

# ONE IDI

## Science Fair 2022



**Theme:**

**A Tale of Two Pandemics: Harnessing Science in a Rapidly Changing Landscape**

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# LIST OF ACRONYMS

<b>ACE</b> African Center of Excellence	<b>PrEP</b> Pre-exposure prophylaxis
<b>AI</b> Artificial Intelligence	<b>PWUDs</b> People who use drugs
<b>AIDS</b> Acquired Immunodeficiency syndrome	<b>RCA</b> Rapid Case Assessment
<b>ART</b> Antiretroviral Therapy	<b>SARS</b> severe acute respiratory syndrome
<b>CDC</b> US Centers for Diseases Control and Prevention	<b>SRC</b> Scientific Review Committee
<b>CM</b> Cryptococcal meningitis	<b>SSA</b> Sub-Saharan Africa
<b>COVID-19</b> Coronavirus disease 19	<b>STI</b> Sexually Transmitted Infections
<b>EDCTP</b> European & Developing Countries Clinical Trials Partnership	<b>US NIH</b> United States National Institute of Health
<b>FIND</b> Foundation for Innovative New Diagnostics	<b>USAID</b> United States Agency for International Development
<b>GHS</b> Global Health Security	<b>TAT</b> Turnaround Time
<b>GPS</b> Geographical Positioning System	<b>TB-LAMP</b> The Loop-mediated isothermal amplification
<b>HCC</b> Hepatocellular carcinoma	<b>WHO</b> World Health Organization
<b>HIV</b> Human Immunodeficiency Virus	
<b>ICT</b> Information and Communications Technology	
<b>IDI</b> Infectious Diseases Institute	
<b>KS</b> Kaposi Sarcoma	
<b>MARPS</b> Most at-risk populations	
<b>MBChB</b> Bachelor of Medicine and Bachelor of Surgery	
<b>MoH</b> Ministry of Health	
<b>NCDs</b> Non-communicable Diseases	
<b>NLP</b> Natural Language Processing	
<b>OTC</b> Over the counter	
<b>PMTCT</b> Prevention of mother to child transmission of HIV	
<b>POC</b> Point of care	
<b>PK</b> Pharmacokinetic	

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## WELCOME REMARKS



**Dr. Andrew Kambugu MBChB, M. Med, FRCP**

The Sande-McKinnell Executive Director

I am delighted and honored to share with you our third report of the annual Research Science Fair hosted by one of the institute's technical pillars – the Research Program. The science fair took place on Thursday, February, 24, 2022 and Friday, February 25, 2022

The Science Fair is a research discussion and dissemination platform that attracts local and international stakeholders from the academia, policy, and program fraternity.

The Science Fair 2022 is the third of its kind, sharing globally recognized research and implementation science efforts to apprise you of the progress and the considerable accomplishments of the Infectious Diseases Institute (IDI) at Makerere University.

In this report, we share major milestones in research, including the NADIA study and MasterCard funded research conducted beyond Uganda's borders and published in highly renowned impact journals.

Vaccination Hesitancy in healthcare is another service area the Research Program is tackling through documentation and impact review.

Uganda is on the cusp of achieving HIV epidemic control based on the UNAIDS 95-95-95 goal and IDI is a major contributor toward achieving this standard in Uganda.

IDI provides care to 8000+ people living with HIV in Uganda through its six technical pillars.

According to the Uganda population HIV impact assessment survey (published February 2022), 80.9% of adults living with HIV in Uganda knew their status, 96.1% of these adults who were aware of their HIV status are on ART, and 92.2% of the adults on ART had achieved viral suppression.

IDI's portfolio has expanded considerably in tuberculosis, early infant diagnosis of HIV (EID), sexually transmitted infections, non-communicable diseases, and global health security capacity-building for emerging infectious diseases in Uganda.

IDI is rapidly expanding to the health innovations and technology space, including a recently piloted and rolled out drone technology.

The 'drones for drug delivery' project to aid the delivery of ART to the island fishing communities and viral load samples back to the central public health laboratory.

During the COVID-19 pandemic, IDI supported the local production of alcohol-based hand rub (ABHR) and supported the decentralization of its production to health facilities.

Through its research program, IDI has substantially contributed to the stature and ranking of Makerere.

The program has produced over 950 peer-reviewed publications.

Additionally, through these outputs, the IDI has immensely contributed to faculty developments, particularly in the School of Medicine at the College of Health Sciences.

I invite you to delve deeper into the details of this report, encouraging you to share novel findings widely for utilization in research, policy, and program settings.



### Partnering With Research to Enhance Business Models



**Tom Kakaire**

Head of Strategic Planning and Development at IDI

At the Research Program, the SPDT catalyzes the uptake of research evidence into policy and programming under a broad umbrella of research called Implementation science while addressing issues of cost-effectiveness in health economics.

The SPDT supports the Research Program in identifying and strengthening new resources and building capacity

The Research Program is one of the IDI's six business units.

The Strategic Planning and Development Department (SPDT) is the bedrock for the IDI business units or technical programs.

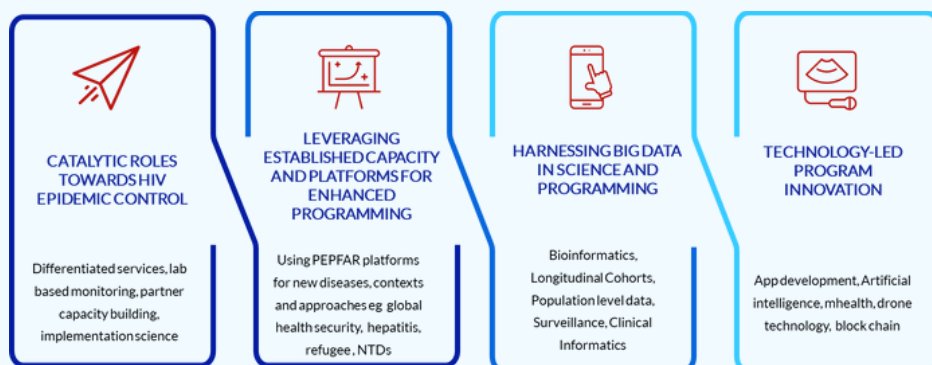
**Theme 1:** The SPDT primarily leverages the competitive advantage of the business units in resource mobilization, grants and contracts management, monitoring and evaluation, technical integration, and agility in business administration.

Additionally, SPDT is critical in core fund management including ensuring efficient cash flows, providing buffers in difficult times, facilitating investments in infrastructure and new programs Summarily.

The SPDT is IDI's compass guiding its thematic business model.

#### MAJOR STRATEGIC THEMES -2018/2023

##### Innovation Ecosystem



**Theme 2:** The SPDT utilizes existing Clinical Trials and Operational Research platforms, implementation science programs, or partnerships to provide “big” data capacities for Artificial Intelligence (AI) and machine learning (ML) analytical modeling Build CTU capacity. The SPDT is steadily growing Contract Research Organization (CRO) capacity at the IDI Research Program as well.

**Theme 3:** The SPDT supports the Research Program's African Center of Excellence in Bioinformatics and Data Science (ACE) to harness 'big' data initiatives with technological innovations for health programming.

Other programs benefit from the SPDT's experience in guiding resource deployment for global health security surveillance in epidemic-prone settings. Together with the Health Systems Strengthening Department (HSSD), the HIV Prevention Care and Treatment (PCT), and Global Health Security (GHS) Programs, the Research Program undertakes Longitudinal cohort research with the strategic guidance of the SPDT.

**Theme 4:** The SPDT is one of the cornerstones of the Uganda Academy for Health Innovations at IDI is fostering the embrace of new technologies for healthcare research. So far, the Academy has rolled out various mHealth with mobile technologies for health-related outcomes (IVR/Voice, text data, and online data) in the programming of HIV and comorbidities care and treatment.

#### What is the role of the Research Programs in galvanizing Business Models?

**Support Inter-organization business:** For example, at IDI, the Core Lab & Translational Research Lab services, Data Fax and REDCAP complement Research.

**Business Innovation:** Create a positive mindset towards new program/project ideas and /or proposals that leverage business

**Value for money:** Integrate core values and approaches in research, which make economic sense, and reflect efficiency and effectiveness

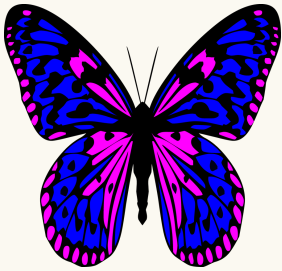
**Compliance:** Integrate capacity-building aspects to enable teams to understand funder or government regulations and internal systems for compliance during research implementation. This reduces the risk of disallowed of costs and maintains sustainable systems.

## ICEBREAKER

### (FAVORITE ANIMAL)

“

*The Butterfly is my favourite animal for its colour, cheerfulness and free spirit*



**Barbara Castelnovo, Head of Research Program IDI**

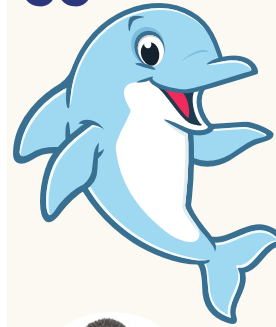
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*The dog for its suave nature and man's best friend*



**Ivan Segawa, Pharmacist and Epidemiologist at IDI.**

“



*The Dolphin is my favourite animal because of its swiftness in water, and friendliness*



**AIDAH NANVUMA**  
Capacity Building Unit  
Coordinator, and  
Research Program IDI

“

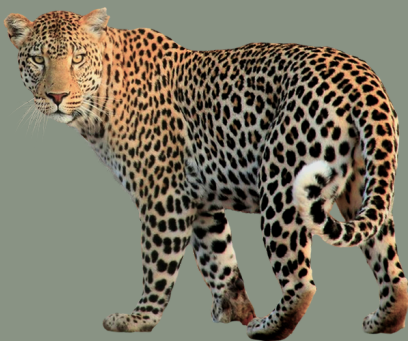
*Lions are my favourite animals for their leadership skills*



**Livingstone Kamoga,**  
Nursing student

“

*The leopard is my favourite animal for its swift spirit and silent pursuits*



**Andrew Mujugira,**  
Head of IDI  
Kasangati, and  
Specialist in PrEP  
Delivery in Key  
populations

“

*I wake up daily to mimic birds' energy, free spirit, and colourfulness. Birds are my inspiration.*



**Catriona Waitt,**  
Professor in Clinical  
Pharmacology,  
University of Liverpool,  
and at IDI.

“

*The goat is the best animal for its flexibility with food choices, shelter and company. Never burdensome*



**Allan Buzibye,**  
PhD Scholar, a specialist in  
chromatographic  
laboratory techniques.



## MEET & MENTOR PANEL DISCUSSION

Prior to the Meet the Mentor session held on Day One, a call for mentee applications was sent out to different universities in Uganda and abroad. Mentee applicants shared their elevator pitch statements, which the Research Program used to guide Mentee-Mentor pairing. High lights of mentee and mentor discussions are presented herein.

### Relation building



**What informs a mentee's decision to prefer a specific mentor?**

**A**

Mentees utilise peer relations and supervisor referrals to understand and select mentors. We use our wild ideas and dreams to leverage ourselves in creating the relationships



**What are a mentee's expectations from a mentor?**

**A**

To be open to a relationship that goes beyond career and equip the mentee with life skills. To help mentee draw clear boundaries in relationship to avoid mixed messaging and emotional attachments earlier on in the relationship

### Leadership Style



**At what point can a mentee feel that a mentor is agreeable to a mentorship relationship?**

**A**

A decision about the relationship starts from the onset, based on how the mentee presents themselves' Dr. Mujugira Andrew.

