

BLOOD CULTURE POSITIVE TYPHOID & PARATYPHOID CASES IN CHILDREN PRESENTING TO PATAN HOSPITAL, NEPAL OVER A 15 YEAR (2009-2023) PERIOD

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BACKGROUND

- Typhoid fever is the fourth most common cause of hospital admission in Nepal: HMIS (Health Management Information System) data Nepal
- Sentinel IBD surveillance in children (Patan Hospital) data: *S. Typhi* accounted for 28% of all the pathogens isolated which was 1.6% of all blood cultures done (2005-2013)¹
- Incidence: 1062 cases/100,000; highest in the age grp 5-9 years followed by 10-14 years (study conducted in Lalitpur distric, Nepal)²

¹*Childhood Invasive Bacterial Disease in Kathmandu, Nepal (2005–2013)* *The Pediatric Infectious Disease Journal* DOI: [10.1097/INF.00000000000003421](https://doi.org/10.1097/INF.00000000000003421)

²*Burden of enteric fever at three urban sites in Africa and Asia: a multicentre population-based study.* *Lancet Glob Health* 2021; 9: e1688–96

TCV INTRODUCTION IN NEPAL

- In Nepal TCV was introduced into the National immunization program in May 2022
- Before the introduction of TCV in routine immunization, a National wide catchup campaign targeting children aged 15 months to 15 years was conducted (April/May 2022) -99% coverage
- Nepal is the fourth country in the world to introduce Typhoid vaccines in the routine immunization programme with Gavi support

RELATIVE BURDEN OF TYPHOID & PARATYPHOID

- It has been reported that the relative burden of paratyphoid fever compared to typhoid fever varies depending upon the geographical location
- Paratyphoid fever is reportedly increasing especially in South Asia
- There are concerns that the increase may be associated with vaccination against typhoid⁴

⁴ <https://www.who.int/teams/immunization-vaccines-and-biologicals/diseases/paratyphoid-fever>

OBJECTIVE

- *We aimed to assess the relative burden of Paratyphoid fever among children visiting Patan hospital and to look for any changes post TCV introduction*

