

INFORMATION SESSION

Project STELLAR

Information session on Project STELLAR phase one: outcomes and key takeaways

28 August 2024

Agenda

Topic

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Opening remarks - Linden Morrison, The Global Fund

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Overview of project achievements - Silver Mashate, ASLM

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Uganda: Achievements on data integration and wastewater surveillance - Dr. Susan Nabadda, MOH/NHLDS

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Q&A

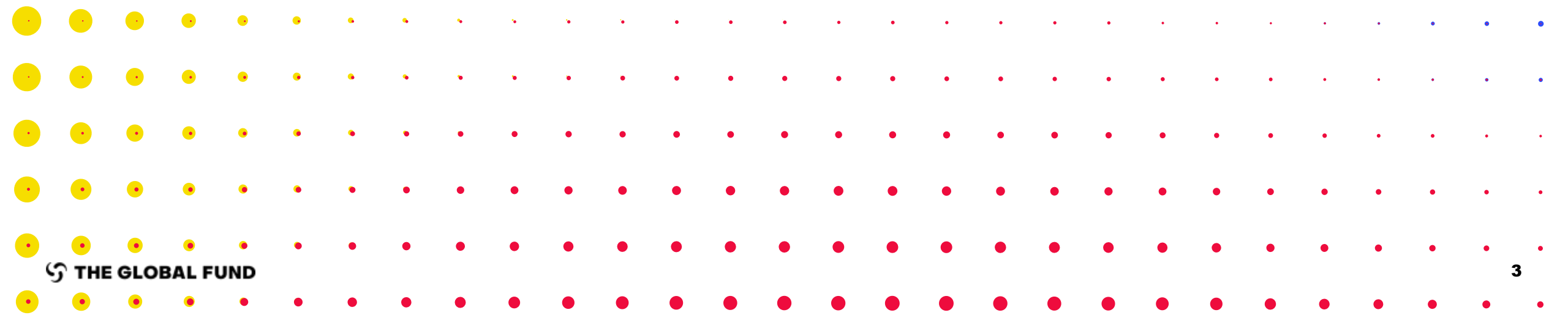
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Closing remarks - Fatim Challow-Jallow, The Global Fund



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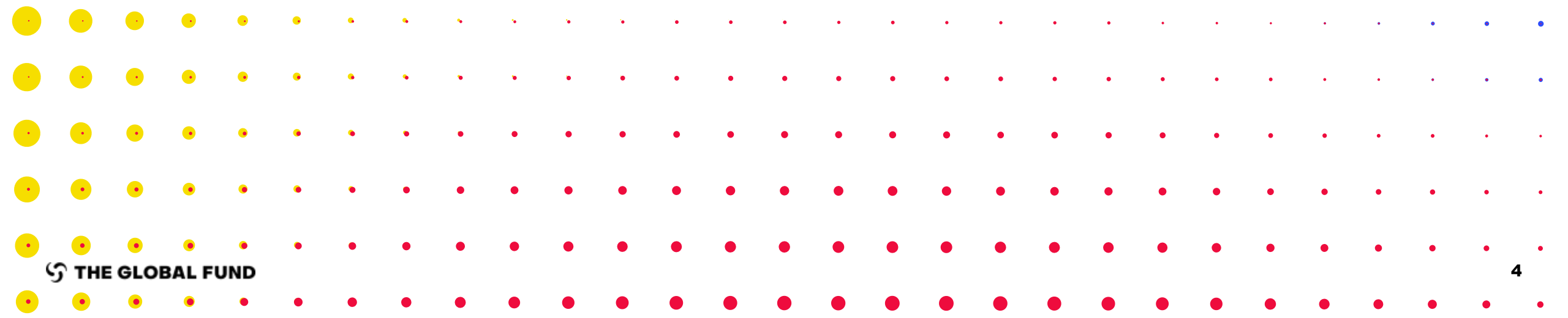
Opening remarks





2

Overview of project achievements





In partnership with



Project STELLAR

Overview of Technical Assistance (TA) mechanism for Laboratory Systems Strengthening for improved diagnostic services

28 August 2024

Project Stellar Overview...