As you wait upon a mentor to engage a mentee, beware that they [mentors] undertake background checks using social media, peers and reports to more about the potential mentee's personality, professionalism, and compatibility. It is important to maintain a professional profile' Barbara Castelnovo

### Utilising Past Experiences



**As a mentor, have you ever felt you have messed up? How did you bounce back?**

**A**

'It is not about falling but getting up when you fall. Pick yourself up and dust yourself off. Mistakes are key in life. They teach us to be gracious to others and humble. Learn to utilise lessons from past experiences to inform future decisions' Dr. Mujugira Andrew.

Do everything possible to meet deadlines and address all requirements because it is better late than never. Keep focused on the bigger picture' Dr Castelnovo Barbara

## Dealing with Different Personalities



**How do you handle personality clashes?**

**A**

Consciously fight the Imposter Syndrome (you are not good enough), which is a common challenge to potential high achievers, by identifying the root cause (e.g. perfectionism). Learn personalities to help you understand people and the reason they do things the way they do' Miriam Laker

## If you were to turn back the clock...



**What advice would you give to a younger version of yourself?**

**A**

Beware of an unnecessary or exaggerated civility (aka Ugandan politeness) that hinders straightforwardness and blocks opportunities. Parents should teach children not to fear authority but harness it for good. Ask 'why'. Ms. Aidah Navuma

Have a willingness to unlearn some things and to learn and adjust to accommodate a mentor's preferences including their personality, priorities, preferences' Dr. Catriona Waitt

Never leave in regret. Move on to the next best opportunity before you. 'A happy man marries the girl he loves, A happier man loves the girl he married' Dr Mujugira Andrew

## In Research, do leadership skills matter



**What is the best leadership style in Research?**

**A**

Understand personalities of the people you are dealing with. Talk about leadership styles with your supervisor. Find role models that are more senior; people whose leadership styles appeal to your career. Request them to take you under their wing or give guidance.' Dr. Catriona Waitt



### Chat Messages



**Catriona Waitt**

01:01:07

@Benson - to the second, be confident - we have all been in junior roles and desired a mentor. Remember sometimes people are busy, but most people do want to support juniors too! So just be confident and ask



**Catriona Waitt**

01:23:24

This is a quick and useful tool that I found insightful on this question of personalities  
<https://www.16personalities.com/>

### Chat Messages



**Catriona Waitt**

01:48:28

@Neckson - I don't think I could make a list because everybody is so different. i would want to see that a person wants to grow and learn and develop. The only frustrations I have really had is when a person keeps coming back with the same concerns but hasn't done any of the action points from the time before - I start to feel I can't help them, or that they don't really want my advice, so I wonder what the point is

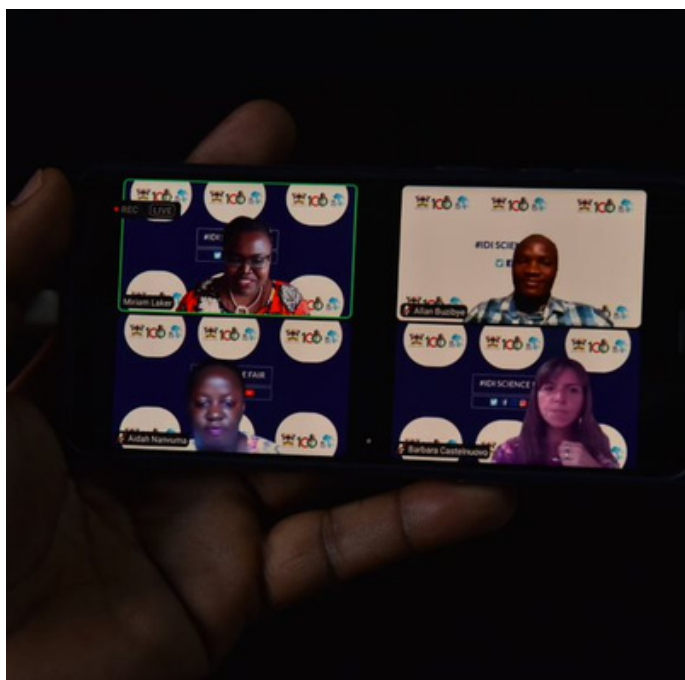
### Chat Messages



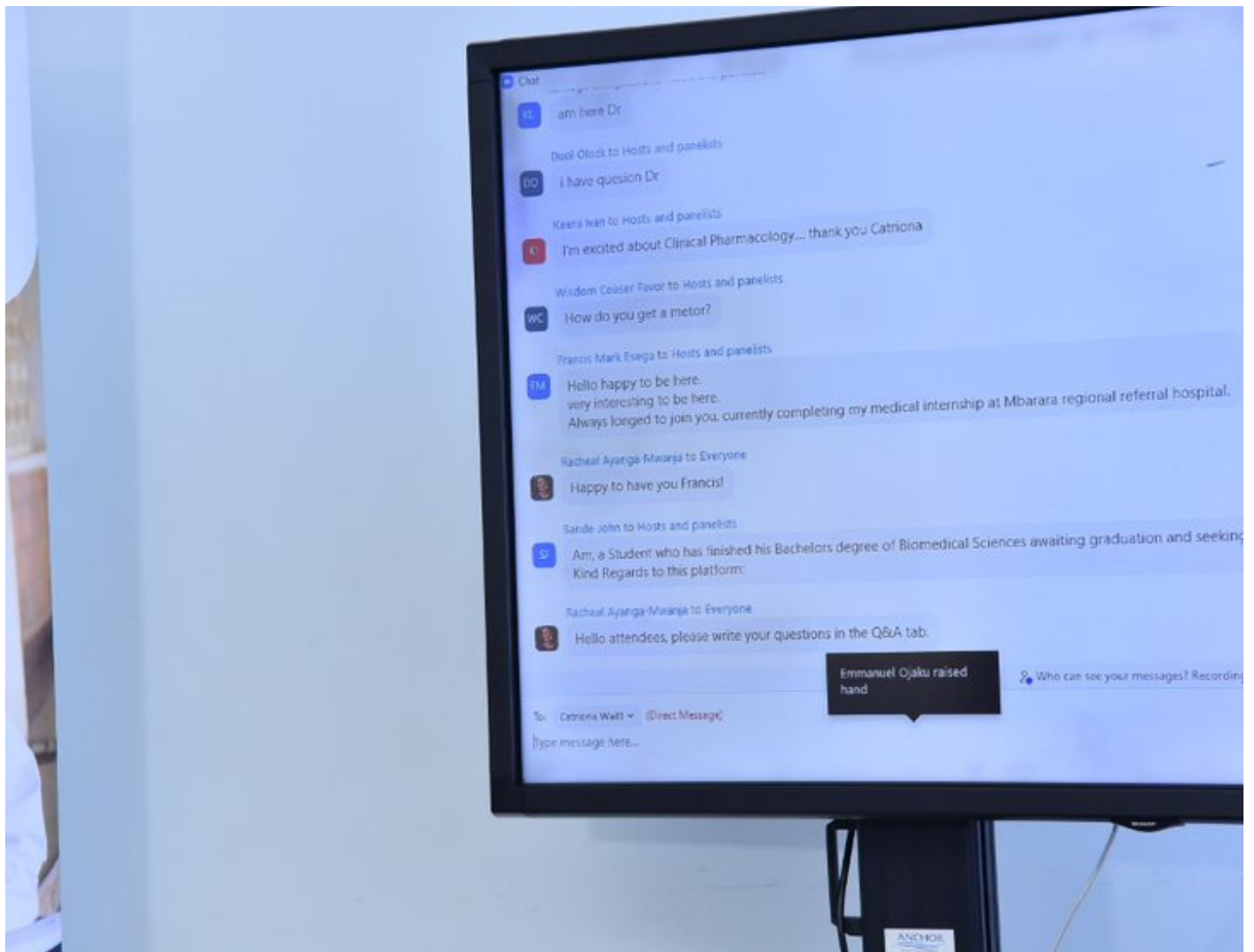
**Paul Gonza**

01:41:05

I hope this was meant for the audience from Dr. Andrew Mujugira "Neckson, Gary Player (a renown golfer) famously said that the harder he practiced the luckier he got. There is no substitute for hard work; you reap what you sow. Someone also said luck is what happens when preparation meets opportunity. So be prepared."





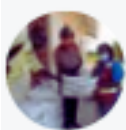


**Bwambale Neckson** @beneckson · Feb 25

"COVID-19 lockdown improved air quality levels. As mobility increases, air quality decreases", Dr Ronald Galliwango at the [#IDIScienceFair2022](#) @IDIMakerere @MinofHealthUG @DianaAtwine @akambugu



1



**Bwambale Neckson** @beneckson · Feb 25

"We have good TB diagnostic tools, the challenge is that we are still missing many TB cases, Armstrong at the [#IDIScienceFair2022](#) @IDIMakerere @MinofHealthUG @DianaAtwine @JaneRuth\_Aceng @ntvuganda @DailyMonitor @akambugu @CatrionaWaitt @drmiriamo



# ENGAGING COMMUNITIES SAFELY DURING COVID-19



Health worker engaging people living with HIV (Friends) while observing Covid-19 SOPs.



Delivering HIV medical drugs to PLHIV in the community.



IDI HIV peer group leader receiving HIV drugs for community delivery.



Outpatient triaging in outdoor settings.



PCT program lead, Dr. Isaac Lwanga conducting clinical supervision during the ward round".



IDI health workers celebrating world nurses day.

## PLENARY SESSION 1

### Sub-Theme: It takes two: HIV Prevention for Key Populations and their partners

#### Point-of-care HIV Viral Load Testing at Delivery for Mothers and Babies



**Agnes Nakyanzi**

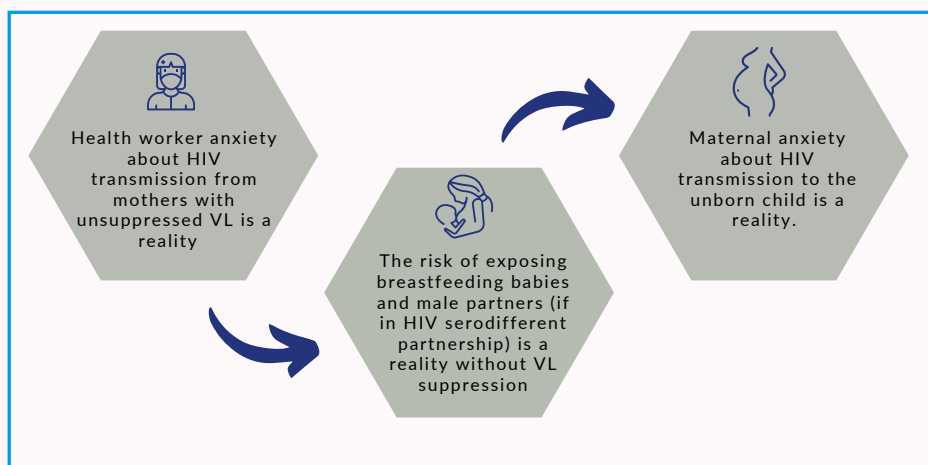
BScM

#### Introduction:

Improved quality of HIV care among mothers is essential, to achieve the elimination of mother-to-child transmission of HIV. Mother-to-child transmission of HIV (MTCT) is defined as the transmission of HIV from a mother to her child during pregnancy, labor, delivery, or breastfeeding. In the absence of any interventions, transmission rates potentially range from 15% to 45%. Preventing MTCT (PMTCT) is a critical component of HIV control programming, including ensuring adherence to ART, monitoring viral load (VL) as well as practicing safe childbirth, appropriate infant breastfeeding, and other post-natal healthcare services.

#### Study:

A pilot study on the use of point-of-care (PoC) HIV VL testing to practice safe childbirth was based on a prior study in Uganda among women in Obumu who had received a 6 and/or 12-month postpartum visit. The study visit had revealed that 24% (of the women visited at 6 months postpartum) and 34% (of the women visited at 12 months postpartum), had not recorded their VL at childbirth, 20-22% had a detectable VL.



