My Fellowship Achievements

Dr. Fred Nsubuga, MBChB, MPH
Fellow, Cohort 2015
Goal

- Ensure that every child and high-risk group is fully vaccinated with high quality and effective vaccines
Public health surveillance

- Measles surveillance data analysis; 2012-2015
- Trained DHTs on surveillance during implementation of house to house polio campaign
- Evaluation of AFP surveillance system in Uganda
Response to public health emergence

- Outbreak investigations
  - Measles outbreak in Kamwenge district, Western Uganda, 2015
  - Typhoid verification exercise in Bukwo
  - Outbreak investigation that assessed “Risk factors for measles death: Kyegegwa District, Western Uganda”
  - Rapid assessment of a suspected measles outbreak at Rwamwanja primary school
Response to public health emergence

- Outbreak investigations
  - measles outbreak investigation in Rwamwanja refugee settlement
  - Typhoid verification in Pallisa District
  - Outbreak of typhoid fever in Kampala in 2015
Epidemiological study

- Conducted study that compared the proportion of children reached during static and outreach immunization strategies, Uganda
- Conducted a study to assess factors that affect immunization data quality in Kabarole district
Scientific communication

- Manuscript titled: Factors contributing to measles transmission in Kamwenge District – BMC Public Health
- Co-author in a publication on measles death in Kyegegwa 2016 – BMC Infectious Health Journal
- Co-author in a publication on a large typhoid outbreak in Kampala – BMC Public Health
- Co-author in a publication factors affecting virological non suppression among HIV patients on ART in Uganda – BMC Infectious disease
Scientific communication

- Presented at AFENET Conference and got an award as 2nd run-up
- Presented at 2 national conferences: Regional HIV Conference and National Epidemiology Conference
- Published 1 article in MOH quarterly epidemiology bulletin
- 1 newspaper article in New Vision
Leadership and Management

- Facilitated a session on the management of measles outbreak for medical students at the College of Health Sciences, Makerere University
- Member of TWG that updated Immunization in Practice Manual for Uganda
- Trained Gulu regional teams on polio end game to prepare for IPV introduction, switch and SIAs
Leadership and Management

- National supervisor/trainer during the Sub National Immunization Days for polio in Lamwo District
- Led and coordinated the writing of national report on sub-national immunization days, 2016
- Member of the NTF
End of Fellowship Achievements
Large Outbreak of Typhoid Fever in Kampala, Uganda; January – June 2015

Dr. Fred Nsubuga, MBChB, MPH
On behalf of Cohort 2015 Fellows of the Uganda Public Health Fellowship Program – Field Epidemiology Track
Strange disease reported in Kampala
Feb 2015

Index patient hospitalised

Feb 2nd 3rd 4th 5th 6th 7th 8th 9th 10th

Death of index patient

- Abdominal pain
- Prolonged fever
- Jaundice

Symptoms:

Reported to city authority and MoH

Start of investigation
Initial investigation indicated typhoid

- Doctor: Index patient had severe abdominal pain and (+) Widal Test
- A hospitalised patient had similar symptoms
  - Many of her colleagues sickened; some died
  - Her husband had similar symptoms, took antibiotics and got better
- Community interviews and observations identified other people with similar symptoms
Case definition

- **Suspected case:**
  - Onset of fever ≥5 days since 1/1/2015, not responding to antimalarial treatment, in a person working or living in Kampala
  - Plus ≥2 of the following: abdominal pain; diarrhea; headache; nausea/vomiting; or altered mental state

- **Probable case:** Suspected case plus TUBEX test (+)

- **Confirmed case:** Suspected case plus *Salmonella Typhi* (+) from blood culture
Case finding

- Active case finding in areas where outbreak had been reported
- Setting up free treatment centers throughout the city
- Media outreach
Case count  30-Mar-2015

- 3817 Suspected cases
- 1033 Probable cases
- 46 Confirmed cases
1623 cases have been found (as of 12 Mar); Cases Reported throughout Kampala
### Demographic info (as of March 30th)

| Age (years) | Mean = 26  
|            | Range = 1-79 |
| Sex        | Male 55.0%   
|            | Female 45.0% |
Epi Curve, Suspect Typhoid Fever Cases meeting the case definition – Kampala, 2014-2015, n = 4,139*

Death of index patient

Investigation began

Number of cases

0 50 100 150 200 250 300 350 400 450

Typhoid outbreak

Illness onset

* for whom date of illness onset is available
Food-borne or water-borne?

