UGANDA NATIONAL INSTITUTE OF PUBLIC HEALTH
The Uganda Public Health Bulletin: April – June 2025,
2025Volume 10 / Issue 2 /Article No. 7

Uganda Public Health Fellowship-Laboratory Leadership Program (LLP) support and achievements during a cholera outbreak response, Kasensero Landing Site, Kyotera District, Masaka Region, May 2024

Authors: Tracy M. Rutogire [1,2], Amiable Ayebale[2], Jackson Were[3], Shem Mwebaza[1], Ritah Namusoosa[1,4], John Bachman Nambale[5], David Isabirye[6], Harriet Nambozo[7], Gideon Ononge[7], William Ssenyonga[4], Francis Ongole[4], Wilfred Opeli [1,4], Samuel Gidudu[1],
Institutional affiliations: [1]Uganda National Institute of Public Health, Ministry of Health, Kampala, Uganda, [2]Kampala Capital City Authority, Kampala, Uganda, [3]Mulago National Referral Hospital, Kampala, Uganda,[4]National Health Laboratory and Diagnostics Services, Ministry of Health, Kampala, Uganda, [5]Kyotera district local government, Kyotera, Uganda, [6]Kasensero health center II, Kyotera, Uganda, [7]Masaka Regional Referral Hospital, Masaka, Uganda
Correspondence: Email: trutogire@uniph.go.ug, Tel: +256 782344218

Summary

Background: On May 8, 2024, the Ministry of Health confirmed a cholera outbreak at Kasensero landing site in Kyotera District, Masaka Region, Uganda. We describe the Uganda Public Health Fellowship (UPHFP)-Laboratory Leadership Program (LLP) support and achievements during the outbreak response.
Methods: We modified the World Health Organization (WHO) capacity assessment checklist to assess four key laboratory outbreak response capacities at Masaka regional referral hospital (RRH) and Kasensero HCII laboratories: human capacity; infrastructure; equipment functionality; and cholera specific logistics management and records, such as rapid test kits, culture media and sample tracking registers. Following the assessment, we initiated targeted resource mobilization through stakeholder engagement meetings. Key partners were mapped and engaged to provide the necessary support.
Results: Masaka RRH laboratory met infrastructural standards with functional equipment and staffed with a qualified microbiologist. However, critical gaps were identified including shortages of cholera rapid diagnostic test (RDT) kits, limited staff training on their use and insufficient supplies of culture and transport media. Kasensero HCII had two untrained laboratory personnel and poor record keeping. Following the assessment, 160 RDT kits were acquired, laboratory staff were mentored on RDT cholera testing, two expert microbiologists were deployed, and a sample tracking register was developed.
Conclusion: We identified strong diagnostic capacity to support cholera outbreak response, critical logistical gaps—particularly shortages of rapid diagnostic test kits and culture media which undermined effective response efforts in the region. The UPHFP-LLP support facilitated filling of the gaps and strengthening of the overall laboratory capacity for cholera outbreak response.

UGANDA NATIONAL INSTITUTE OF PUBLIC HEALTH
The Uganda Public Health Bulletin: April – June 2025,
2025Volume 10 / Issue 2 /Article No. 7

Background

In Uganda, periodic cholera outbreaks continue to pose challenges, especially in districts bordering large water bodies such as Lake Victoria, where risk factors are heightened due to dense populations and inadequate sanitation infrastructure (2). Rapid and accurate laboratory diagnosis is essential for early outbreak detection, timely clinical management, and implementation of control measures.

The World Health Organization (WHO) recommends a tiered diagnostic approach using rapid diagnostic tests (RDTs) for initial screening and culture confirmation for definitive diagnosis and antimicrobial sensitivity testing (3). However, laboratory systems in resource-limited settings often face constraints in supplies, trained personnel, and sample transport logistics, all of which can delay outbreak response and increase mortality risk (4).