METHODS

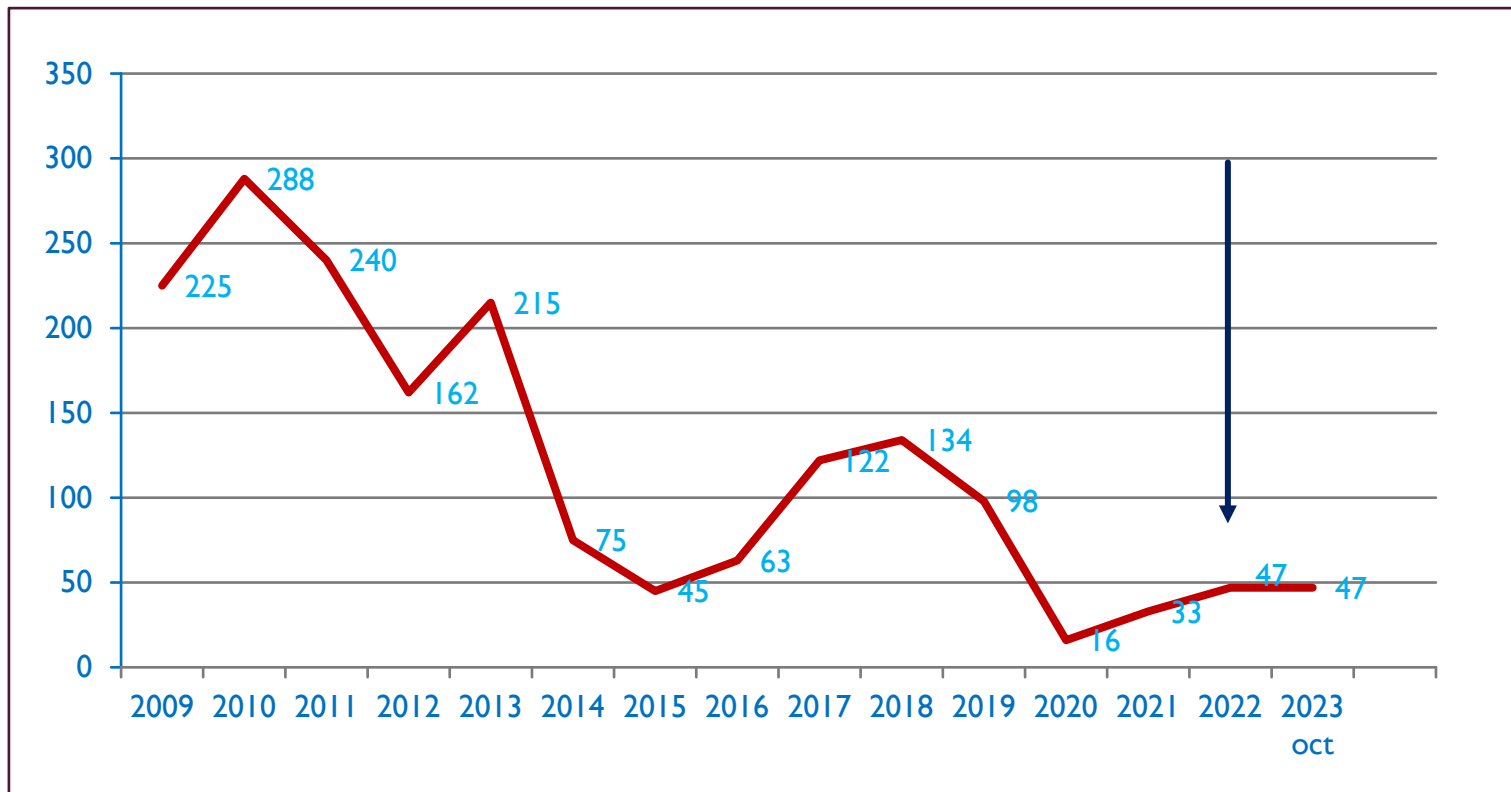
- As part of a long-running study on Invasive bacterial disease in children (1 month-14 years), at Patan Hospital, the record of all positive blood culture isolates, including *Salmonella typhi* and *paratyphi*, are available since 2009
- Patan Hospital is the main teaching hospital of Patan Academy of Health Sciences, located in Lalitpur district within Kathmandu valley.
- We reviewed the recorded data on culture positive enteric fever cases.



