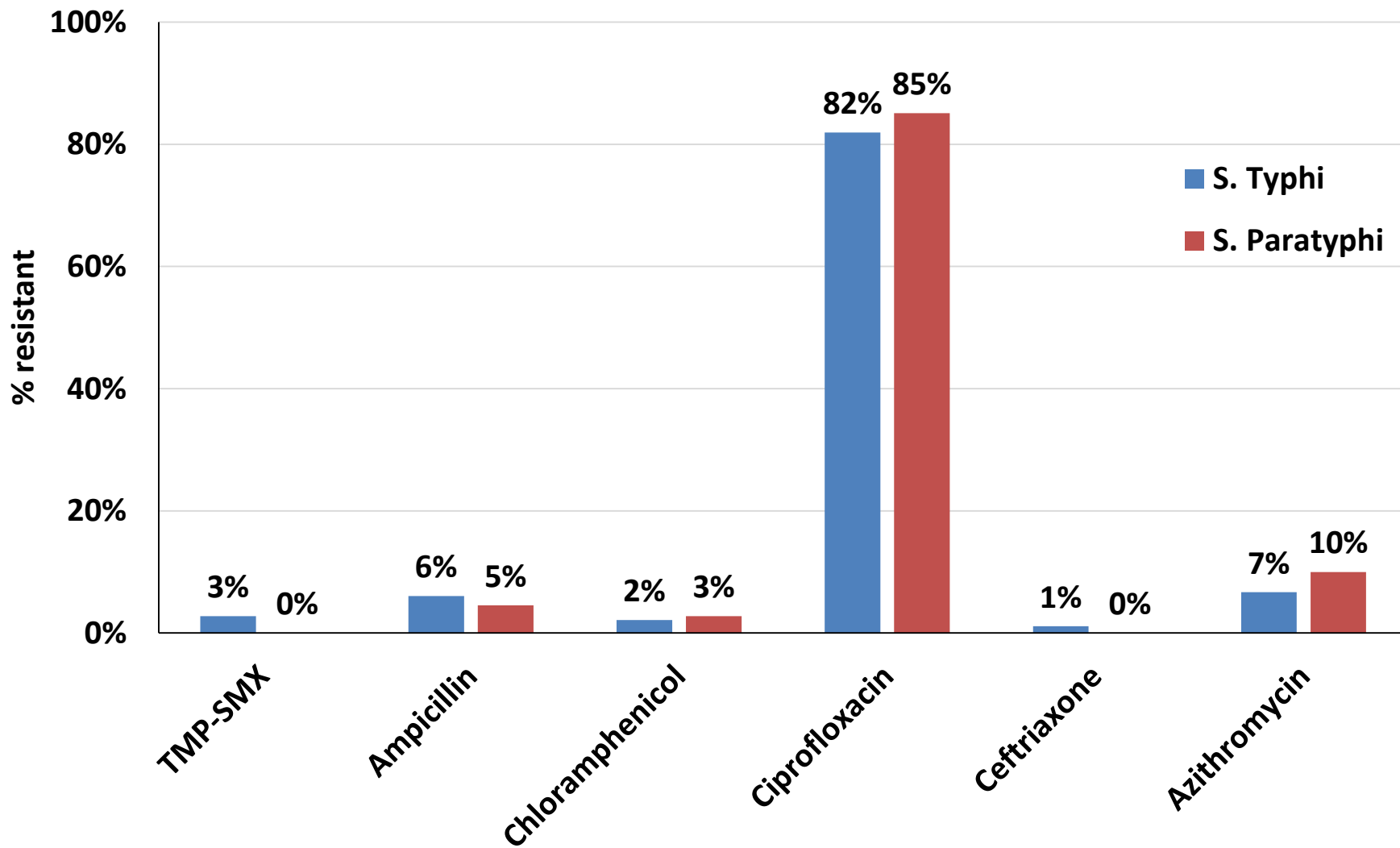
Clinical Features of Laboratory-Confirmed Inpatients