Funding source



Coverage: 23 countries



Implementation period: Mar, 2022 - Jun 2024

Technical Assistance (TA) Partners



Sub-contractors:

Amref, BHP, Solina Health, PSI

Multi-phased implementation



Scope

1. Policy and Governance
2. Integrated Quality Testing Services
3. Laboratory Data Systems integration
4. Laboratory-based surveillance
5. Laboratory Systems Strengthening
6. Waste water-based surveillance (WWBS)



...Broad Lab Systems TA provided across the 23 countries was country specific based on and tailored to MoH/Lab identified priorities.



...TA provided in 6 countries (Ethiopia, Kenya, Mozambique, Tanzania, Uganda, Zambia).

Strengthened countries' strategic policy and governance environment for laboratory systems

Development, revision/updating and implementation of National Strategic policy and governance components	Countries
<ul style="list-style-type: none"> National testing strategies guidelines to integrate COVID-19 into routine healthcare services (including COVID-19 self and community testing, bi-directional/multi-disease testing) 	Botswana, Burkina Faso, Chad Ethiopia, Ghana, Lesotho, Malawi, Mali, Madagascar, Mozambique, Nigeria, Uganda, Zambia, Tanzania
<ul style="list-style-type: none"> National Laboratory Policy (NLP) 	Zambia, Ghana
<ul style="list-style-type: none"> National Strategic Plan (NLSP) 	Ethiopia, Lesotho and Zambia, Burkina Faso, Chad, Congo, Cote d'Ivoire, DRC, Madagascar, Tanzania
<ul style="list-style-type: none"> National Essential Diagnostic Lists (NEDL) 	Ethiopia, Lesotho, Malawi, Zambia, Tanzania, Burkina Faso, Cote d'Ivoire
<ul style="list-style-type: none"> Guidelines on integrated Laboratory based Surveillance (Genomic/ILI) 	Botswana, Ethiopia and Nigeria,
<ul style="list-style-type: none"> Concept Note/Roadmap for National Integrated Sample Transport System 	Togo, Angola, Chad, Congo
<ul style="list-style-type: none"> National Laboratory Waste Management guidelines 	Zambia
<ul style="list-style-type: none"> Guidelines for electronic laboratory information systems; M&E Frameworks 	Kenya



Lab. systems achievements across diverse work areas



Policy & Governance

- Central level coordination & MoH/LD TWGs,
- Transitioning C-19 response from emergency to into routine care bi-directional strategy,
- Development, review and updating of national level policies and guidelines

- National Lab Policy (2 countries)
- NLSP (10 countries)
- NEDL (7 countries)
- Surveillance guidelines (3 countries)
- Waste management (1 country)
- Data mgt (2 countries)
- Specimen referral guidelines (4 countries)

Improved governance and policy environment to inform and guide lab investments



Improve Access to Testing

- Implementation of national C-19 testing guideline
- Activation of HFs for integrated COVID-19;
- HWCs competence strengthening/training
- Rollout of C-19 self testing or community testing
- Mentorship; EQA

- 53% (2,279/4,289) health facilities activated for integrated testing
- 90% (6,579/5,920) HCWs trained on integrated testing

Improved communities access to integrated quality COVID-19 testing services



Surveillance

- Developed surveillance guidelines
- Sequencing implemented
- Personnel trained on integrated surveillance systems
- Activated sentinel sites

- 57% (4/7) countries implementing developed/revised strategies & guidelines for surveillance (*Sequencing implemented, personnel trained on surveillance, integrated surveillance systems, activated sentinel sites*)

Improved COVID-19 surveillance



Data Management

- Integration of Disease outbreak
- Facilities reporting Covid-19 data,
- Integration of Covid-19 data systems into routine data systems
- Interoperate LIS-EMR systems

- 40% (4/10) countries supported to have integrated data reported at the central data warehouse
- 67% (597/896) health facility activated to have integrated data management systems

Improved Data management



Labs Systems Strengthening

- Integrated sample referral systems,
- DNO
- Biosafety and biosecurity guidance,
- LQMS, Equipment management
- GC7 application

- 53% (10/19) countries with additional system strengthening improvements implemented
- supported on improvements to health systems **in 123% (522/423) HFs** during Mar 2022-Dec 2023 & **124% (683/551) HFs** during Jan-Jun 2024

