

The burden of culture-confirmed enteric fever in an urban slum – an ongoing community-based longitudinal cohort in Delhi, India

Tier 1 Surveillance of Enteric Fever in India (SEFI) site

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on behalf of SEFI Tier 1 collaborators



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Background

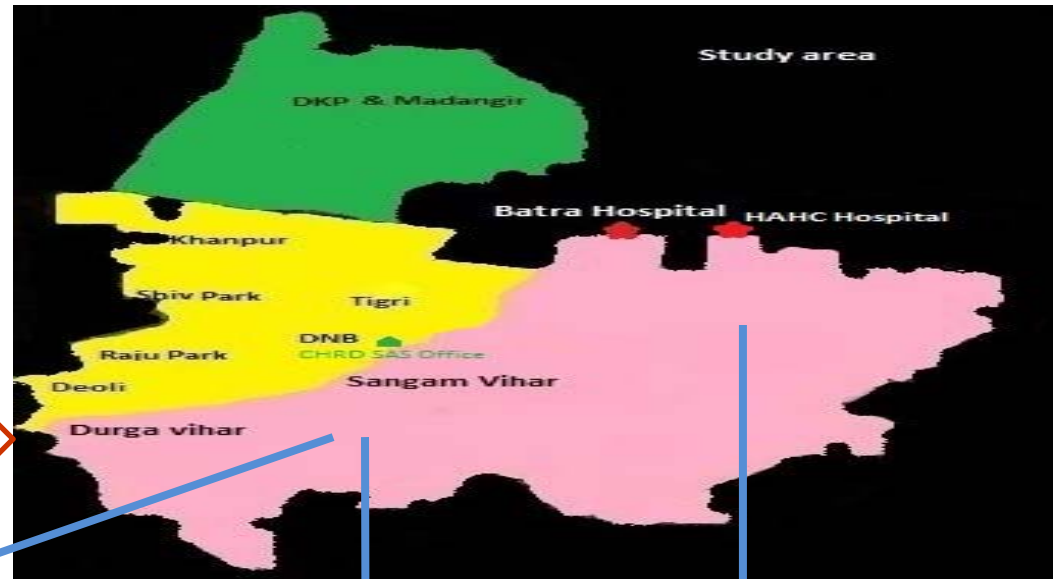
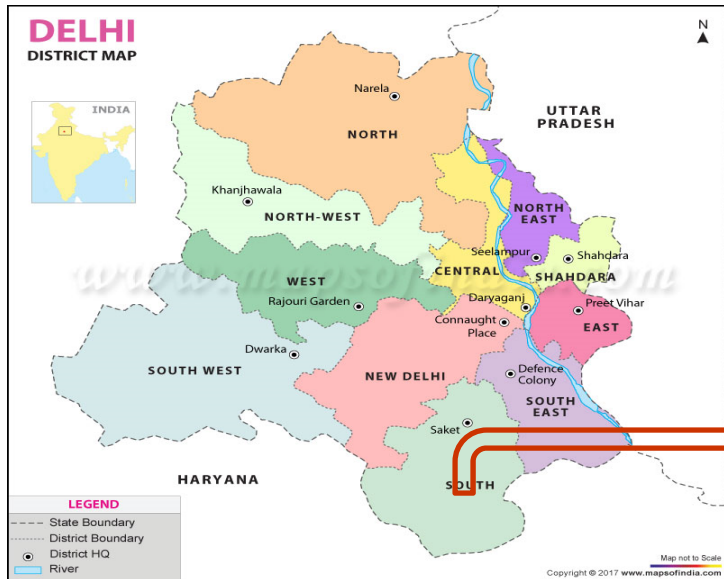
- India – endemic to Typhoid; emergence of multidrug resistant H58 strain reported.
- Limited evidence on population-based incidence of culture-positive typhoid. Sinha A et al, 1999 – Incidence 9.8 /1000 PY in <40 years in Delhi; highest in < 5yr children (27.3/1000 PY).
- Typhoid vaccine currently not implemented in the National immunization programme – perceived decline in disease, based on hospital reports
- Better knowledge of age-specific estimates in children (likely target population for the vaccine); disease sequelae; seasonality and distribution is essential for policy decisions