- Case distributed throughout Kampala
- Cases reported buying unbottled drinks at unreasonably low price
- Hypothesis-generating interviews: Patients more likely to get drinking water from workplace

Strong suspicion of water-borne outbreak
Case-control study

- 33 cases
- 78 controls
- Frequency-matched by sex and place of work
- Info on water and food intake
**Consuming locally made drinks and water associated with disease**

<table>
<thead>
<tr>
<th>Usually drank…</th>
<th>OR$_{\text{M-H}}$ (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kaveera water (Y/N)</td>
<td>8.9 (1.6-49)</td>
</tr>
<tr>
<td>Butunda (Y/N)</td>
<td>4.6 (1.9-11)</td>
</tr>
<tr>
<td>Obushera (Y/N)</td>
<td>2.8 (0.76-10)</td>
</tr>
<tr>
<td>Munanansi (Y/N)</td>
<td>2.0 (0.74-5.2)</td>
</tr>
</tbody>
</table>

Bottled water and food items were not associated with disease
Typhoid outbreak

Kaveera water

Butunda

Munanansi
## Dose-response

<table>
<thead>
<tr>
<th># of types of locally made drinks</th>
<th>% cases (n=33)</th>
<th>% controls (n=78)</th>
<th>OR (95%CI)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>36</td>
<td>64</td>
<td>1 (Ref)</td>
</tr>
<tr>
<td>1</td>
<td>27</td>
<td>26</td>
<td>1.9 (0.68-5.1)</td>
</tr>
<tr>
<td>2</td>
<td>15</td>
<td>9</td>
<td>3.0 (0.80-11)</td>
</tr>
<tr>
<td>3-4</td>
<td>21</td>
<td>1</td>
<td>29 (3.2-260)</td>
</tr>
</tbody>
</table>

*Chi-square test for linear trend: Chi-square =14.65, p = 0.00013
Typhoid outbreak
Butunda - passion fruit juice
Laboratory investigation 9th April

- 46 blood samples (+) for *Salmonella typhi* by culture
- All drinks and water heavily contaminated with faecal matter
  - 9/9 juice samples
  - 18/20 water samples
Conclusions

- Large outbreak of typhoid fever
- Caused by consuming locally made drinks, made with contaminated underground water
Public health actions taken

- Provided safe water to most heavily affected areas
- Closed off underground water sources
- Health education
  - Drink only boiled water
  - Avoid drinking unclean water and juice from markets
Acknowledgements

KCCA
MOH
CPHL
EOC - MoH
Makerere College of Health Sciences Microbiology Laboratory
MoH-MAKSPH-CDC PHFP-FET
Market committee members
Health workers at the area HCs
Typhoid fever

- **Salmonella typhi**
- **Major signs/symptoms**
  - Prolonged fever
  - Abdominal pain
  - Vomiting
- **Transmission – fecal oral**
  - Waterborne
  - Foodborne
- **Incubation period**
  - Most common: 8-14 days
  - Range: 3-60 days
- **Humans are the only host**
### Other variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sealed Water</td>
<td>0.6 (0.2-1.7)</td>
</tr>
<tr>
<td>Unsealed Water</td>
<td>1.8 (0.7-4.8)</td>
</tr>
<tr>
<td>Lunch food Market</td>
<td>0.3 (0.1-1.1)</td>
</tr>
<tr>
<td>Breakfast food Market</td>
<td>0.2 (0.1-0.9)</td>
</tr>
</tbody>
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Typhoid outbreak
Typhoid outbreak