Laboratory Network Strengthened via integrated systems /testing approaches

Key TA activities

Outputs

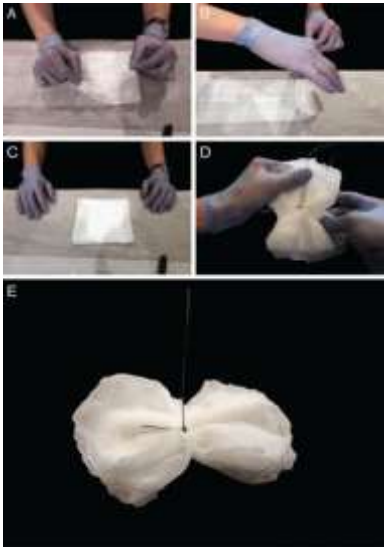
Outcomes

Waste Water-Based Surveillance (WWBS) - Pilot Study

- Wastewater-based surveillance pilot program – The Global Fund
- 6 countries (Ethiopia, Kenya, Mozambique, Tanzania, Uganda, Zambia)
 - 4-6 sites in each country tested 2-3x per week for 6-12 months
 - 250-300 samples; RT-qPCR, NGS, data management, and reporting

Achievements..

- Project STELLAR demonstrated the capability of WWBS for the detection and monitoring of SARS-CoV-2 and its variants in six countries.
 - Feasible potential for expansion to other pathogens to support pandemic preparedness
- The project was able to develop capacity:
 - Sample collection and processing
 - PCR, NGS, bioinformatics, and data analysis
- Data management and dissemination
 - Electronic test reporting and visualization
 - Complement findings with case-based surveillance



Moore Swab preparation



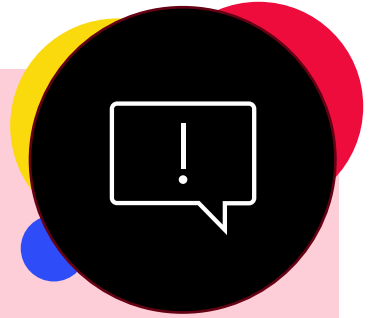
Swab installation



Swab sample collection

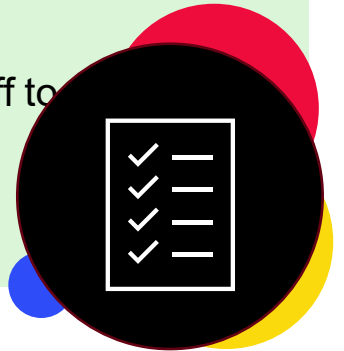
Challenges

- Complexities in communication channels and multi-stakeholder base.
- Constantly changing MoH/Lab. directorates priorities.
- Reliance on complimentary funds needed to implement some TA activities.



Lessons learned

- Strengthening and amplifying visibility of Lab. Directorates to ensure that laboratory system priorities are effectively integrated into the resources mobilization processes, e.g., grant-making processes.
- Effective coordination structures and robust stakeholder engagement are essential for delivering valuable technical assistance.
- The effectiveness of technical assistance is closely linked to the timely availability of programmatic funds for implementing activities.
- It is important to ensure that initiatives are led by the Ministry of Health and include capacity building for MoH staff to ensure sustainability and continuity in the effective implementation of laboratory activities.
- Flexibility and responsiveness to MoH needs are essential in dynamic contexts.





3

Uganda: Achievements on data integration and wastewater surveillance



THE REPUBLIC OF UGANDA
MINISTRY OF HEALTH



**Uganda National Health Laboratory & Diagnostic Services
(NHLDS)**

Project Stellar

Data Systems Integration & WWBS updates

Dr. Susan Nabadda

Commissioner, MoH/NHLDS

The Global Fund Information Session

August 28, 2024



Overview of Project Stellar Technical Assistance (TA) with funding from The Global Fund

TA Partners



Interventions

- a. Decentralizing & integrating COVID-19 into routine healthcare services delivery
- b. Strengthening data management systems

Waste Water-Based Surveillance (WWBS)

Core work areas

- Decentralizing & Integrating quality COVID-19 testing
- Surveillance
- Data systems integration
- Broader Lab Systems strengthening (Biosafety and Biosecurity, NSPRN, HR)