Objectives

- The community-based active surveillance component (**Tier 1**) of the Surveillance of Enteric Fever in India (**SEFI**) study was initiated in 2017 in 4 sites in India i.e. **Kolkata, Pune, Delhi, Vellore**
- **Primary Objective:** To estimate the overall and age-specific burden of culture-confirmed typhoid fever in the community among children aged 6months to <15 years

Here we describe some preliminary findings from the **Delhi site** for the duration from **23 Oct 2017 to 31st Dec 2018**

Delhi - Site Description



- Study Area: South Delhi, Sangam Vihar
- Population: ~10 Lakhs; Birth Rate: 20/1000;



18-Mar-19 **Study Office**



Study Lab



Study Hospital ⁴

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Methods

Study design	Population based cohort with active surveillance
Sample Size	6000 children
Inclusion criteria for enrolment	Age between 6 months and <14 completed years Likely to stay in the study area for the study duration
Duration follow-up	24 months or till 15 th birthday, whichever is earlier

Definitions

Fever: Caregiver report of fever or a recorded temperature $\geq 38^{\circ}\text{C}$ (100.4F)

Confirmed case of typhoid fever : A patient with fever & laboratory confirmation of *S. Typhi* by culture from a sterile site (blood).

Study Procedures

Identification:

- Door to door survey to identify households with potentially eligible children.

Consenting and Screening:

- Unique screening ID assigned to all potentially eligible children in each household
- Consent and assent (for the age eligible children) administered.
- Screening of potential eligible children



Study procedures contd..

Enrolment:

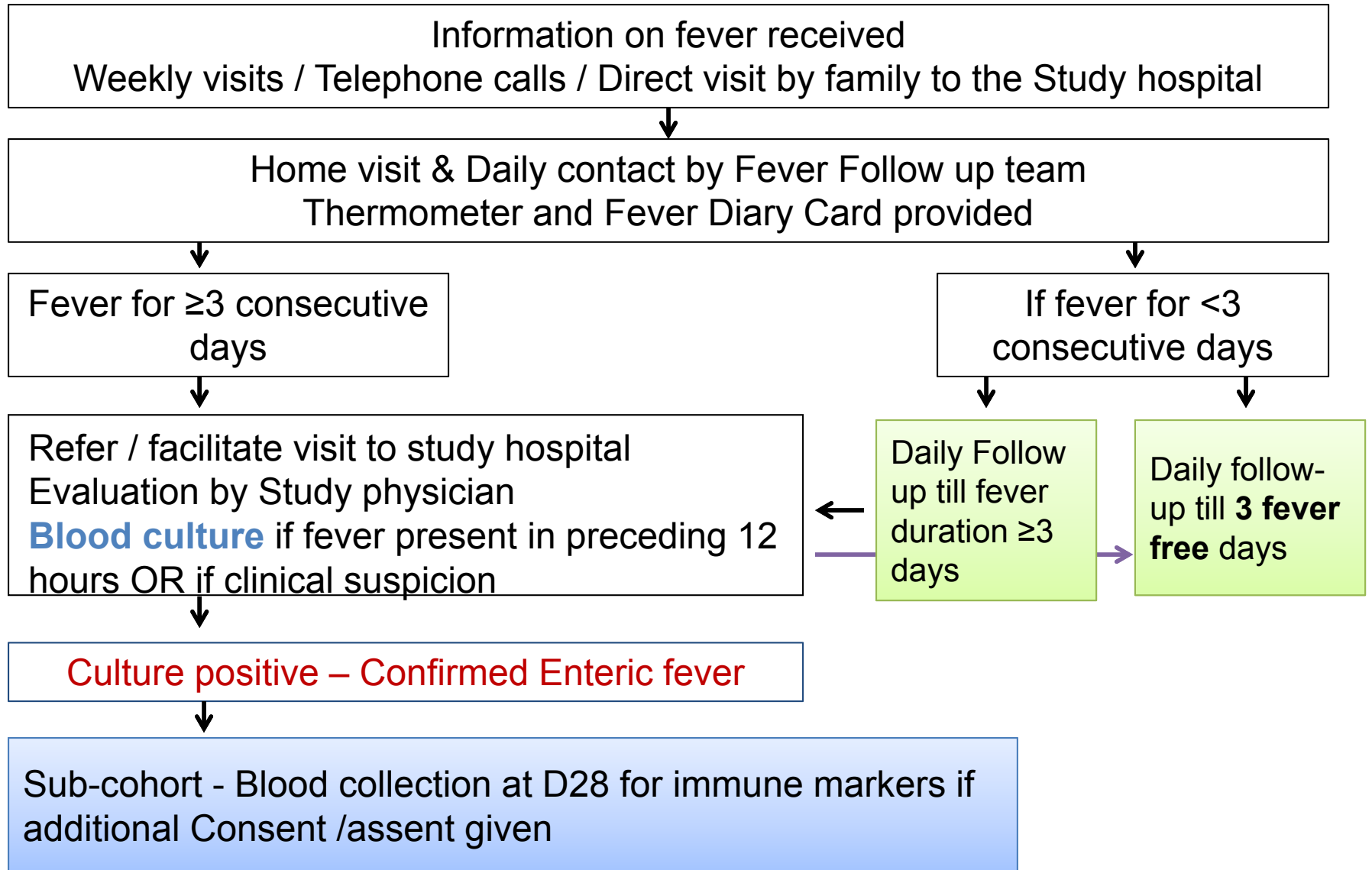
- Children whose caregivers agree participation and follow study procedures are enrolled - Sequential Subject ID allotted
- Participant card provided with team contact number
- Instructions to primary caregiver(s) to call study team to report any fever in the enrolled child.
- Phone recharge of INR 50 /month/family to communicate

Weekly Surveillance:

- Weekly contact; at least 1 face to face contact in a month



Fever Surveillance



Preliminary Findings

Number of children	N (%)
Screened	6183
Enrolled	6000
Censored as of 31 Dec 2018	117 (1.9%)
Currently in cohort	5883 (98.1%)

Reasons Censored

Family refusal for participation during period of follow-up	28
Shifted out from study area / loss to follow up	82
Study completion	5
Death	2 (1 Thalassemia, 1 PUO)