Strengthening regional laboratory capacity including infrastructure, human resources, and logistical preparedness is critical to improving cholera surveillance and outbreak containment. On May 8, 2024, the Ministry of Health confirmed a cholera outbreak at Kasensero landing site, Kyotera District, Masaka Region. We describe the Uganda Public Health Fellowship (UPHFP)-Laboratory Leadership Program (LLP) support and achievements during the response.

Methods

To assess the readiness for cholera response at Masaka Regional Referral Hospital and Kasensero HCII laboratories, we conducted a capacity evaluation using a modified WHO capacity assessment tool. We interviewed the district health officer and the laboratory managers about the human resource capacity, laboratory infrastructure standards, equipment functionality and cholera specific logistics management, and records such as cholera rapid diagnostic test kits (RDT), culture media, transport media for cholera samples, personal protective gears, sample tracking registers among others.

Following the assessment, we initiated targeted resource mobilization through stakeholder engagement meetings. Key partners were mapped and engaged to provide the necessary support. Laboratory managers were assisted in placing emergency orders for critical cholera testing supplies, including cholera RDT kits, Cary-Blair transport medium, and selective culture media. In collaboration with the district laboratory focal person, we also supported the submission of a formal request to the Ministry of Health for mentorship on cholera sample management. Additionally, the laboratory leadership team worked closely with both Kasensero HCII and Masaka RRH laboratories to design a sample tracking register to enhance accountability and ensure timely documentation of sample collection and test results.

We analyzed data in excel and presented findings in form of percentages.

The Ministry of Health Uganda provided administrative clearance to conduct this investigation. In addition, we received a non-research determination clearance from the US Centers for Disease Prevention and Control (US CDC). This activity was reviewed by the CDC and was conducted consistent with applicable federal law and CDC policy. § §See e.g., 45 C.F.R. part 46, 21 C.F.R. part 56; 42 U.S.C. §241(d); 5 U.S.C. §552a; 44 U.S.C. §3501 et seq. We sought informed consent from participants who were ≥18 years and assent from those who were <18 years.

Results

Regional laboratory capacity assessment to respond to the cholera outbreak

At Masaka Regional Referral Hospital (RRH), the laboratory met WHO standards for both human resources and infrastructure requirements. It was staffed with a qualified microbiologist and was equipped with essential functional equipment, such as incubators. Despite this, RDT kits and culture media were unavailable. Additionally, there was a notable training gap, as staff had not received adequate guidance on the use of cholera RDTs. The team had challenges with access to the result dispatch system which hindered timely access of the results.

Kasensero laboratory capacity assessment to respond to the cholera outbreak

At Kasensero HCII, two laboratory personnel were available to support the outbreak response; however, neither had been trained in cholera sample management or RDT techniques. The facility lacked RDT kits during the early stages of the outbreak, necessitating the referral of all samples to Masaka RRH for testing. Furthermore, Kasensero had poor sample documentation and did not have access to test results.

Achievements following the assessment

As a result of these engagements, several response gaps were effectively addressed (Table 1). Additionally, emergency orders for critical cholera testing supplies, including cholera RDT kits, Cary-Blair transport medium, and selective culture media was made. A formal request to the Ministry of Health for mentorship on cholera sample management was made. A sample tracking register to enhance accountability and ensure timely documentation of sample collection and test results was developed. The RDS was activated for result access.

Table 1: Resources provided by stakeholders following mapping and engagement

Identified Gap	Responsible stakeholder	Intervention
Limited diagnostic capacity at onset of outbreak	Ministry of Health	Mentored six laboratory personnel on RDT techniques; supplied 160 cholera RDT kits
Delayed sample transportation	Ministry of Health	Strengthened transport network and re-routed couriers for prompt sample delivery
Inadequate human resource capacity for culture testing	Implementing Partners	Deployed two senior microbiologists to Masaka RRH laboratory
Lack of dedicated transport for field sample movement	Implementing Partners	Provided a standby, fueled vehicle for timely sample transportation
Need for confirmatory laboratory testing	Masaka RRH Laboratory	Conducted RDT and culture testing; referred samples to National Reference Laboratory
Poor coordination of result flow from regional to peripheral levels	Kyotera District	Coordinated dissemination of laboratory results from Masaka RRH to Kasensero HCII

