Cholera in Uganda: a Molecular Diagnosis Journey

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GTFCC meeting

Maputo, Mozambique

Outline

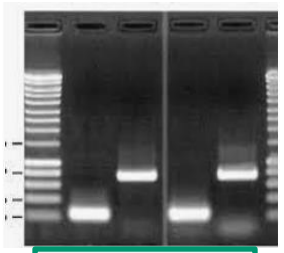
History of cholera in Uganda

- Sporadic cases and localized outbreaks occur, occasionally resulting in prolonged widespread epidemics
- Outbreaks have occurred periodically from every region in Uganda since 1971
- Endemic in areas located near rivers or lakes in the western Rift Valley, especially Lakes Albert, Edward, Katwe, and George
- Other affected are communities along borders with neighboring countries, especially DRC, South Sudan, and Kenya (due to the influx of refugees during conflicts)

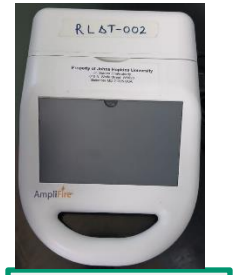
Journey of cholera diagnosis in Uganda

Clinical diagnosis Untill 1960s

Culture 1968



Conventional PCR 2000

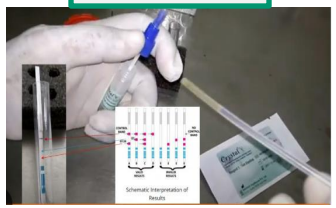


LAMP- assay 2018

Cholera genomics

Microscopy 1960s

RDTs 2000

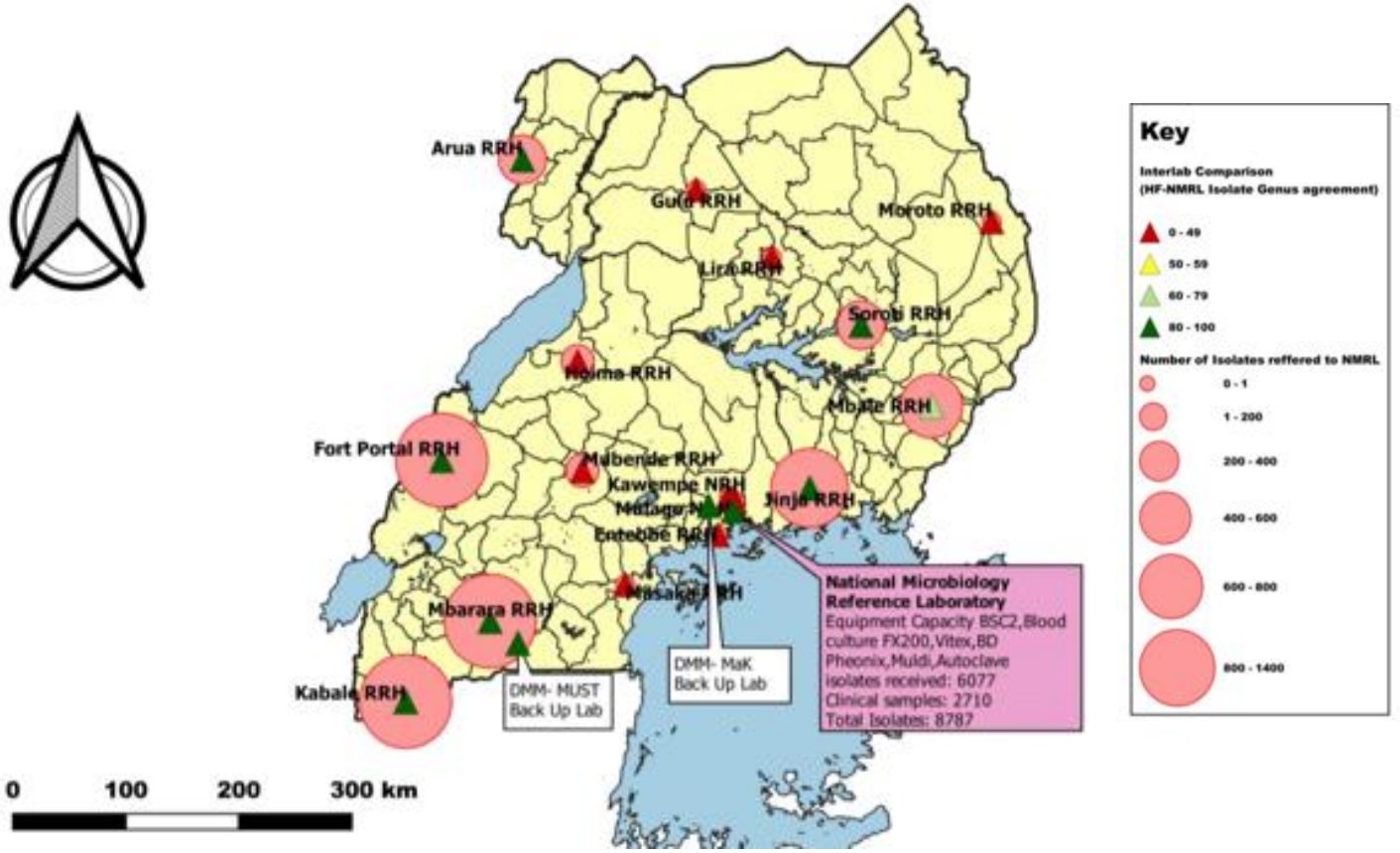


Microbiology culture remains the gold standard

- Still remains the Gold standard for diagnosis
- Turn around time(TAT) is 3-4 days from plating onto selective agars, sequential subculture, and cytotoxic (CT) production test.
- Can be done in 9 public laboratories and a few private laboratories across the country
- Regions that lack capacity refer samples to national microbiology reference laboratory (NMRL)

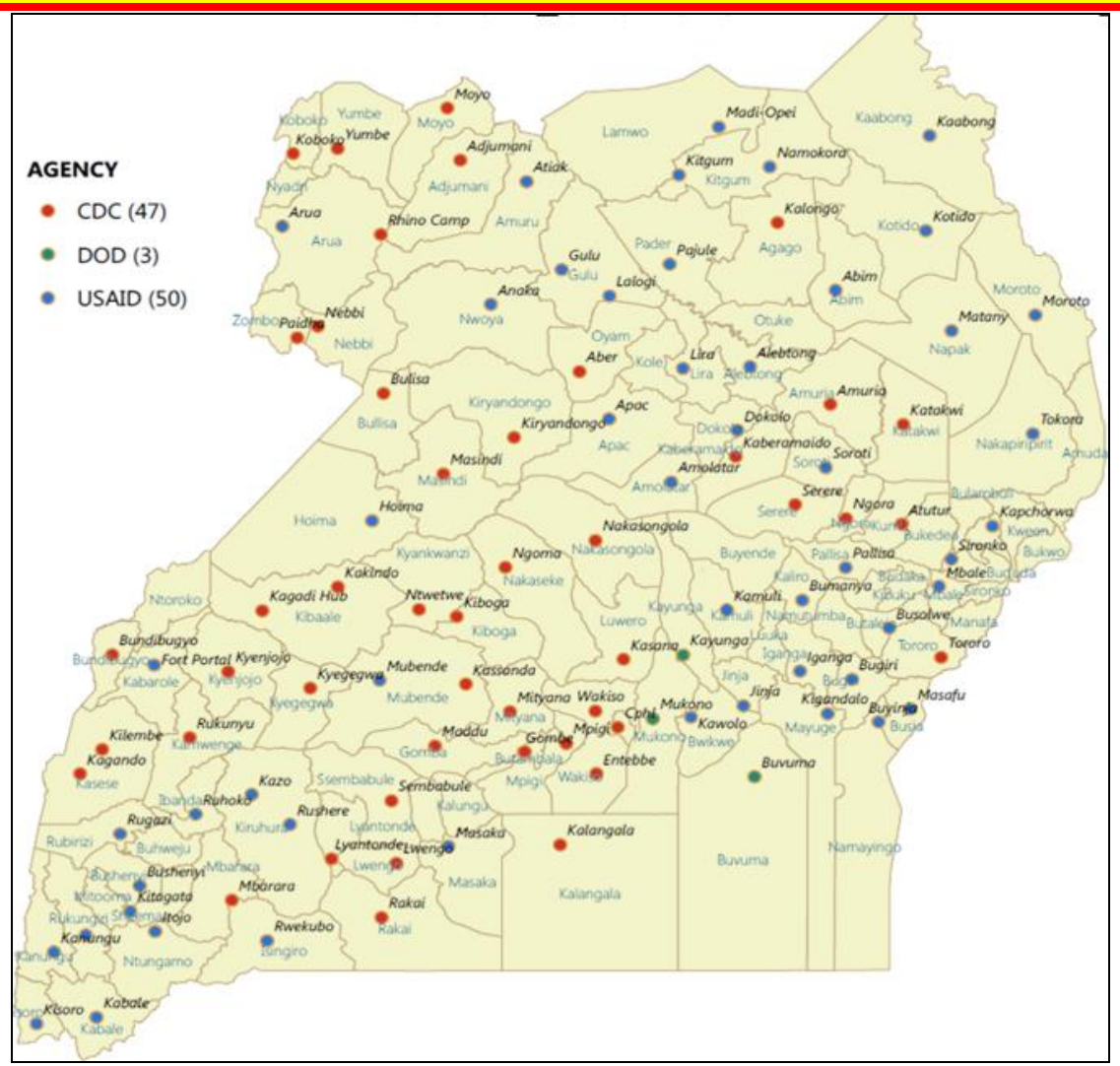
-Built a robust National Microbiology Reference Laboratory which supports other sites