The study noted that a significant number of postpartum women living with HIV did not have VL tests for various reasons or did not receive their VL test results from a healthcare center/worker until their next postpartum visit, thereby missing out on the benefit of VL monitoring and prompt ART adherence counseling. A follow on mixed methods study was conducted at Kitebi Public KCCA H/C III, Wankulukuku road, Lubaga Division, Kampala District, Uganda.

#### Objectives:

To evaluate whether POC viral load testing with same-day ART adherence support improves viral suppression among postpartum women living with HIV compared to standard of care lab-based HIV VL testing.

**Intervention:** We need a photo/graphic of the PoC VL testing at the ANC setting

#### Observations

- Pregnant women newly diagnosed with HIV fear transmitting the virus to their babies
- POC testing facilitates same-day receipt of VL results and knowledge of treatment success
- POC VL testing mitigates maternal anxiety about HIV transmission to the unborn child
- Pregnant women newly diagnosed with HIV fear transmitting the virus to their babies
- POC testing facilitates same-day receipt of VL results and knowledge of treatment success
- POC VL testing mitigates maternal anxiety about HIV transmission to the unborn child



**PN, 32 years old, 4+0 on ART**

*During pregnancy, I kept on telling musawo (health worker) that I am taking my pills very well, but when the real time results were given to me, I was forced to disclose my inadequate taking of my pills. This in turn motivated me to take my pills well since I was going to be tested during labour/post-delivery. Now the midwives are encouraging me to initiate breastfeeding but I am here waiting for my VL results and decide on the method of feeding my baby"*

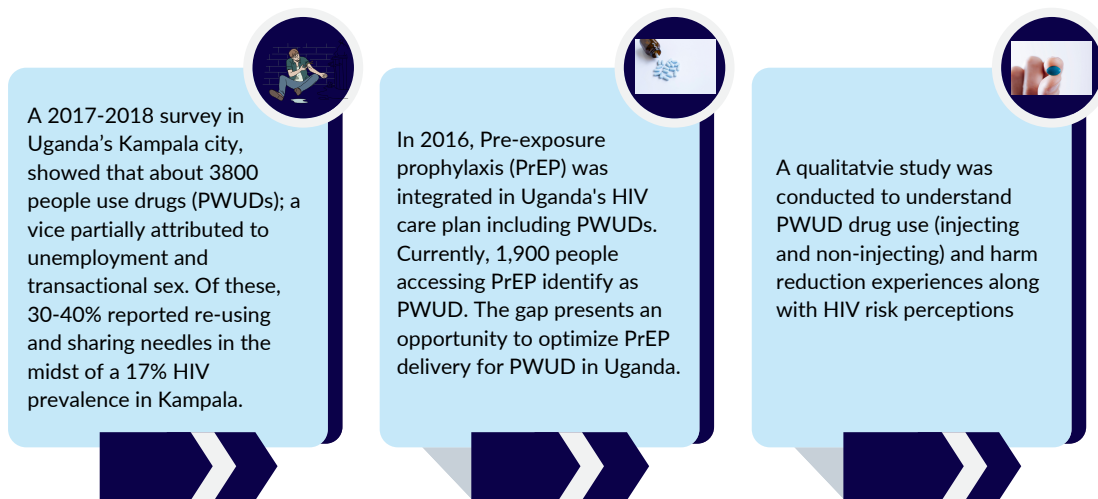




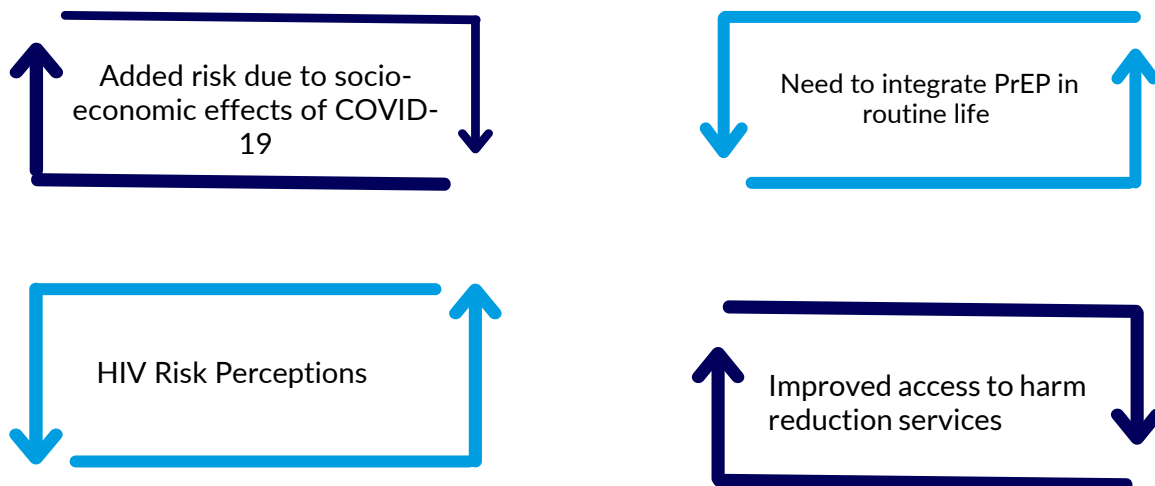
**Brenda Kamusiime**

B.Community Psychology, MSc Clinical Psychology, IDI- Kasangati

## Introduction:



## Emerging Themes from a study seeking to optimize PrEP delivery for PWUD



## Recommendations

- A 'hidden' population like PWUD needs safe and friendly, comprehensive HIV prevention services tailored to their specific needs.
- Integrating PrEP and harm reduction services will reduce HIV risk among PWUDs. Barriers to accessing existing harm reduction services should be addressed.
- Approaches to integrating PrEP into harm reduction services that are informed by PWUD experiences has the potential to prevent HIV acquisition among this key population.

# Implementing PrEP Delivery for Diverse Populations in Uganda



**Dr. Timothy Muwonge**

MBChB, MPH (Head of Programs - HIV Prevention Research) IDI

## Introduction:

Since 2017, the IDI has specialized in research among key populations including HIV sero-discordant couples, male, female and transgender sex workers, adolescent girls and young women, male partners of HIV-positive pregnant women, transgender men and women, fisher folk, and people who use drugs. The IDI HIV Prevention Research Program continues to conduct novel mixed-methods research studies collaboratively, to generate evidence to address barriers to prevention access.

The Research Program is also addressing barriers to the scale-up of proven 'PrEP community service delivery models' for stigmatized key populations in the broader CDC-PEPFAR supported HIV program delivery services. So far, our research shows that people in highly stigmatized populations in Uganda are ready to receive PrEP and that this should encourage Uganda MoH to accelerate the rollout of PrEP and meet the needs of these MARPs. HIV self-testing rollout has been embraced by persons at substantial risk as well, with HIV self-testing and PrEP having benefitted not only prevention efforts, but also availing economic and relational empowerment for sex workers in Uganda.

Other studies have addressed issues around PrEP services delivery to trans-men and women, sex workers, HIV sero-discordant couples, fish folk, as well as adolescents in the context of stigma at multiple levels, highlighting the need for gender-sensitive healthcare delivery. IDI is also at the forefront of efforts to integrate PrEP into ART programs as well.

## Progress towards comprehensive PrEP service delivery among most at-risk populations (MARPS)



IDI facilitates PrEP research and gender-sensitive service delivery efforts among female sex workers in Uganda



IDI contributes towards data collection and use for harm reduction interventions for people who use drugs (PWUDs)



IDI supports capacity development and community empowerment on MARPS inclusion in HIV services



DI's PrEP research is responsive to highly stigmatised key populations through capacity building, counselling, collaboration, creating demand for PrEP.

(Mujugira A, Kasiita V, Bagaya M, Nakyanzi A, Bambia F, Nampewo O, Kamusiime B, Mugisha J, Nalumansi A, Twesigye CC, Muwonge TR, Baeten JM, Wyatt MA, Tsai AC, Ware NC, Haberer JE. "You are not a man": a multi-method study of trans stigma and risk of HIV and sexually transmitted infections among trans men in Uganda. *J Int AIDS Soc.* 2021 Dec;24(12):e25860. doi: 10.1002/jia2.25860. PMID: 34965322; PMCID: PMC8716065.)

Muwonge TR, *et.al.* Knowledge and barriers of PrEP delivery among diverse groups of potential PrEP users in Central Uganda. *PloS one.* 2020 Oct 28;15(10):e0241399.

Mujugira A, *et.al.* HIV self-testing and oral pre-exposure prophylaxis are empowering for sex workers and their intimate partners: a qualitative study in Uganda. *Journal of the International AIDS Society.* 2021 Sep; 24(9):e25782.



#### Increasing Access to POC STI Testing



**Agnes Kiragga**

B.Stat, MSc, Ph.D. Head of HIV Prevention Programs at IDI-Kasangati  
Head of Statistics at IDI

**Center for Point-of-Care Technologies Research for Sexually Transmitted diseases clinical Translation and Validation Core.**

**Principal Investigators: Agnes Kiragga, Rosalind Parkes-Ratanshi, Annet Onzia, Peter Kyambadde, Matthew Hamill, Johan Melendez, Yuka Manabe**

Two aims drive the Center for Point of Care Technologies Research; (i) to test how to implement mature tests, including increased access, and (ii) to test and implement new POCT tests, including feasibility, acceptability, and impact in Resource-Limited Settings (RLS).

The Center's Principal Investigators (PI's) are leading various studies spanning 2014 to 2022, including Rapid Tests in surveillance populations, Novel ways to increase access/ patient management / follow up / partner notification, Community pharmacy STI testing, STI-AMR Study, and the SARS-Cov-19 International Bio repository conception. Summarily, the COPHAS study seeks to understand the overall prevalence of STIs among symptomatic and asymptomatic clients seeking care at select community pharmacies in Kampala city, Uganda.

The STI's of interest include HIV, Syphilis, Chlamydia trachomatis, Neisseria gonorrhoea, and Trichomonas vaginalis. Consenting participants are encouraged to bring their partners for HIV/STI testing, and followed up through the Call for Life platform – an automated call system that reminds index clients to disclose STI status to partner(s) as well as provide a notification slip.

The studies on sexually transmitted infections, with special interest in Gonorrhea focus on examining antimicrobial resistance in pharyngeal (pNG) (from the nose/mouth) compared to urethral NG (from penis), as well as identifying predictors of pNG infections and AMR pNG.

The other study is the MOBINAAT rapid test (15-minute assay) examining the feasibility of the PoC test in routine surveillance and transactional sex, among other potential uses. In addition, a sub-study project on the drone –technology is ongoing, to inform the feasibility and acceptability of the drone technology to transport STI samples from far-to-reach places, after delivering ARVs to peer-support workers who access these clients.

Data from all studies are currently in the pipeline for peer-reviewed publications.

## The role of Clinical Research



**Dr. Lydia Nakiyingi**

MMED, PhD, Principle Investigator-IDI.

### Background

In order to achieve the END TB global goals, new and feasible tuberculosis (TB) diagnostics applicable to low and middle income country (LMIC) settings are warranted.

This is a realization impelled by the ongoing HIV epidemic, whose comorbidities include tuberculosis (TB), the number one cause of death among those infected with HIV.

This perfect HIV storm brought into focus the magnitude of the inadequacy of accessible tests including existing sputum-based TB diagnostics.

With the support of various researchers, funders and several stakeholders including TB CDRC (a consortium of researchers and implementers), FIND-diagnostics, FEND-TB, and the Ministry of Health of Uganda (MoH).