RESULTS

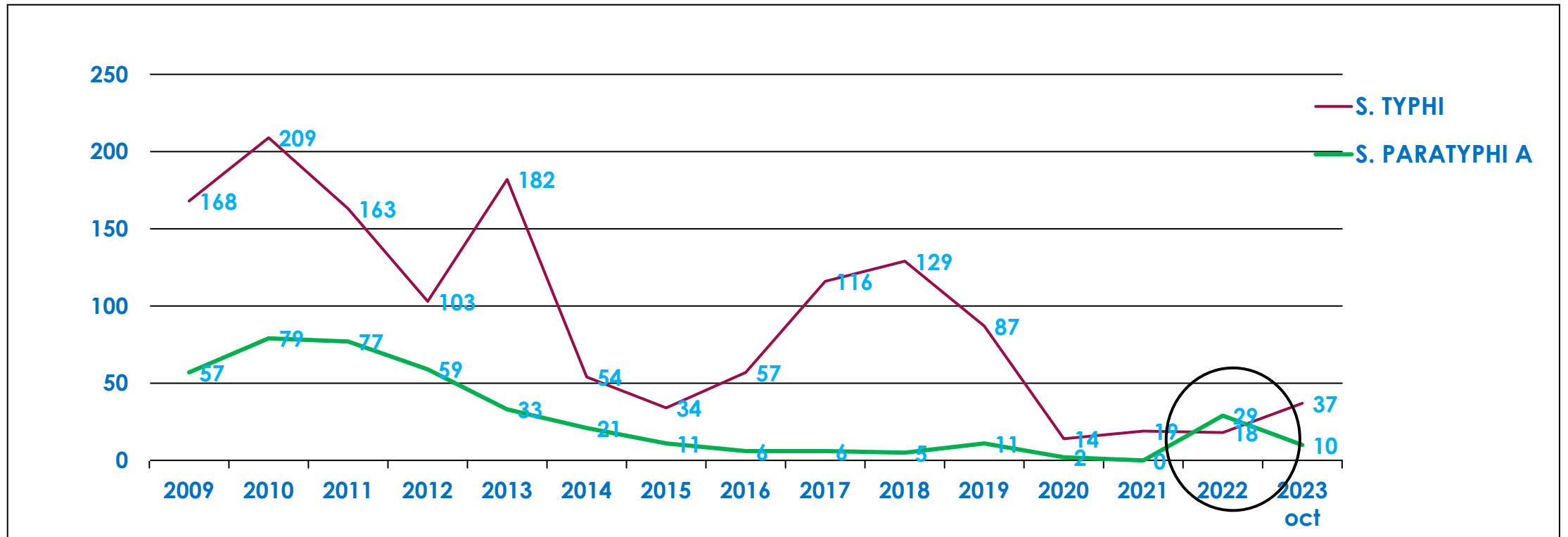
BLOOD CULTURE +VE ENTERIC FEVER CASES (TYPHOID + PARATYPHOID)

TOTAL NUMBER OF BLOOD CULTURE+VE & ENTERIC FEVER CASES IN CHILDREN (2009-2023 OCT.)



- From >200 cases/year (2009-2013), decreased to around 100 cases/year in 2014 -2019
- A significant drop to <50 cases/year during the pandemic (2020 & 2021)

BLOOD CULTURE +VE S. TYPHI & PARATYPHI CASES IN CHILDREN (2009- 2023 OCT.)



Blood culture +ve *S. typhi* and *S. paratyphi* cases (2009-2021) Pre TCV

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
<i>S. Typhi</i>	168	209	163	103	182	54	34	57	116	129	87	14	19
<i>S. Paratyphi</i>	57	79	77	59	33	21	11	6	6	5	11	2	0
	25%	27%	32%	36%	15%	28%	24%	10%	5%	4%	11%	13%	0
TOTAL	225	288	240	162	215	75	45	63	122	134	98	16	33

- From 2016 onwards till 2021, a decline in percentage contribution of *S. Paratyphi* to the total culture positive enteric fever cases has been observed

Blood culture +ve S. typhi and S. paratyphi cases (2009-2023 Oct)

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023 Till Oct
S. typhi	168	209	163	103	182	54	34	57	116	129	87	14	19	18	37
S. paratyphi	57	79	77	59	33	21	11	6	6	5	11	2	0	29	10
	25%	27%	32%	36%	15%	28%	24%	10%	5%	4%	11%	13%	0	61%	21.5%
TOTAL	225	288	240	162	215	75	45	63	122	134	98	16	33	47	47

Post TCV introduction, (2022 and 2023,till oct) the % contribution of paratyphoid was 41.5%

