

**A Large Outbreak of Typhoid Fever
caused by Consuming Contaminated
Water and Street-vended beverages
Kampala, Uganda Jan-Jun 2015**

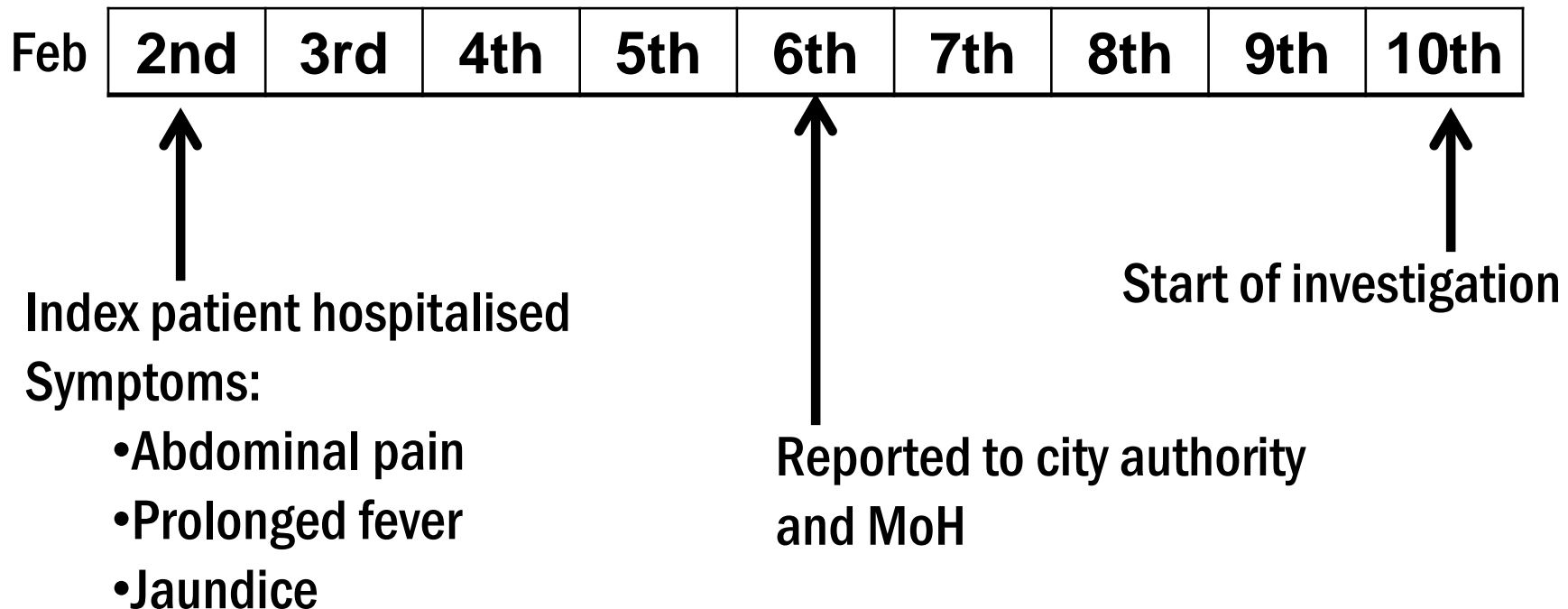
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Strange disease reported in Kampala

Feb 2015

Death of index patient



Objectives

- **Identify nature of illness**
- **Establish mode of transmission and risk factors**
- **Inform control measures**

Initial investigation indicated typhoid

- **Doctor: Index patient had severe abdominal pain and (+) Widal Test**
- **A hospitalised patient had similar symptoms**
 - Many of her colleagues were sick
 - 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 (≥ 37.5 °C) for ≥ 3 days from 1 Jan 2015, with headache, abdominal pain, negative malaria test or failure to respond to anti-malaria treatment, and ≥ 2 of the following symptoms: diarrhea, nausea or vomiting, constipation, or fatigue in a resident of Kampala or neighbouring districts
- **Probable case: Suspected case plus TUBEX test (+)**
- **Confirmed case: Suspected case plus *Salmonella Typhi* (+) from blood culture**