- Support the development and implementation of:**
- Testing capacity for SARS-CoV-2 in wastewater
 - Next-generation sequencing (NGS) of wastewater for SARS-CoV-2 and other pathogens of public health concern
 - Use of data from WWBS surveys to complement case-based surveillance, and monitor in-country trends

Overarching Achievements

- Accelerated transition of decentralized COVID-19 testing into routine health services (Developed guidelines, >200 activated HF; >1,930 trained HCWs)
- Data systems integration for disease outbreaks; LIS-EMR interoperability at 5 hospitals
- Laboratory Network Strengthened through integrated systems (NSTS, BSBS, QMS)

Strengthened laboratory capacity to implement wastewater-based COVID-19 surveillance and support the use of this data from the surveys to complement disease surveillance and monitor trends in Uganda



Permanent Secretary MoH-Uganda launching the laboratory guidelines



Data Systems Integration for Disease Outbreaks

Identified gap

Issue: At the peak of COVID-19 pandemic response, there were multiple & siloed data management platforms that varied in design, technology and data elements

Surveillance	Laboratory	Sample Referral Network	Case management	Stock & Logistics Management
•eIDSR •Go Data •Specimen collection	•LIMS •eLIF •RDS	•RESTRACK	•EMS •EMRS	•RASS

Multiple application technologies: Android, Web based, SMS reporting, Web browser, Mobile IOS, etc

Challenge with siloed systems: Data governance, Limited and untimely data access for timely decision making; high risk for inaccurate data;

Project Stellar TA

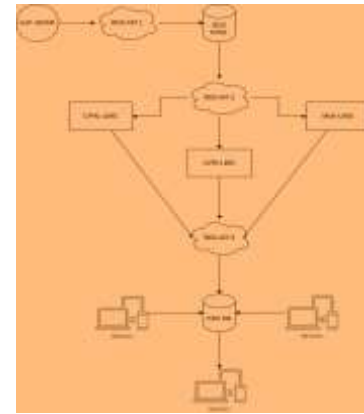
Convened workshops Software Developers & Systems' Users to integrate the various platforms

- Profiled the various data systems operating systems
- Determined intergratable elements across the various platforms
- Mapped out the various User needs (lab, surveillance, sample/results transportation, case management, logistics)
- Profiled referral labs LIS and linkage to national specimen transport systems

Designed an integrated Disease Outbreak data reporting system linked to the NSTRS & Referral labs LIS

Irrespective of the data collection tools in use, LIMS of ref labs, surveillance teams, NSRTN & HF connect to Results Dispatch Systems

Piloted in 7 hospitals

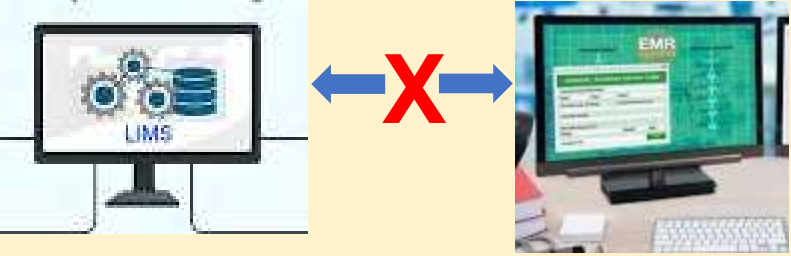


- Data Systems Integration for disease outbreaks across the various data collection platforms was in the initial phase piloted using COVID-19 samples/results tracking across 7 hospitals referring facilities and the referral labs. Later on, Measles, Polio & Ebola (co-supported by WHO)

Interoperability of Lab. Information System (LIS) & Electronic Medical Records (EMR)

Identified gap

Issue: LIS deployed at some hosp. labs but work independently of the hospital electronic medical records (EMR)



African Laboratory Information System (ALIS)

Clinic Master EMR system

Challenge: Need to make independently entry of patient bio-data at LIS and EMR which is laborious and receipt for errors, delayed TAT since it involves manual delivery of test results

Project Stellar TA

Supported MoH/NHLDS ICT team to accelerate and fast-track interoperability between LIS-EMR



African Laboratory Information System (ALIS)