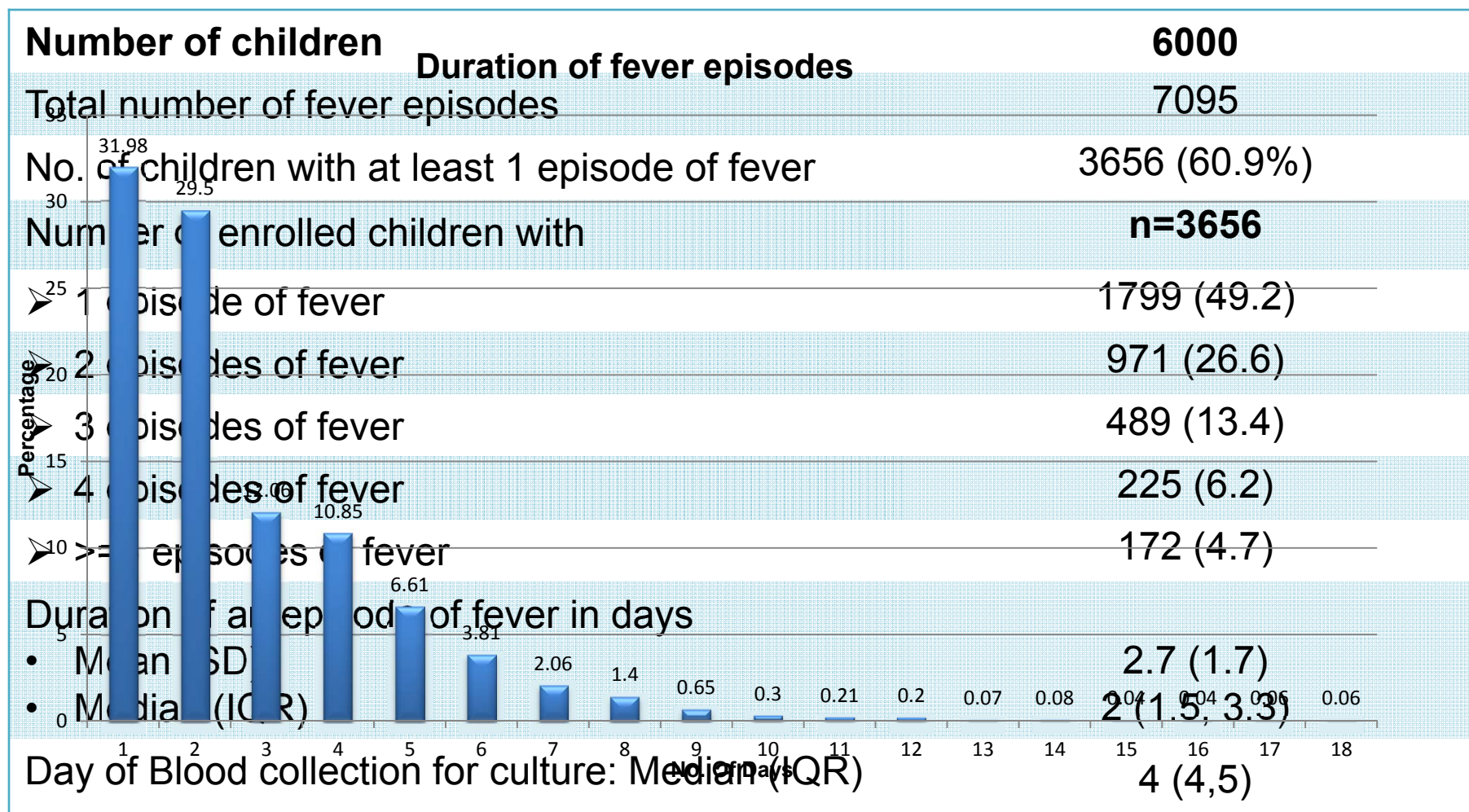
Sociodemographic characters		No (%) N=5908
Sex of the Child: Female		2893 (48.0)
Type of Family		
Nuclear		4293 (72.7)
Three generation		339 (5.7)
Joint		1276 (21.6)
Family Size: Mean (SD)		5.7 (2.2)
Highest education in family as years of schooling: Mean (SD)		10.8 (3.3)
Type of House: Pucca		5854 (99.1)
Overcrowding present (>2.5 persons per living room)		4147 (70.2)
https://www.who.int/ceh/indicators/overcrowding.pdf		
Separate kitchen available		3762 (63.7)
Primary fuel used for cooking in household		
LPG Gas		5894 (99.8)
Others		14 (0.2)
Monthly income in USD : Median (IQR)		143 (114 to 214)
Received Typhoid Vaccine		62 (1.08)

Person years of Follow-up by age group

(till 31st Dec 2018)