PASSIVE SURVEILLANCE DATA FROM TYVAC & TYVOID STUDIES

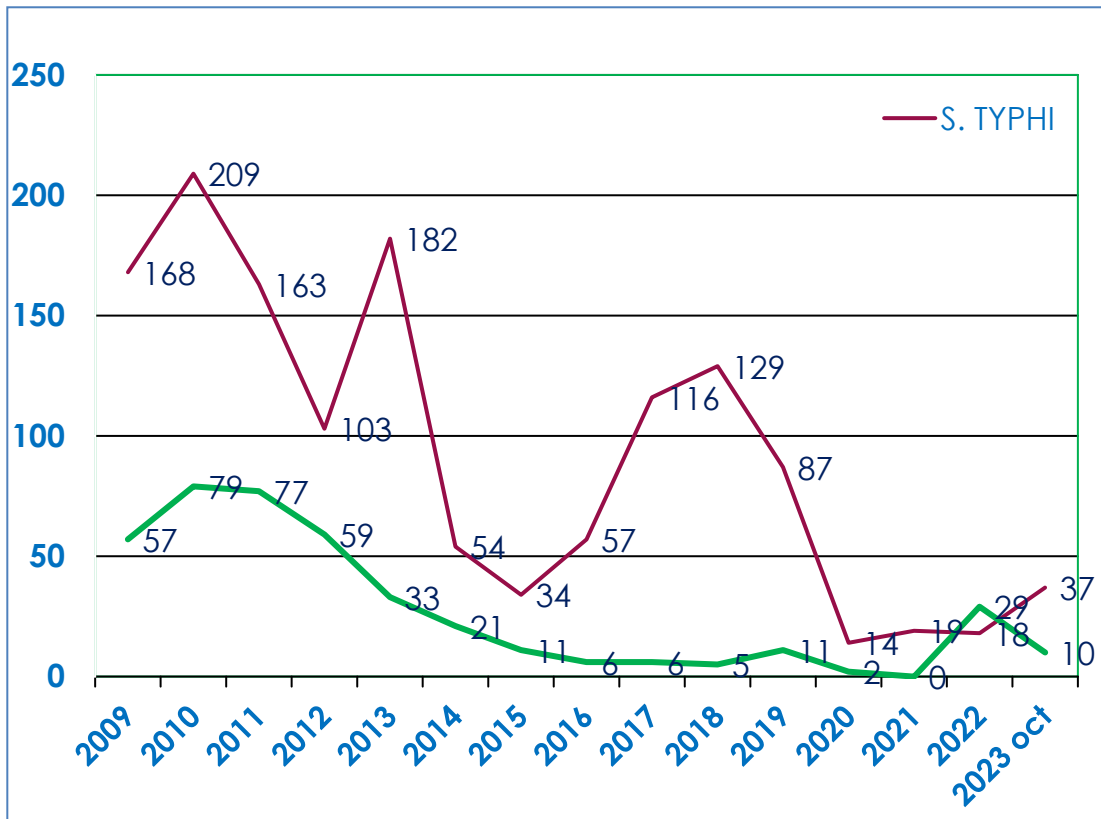
	TyVAC data ⁶	TyVOID data*		
Dates	<i>Dec, 2017- Apr, 2021</i>	<i>Oct,2021–Dec, 2022</i>	<i>Jan 2023 - Oct 2023</i>	<i>Total (Oct 2021-Oct 2023)</i>
Total blood cultures	3433	2023	1263	3286
S Typhi +ve (% of all blood C/S)	75 (2.2 %)	29 (1,4%)	72 (5.7%)	101 (3%)
S. Paratyphi +ve (% of all blood C/S)	19 (0.6 %)	38 (1.87%)	12 (0.95%)	50 (1.5%)
% contribution to the total blood culture +ve Enteric fever cases		% contribution to the total blood culture +ve Enteric fever cases		
S Typhi	80%	43.3%	85.7%	66.9%
S. Paratyphi	20%	56.7%	14.3%	33.1%