Clinic Master EMR system

- Identified pilot hospital facilities that already had LIS and EMR installed but working independently
- Profiles and mapped interoperable variables
- Interlinked the core function for lab processes and clinician patient care processes

Achievement: Interoperability attained between LIS & AMR at allowing single entry of patient bio-data at the clinician to make test requests while the laboratory can manage sample management and electronic return of results to clinicians

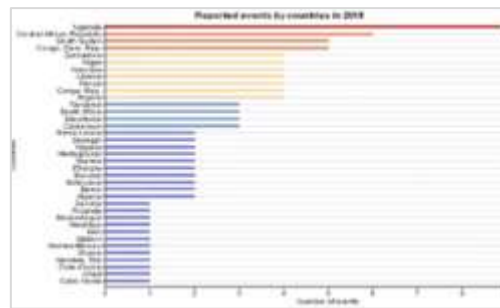
- LIS-EMR interoperability achieved, piloted and operationalized at 5 hospital laboratories. MoH/NHLDS plans to scale up this to more hospital laboratories

Waste Water Based Surveillance (WWBS)



Uganda

- In 2018, recorded highest number of outbreaks on the continent
- In the past 20 years, experienced 30 VHF's outbreaks (8 Ebola, 4 Marburg, 8 CCHF and 10 RVF, others include: Cholera, Plague, Anthrax, Rabies, Brucellosis, Trypanosomiasis, and Avian Influenza)
- Vulnerability attributed to: Location in the meningitis, RVF & filovirus belt; Rapid urbanization, globalization, deforestation; Climate change has closely bridged human-animal-environmental interactions; Frequent and prolonged refugee influx due to political insurgencies in some of the neighboring countries



Laboratory plays a critical role in detecting, confirming, and reporting these emerging and re-emerging infectious diseases

Clinical Based Surveillance Has Limitations

- a. Underrepresents mild or asymptomatic cases,
- b. Uganda has also documented poor health-seeking behaviors (Amy W et al., 2021).

These limitations impact the accuracy of clinical epidemiological surveillance, hence the need to complement it with **Wastewater-based Surveillance**.

- Pathogens are shed in the feces of infected individuals, both symptomatic and asymptomatic (Holshue et al., 2020), hence the WWBS has gained traction as a non-invasive, health-seeking behaviour - independent, and a cost-effective approach for disease surveillance (Harris-Lovett et al., 2021).

Project STELLAR Pilot enabled us to initiate WWBS:

In Jan, 2023 mapped out the Wastewater sampling sites & validated 4

THE MAP OF UGANDA SHOWING THE SPREAD OF THE DIFFERENT WASTEWATER TREATMENT PLANTS IN UGANDA



S/N	Category	Selected WWBS Pilot Sampling Sites (4 Sites were selected)
1	3 Faecal-sludge treatment plants	Bugolobi Faecal Sludge Treatment Plant
2	28 stabilisation ponds	Naalya Wastewater Stabilization Pond – Naalya
3	5 compact & conventional treatment plant	Nakivubo New Wastewater Treatment Plant Inlet 1
		Nakivubo New Wastewater Treatment Plant Inlet 2

