Strengthening Typhoid Surveillance around Mass Vaccination Campaign in the Northern Division of Fiji

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Typhoid & Other Invasive Salmonellosis Conference
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Ty-FIVE project – intro about typhoid in Fiji

- important public health problem, priority disease of MOH
- historically important burden in Northern Division
- middle endemicity by WHO classification
- for 2022: 55 cases per 100’000
- serology data suggest:
  - substantial under-reported burden and/or
  - presence of asymptomatic transmission

Goal of the project:
- strengthen typhoid surveillance in Northern Division
- vaccinate the whole Northern Division against typhoid (Bharat TCV)
- reduce disease burden -> typhoid elimination?

From: de Alwis et al. 2018, EID
Overview of Ty-FIVE Project

Clinical Surveillance

Environmental Surveillance

Mass Vaccination with TCV

Vaccination prevents Typhoid!
Get your vaccine today!
Clinical Surveillance Principle

CASE IDENTIFICATION

- Febrile individual
- Local health center
- Typhoid?
- Labasa hospital
- Blood culture-positive

Only lab on the island!

Culture-positive typhoid case

CONTACT TRACING

- Identify contacts
- Stool sampling in contacts
- Stool culture for Salmonella
Strengthening Clinical Surveillance

<table>
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<tr>
<th>Standardisation of documents and processes</th>
<th>Capacity building and training</th>
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<tbody>
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<td>Improvements in lab results sharing</td>
<td>Field assistance</td>
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STRENGTHENING TYPHOID SURVEILLANCE
- Standardization of documents and Processes

Typhoid Surveillance Flowchart for Macuata Subdivision

1. Diagnosis of a suspected case of typhoid
   - Fever (≥38°C) of unknown origin lasting 1 day or longer, and at least one of the following: Severe headache, abdominal pain, diarrhea, or constipation.
   - Vomiting or bloody stools, if any.

2. Notification
   - Typhoid: The Medical Officer (MO) shall report the case to the Divisional Laboratory.
   - In-patient: The patient is admitted for treatment with broad spectrum antibiotics.
   - Out-patient: The patient is treated in the clinic with broad spectrum antibiotics.

3. Laboratory Confirmation
   - The Divisional Laboratory shall ensure that the following are accurately recorded:
     - Date of sample sent.
     - Name of patient.
     - Date of symptom.

4. Contact Tracing
   - The Divisional Laboratory shall conduct the following:
     - Contact tracing of the patient's contacts.
     - Reporting of cases to the Ministry of Health.

5. Follow-up
   - The Divisional Laboratory shall follow up on the status of the patient's treatment and outcome.

Typhoid Case Investigation Form – Northern Division Fiji

NOTIFICATION FORM FOR COMMUNICABLE DISEASES
Form to be completed by Infection Control Nurse. Please check one of the following:

- LEPTOSPIROSIS
- TYPHOID
- DENGE

SECTION A  PATIENT INFORMATION

<table>
<thead>
<tr>
<th>NAME</th>
<th>DOB (DD/MM/YYYY)</th>
<th>AGE</th>
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<tr>
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<th>SEX</th>
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<thead>
<tr>
<th>HOME/PERMANENT ADDRESS</th>
<th>DESCRIPTION OF HOME LOCATION</th>
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<table>
<thead>
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<th>DESCRIPTION OF TEMPORARY LOCATION</th>
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<table>
<thead>
<tr>
<th>HISTORY OF TRAVEL (IN LAST 4 WKS)</th>
<th>PHONE # OF PATIENT</th>
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<table>
<thead>
<tr>
<th>NAME OF EMERGENCY CONTACT</th>
<th>PHONE # OF EMERGENCY CONTACT</th>
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SECTION B  DISEASE INFORMATION

<table>
<thead>
<tr>
<th>BRIEF DESCRIPTION OF SYMPTOMS</th>
<th>CONTACT WITH KNOWN TYPHOID PATIENT (IN LAST 4 WKS)</th>
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<tbody>
<tr>
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<table>
<thead>
<tr>
<th>CONFIRMATORY SAMPLE</th>
<th>DATE OF SAMPLE SENT</th>
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<table>
<thead>
<tr>
<th>DATE OF REPORT RECEIVED</th>
<th>SENSITIVITY AVAILABLE</th>
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<table>
<thead>
<tr>
<th>DATE OF SYMPTOM</th>
<th>DATE OF DIAGNOSIS</th>
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STRENGTHENING TYPHOID SURVEILLANCE
- Capacity Building & Training

Training

1. Training of Health Care Workers
   - Training Components: Surveillance System, Standardized documents, Notification Flowchart, Case Definitions and Classification, Treatment regime as per antibiotic guidelines and Community Awareness.

2. Training of the Community Health Workers
   - Training Components: roles they play in the Typhoid Surveillance (Stool Collection), Stool collection guidelines, and Sanitation (WASH)

3. Training on ELISA at the IVI headquarters
   - Also reviewing of Typhoid Diagnosis Laboratory Algorithm with the Microbiology Diagnostic Unit (University of Melbourne).
STRENGTHENING TYPHOID SURVEILLANCE
- Improvements in lab result sharing

Contact tracing and stool sample collection started → Stool samples picked up and delivered to Labasa Hospital Laboratory → Internal recording of receipt and results of samples - via logbook and LIS → Results of stool samples from typhoid cases and contacts NOT shared regularly and timely with respective SORT. Currently individuals from SORT call the Labasa Lab for results of samples → Currently SORT unable to confirm number of samples received and processed at Labasa lab. Most importantly, results are not confirmed timely, delaying follow up and feedback to community.