*Included both TyVAC and non-TyVAC participants

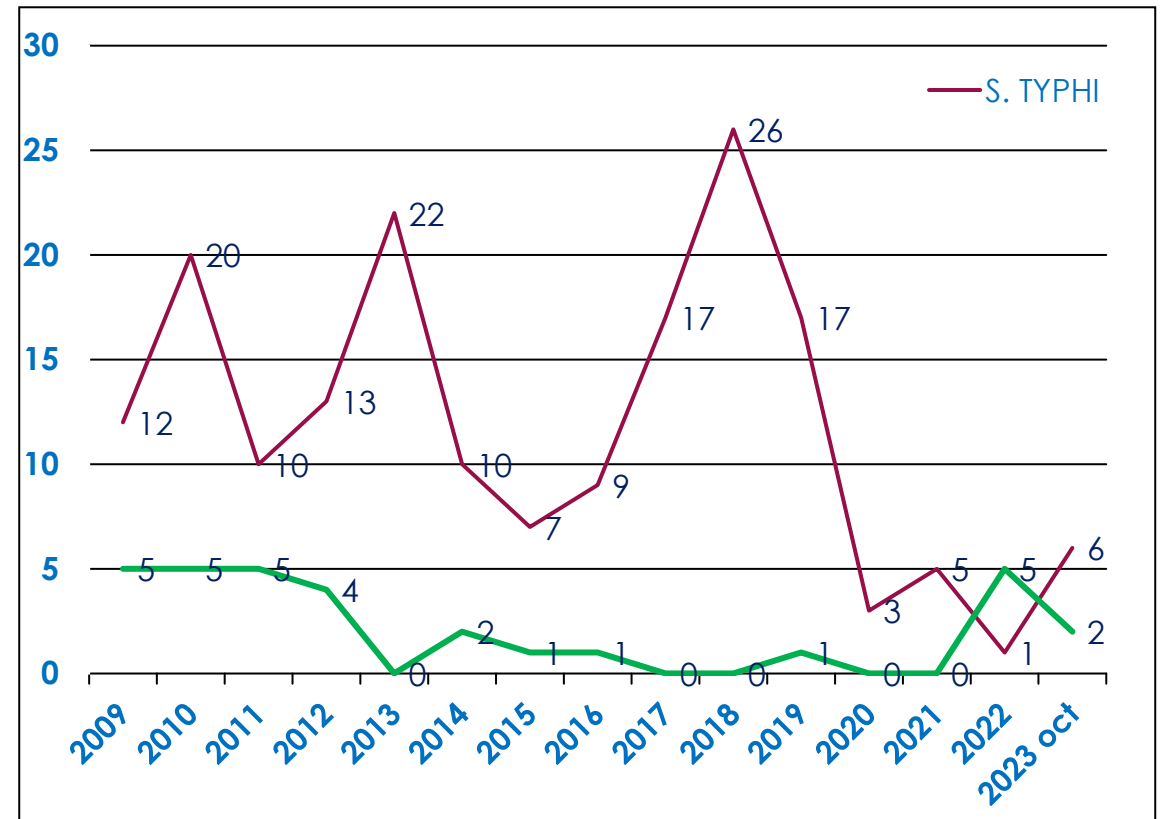
⁶Efficacy of typhoid conjugate vaccine in Nepal: final results of a phase 3, randomised, controlled trial *Lancet Glob Health* 2021; 9: e1561–68