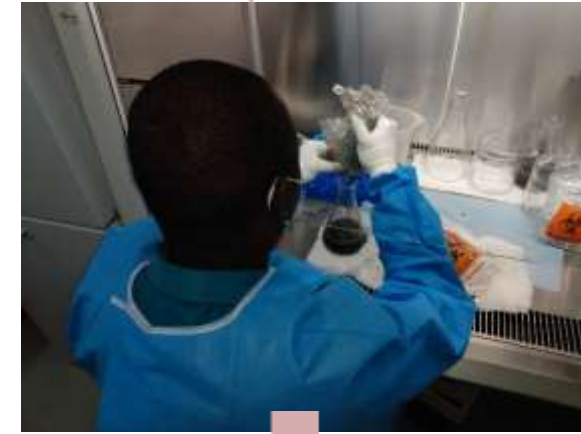
Designed a WWBS Work-Flow

1. Construction of Moore Swab

2. Submerging/sampling

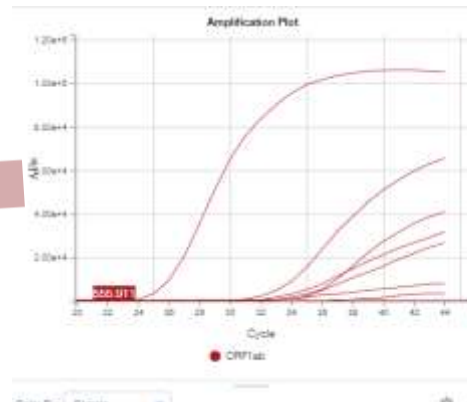
3. Retrieval, Packaging

4. Reception & Processing

6. Results upload in to COVID 19 WWBS LIMS

Facility	Specimen ID	Submerged at	Retrieved at	Temp. at retrieval (°C)	Temp. at reception (°C)	ORF1ab Gene	S Gene	N Gene	IC Gene	Result	Test Date	Action
Nashua Virus Water Substitution Pond - Nashua	WWBS0002	09 May 2023 11:27 am	10 May 2023 11:30 am	9	13	33.301	33.003	50.300	32.86	Positive	12 May 2023 09:02 pm	Options
Burgin+ Faecal Sludge Treatment Plant	WWBS0003	09 May 2023 12:10 pm	10 May 2023 12:07 pm	9	13	33.679	36.855	0	31.438	Positive	12 May 2023 09:02 pm	Options
Nashua New Wastewater Treatment Plant site 1	WWBS0004	09 May 2023 12:16 pm	10 May 2023 12:16 pm	9	13	33.349	38.41	26.194	21.878	Positive	12 May 2023 09:02 pm	Options
Nashua New Wastewater Treatment Plant site 2	WWBS0005	09 May 2023 12:20 pm	10 May 2023 12:19 pm	9	13	33.759	37.401	33.167	21.899	Positive	12 May 2023 09:02 pm	Options
Nashua Virus Water Substitution Pond - Nashua	WWBS0006	09 May 2023 07:40 am	12 May 2023 07:50 am	8	13	34.803	33.492	31.828	24.404	Positive	12 May 2023 09:02 pm	Options



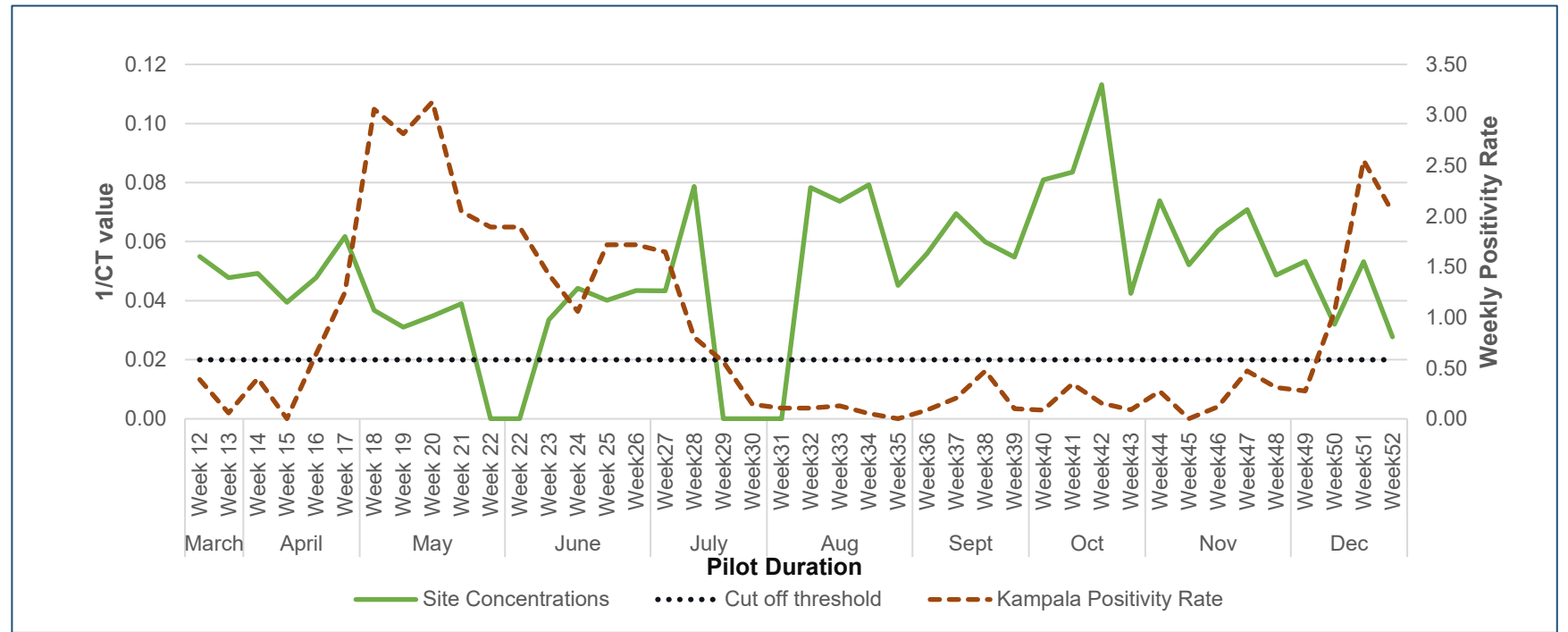
Well	Gene	Sample	Ct*
A4		NEGATIVE CTRL	Undetermined
E2		001-033WWBS	Undetermined
F2		001-034WWBS	Undetermined
H2		NTC	Undetermined
B4		POSITIVE CTRL	33.884
D8		001-032WWBS	30.734
Q8		001-028WWBS	31.808
88		001-030WWBS	32.713
48		001-029WWBS	33.285
C8		001-031WWBS	33.803