- **Active case finding in areas where outbreak had been reported**
- **Setting up free treatment centers throughout the city**
- **Media outreach**

Case count 12 Jun 2015

- **10230 Suspected cases**
- **1038 Probable cases**
- **56 Confirmed cases**

Attack rates by sex and age-group

| Demographic | Attack Rate/1000 |
|------------------|------------------|
| Sex | |
| Male | 11 |
| Female | 8.4 |
| Total | 6.5 |
| Age group | |
| <15 | 2.0 |
| 15 - 59 | 12 |
| >59 | 2.0 |

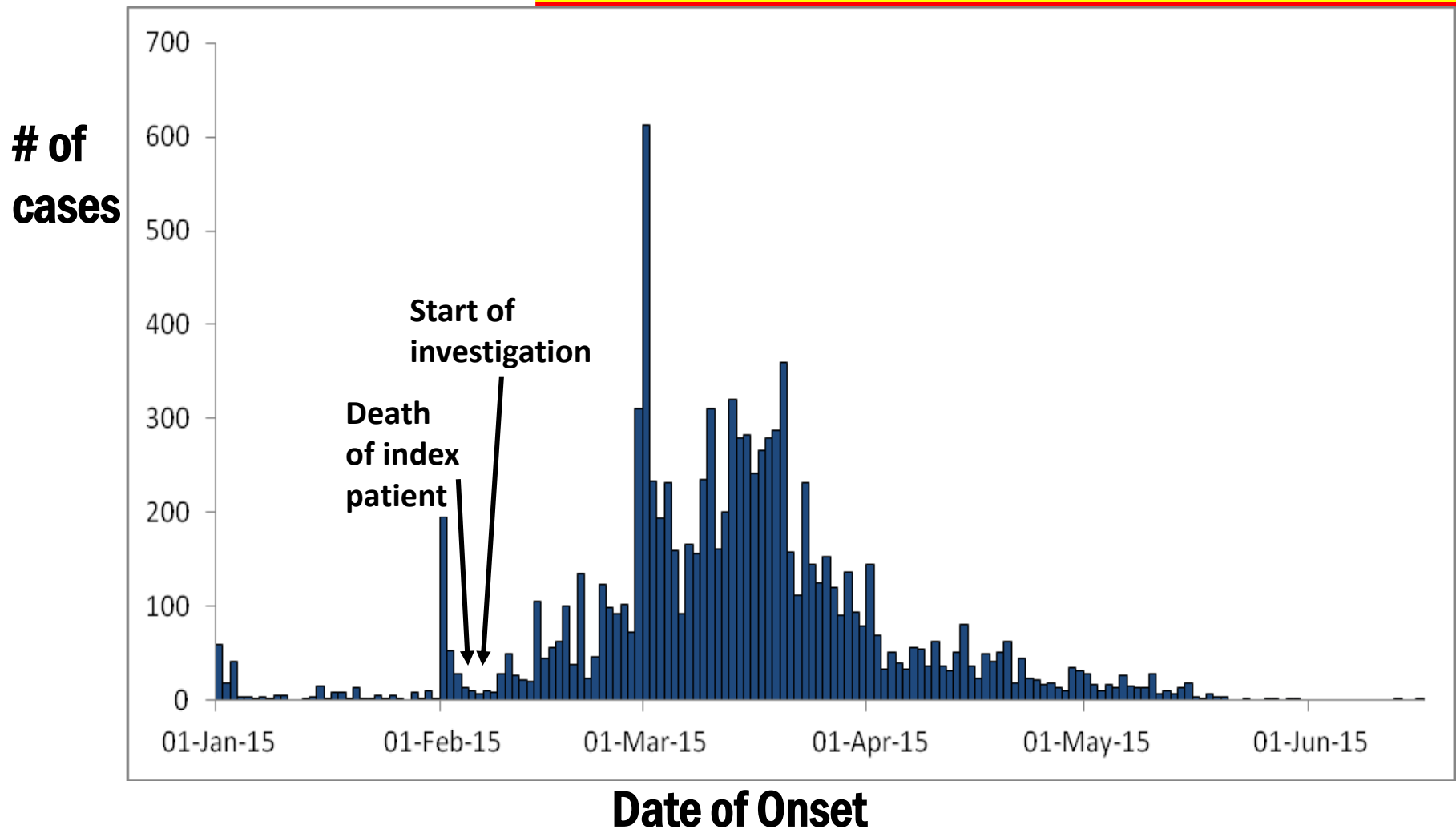
Suspected case-patients by place of residence