IDI undertook clinical research activities investigating performance and feasibility of several new and improved investigational tests for TB diagnosis in Uganda.

Results from these clinical diagnostics evaluations provided valuable information as to whether additional test development was indicated or whether the test of interest was ready for a larger-scale clinical application.

### Method

At the IDI, various body samples from prospectively enrolled willing participants were collected and tested using the new and/or improved TB tests.

Results were compared to the existing TB tests and reference TB tests, to determine test accuracy, feasibility, ease of use and the overall clinical application.

Several new TB diagnostics were evaluated for use and these include among others: the Lateral flow (LF) urine TB-LAM test for advanced HIV disease, Xpert Ultra test, Loop-mediated isothermal amplification (TB-LAMP), Fluorescence Microscopy, BD Max and several other molecular and nucleic acid tests.

### Results

Findings from these diagnostics evaluation studies informed policy and impacted TB diagnosis not only in Uganda but also internationally and resulted into improved TB diagnosis worldwide.

For instance, findings on lateral flow urine TB-LAM and TB LAMP contributed to the body of evidence that the World health Organisation (WHO) used to derive policy recommendations for TB programs. Specifically, TB LAM is currently recommended for TB diagnosis in patients with advanced HIV disease while TB-LAMP has been recommended for diagnosis of Pulmonary TB in adults as a replacement to smear microscopy (FM) or as follow-on test to smear microscopy in smear-negative specimens in areas where GeneXpert is not available.

### Conclusion

Clinical TB diagnostics evaluations at the IDI have significantly contributed to improved TB diagnosis particularly in resource limited settings.

This underscores the need for Clinical Research data for informed decision-making regarding further development and/or clinical application of new diagnostic tools. IDI continues to actively participate in these new TB diagnostics evaluation studies, with several others still in the pipeline.



**Dr. Stella Zawedde-Muyanja**

MBChB, MPH, IDI Research Department

## Background

In practice, HIV/TB treatment are freely available in public health facilities in Uganda, but the right diagnosis often impedes prompt access to treatment. In Sub-Saharan Africa, the World Health Organization (WHO) reports 25% of incident TB cases and 42% of TB associated deaths annually as well as 70% of new HIV infections and 60% of HIV deaths annually.

Although POCs are widely used for HIV care, there is need to pre-test, contextualize and scale up proven POCs for TB, including rifampicin drug resistant TB (MTB/RIF). The IDI implementation research scientists identified gaps worth addressing in access to prompt diagnosis of HIV/TB and linkage to health facility based care, in order to decrease mortality from both diseases. Two implementation science studies were effected to address these gaps.

### Improving the effectiveness of Xpert MTB/RIF testing in Uganda

A 2018 study by S. Zawedde-Muyanja et al. published by BMC Public Health (<https://doi.org/10.1186/s12889-020-09955-0>) found that a POC (Xpert) was associated with an increase in the proportion of patients of smear-negative patients initiated on TB treatment from 5.9% to 10.8% ( $P < 0.01$ ).

The study showed that there was a decreased time to TB treatment initiation from 8 to 3.5 days with the same POC. However, 37% (32/ 87) of patients with a confirmed TB diagnosis did not start on TB treatment! In order to understand the facilitators and barriers to accessing treatment for TB, a study was embedded in TB service delivery programs.

The outcomes pointed to the need for (a) educating health workers, (b) environmental restructuring, (c) enabling communication between healthcare providers and patients.

IDI supported the Ministry of Health to modify laboratory request forms, redesign the sputum collection and testing processes, thereby decreasing turnaround time (TAT). Mobile telephones and airtime were provided to expedite test result communication. The TAT decreased from 48 to 4 hrs and treatment initiation increased from 67% to 90% with 25% same-day diagnosis.



### Improving access to LF-LAM testing in Uganda

Earlier studies proved that the detection of the Mycobacterium tuberculosis (TB) cell wall antigen lipoarabinomannan (LAM) in urine, permits diagnoses of TB to be made in HIV-infected patients with advanced immunodeficiency. The POC for this test is the commercially available lateral-flow (LF) urine 'strip test' assay - TB-LAM - that gives results in just 30 minutes. Uganda adopted this test in June 2017 for adult HIV+, presumptive TB patients who were very ill or with CD4 cell counts  $\leq 100$ . However, issues related to access and use (Reach, Effectiveness, Adoption, Implementation) were not well understood.

The IDI scientists commenced with an operational research study at 12 high volume health facilities to generate evidence for utilization of LF-LAM POC. The study identified barriers and facilitators, which have informed policy review intergration of the POC into the existing clinical algorithms, laboratory processes, information services, logistics and supply management.



LF-LAM image

Evidence - based dosing in complex populations .



### Dr. Christine Sekaggya

MBChB, MMED, Ph.D., FCP (ECSA)

Research Scientist at IDI and Internal Medicine Physician at Mulago National Referral Hospital.

Clinical pharmacokinetic studies (PK) are key in informing medication and dosing in patient care, thereby generating a body of evidence on the efficacy and safety of drugs. PK studies are performed focus on examining the absorption, distribution, metabolism, and excretion of an investigational drug or approved drug. At IDI, several PK studies were undertaken inform HIV care and therapy.

#### SAEFRIF- Christine Sekaggya

High dose rifampicin is efficacious but safety in HIV was unknown. The SAEFRIF set out to determine the safety & effect of high-dose Rifampicin on DTG/EFV concentrations.

The study enrolled 130 HIV infected with pulmonary tuberculosis (PTB), randomized to Rifampicin and to ART (for ART naïve).

Although high dose rifampicin decreased EFV and DTG concentrations, virologic suppression was not compromised.

#### PHINX - Christine Sekaggya

The PHINX study evaluates the safety and efficacy of the pharmacogenomic dosing for Isoniazid. In this study Isoniazid dosing is based on NAT2 genotype with fast and intermediate acetylators being given high dose isoniazid. Patients are followed up to determine safety, treatment outcomes and time to sputum conversion,

#### DolPHIN- Catriona Waitt

The DolPHIN study intends to address gaps in dosing of DTG in pregnant women with HIV. Our aim is to understand if once daily DTG given in late pregnancy is safe and leads to virological suppression.

We found that starting dolutegravir (DTG)-based ART after presenting in late pregnancy achieved more rapid virological suppression before delivery than those who started with an efavirenz (EFV)-based regimen.



#### DERIVE study-Catriona Waitt

The aim of the DERIVE study was determine if a model-predicted dose escalation of atazanavir/ritonavir could safely overcome the drug DDI with rifampicin at standard and double doses.

We found that doubling the dose of atazanavir/ritonavir (twice daily dosing) safely overcame the drug-drug interactions with both standard dose and high dose rifampicin

#### Impact



Our results contributed towards global health policy recommendations for the use of antiretroviral drugs during pregnancy.

Our findings informed decisions to adopt dolutegravir (DTG) as the preferred antiretroviral (ART) for women trying to conceive and throughout pregnancy for durable viral suppression

#### The 3HP tuberculosis (TB) preventive therapy PANDORA study

The PANDORA study is evaluating the safety of weekly rifapentine and isoniazid given for 3 months in both HIV infected and uninfected adults and children receiving TB preventive therapy.

We will determine the pharmacogenomic and pharmacokinetic predictors of drug-related adverse events in this population.





**Dr. Catriona Waite**

Professor of Clinical Pharmacology and  
Global Health

## Background

Clinical pharmacology include clinical trials of medicines and studies that measure the amount of medication that reaches different parts of the body, such as the bloodstream, the breastmilk and other body fluids – these are known as pharmacokinetic (PK) studies.

Together, these aim to generate evidence to ensure the dose of medication is correct, safe and delivered at the right dosage. Many PK studies are designed and given catchy code names. This is to ease reference to records and public engagement in PK. For example, the MILK program stands for Maternal and Infant Lactation PK study. The DoLPHIN multinational trial stands for Dolutegravir in Pregnant HIV mothers and their Neonates.

PK studies can be challenging. They require careful consideration of what is to be measured and how this will be analyzed. In some situations, there are no previous data on which to base a sample size calculation at all.

In that situation, you can do an interim analysis where you look at data from the first batch of participants and consider whether any adjustment to the study design is required.

Clinical trials need to be carefully designed and appropriate participants selected. While IDI has PK expertise and healthy volunteer studies, studies involving antiretrovirals and anti-tuberculosis drug interactions are not always possible among healthy volunteers who seem to be at risk of higher rates of toxicity levels, unlike participants who are already stable on current drugs. Examples of high-impact studies involving real-life complex populations include the SOUTH study which showed that current TB drug doses might be too low and the VirTUAL consortium which explores drug-drug interactions between TB drugs and second-line antiretroviral.

At IDI, the PK research community is increasingly focusing its niche on dose escalation studies that review the pharmacokinetics of medicines whose data show that there is a need to increase dosage for effective treatment.

Our team enroll healthy volunteer participants who are stable on such medicines (traditionally, people living with HIV on antiretroviral were not considered ‘healthy volunteers’), into a trial that increases drug dosage safely and correctly, while carefully observing for adverse effects and measuring drug concentrations.

New data are shared with the Ministries of Health and the World Health Organization, to inform drug policy reviews.

Also, it is essential that we communicate our findings back to the communities where the questions are most relevant – this includes many aspects of science communication and public engagement, and through the Wellcome-funded ATtaining EQUity of Access To Research (At The EQUATOR) grant we are building networks and structures to enhance science communication across the Research Department.

## Objectives

Design, delivery &  
analysis of relevant  
clinical trials

Capacity building in  
all aspects and  
incubating new ideas

Informing policy,  
practice and public

Increased external  
visibility and  
Transformation of  
Culture

Broadening  
collaborative network

Growing networks  
for PK knowledge  
exchange

## Ongoing Studies

### Clinical Studies

**MILK,  
VirTUAL, SAEFRIF,  
DoLPHIN-2, HARVEST  
DORIS, PANDORA,  
PHINX**

### Pharmacometrics

Analysis of specific  
studies  
Training mathematical  
modelers  
Hands-on mentorship of  
staff

### Laboratory Capacity

Novel Assays  
(different drugs and  
matrices,  
international  
collaborations)

### Public Engagement

Study specific dialogue  
training  
(social media, graphic  
design, media)



1

Genotyping capacity to inform drug initiation for a faster turn around

2

Mathematical models to address PK gaps in complex populations

3

Laboratory Infrastructural capacity building for PK studies

4

Pharmacokinetics capacity building for training and mentorship

5

Human Resource strengthening with post-PhD mathematical modelers



### Success Stories



Allan Buzibye running drug assays on the mass spectrometer at IDI Translational Laboratory. There are 15+ existing drug studies, 04 under development and 06 upcoming drug studies)



## Free Online Course

### FUNDAMENTALS OF PHARMACOMETRICS

*In this introductory course, you will learn the fundamental principles of pharmacology, biostatistics and mathematical modeling. Then, you will design and use mathematical models to describe the relationship between the amount of drug in the body (pharmacokinetics) and the effect of the drug on the body (pharmacodynamics).*



The PK team at IDI offers human resource capacity strengthening opportunities to enhance local capacity



A team of Public Engagement officers dialoguing with PK study-hosting communities

#### Ending Cryptococcal Meningitis death



**Assoc. Prof. David Meya**

MBChB, MMed and PhD

Cryptococcal meningitis (CM) is one of the main causes of death of people living with HIV (PLHIV). More than 1000.00 deaths occur annually in Africa south of the Sahara due to limited access to relevant diagnostics and treatment in resource-limited settings.

The bulk of donor support focusses on ART scale up as a requisite necessity, however, this is insufficient for ending AIDS deaths. The need to engage pharma to achieve a sustainable and affordable pricing in order to accelerate access to this medicine is imminent.