ADMITTED CASES OF BLOOD CULTURE +VE ENTERIC FEVER

TOTAL CASES OF BLOOD CULTURE +VE S. TYPHI AND S. PARATYPHI



ADMITTED CASES OF BLOOD CULTURE +VE S. TYPHI AND S. PARATYPHI

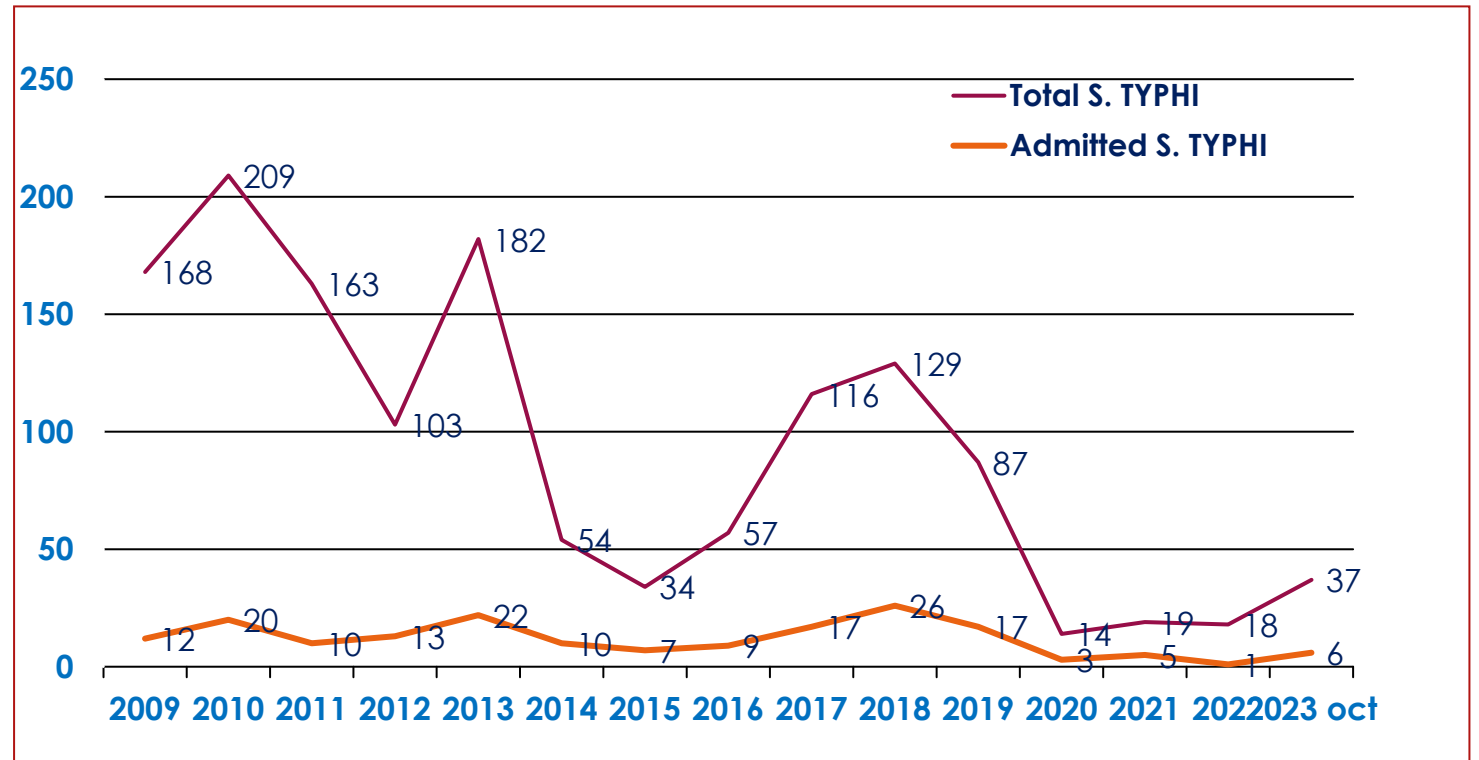


TOTAL AND ADMITTED CASES OF BLOOD CULTURE +VE S. TYPHI IN CHILDREN <14 YEARS (2009-2023 OCT)

Of the 1390 cases of culture positive S.typhi cases, 178 (12.8%) were admitted

Median percentage of Admission 15.8% (IQR 9.6-20.1)