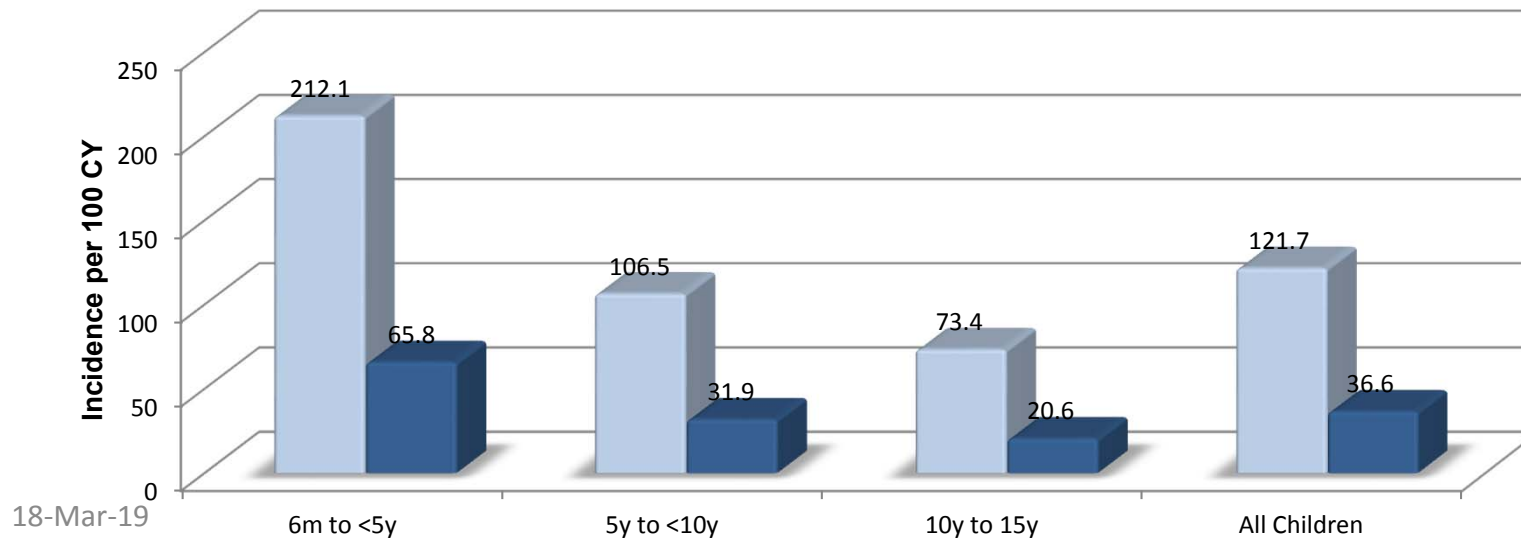
Age group	Person-years of follow up
6 m to <5 y	1463.2 (25.1)
5 y to <10 y	2377.5 (40.8)
10 y to 15 y	1991.8 (34.1)
All children	5832.5