The pharmaceutical industry should be engaged to fund additional research and development into new, more effective treatments for CM with low toxicity, all-orally administered therapy or combination therapy.

There is limited systemic and community-based healthcare support to ensure that all people with CM are identified quickly and treated with the WHO-preferred regimen of flucytosine and amphotericin B.

Access to flucytosine is unacceptably low, with less than 35% of Africa's affected population accessing it. Most affected people who need the drug, never access it.

Missed opportunities in the screening for CM according to the WHO-preferred procedures should be addressed at national policy level, in addition to pre-emptive therapy for CM in people with AHD

A general motivational engagement took place between mentors and mentees before breakout sessions for subject-specific consultations. Some of the key statements and quotes by mentors are presented herein.

'Be flexible. Meet the other peers/circles they have mentored. Attend their lectures in a convenient settings' **Allan Buzibye**

Find out about the mentor's interests and engage them through their areas' of passion.' **Ms. Aidah Nanvuma**

The best question to ask oneself is, 'Why do you want to pursue a doctorate degree? Do you have passion for the lonely tedious journey that leads to a doctorate degree, award?'

"The Science Fair is a major 'One IDI' annual event for celebrating our contributions as medical researchers towards evidence for driving policies and practice globally.

It is also a platform for inspiring young researchers and informing partners who support the development of scholarly body" **Miriam Laker**,

A reading culture is very important as well. Constructive social media engagement and reading platforms will incrementally contribute to your knowledge base' **Dr Miriam Laker**

'Who am I?" is an important question in life. Do not try to be another person as you grow in your career. **Miriam Laker**

'Do not be ashamed to not know more or better; as a mentor or mentee' **Barbara Castelnovo**

We are happy to be contributing to TB diagnosis as IDI" **Dr Agnes Nakiyingi**

'Draw a line between persistent and annoying while engaging a mentor.' **Dr. Miriam Laker**

"It's not the availability of vaccines, but the ability to get vaccinated that will stop further transmission of Covid-19" **Judith Nanyondo**

"Build the personal before the professional relationship. Prove your capacity and commitment by completing initial tasks in a timely manner. Demonstrate interest and seriousness' **Dr. Catriona Waitt**

26

**Presentations**

900

**Registered**

12

**subthemes**

500

**Day 1 Statistics**

400

**Day 2 Statistics**

## PLENARY SESSION V

### Sub-Theme: Emerging Technologies for Infectious Diseases Prevention, Control and Management

The drones technology in the pandemics. Use of unmanned air vehicles (medical drones) to overcome geographical barriers to delivery of anti-retroviral therapy and medical samples



**Dr. Rosalind Parkes-Ratanshi**

Director of the Ugandan Academy for Health Innovations IDI

#### Use of unmanned air vehicles (medical drones) to overcome geographical barriers to delivery of anti-retroviral therapy and medical samples

**The Gap:** Untimely delivery of ART to patients under IDI's care in remote settings, as well as untimely picking of IDI clients' viral load samples from the health facilities that serve them.

**Proposed Solution:** Deployment of two types of drones – the Multirotor, which carries a higher payload of 4,000 and travels 30km distance and the VTOL drone (Vertical Take Off and Landing) with long distance (150km in air) and 2kg Payload capacity. Drones are just a form of transport The reason for using them is if they can be cheaper or faster or safer than both forms of transport.



**VTOL drone** (Vertical Take Off and Landing)  
Long distance (150km in air)  
Payload 2kg



**Multirotor**  
30km distance  
Higher payload of 4kg

#### Context:

These communities include 84 islands on Lake Victoria with a predominant fishing population, highest HIV prevalence in Uganda (27%), sparse health services sparse (18 facilities, 6 doctors), expensive and often risky means of transport (canoes and boats) as well as generally unmet need for health services. The West Nile region hosts two refugee hubs – the Rhino camp and Warr camp, both of which are potential hotspots for infectious disease outbreaks and rapid community transmission. The two refugee settlement camps are 64km and 52km away from the nearest certified COVID-19 testing laboratory respectively.

#### Approach:



##### Operational study design

- A non-randomised pilot on feasibility and acceptability was embedded in the implementation of the project in select districts.
- Sub-studies assessed the most feasible and safe transportation mechanism (drone/boat) for COVID-19 and STI samples.
- Research variables included Sensitivity and Specificity



##### Community Engagement

- Built a drone capacity development partnership
- Communities of Kalangala district (L.Victoria island), Moyo, Adjumani districts (West Nile region)



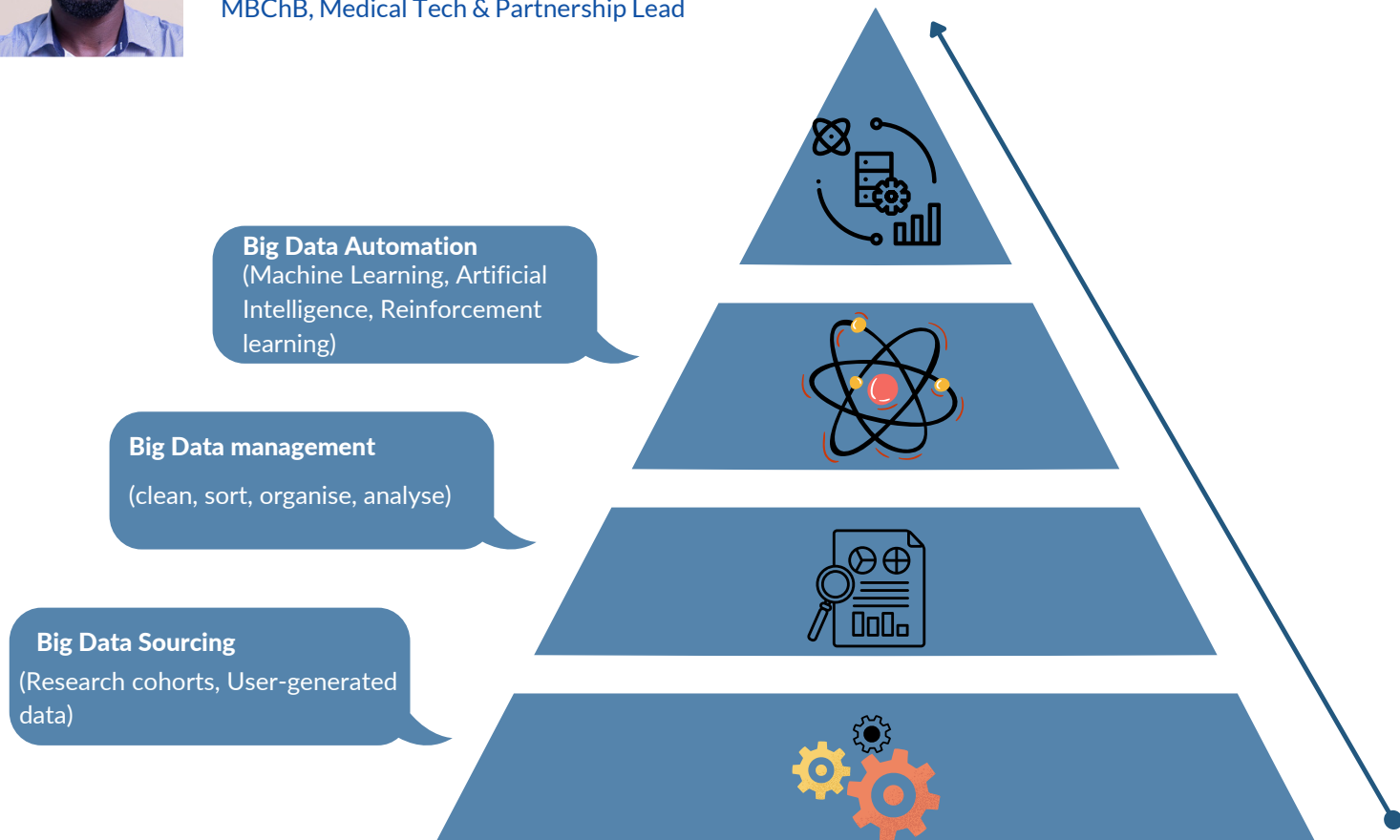
##### Monitoring and Evaluation

- Drone Engineering and Flight plans
- Research approvals
  - Data Collection
- Data Analysis
- Reports and Publications
- Best Practice utilisation efforts

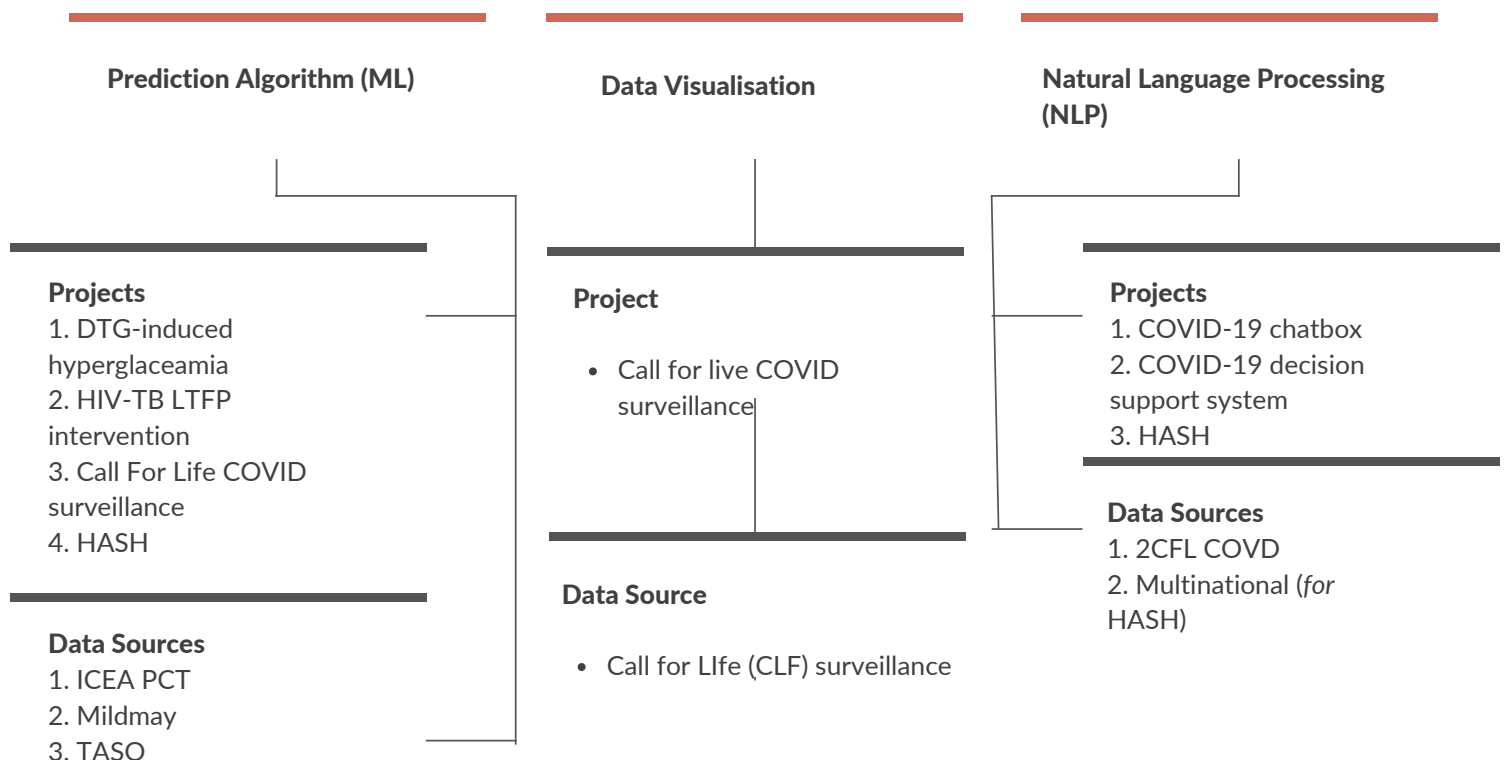


**Dr. Martin Balaba**

MBChB, Medical Tech & Partnership Lead



## Data Sciences projects at The Academy





## The MEMSCAP: The 'wise cap' Technology



**Clara Wekesa**

MBChB | Trial Manager, WISECAP Study

**Study Aim: To evaluate MEMSCAP technology for improved access and adherence to multi-drug resistant TB (MDR-TB) therapy**



The 'wise cap' trial is applying a MEMS adherence technology, working with MDR-TB patients. The Medication Events Monitoring System (MEMS) devices are electronic chips attached to the caps of medicine containers given to patients. The chips take count of each time a medicine container is opened to access medicine. The information stored on this chip is downloaded and read by the clinician, giving easily understood pictorial illustrations of the patients' patterns and rates of adherence to treatment, and this information helps tailor specific adherence counseling provided.

