Leveraging the WHO-coordinated IB-VPD Surveillance Platform for Enteric Fever Surveillance: Lessons from Bangladesh

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10th International Conference on Typhoid & other Salmonelloses
Lack of enteric fever surveillance systems in endemic countries

- Majority of data on enteric fever come from sporadic incidence studies
- Very few surveillance systems in place in endemic areas
- New and dedicated surveillance systems are
  - Expensive
  - Not sustainable
IB-VPD surveillance system of WHO

• Invasive Bacterial-Vaccine Presentable Diseases
• 178 sites in 61 countries*
• in ≥59 month children
• Sepsis, pneumonia, meningitis
  • *Neisseria meningitidis*, *Streptococcus pneumoniae* and *Haemophilus influenzae* type b

• Objectives:
  • To describe epidemiology and estimate burden
  • To establish a platform to measure vaccine impact
  • To characterize circulating bacterial types

Enteric fever is not a part of this surveillance

*Adam L Cohen, WHO, personal communication
Bangladesh operates high-performing sentinel sites

- Four sentinel sites
- Record of high quality laboratories
- Generate strong epidemiology data
- Facilitated introductions of Pneumococcal and Hib vaccines

The most frequently isolated from blood in the IB-VPD platform is *Salmonella Typhi*

Can we leverage the ongoing IB-VPD platform to surveil enteric fever?
Enteric fever surveillance on the IB-VPD platform

• Inclusion criteria:
  • Fever of $\geq 102 \, ^\circ F$ for $\geq 3$ days
  • Eligible cases were enrolled on blood collection *(in-patient department)*
  • 2-59m children

• Conducted in two urban sentinel hospitals, 2012 - 2016
  • Dhaka Shishu Hospital and Shishu Shasthya Foundation Hospital
Leveraging the IB-VPD platform for Enteric Fever Surveillance

2012 - 2016

Enrolled on blood collection

N = 5185
N = 1699

Culture positive

N = 171 (3%)
N = 358 (21%)

Confirmed enteric fever

N = 94 (55%) (85 Typhi, 9 Paratyphi)
N = 349 (97%) (305 Typhi, 44 Paratyphi)

Total culture confirmed cases = 471
IB-VPD platform = 443/471 (94%)
Enteric fever cases in children 0-18 years

- Additional retrospective laboratory surveillance revealed 283 cases in children >5 years

- Total culture confirmed enteric fever cases (2012-2016) = **754**
- Cases in 2 – 59 m = **471** (62%)
- Cases in >59 m = **283** (38%)

Additional cost required for the integration = USD 44,974/year
23% of cases occur in children 12-23 months

Antimicrobial susceptibility patterns are similar to other studies from the region.

Multidrug resistance, **MDR**, = resistance to chloramphenicol, ampicillin **AND** cotrimoxazole

**DCS** = Decreased Ciprofloxacin Susceptibility
Limitations and Future Directions

- The surveillance was done only in the in-patient departments
- The surveillance does not have a denominator and hence does not allow for incidence calculation
Take home message

• Ongoing IB-VPD platforms can be **sustainably leveraged** for monitoring enteric fever
  • To describe epidemiology and estimate burden
  • To characterize circulating bacterial types
  • To measure impact after vaccine introduction

With typhoid vaccine introductions in sight, we recommend that WHO expands its IB-VPD surveillance system to include enteric fever.
“From Evidence to Action”
Thank you