Kampala, Uganda, 17 Feb 2015 – 14 Apr 2015



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Epi curve of suspected typhoid case patients, Jan-Jun 2015



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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

| Usually drank... | OR _{M-H} (95% CI) |
|---------------------|----------------------------|
| Kaveera water (Y/N) | 8.9 (1.6-49) |
| Butunda (Y/N) | 4.6 (1.9-11) |
| Obushera (Y/N) | 2.8 (0.76-10) |
| Munanansi (Y/N) | 2.0 (0.74-5.2) |

Bottled water and food items were not associated with disease



Kaveera water



Butunda



Obushera

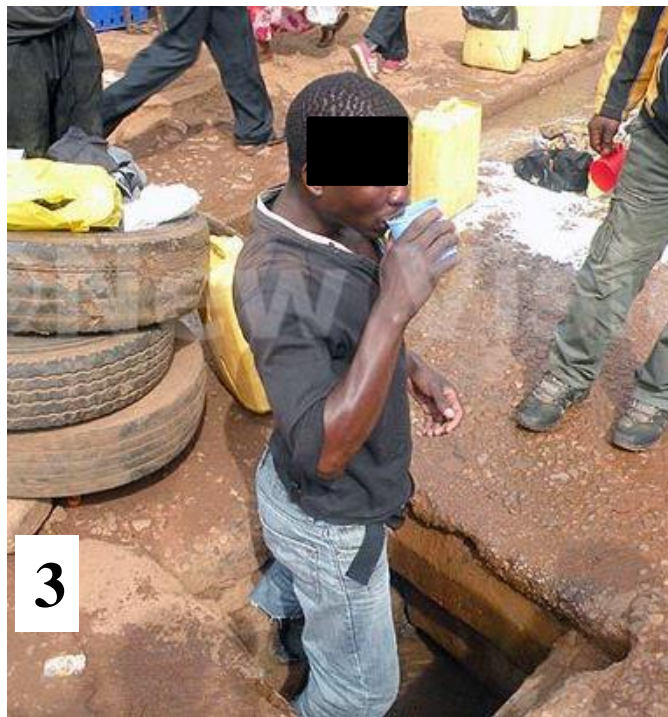


Munanansi

Higher odds from consuming more types of drinks

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

*Chi-square test for linear trend: Chi-square=14.65, p=0.00013