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

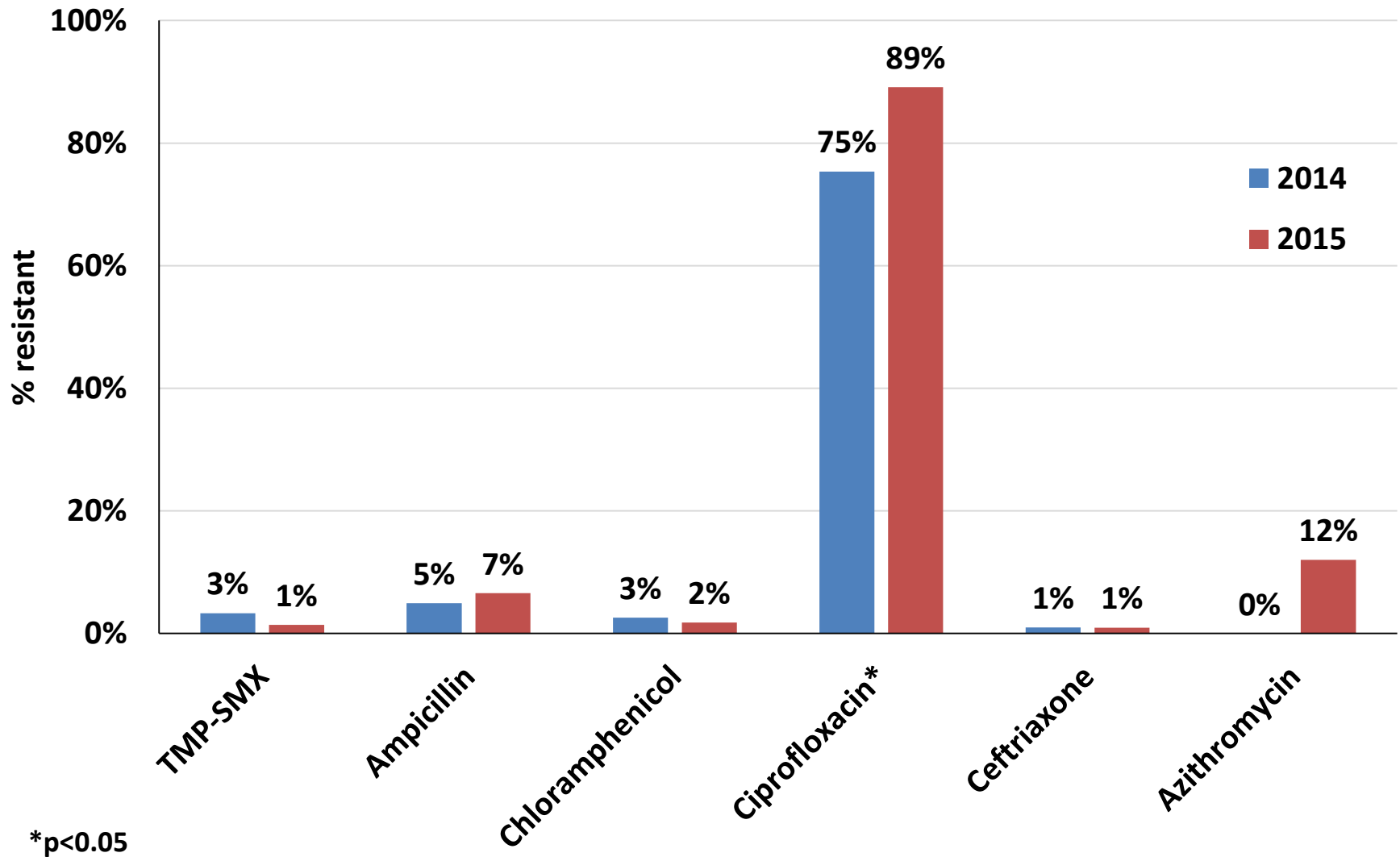
	<i>S. Typhi</i> n=362 (%)	<i>S. Paratyphi</i> n=67 (%)
Fever	351 (97)	67 (100)
Nausea/vomiting**	188 (52)	25 (37)
Weakness/malaise	133 (34)	31 (46)
Headache	123 (34)	27 (40)
Abdominal pain	116 (32)	20 (30)
Diarrhea**	115 (32)	11 (16)
Cough/difficulty in breathing	107 (30)	18 (27)
Skin rash/rose spots*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

* 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 (%)
Hepatitis	26 (6)
Encephalopathy	11 (3)
Renal impairment	10 (2)
Shock	7 (2)
GI bleeding	6 (1)
Death	5 (1)
Intestinal perforation	3 (0.7)
Myocarditis	1 (0.2)
Other complications	31 (7)

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

Acknowledgements

THSTI

- Principal Investigator – Prof. N.K.Ganguly
- Consultant – Dr. Dipika Sur
- Country Co-ordinator – Dr. Bratati Mukhopadhyay
- Swati Verma
- Nisha Arora
- Radhesh Notiyal
- Prity Kapoor

Sabin Vaccine Institute

- Denise Garrett
- Caitlin Barkume

Postgraduate Institute of Medical Sciences

- Pallab Ray
- Vikas Gautam

Medanta Hospital

- Sharmila Sengupta
- Amarjeet Khan

Christian Medical College

- Balaji Veeraraghavan

Apollo Hospital

- Ujjwayini Khan
- Soma Dutta

Kasturba Medical College, Manipal University

- Vandana KE
- Yasha Mukim

Thank you