In this study, the MEMS technology will potentially support health workers to measure patient adherence to therapy remotely, and compare their adherence rates to patients in the directly observed therapy (DOTS) standard of care. Expected outcomes include better adherence to therapy and aversion of high costs and operational limitations associated with DOTS.

Some limitations with access to DOTS include high costs of commuting to health facilities on a daily basis, long clinic waiting times, and limited health personnel to adequately implement the DOTS strategy.

**Result :** Remote adherence monitoring for chronic infections, like TB, may help improve treatment outcomes and encourage more efficient use of limited resources.

## Tuberculosis Adherence Technologies

### The Call for Life- Uganda (CFL-U) TB technology



**Dr. Hope Mackline**

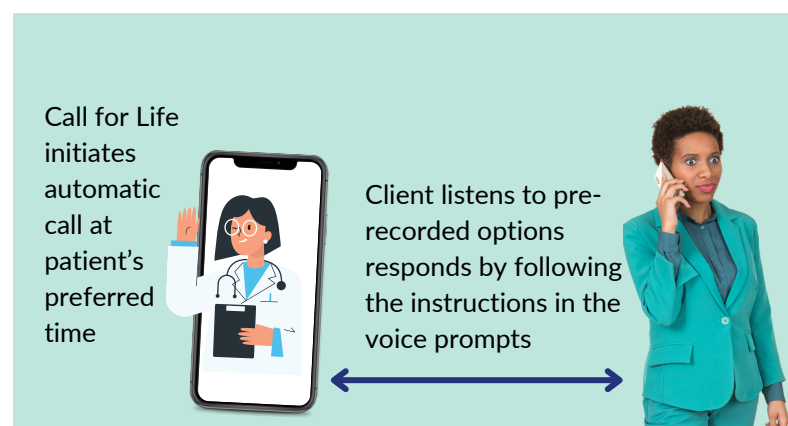
MBChB | Project coordinator CFL-U TB study

IDI's health innovations team leveraged its health technology expertise to address systemic challenges of ensuring adherence to tuberculosis (TB) therapy and improving treatment success rates in the country.

**Study Aim: Evaluate the utility of health technologies in differentiated service delivery for patients with both drug sensitive and drug resistant tuberculosis.**

The team designed and tested a mobile phone-based Call4Life mHealth tool (CFL-U technology) to efficiently automate calls to clients, send out health tips, manage symptom reporting, and generate pill reminders for adherence as well as auto-reminders for visit appointments for patients. CFL-U uses Interactive voice response technology (IVR).

A randomized controlled trial enrolling 274 drug-sensitive TB participants on treatment, assessed the effect of CFL\_U intervention on TB treatment success.



## Science Fair is a "One IDI" Event

The One IDI approach, which leverages the six technical program pillar experts, was deployed to execute the Science Fair.



The senior Heads of IDI supported Research Program Science Fair



Support department staff tuned in to the virtual science fair



The Head of Information Services monitoring IT functions of the Science fair broadcast.



Science fair panelists on the screen during the virtual event.

### Air Quality and Associations with Transmission of Infectious Diseases



**Ronald Galiwango**

MPhil, PhD,

#### Background

Africa is undergoing both an environmental and an epidemiological transition. According to the WHO, air pollution was responsible for 1.1 million deaths across Africa in 2019. Household air pollution accounted for 697 000 deaths and ambient air pollution for 394 000.

Ambient air pollution-related deaths increased from 361 000 in 2015, to 383 000 in 2019, with the greatest increases in the most highly developed countries.

The majority of deaths due to ambient air pollution are caused by non-communicable diseases. Monitoring air quality should be part of public health indicator monitoring in a seamless manner. Could ground-monitored air quality a viable and seamless alternative to aggregated location data collection?

#### Motivation for the study

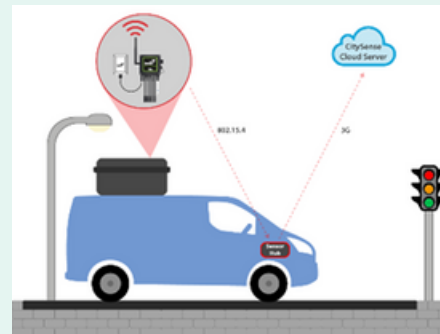
Aggregated mobile phone data is the most common means of measuring human movement at population level. However, it comes with ethical challenges and the GPS location can be restricted by the user. We thus explored the viability of using ground monitored air quality data as an alternative that is not affected by these factors.

#### Conclusions

- Government-restricted movements during the COVID-19 pandemic (aka lockdown) reduced pollution levels, although unsustainable
- Twenty-four hour average levels for air pollution were above WHO guideline limit despite lockdown periods, despite the restricted movements
- Air quality data depict movement patterns



**Figure 1:** Example of an air quality sensor installed in a city



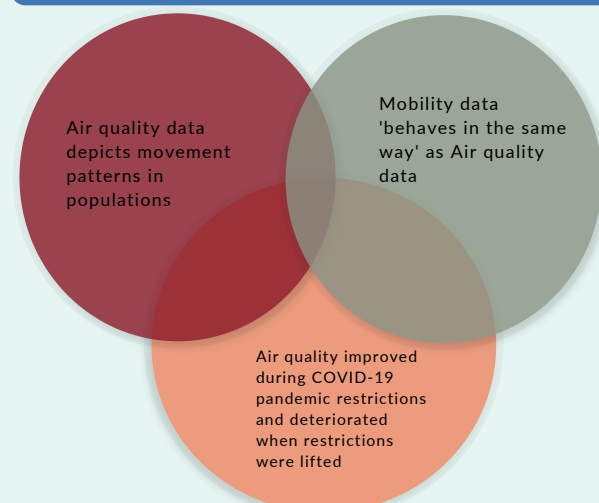
**Figure 2** Example of an air quality monitoring system integrated in vehicles

#### Study Approach

A unique mathematical model designed to use human aggregated mobility data derived from mobile phones with public settings for access and restriction of GPS location. Aggregated data is the main way of measuring population data

Mobility data was obtained from Google Community Mobility Reports, Google tracks movement in six kinds of places; grocery and pharmacy, residential, work places, retail and recreation, transit stations, and parks.

Data Types included Air Quality (AirQuo), Google Mobility, Nature & Timing restrictions, Government Response Stringent Index (GRSI), Uganda 2021 general elections period







**Gerald Mboowa**

Ph.D.

## Background

COVID-19 transformed pathogen genomics and changed the way we investigate disease outbreaks forever. From the start of this pandemic, genome sequencing informed scientists that they were dealing with a virus that hadn't been seen before hence the name novel coronavirus 2019-nCoV.

The prompt decrypting of the virus's genetic code allowed rapid diagnostics and vaccines to be developed at unprecedented rate. Since then, scientists have sequenced more than 11 million virus samples and continue to do so to track its evolution that has already seen at least five different variants of concerns (Alpha, Beta, Gamma, Delta and Omicron) emerge in just two years.

Genome sequencing has enabled scientists to monitor changes and detect these variants as they emerge and guide vaccine and diagnostic development.

With this information scientists can then track how specific forms of the virus are spreading locally, nationally, regionally and internationally.

It makes COVID-19 the first outbreak to be tracked in near real-time on a global scale which has helped with controlling the virus through genomics-informed public health decision-making.

Recently, genome sequencing is now being performed on wastewater from cities to predict possible emergency of new variants, giving the authorities sufficient time to advise on the best preventive options.

Africa is ranked position number four with over 120,000 SARS-CoV-2 genomes from 53 of the 55 AU member states generated and shared via GISAID (Global initiative on sharing all influenza data) during the ongoing pandemic and of which 96% sequenced by laboratories based in Africa.

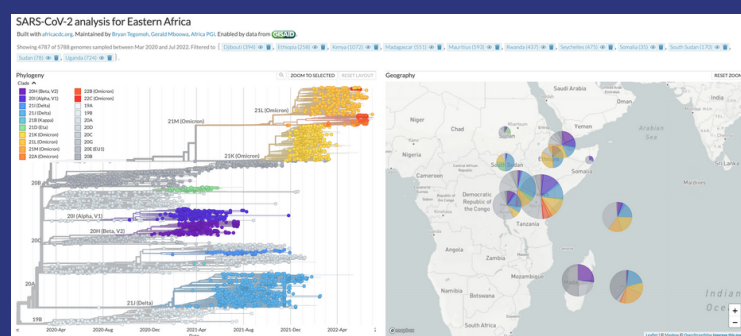
## The Gap in LMIC settings

Lack of technical capacity and infrastructure for pathogen genomic sequencing, genomic data analysis and big data computing

## Success Stories and Initiatives

Africa CDC institute of Pathogen Genomics (<https://ipg.africacdc.org/>)

SARS-CoV-2 sequencing network for COVID-19 and emerging pathogens (<https://nextstrain.org/groups/africa-cdc/>)



## Near real-time tracking of SARS-CoV-2 evolution (<https://bit.ly/3RHpCks>)

Attached is a picture from the training on SARS-CoV-2 Genome Sequencing and Bioinformatics by Africa CDC, the Institut Pasteur de Dakar (IPD) in Senegal; 25 Oct 2021 – 05 Nov 2021

## Challenges

- Long turnaround time (TAT) for sharing genomic sequences
- Limited funding and expertise to develop indigenous capacity of training institutions
- Unprecedented travel restrictions & quarantine requirements
- Timely distribution of sequencing reagent and supplies
- Delays in acquiring regulatory requirements | material transfer agreement (MTA): Import & export permits
- High costs associated with sample shipment, delays in flights/courier services and inavailability of dry ice.



# Chatbot: A natural Language Processing Tool for COVID-19 communication



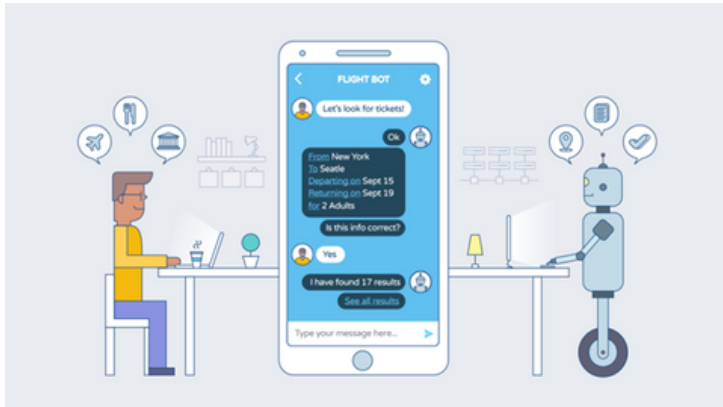
**Daudi Jjingo**

Ph.D.

Programme Director/PI for the Ugandan NIH H3Africa Bioinformatics Training Programme (BRECA) at IDI.