Description of Fever episodes

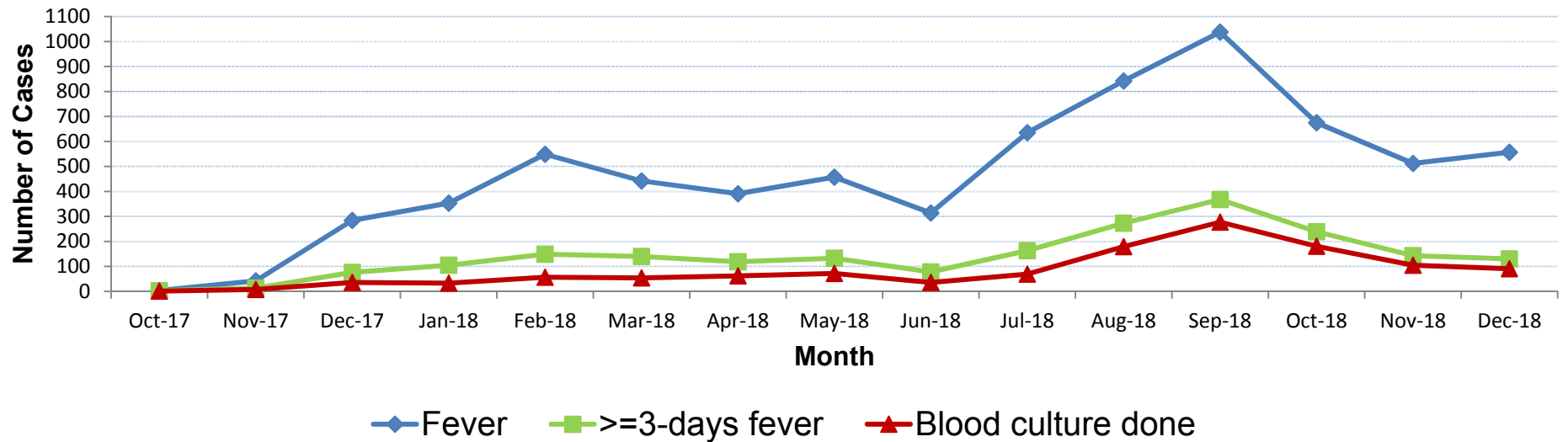


Fever by age group

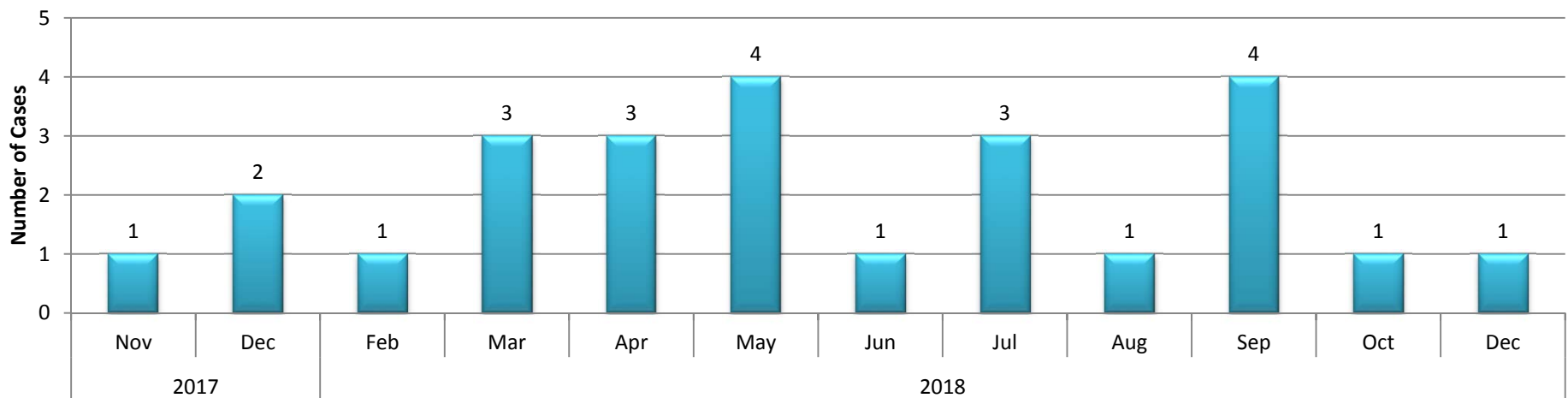
Age group	Number of fever episodes	Incidence (95%CI) of fever per 100 CY	Number of ≥ 3 day fevers	Incidence (95% CI) of ≥ 3 day fevers per 100 CY
6 m to <5 y	3103	212.1 (204.7, 219.6)	963	65.8 (61.7, 70.1)
5 y to <10 y	2532	106.5 (102.4, 110.8)	759	31.9 (29.7, 34.3)
10 y to 15 y	1460	73.3 (69.7, 77.2)	410	20.6 (18.7, 22.7)
All children	7095	121.6 (118.9, 124.6)	2132	36.6 (35.0, 38.2)