Contact tracing and stool sample collection started → Stool samples picked up and delivered to Labasa Hospital Laboratory → Internal recording of receipt and results of samples - via logbook and LIS → Results of stool samples from typhoid cases and contacts shared regularly and timely with respective SORT → Regular SORT meetings for coordination of further follow up
STRENGTHENING TYPHOID SURVEILLANCE
- Provision of Field Assistance

Field Assistance to Zone nurse and Health Inspectors

- Follow up on active cases
- Contact tracing after disease investigation
- Stool and serum sample collection
  - After treatment
  - Periodic (3m/6m/1y) follow up
- Community Awareness on typhoid
- Training for Community Health Workers
Impact: more blood culture taken since beginning of project!

Monthly blood cultures processed in Labasa microbiology lab from 2020 to 2022
Impact: more asymptomatic shedders detected
Impact: faster disease investigations -> faster outbreak detection
Vaccination Campaign

DON'T FORGET TO GET YOUR FREE TYPHOID VACCINE!

Visit your nearest health facility today!
Vaccine Delivery Strategies

Target population: everybody from 9 months to 65 years old living in the North

59 Vaccination teams

Schools (mobile teams)

Villages (mobile teams)

Health centers (fixed centers)
Overview of Vaccination Campaign

- completed – 10 weeks from July 4th to Sep 15th
- vaccine: Bharat TypBar TCV
- WHO pre-qualified 6 months to 65 years
- target population: around 133’000
- age-range : 9 months to 65 years
- As of Sep 15th – 69’635 doses given (coverage 52.2%), no severe adverse event
## Vaccination Coverage

<table>
<thead>
<tr>
<th>Subdivision</th>
<th>Number Vaccinated</th>
<th>Adverse Events</th>
<th>Target Population</th>
<th>Percentage Vaccinated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Macuata</td>
<td>32,012</td>
<td>3</td>
<td>67,839</td>
<td>47.2%</td>
</tr>
<tr>
<td>Cakaudrove</td>
<td>19,567</td>
<td>3</td>
<td>34,394</td>
<td>56.9%</td>
</tr>
<tr>
<td>Bua</td>
<td>8,364</td>
<td>-</td>
<td>16,415</td>
<td>51.0%</td>
</tr>
<tr>
<td>Taveuni</td>
<td>9,692</td>
<td>1</td>
<td>14,677</td>
<td>66.0%</td>
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<tr>
<td></td>
<td>69,635</td>
<td>7</td>
<td>133,325</td>
<td>52.2%</td>
</tr>
</tbody>
</table>
Vaccination by Age Group

Percentage of population vaccinated by age group, Northern

- 9 months-5 years: 52.2%
- 6-18 years: 65.1%
- 19-45 years: 42.1%
- 46-65 years: 52.7%
Confirmed Typhoid Cases Graph

Comparison of Confirmed Typhoid Cases – 2020 – Nov 30, 2023

- 2020
- 2021
- 2022
- 2023
Confirmed Typhoid Cases Graph

Comparison of Confirmed Typhoid Cases – 2020 – Nov 28, 2023

Due to vaccination?

- Vaccination campaign
  - 52.2% coverage
  - 69k vaccine doses
- In 2023, no cases from Sep 27 to Nov 28 (2 months)
Conclusion

• island-wide typhoid vaccine roll-out project, including:
  ➢ mass vaccination using TCV
  ➢ clinical surveillance
  ➢ environmental surveillance

• improved surveillance system has accelerated detection of cases and outbreaks and increased number of identified asymptomatic shedders (?)

• mass vaccination achieved:
  >50% coverage with regional differences
  almost 70’000 doses given, no safety issue!

if successful in reducing typhoid burden, we hope this project will pave the way for a national introduction in the main island of Fiji
Next Steps

- Vaccinate birth cohort and offer vaccine in health centers
- Survey on reasons for refusal
- Case-control study for effectiveness

"I’m happy I got the vaccine because now I won’t get the infection."

Shivanjali Chand
Student
St. Mary’s Primary School
Ty-FIVE Consortium

IVI team in Fiji
- Dr Alumita Vuakanisakea (Project Lead)
- Orisi Cabenabatua (Laboratory Officer)
- Matelita Buli (Clinical Surveillance Nurse)
- Komal Aswhini (Project Administrator)
- Pranit Kapoor (Environment Surveillance Lead)
- Mishal Naidu (Laboratory Officer)
- Aseri Bale (Laboratory Officer)
- Rahul Pasad (Data Manager)
- Ashweeni Kumar (Vaccination Nurse)
- Pranay Reddy (Laboratory Assistant)
- Luke Rawalai (Risk Communication Officer)

IVI team in Seoul
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- Dr. Raphael ‘Rafi’ Zellweger (IVI lead, Principle Investigator for Environmental Surveillance)
- Hea Sun Jenny Joh (Researcher)
- Jinhui Hong (Project Manager)
- Hwayoung Kim (Project Administrator)
- Juyeon Park (Statistician)
- Hyoryoung Lee (Statistician)
- Jae-woong Lee (Data Management)
- Alyssa Cho (Associate Researcher)

Fiji Ministry of Health
- Dr. Rachel Devi, Head of Family Health
- Dr. Tiko, Head of Northern Health Division
- Dr. Daniel, Senior Medical Officer, FCDC
- Dr. Rafai, Head of Research, Innovation & IT
- Mr. Vimal Deo, Chief Health Inspector
- Dr. Aalisha Sahukhan, Head of Health Protection

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Peter Doherty/University of Melbourne
- Prof. Dick Strugnell
- Dr. Aneley Getahun

Imperial College London
- Prof. Nick Grassly
- Dr. Christopher Uzzell

University of Washington, Seattle, USA
- Prof. J. Scott Meschke
- Dr. Jeff Shirai
- Dr. Nicolette Zhou
- Dr. Nicola Beck
Thank you! Questions?