Data gaps as obstacles to elimination

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Elimination as a public health problem is...defined by achievement of measurable global targets

- WHO Generic Framework For Control, Elimination and Eradication of Neglected Tropical Diseases
Data are essential to elimination
Elimination efforts require data to...

• Accurately estimate burden to persuade stakeholders and motivate political will
• Characterize the spatial distribution to understand where to prioritize interventions
• Track progress
• Determine if/when we’ve achieved our targets and detect control failures
Published typhoid incidence data, 2000

Data available from a small number of vaccine trials and fever surveillance studies
Published typhoid incidence data, 2010
Published typhoid incidence data, today

TSAP (2010 – 2014)
Published typhoid incidence data, 2020+
SEAP, SETA, STRATAA, SEFI
Uncertainty remains

Most countries lack systematic typhoid surveillance systems and, consequently, can't know their true burden or trends in that burden

Data abundance for typhoid trails behind other causes considered targets for elimination/eradication efforts
Typhoid surveillance is challenging

• Diagnostics
  o Diagnostic limitations (e.g. low sensitivity, cost, necessary lab expertise & equipment, etc.) result in infrequent testing
  o Clinical diagnosis common but often inaccurate

• Incidence vs prevalence
  o Chronic infections: long window to detect cases; allows for survey-based monitoring
  o Acute infections: short window to detect cases
Elimination efforts require data to...

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Estimating overall burden: broad agreement globally
Characterizing spatial distribution: less agreement regionally
Where are the estimates most variable?

- East Asia
- South Asia
- Southern Africa
- Western Africa
- Eastern Africa
- Latin America
- Central Africa
- North Africa
- Oceania

Coefficient of Variation ($\sigma/\mu$)
Variability is a function of data richness

\[ \frac{\sigma}{\mu} \]
<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>Cumulative % of Total Global DALYs</th>
<th>Data Sources</th>
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<tr>
<td>1</td>
<td>India</td>
<td>49.7%</td>
<td>6</td>
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<td>2</td>
<td>Bangladesh</td>
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<td>75.2%</td>
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</tbody>
</table>

Data likely adequate to justify vaccination in highest burden countries

Detailed subnational data may not be necessary: many countries will choose national TCV campaign rather than targeted approach.
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Tracking progress

• Does the surveillance infrastructure exist where it's needed?
• Do we trust current diagnostics to detect cases
Tracking progress

• Surveillance of Enteric Fever in India (SEFI) is promising and may offer a model

• Leverage existing capacity (e.g. SEAP/SETA sites)

• Pursue low-cost alternatives to traditional surveillance: e.g. environmental surveillance may offer useful surrogate measure
Call to action

• Research should target areas where uncertainty is greatest and burden is expected to be large

• Countries should work to establish typhoid surveillance to track progress with TCV

• Do not let uncertainty justify paralysis
Thank you