Fever cases by month



Culture confirmed Enteric fever by month



All cause Hospitalizations

Age categories	Number of all-cause hospitalizations	Incidence of all-cause hospitalizations per 1000 CY
6 m to <5 y	29	9.3 (6.3, 13.4)
5 y to <10 y	12	5.0 (2.6, 8.8)
10 y to 15 y	12	6.0 (3.1, 10.5)
All children	53	9.1 (6.8, 1.2)

Antibiotics use in fever episodes

Antibiotics in Fever	N=7095 n (%)	Day of antibiotic start since onset of fever episode Median (IQR)
Any antibiotics used (including unknown)	2612 (36.8)	2 (1,3)
Antibiotics used (excluding unknown)	2206 (27.9)	2 (1,4)
Fever episodes where the following antibiotics were used:		
• B-lactam group	1115 (15.7)	2 (1,3)
• Cephalosporin	707 (9.9)	2 (1,4)
• Macrolides	573 (8.1)	3 (1, 4)
• Co-trimoxazole	105 (1.5)	3 (2, 5)
• Quinolones	78 (1.1)	2 (1,3)

Blood culture results and use of antibiotics

Blood culture and antibiotics	n	<i>Enteric fever +ve</i>	No Growth	Contamination
Overall Blood culture results	1260	25 (2.0)	1213 (96.3)	21 (1.7)
Received Any Antibiotics before blood culture				
• Yes	442	12 (2.7)	421 (95.2)	9 (2.0)
• No	818	13 (1.6)	792 (96.8)	12 (1.5)
Received 2-days of Antibiotics before blood culture				
• Yes	378	10 (2.6)	360 (95.2)	8 (2.1)
• No	882	10 (1.7)	853 (96.7)	13 (1.5)

Enteric fever by age categories

Enteric Fever	All children		6 m to <5 y		5 y to <10 y		10 y to 15 y	
	n	Incidence per 100,000 CY	n	Incidence per 100,000 CY	n	Incidence per 100,000 CY	n	Incidence per 100,000 CY
All enteric fever	25	428.9 (277.6, 633.1)	7	478.5 (192.4, 985.8)	8	336.5 (145.2, 663.1)	10	502.1 (240.8, 923.3)
Typhoid	18	309.2 (183.2, 488.6)	6	410.1 (150.5, 892.7)	7	294.5 (118.4, 606.7)	5	251.0 (81.5, 585.8)
Para typhoid	7	120.5 (48.4, 248.2)	1	68.4 (1.7, 380.8)	1	42.1 (1.1, 234.4)	5	251.0 (81.5, 585.8)

Description of the Enteric fever cases

	All enteric fever (N=25) n (%)	Typhoid (N=18) n (%)	Paratyphoid (N=7) n (%)
Symptoms other than fever			-
Diarrhea/Loose stools	4 (16.0)	3 (16.6)	1 (14.2)
Cough	8 (32.0)	3 (16.6)	5 (71.4)
Abdominal pain	13 (52.0)	8 (44.4)	5 (71.4)
Nausea/Vomiting	12 (48.0)	11 (61.1)	1 (14.2)
Headache	2 (8.0)	2 (11.1)	-
Not feeding well	5 (20.0)	4 (22.2)	1 (14.2)
Joint pain	1 (4.0)	1 (5.6)	-
Sore throat	1 (4.0)	-	1 (14.2)
Duration of episode: Median (IQR)	8 (7, 11)	9 (7, 14)	8 (6, 8)
Hospitalization during episode	1*(4)	1*(5.5)	-

All cases recovered without any sequelae

Acknowledgements

- The whole Tier 1 SEFI team at CHRD SAS, Delhi and our director Dr. Nita Bhandari
- All SEFI Collaborators, Jacob John, Ashish Bavdekar, Shanta Dutta and Gagandeep Kang
- Duncan Steele, Megan Carey & Supriya Kumar, Bill & Melinda Gates Foundation and Nicholas Grassly, Imperial College London for their technical support in proposal development

Funding: The study is supported by a part of the grant from the Bill & Melinda Gates Foundation (OPP1159351)



-19

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