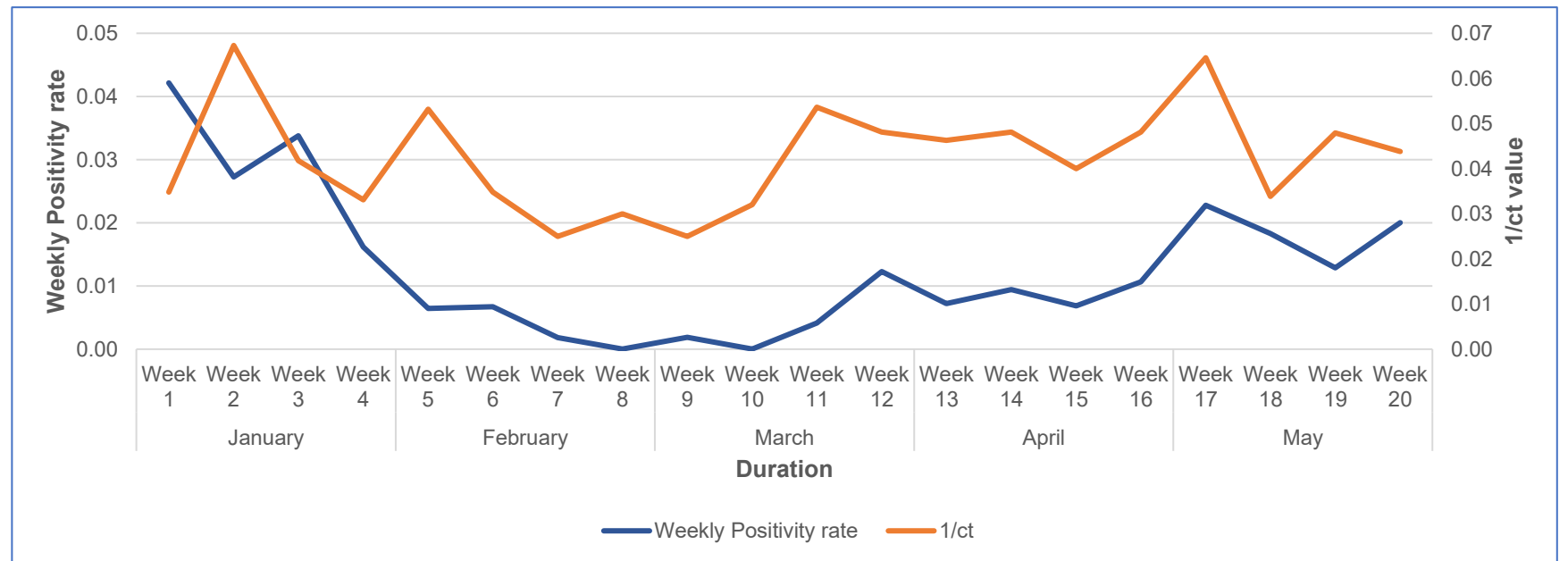
5. RT-PCR using ABI

**Public Health Utility
SARS CoV-2 Trend Analysis:
WWBS Vs Clinical Data**

March to December 2023



January to May 2024



CLINICAL vs WWBS NGS COMPARISON WITH WWBS NGS

S/N	VARIANT DETECTED IN WWBS	COMMENT	Ww MONTH OF DETECTION	CLINICALMONTH OF DETECTION
1	JN.1	Variant under Monitoring	December 2023	November 2023 -date
2	JN.1.1	Sub Variant of JN.1	December 2023	Not detected
3	JN.1.1.1	Sub Variant of JN.1	December 2023	Not detected
4	JN.1.2	Sub Variant of JN.1	December 2023	Not detected
5	JN.1.3	Sub Variant of JN.1	December 2023	Not detected
6	XBB.1.22	Variant under Monitoring	May 2023	Not detected
7	XCV		May 2023	Not detected

Project Stellar Achievements: WWBS

- WWBS COVID-19 results of Oct-2023 were relied on by MOH to intensify case detection in Kampala Metropolitan in the following months of Nov & Dec. This averted the possible resurgence of COVID-19 with only a short-lived spike in cases in December. Hence WWBS can aid in the early detection of a resurgence in infections