## Background

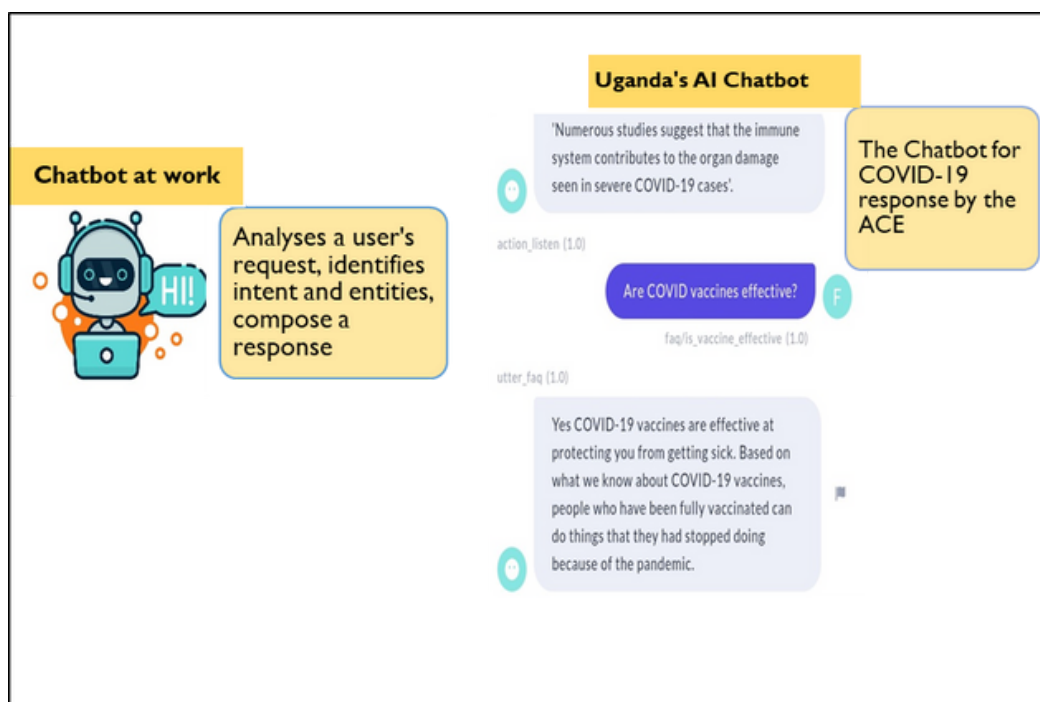
The African Center of Excellence (ACE) in Bioinformatics & Data Intensive Science (ACE) continues to explore innovations that speak to the fourth industrial revolution, including Natural Language Processing (NLP), a field of Artificial Intelligence (AI) that gives the machines the ability to read, understand and derive meaning from human languages.



Among innovations at the ACE is the concept of Chatbot – a friendly robo-advisor. Chatbots seem clever, but they are not. Computer programmers design them to spot patterns and repeat actions associated with human conversations, when triggered by keywords, phrases or other stimuli. They are adaptive & predictive in their learning curve. This means that if the input is poor, or repeats questionable statements, the chatbots behaviour will evolve accordingly. Chatbots combine the best of both the worlds (of written and spoken human language) in a fast, and convenient way to capture a conversation at front end while providing a solution at back-end. Many large corporations such as #Uber, #CNN, #UNICEF, #WhatsApp, are already using chatbots.

## Titbits

- An average human speaks 150 words per minute, while can only type 40 words. AI empowerment can harness the gap between spoken and written language.
- Worldwide, we send over 23 billion text messages a day on smartphones, and over 90% of the text messages are read in under 3 minutes.
- Whatsapp®, the most popular messaging app reported that they are now handling over 30 billion messages daily; a significant advantage due to the massive level of conversations a chatbot could perform with us



**"The greatest trick ever played by a Chatbot was to deceive a human into believing that it was human!"**

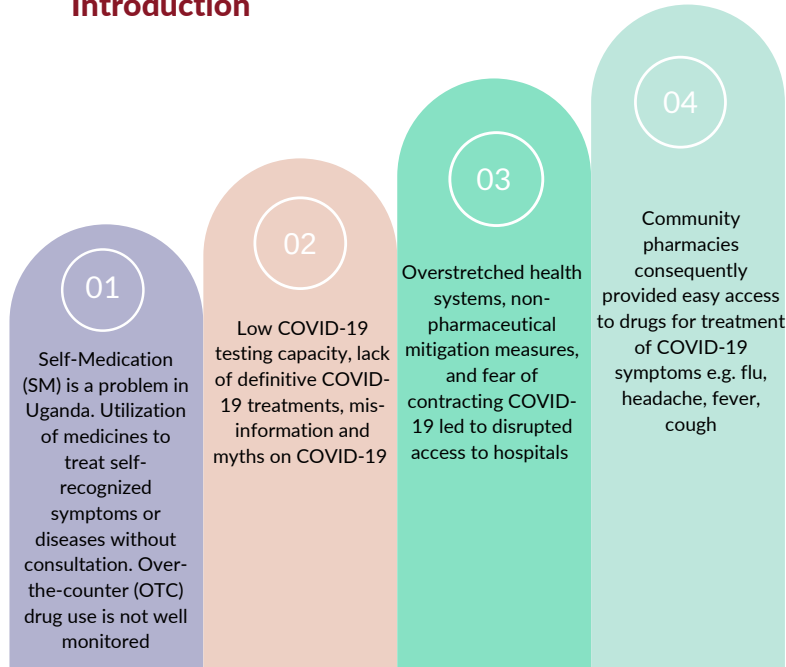
**Phani Marupaka, March 29, 2018. Chatbots of the future.**

# Data mining of pharmacy records to predict drug purchase for treatment of COVID-19 in Uganda



**Letisha Najjemba**  
Research Statistician at IDI

## Introduction



Persons in Uganda seeking community pharmacy services during the COVID-19 pandemic



In order to estimate the extent of SM for drugs used to treat COVID-19 symptoms, the study used community pharmacy sale e-records in Kampala Uganda.

**40** pharmacies enrolled in study  
(Jan 2018 – Nov 2021)

Data Use Agreements signed with 40 Pharmacy Proprietors

Data mined on **07** drugs associated with COVID-19 therapy

## Findings

- Antibiotics purchases (consumption) correlated with COVID-19 cases recorded at the community pharmacies
- Mining of Pharmacy records revealed changes in drug purchase
- Community pharmacy data records are a valuable source predicting health seeking behavior during pandemics and quantifying SM

## PLENARY SESSION VII

### Sub-Theme: Mobilizing Prioritized Groups for COVID-19 Vaccination



**Judith Nanyondo S.**

MPH, Senior Project Manager | Strengthening Partnerships for Preparedness and Response in Uganda Project

Achieving high coverage of COVID-19 vaccination in vulnerable groups is key to mitigating the impact of COVID-19. Uganda prioritised for COVID-19 vaccination employees in health facilities, educational institutions and security services, and those 50 years and older and people 18 to 49 years with comorbidities. After 5 months of COVID-19 vaccination, uptake was below 10% of national target among the elderly and below 5% among younger people with underlying illnesses.

With support from US Centers for Diseases Control and Prevention (CDC) and alongside other CDC support partners like Mildmay Uganda, Rakai Health Science Project and The AIDS Support Organisation, we initiated a project from month 6 to 11 to promote uptake in these groups by mobilizing stakeholders, examining gaps and influencing factors for vaccination uptake and later implementing uptake models within districts.

Vaccination outreaches were at point of care (clinic settings), at places of worship specifically targeting the elderly and vaccination near payment points for social security targeting the elderly.

The project has reached out to 75,098 individuals as detailed below:

CDC PEPFAR Partner/Sub-grantee	Number Vaccinated per Model				
	Point of care	Place of Worship	Place of Work/CSR	SAGE	TOTAL
Infectious Diseases Institute-Kampala HIV Project	4,096	27,284	2,711	694	34,785
Infectious Diseases Institute-West Nile HIV Project	427	330	1,000	13,731	15,488
Mildmay-Mubende	0	0	0	1,808	1,808
The AIDS Support Organisation (TASO)	787	316	1891	16,233	19,227
Rakai Health Science Program (RHSP)	3,020	570	200	0	3,790
<b>TOTAL</b>	<b>8,330</b>	<b>28,500</b>	<b>5,802</b>	<b>32466</b>	<b>75,098</b>



Engaging leaders of the Islamic faith on COVID-19 vaccination response



Engaging men and women in the army on COVID-19 vaccination response in Uganda



Intersecting Vaccination sensitization programs with government programs for the elderly



Leveraging Social protection programs for vaccination among the elderly



Leveraging financial institutions to access workers and their extended families



# PLENARY SESSION VIII

## Sub-Theme: Ongoing Challenges in HIV Malignancies

### Liver Cancer in Uganda in the Setting of HIV



**Prof. Ponsiano Ocama**  
MMed, PhD

#### Background

Liver cancer or Hepatocellular carcinoma (HCC) is the fifth most common cancer worldwide, second most common cause of death among males and 6th most common cause of death among women, especially in developing countries. Over 600,000 new cases of liver cancer are documented annually around the world and yet its timely detection and management remains very poor.

Partially, this cancer is poorly management is because of its longer interval before diagnosis, and its presentation at more advanced stage of disease.

In Uganda, general estimates of cancer survival indicate low chances of recovery from the disease for patients with a 2.3% / 5-year survival rate. Earlier studies showed that HCC patients (older than 30 years of age) in Uganda who were untreated had an average survival of one month.

Some of the reasons behind the poor chances of survival include limited diagnostic mechanisms, limited treatment options and low resources at community and family level.

In order to improve accessing HCC care in Sub Saharan Africa, a collaborative partnership between Makerere University and Johns Hopkins on HIV and HCC in Uganda; The H2U Consortium was formed to answer unresolved, high priority questions on the fundamental epidemiology and etiology of HIV-associated HCC.

#### Specific Objectives

- To enhance Ugandan investigator capacity for conducting high-level, collaborative, multidisciplinary scientific investigation of HIV-associated HCC
- To solidify the clinical, population and translational research infrastructure for the study of HIV-associated HCC in Uganda

- To advance the foundational understanding of the epidemiology, mechanisms, and clinical spectrum of HIV-associated HCC
- To inform prevention and treatment strategies applicable to HIV-associated HCC occurring in Uganda and similar resource-limited settings

#### Method

Studies were designed and categorized into two projects. Project 1 focused on HCC case-control.

The project aimed at understanding factors associated with HCC, HBV markers, co-infections including HIV and how they may influence chances of liver cancer.

Project 2 focused on HCC screening, aiming to describe the clinical presentation of HCC cases and determine the impact of HIV infection on the clinical presentation, and to assess the socio-demographic and clinical determinants of mortality among HCC patients in an African setting of high HIV-prevalence and antiretroviral (ART) use.

#### Findings

- Extremely short duration of survival among HCC cases in the Ugandan cohort
- Predictors of death included HBV infection, Schistosomiasis and markers of deranged liver function
- HIV-HCC does not appear to be associated with a different clinical presentation. However, but HIV-infected HCC cases had a slightly poorer prognosis compared to HIV negative HCC patients
- Screening of high risk patients for early HCC diagnosis linked to localized curative treatments will likely be required to modify this uniformly lethal disease

#### Future Direction

- A Schistosomiasis study investigating the mechanism of Schisto-HCC interaction, where this interaction occurs (liver and/or periphery)
- An expanded study H2A at Johns Hopkins University, Uganda and Senegal investigating;
  - Project 3 Aims: HBV antiviral treatment for HCC prevention
  - Project 4: Impact of Schisto (Sm) treatment on HBV course



# Updates on HIV-Associated Kaposi Sarcoma



**Dr. Helen Byakwaga**

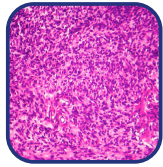
MBChB, MAS, PhD



**Dr Aggrey Semeere**

MB.ChB, M.Med, MAS, FCP (ECSA)

## Background



In Sub-Saharan Africa Kaposi Sarcoma (KS) continues to be a common cancer. It is associated with high morbidity and mortality in people living with HIV.