Butunda - passion fruit juice

Laboratory investigation

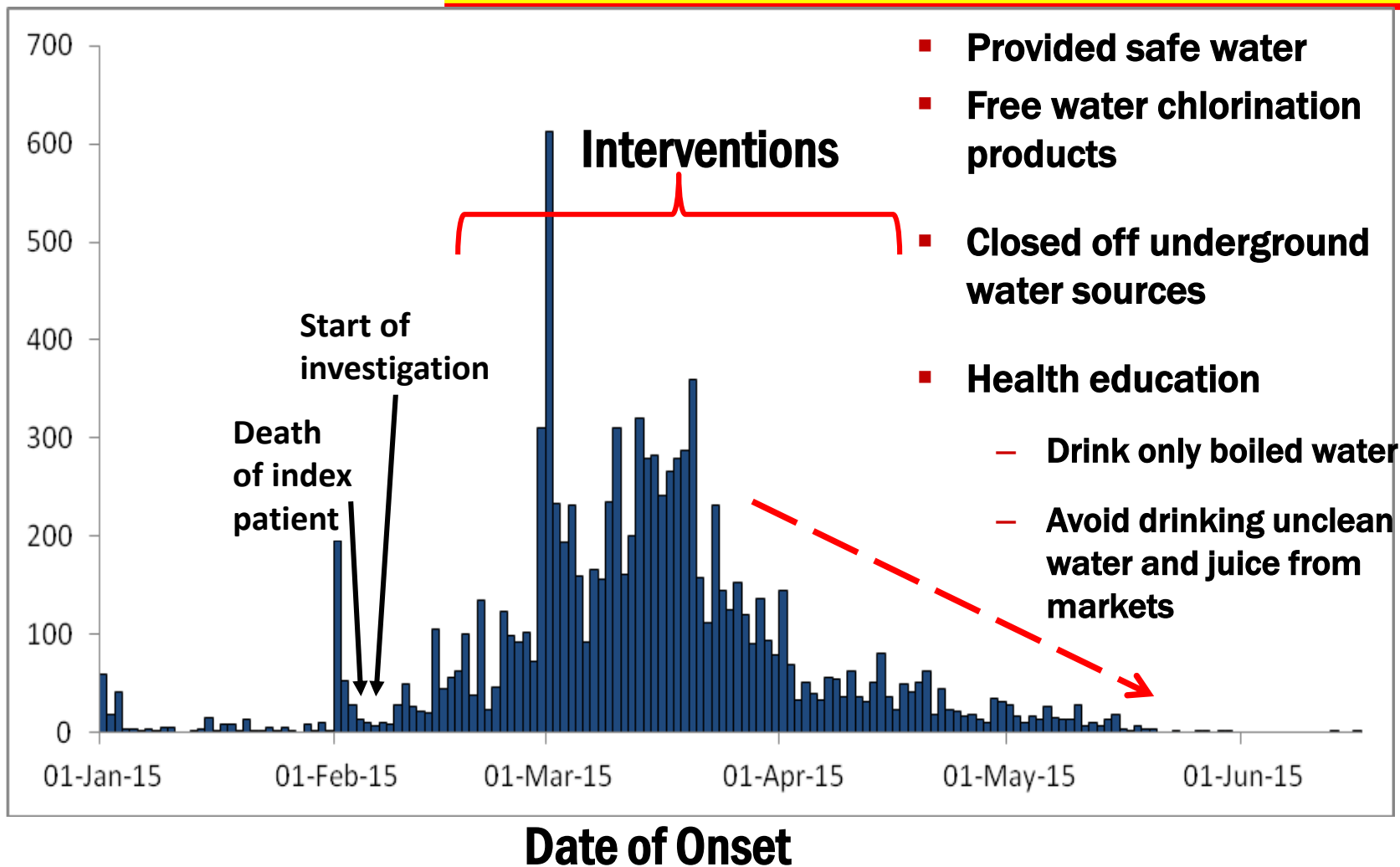
- **56 blood samples (+) for *Salmonella typhi* by culture**
- **All drinks and water heavily contaminated with faecal matter**
 - **9/9 juice samples**
 - **18/20 water samples**

Conclusions

- **Large outbreak of typhoid fever**
- **Caused by consuming locally made drinks, made with contaminated underground water**

Public health actions taken

of cases



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Acknowledgements

- PHFP Cohort 2015
- Ministry of Health
- MakSPH
- US CDC
- PHFP
- NWSC
- KCCA



Other variables

| Sealed Water | 0.6 (0.2-1.7) |
|-----------------------|---------------|
| Unsealed Water | 1.8 (0.7-4.8) |
| Lunch food Market | 0.3 (0.1-1.1) |
| Breakfast food Market | 0.2 (0.1-0.9) |