Discussion

The assessment revealed both considerable capacity and notable gaps in diagnostic readiness. Masaka RRH laboratory met WHO standards regarding infrastructure and human resources, including the presence of a qualified microbiologist and essential equipment. The laboratory at Kasensero HCII had two laboratory personnel available to support the outbreak although they were both not trained on cholera sample management. The WHO guidelines emphasize the need for functional laboratories with skilled personnel as critical components of cholera outbreak response strategies (7). Significant logistical barriers were encountered, particularly shortage of RDT kits at both sites and culture media at the RRH laboratory which impacted timely screening and confirmation. Prompt diagnosis is vital in managing cholera outbreaks (4).

Following the assessments, resources were mobilized including RDT kits and deployment of additional laboratory personnel at the RRH laboratory to fill the identified gaps. These actions align with the Global Health Security agenda's call for strengthened laboratory systems and emergency responsiveness (5).

These findings highlight the critical need for continuous investment in laboratory systems, including logistics, staffing, and diagnostics. They also highlight the value of cross sectoral collaboration and rapid resource mobilization in outbreak settings (8).

Study limitations

We did not assess the effect and sustainability of the interventions over time.

Conclusion

We identified strong diagnostic capacity to support cholera outbreak response, critical logistical gaps—particularly shortages of rapid diagnostic test kits and culture media which undermined effective response efforts in the region. Following the assessment, we mobilized resources through engagement of stakeholders that led to acquisition of RDT kits, mentorship on RDT techniques, deployment of expert microbiologists, and development of a sample tracking register. We additionally, mentored laboratory staff in different aspects cholera testing. These interventions led to faster diagnosis and strengthened overall laboratory capacity for cholera outbreak response.

Conflict of interest: The authors declare that they had no conflict of interest.

Authors contribution

TMR, designed the study and data analysis. SG, AA, JW, WS, SM, RN, JBN, DI, HN, GO, FO participated in bulletin review to ensure scientific integrity and intellectual content. All authors read and approved the final bulletin.

Acknowledgements:
We acknowledge the US Centers for Disease Control and Prevention Uganda through Makerere University School of Public Health, and Baylor Uganda for technical and implementation support. We extend our heartfelt gratitude all the stake holders and partners for their vital roles in managing the cholera outbreak. Their collaboration, expertise, and dedication were key in effectively responding to the crisis and protecting public health.

References

1.World Health Organization. Cholera – Key facts. Geneva: WHO; 2023. Available from: https://www.who.int/news-room/fact-sheets/detail/cholera
2.Ministry of Health, Uganda. Cholera Preparedness and Response Plan 2023–2026. Kampala: MoH; 2023.
3.World Health Organization. Laboratory methods for the diagnosis of epidemic dysentery and cholera. Geneva: WHO; 2010.
4.Centers for Disease Control and Prevention. Cholera: Diagnosis [Internet]. Atlanta (GA): CDC; 2018 [cited 2025 Jun 10]. Available from: https://www.cdc.gov/cholera/diagnosis.html
5.Global Health Security Agenda. Laboratory systems strengthening [Internet]. GHSA; 2020 [cited 2025 Jun 10]. Available from: https://ghsagenda.org/
6.Ali M, Nelson AR, Lopez AL, Sack DA. Updated global burden of cholera in endemic countries. PLoS Negl Trop Dis. 2015 Jun;9(6): e0003832.
7.World Health Organization. Laboratory preparedness, detection and control of cholera outbreaks. Geneva: WHO; 2021.
8.Global Task Force on Cholera Control (GTFCC). Global roadmap for ending cholera by 2030. Geneva: WHO; 2017. Available from: https://www.gtfcc.org/wp-content/uploads/2020/05/global-roadmap-to-end-cholera-by-2030.pdf