9 AMR sentinel surveillance laboratories



Robust sample transport network

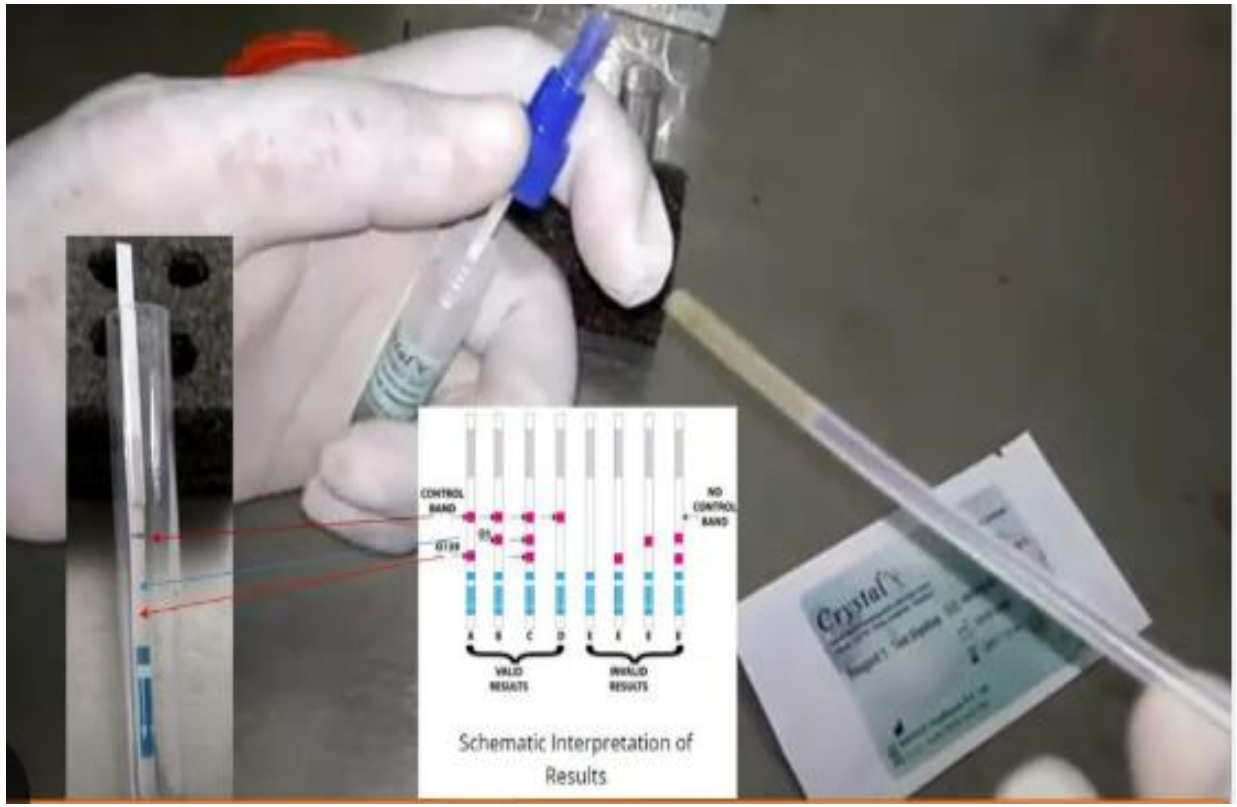
- 100 hubs
- Connecting over 3,000 health facilities (spokes)
- 300 motorbikes spoke to a hub
- 16 vehicles move from hubs to ref labs
- Over 2.5m samples transported



National hub and sample transport promotes access to quality lab services during outbreaks and routine care

Rapid diagnostic tests

- Mainly screening tests, but are not rolled out yet
- Previously there was one targeting both O1 and O139
- The one currently in use(under validation targets the O1
- Can be done at the point of care(POC)
- All samples are still referred for reference testing irrespective of the RDT result



Conventional PCR assay

- Have been in use since 2000
- Largely in study mode but serves the public health function
- Currently used on demand and is stationed at the NHLDS and research laboratories only
- Uses the Gel electrophoresis method
- TAT is approx. 3-4hrs

LAMP Assay

- Currently being validated
- The LAMP with the following advantages
  - Faster hence Shorter TAT
  - Easier to use
  - Can be deployed in the field
- Still in research mode

Lessons learnt

- Molecular techniques are still expensive in terms of supplies, equipment and technical competences
- Culture TAT is still long especially in case of outbreaks although it is the gold standard
- Immunological assay RDTs are promising but the one currently available is yet to be validated
- Dedicated funding to molecular diagnostics and surveillance can improve national capacity for detection and preparedness

Conclusion

- Uganda has made great strides in cholera diagnostics from clinical diagnosis to molecular techniques
- Culture still remains the gold standard in the country
- RDTs provide an even more acceptable and cheaper POC if validated in the Ugandan context
- Molecular techniques especially the LAMP are promising assays that need to be validated and rolled out even for routine testing
- The country has genomic capacity and Cholera is yet to be included

Current state of the genomics laboratory