- Developed & Validated COVID-19 WWBS tools, Methodologies manuals & SOPs for sample collection, preparation, analysis, LQMS, BSBS that can be customised to detect an expanded scope of pathogens
- Developed a WWBS Lab Information Management System that can be adopted for other pathogens
- Integrated WWBS COVID-19 into the National COVID-19 testing guidelines
- Made some progress on WWBS NGS, these lessons are key for future WWBS NGS

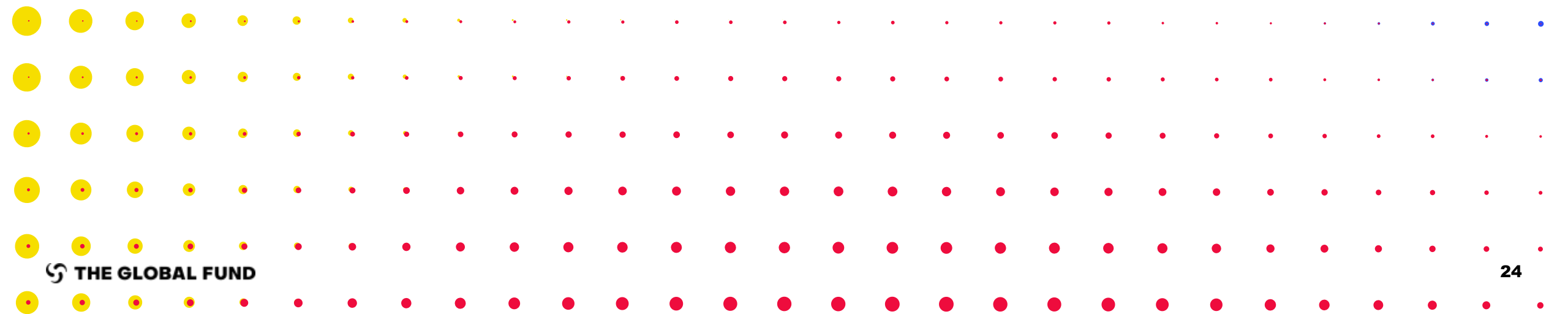
Future Prospects

- **Geological Mapping:** Conduct detailed geological mapping to understand subsurface structures
- **GIS Integration:** Utilize GIS to trace, and digitize sewer lines, facilitating accurate system flow location mapping.
- **Manual Sewer Mapping** to precisely determine sewer flow directions, both upstream and downstream.
- Development of an **Interactive Online Environmental Surveillance Map**
- **Population Density Mapping** using World Pop. data for accurate population density mapping.



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Closing remarks



Thank you!



The Global Fund to Fight
AIDS, Tuberculosis and Malaria
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