Role of Gallstones in *Salmonella* Typhi Stool Carriage and Shedding in an Urban Typhoid Endemic Setting in Nairobi, Kenya

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Typhoid Acute infection and Asymptomatic Carriage

- Typhoid fever has an estimated annual global incidence of 11-20 million cases and a mortality rate of 2–3% even with adequate antibiotic therapy.
- Approximately 5% of those infected fail to clear the bacteria and become carriers.
- In chronic carrier state, *S. Typhi* colonizes the biliary tract especially in patients presenting with *cholesterol gallstones* (GS); approximately 90% of chronically infected carriers have GSs.
Study Area/Site

• Mukuru informal settlement - an endemic typhoid setting
• Mama Lucy Kibaki Hospital (MLKH) - county referral hospital
Study participants

- Confirmed (Blood and/stool culture positive) **acute cases** aged $\geq 12$ yrs and their **household contacts**
- Follow-ups were done after treatment and Ultrasound scan done to detect Gallstones in Gallbladder.

- 23 acute cases and household contacts were successfully followed up
RESULTS: Shedding patterns of Cases and Household Contacts

### Cases

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### Household Contacts Shedding S. Typhi

- **Positive/shedding**
- **Culture negative**
- **With gallstones**

#### Age (Yrs)

- 12-19
- 20-29
- 30-39
- 40-49
- 50-59

#### S. Typhi carriage

<table>
<thead>
<tr>
<th>Age (Yrs)</th>
<th>% of Study Participants</th>
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<td>12-19</td>
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Hotspots for S. Typhi Carriage in Nairobi/Within the Study Area

- Shedding/no gallstones
- Shedding/gallstones present
- Not Shedding
Antimicrobial Resistance Patterns

S. Typhi from gallstones

Antibiotics

% Resistance

In-vitro Biofilm Forming Ability

Biofilms in presence of bile and cholesterol

S. Typhi Isolates

OD570
Conclusion

• Some patients fail to clear *Salmonella* Typhi immediately after treatment and go on to shed the bacterium.

• Cholesterol gallstones facilitate establishment of *S. Typhi* chronic carrier state, an important phase towards chronic shedding.

• Chronic shedding especially for MDR strains, is playing a major role in transmission and persistence of household and community typhoid infections

• **Follow up analysis:** WGS and phylogenetic relatedness for strains from cases, contacts and gallstones
Acknowledgment

Partners and collaborators

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• The field and Lab Teams