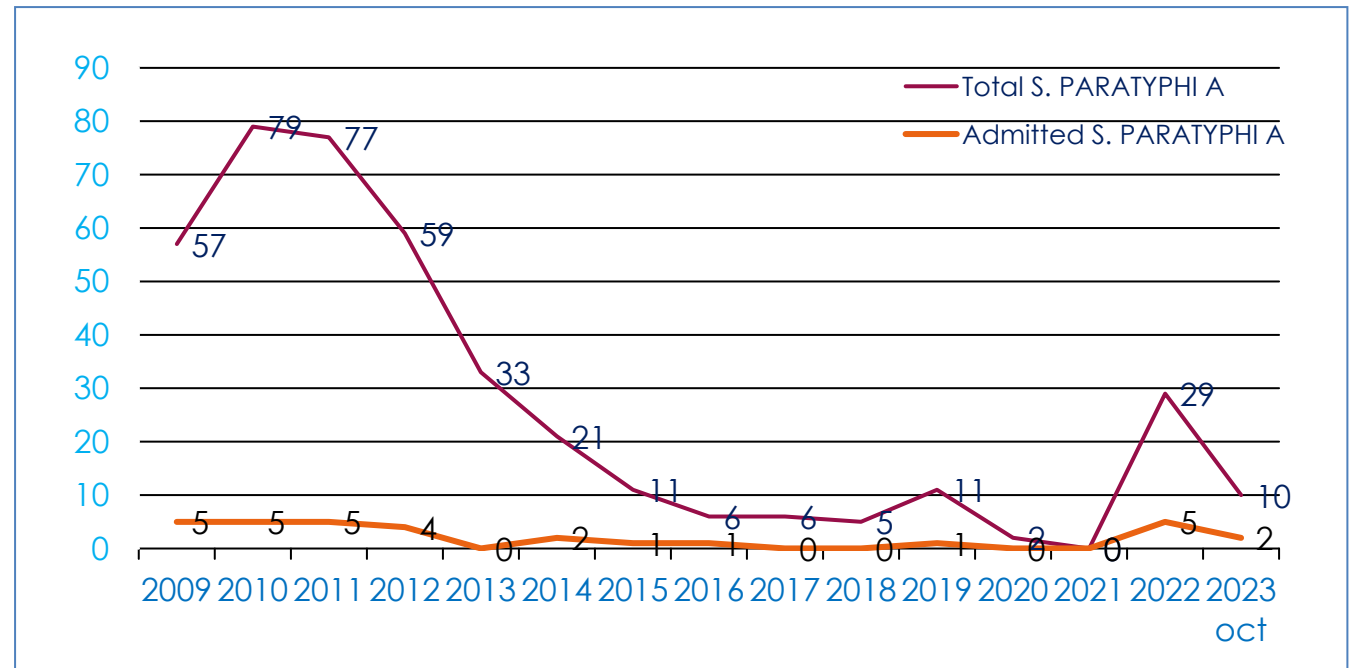
TOTAL & ADMITTED CULTURE +VE S.TYPHI



TOTAL AND ADMITTED CASES OF BLOOD CULTURE +VE S. PARATYPHI IN CHILDREN <14 YEARS (2009-2023 OCT.)

Of the 406 cases of culture positive S. paratyphi, 31 (7.6%) were admitted

TOTAL & ADMITTED CULTURE +VE S. PARATYPHI



- S. paratyphi was 14.8% of the total admitted culture +ve Enteric fever

SUMMARY

- A gradual decline in blood culture positive enteric fever cases (typhoid and paratyphoid) was observed in the 15-year period (2009-2023 oct)
- From 2016 onwards till 2021 (before TCV introduction), a decline in percentage contribution of S. Paratyphi to the total culture positive enteric fever cases has been observed
- In the post TCV introduction years the total number of Blood culture positive enteric fevers remained low (<50 cases/year) but the relative burden of paratyphi has shown an increase

CONCLUSIONS

- Further evaluation of the possibility of an increase in the relative burden of paratyphoid cases after introduction of typhoid vaccine is needed
- Continued surveillance is important to assess the impact of vaccine introduction
- Development of effective enteric fever vaccines covering both typhoid and paratyphoid is needed for disease control.

THANK YOU



Patan Academy of Health Sciences

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