Delays and lack of adequate pathology services has made clinical diagnosis of KS common and reduced access to faster treatment. Exploring potential point of care approaches to KS could improve outcomes of care. We look at KSHV DNA and Image based diagnostics.

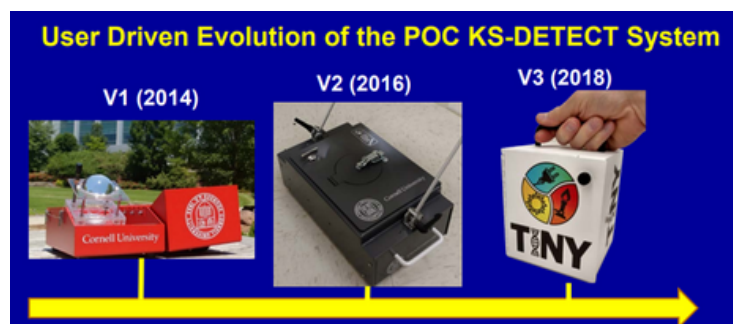


Further understanding of KS occurrence, as well as survival and determinants is critical in research to improve prevention and access to treatment

We seek to improve diagnosis and also understand why patients are still developing and dying from KS despite broader use of ART

## Ongoing KS Research

**User Driven Evolution of the POC KS-DETECT System: A KS-Detect technological Evolution, driven by local user feedback and field experiences**



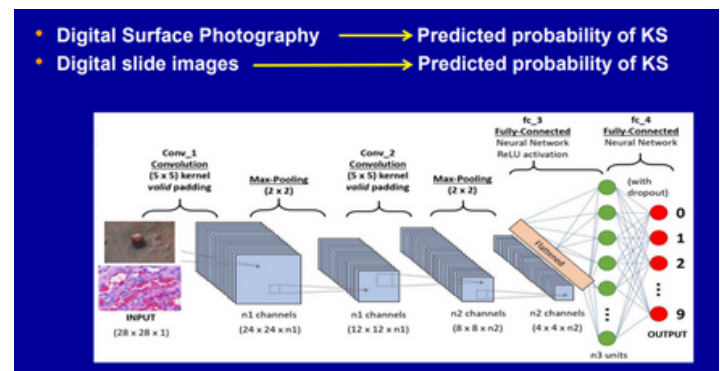
**Validating TINY in Clinical laboratories: A multi-site real world clinical evaluation of TINY in Sub-Saharan countries of Uganda, Kenya, Rwanda, Malawi, and Botswana.**



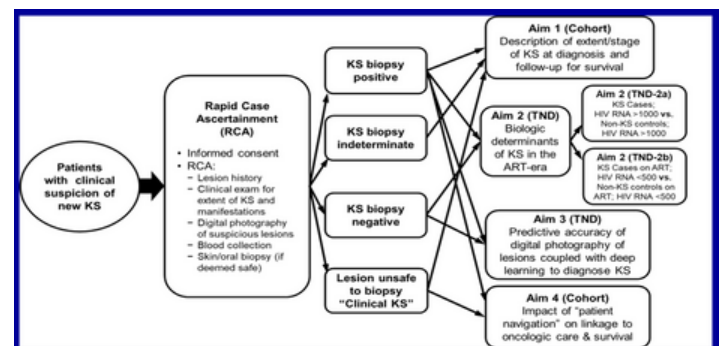
Based on the technology developed with TINY, the MINI, a 96-well device for high throughput testing to examine qualitative LAMP (loop mediated isothermal nucleic acid amplification) has been also developed in the US but is yet to be tested in Uganda

## Utilising big data for deep Learning Neural networks methodologies for machine learning to predict potential K

Image based approaches using Artificial intelligence from skin images of KS is also under development by our team and collaborators at UCSF and Cornell.



## Rapid Case Ascertainment (RCA) as a Tool for Epidemiologic Investigation and Linkage HIV-Infected Patients Diagnosed with Kaposi Sarcoma



RCA is being use to understand Survival after KS Diagnosis and its determinants

RCA is also being used to understand access to oncology care for HIV-associated KS

**Funding:** This work is supported by the US NIH via the NCI

## Sub-Theme: Accelerating and Sustaining Progress against the HIV epidemic in Uganda: an Implementation Science Approach

Innovating and scaling up of HIV prevention and care delivery approaches in challenging times



**Dr. Nelson Kalema**

M. Med (Internal Medicine), MAS (Epi-Biostat., Implementation Science) Program Impact Specialist supporting Data Utilization and Dissemination, HSS Department, IDI

The current trend for efficient HIV care is to 'leave no one behind in the national roadmap to achieve epidemic control. The Health Systems Strengthening Department (HSSD) at IDI supports the Government of Uganda to deploy proven differentiated service delivery models (DSSD) for TB and HIV with other comorbidities. These include HIV Recency testing, Social Network Strategy, a hybrid testing approach for adolescents living with HIV, offering Medical Assisted Therapy (MAT) services to reduce risk for HIV among people who inject drugs (PWIDs), stakeholder-informed client-tracker intervention to improve retention in care, and optimizing Intensive Adherence Counseling (IAC) for improved viral load (VL) suppression. The Health Systems Strengthening Department (HSSD) embeds implementation science and operational research protocols in these HIV/TB service delivery models at high burden health centers, to generate critical data for policy and programming.

### Ongoing Implementation Science Research

**Locating recent infections:** To stop onward HIV transmissions, the HSSD uses the P24 antigen recency testing (aka Asante in Uganda), to conduct surveillance among consenting persons with HIV, 15 years and above, to identify those with newly acquired HIV infection for early linkage to ART care and mapping of hotspots in the Kampala region.

**Case finding through Social Network Strategy:** HSSD implements innovative approaches for contacting, screening, and linking people with HIV and those at high risk of contracting HIV to prevention and care services. The social network strategy is well integrated alongside other proven testing interventions to improve reach and linkage to ART initiation, consequently contributing to the 1st 95.

**Improving HTS screening in children:** Implementation of hybrid community- and health facility-level HIV testing strategies, is improving yield above the national (Uganda) HIV prevalence, in ID-supported facilities and communities.

**Medical Assisted Therapy (MAT) Program rollout:** The HSSD supported the government of Uganda to innovate strategies to provide HIV prevention and care services to difficult-to-reach persons who inject drugs (PWIDs), including, during the period of the government-led restrictions to control the COVID-19 community transmission. HSSD ensured continuity of HTS delivery services through the use of the 'Coupon incentive model' for demand creation amongst peers, existing virtual platforms for communication and support. HSSD supported efforts to secure travel passes for bike riders and escorted referrals (40) for outreach services. HSSD constituted emergency legal response team (community para-legal) for MAT program clients needing legal aid services, and enhanced Peer Approaches for mobilizing clients from homes and hotspot areas.

**Retention Tracker:** HSSD successfully engaged stakeholders to contribute to an innovative approach to improve retention of clients in comprehensive HIV program care, resulting in the development of an innovative electronic retention tracker. The intervention successfully intensified follow-up actions of persons who had interrupted ART 12-months after initiation at six urban high volume facilities.

**Viral Load Suppression:** At the six high-volume health facilities in the Kampala region, HSSD supported the Uganda government to implement the World Health Organisation recommendation that 'all PLHIV failing 1st line should receive intensive adherence counselling (IAC), repeat VL, and switch to 2nd line ART'. HSSD implemented a multi-pronged, stakeholder-informed strategy, improving IAC completion from 81 to 85%, repeat VL from 82 to 93% and timely ART switch from 68 to 78%, demonstrating that the approach is feasible and scalable.

**Community engagement for TB control:** The USAID PACT Karamoja Activity under HSSD continues to build the capacity of Community-owned resource persons (CORPs) in the Karamoja region, to deliver patient-centred TB services.

**TB Differentiated Service Models:** In Kampala and Wakiso districts of central Uganda, the HSSD is supporting the Ministry of Health to improve TB treatment coverage and success rates embedded in TB-differentiated service delivery models. Through research, model-eligibility criteria for TB patient care have been reviewed, an X-ray voucher system introduced to improve access, and health workers at 14 high volume health facilities trained on how to integrate innovative models into existing HIV-TB service structures.

## Frailty in a geriatric cohort on long-term antiretroviral treatment in Uganda



**Dr. Barbara Castelnovo**

MD | Principle Investigator | Head of Research Program, IDI

Study aim: To create a research platform for implementation science, capacity development in screening NCDs and geriatric syndromes, including among people living with HIV



IDI's geriatric research builds upon The Decade of Healthy Ageing (2021–2030) that seeks to reduce health inequities and improve the lives of older people, their families, and communities through four collective action areas: changing how we think, feel and act towards age and ageism; developing communities in ways that foster the abilities of older people; delivering person-centered integrated care and primary health services responsive to older people; and providing older people who need it with access to quality long-term care.

Older age is often characterized by the emergence of several complex health states, commonly called geriatric syndromes.

They are often the consequence of multiple underlying factors and include frailty, urinary incontinence, pressure ulcers, falls, and delirium, and they often lead to negative outcomes such as dependency, disability, morbidity, and mortality.

The Research Program is implementing a prospective cohort with screening for NCDs, frailty, and other geriatric syndromes in people aging with HIV of 60+-year-old.

Data on various geriatric parameters are collected at baseline, year 1, and year 2 using tools that have been validated and adapted for African settings.

### Capacity Building in People Ageing with HIV Research



PhDs and Masters students specializing in NCDs among the ageing



Junior researchers, clinical and social scientists undertaking sub-studies



Junior researchers and students receiving training in geriatric medicine



IDI staff, junior researchers and students managing data on geriatric syndromes

**Future Direction:** Data will provide information on the feasibility and prioritization of introducing some of the evaluations for the screening of geriatric syndromes.

**Acknowledgment:** This work is funded by the European and Developing Countries Clinical Trials Partnership (EDCTP)/GSK through a senior fellowship award (TMA2017GSF-1936)



## Behind The Scenes

The One IDI approach, which leverages the six technical program pillar experts, was deployed to execute the Science Fair.





**Overall Theme: A Tale of Two Pandemics: Harnessing Science in a Rapidly Changing Landscape**

## **Day One: Thursday, February , 24, 2022**

12:00-2:50 pm **MEET-THE-MENTOR PANEL DISCUSSION** Dr. Miriam Laker-Oketta

Some Proposed Panelists

- Dr. Catriona Waitt and mentee Livingstone Kamoga
- Dr. Andrew Mujugira and mentee Rita Nakalega
- Mr. Allan Buzibye and mentee Denis Omali
- Under the guidance of the moderator, there will be opportunities to engage with mentors as well as matched mentees in the panel discussion.

2:50-2:59 PM BREAK (**CHECK CONNECTIONS AND PRESENTATIONS**) Mawazi and Edward

### **KEYNOTE ADDRESS**

3:00-3:20 pm Welcome remarks and presentation on IDI at 20 – Dr. Andrew Kambugu

3:20-3:35 pm Partnering with Research to Enhance Business Models – Mr. Tom Kakaire

3:35-3:40 pm DISCUSSION

### **PLENARY SESSION 1**

**Sub-Theme: It takes two: HIV Prevention for Key Populations and their partners** Dr. Joshua Musinguzi/ Dr. Peter Mudiope

3:40-3:50 pm Point-of-care HIV viral load testing at delivery for mothers and babies – Ms. Agnes Nakyanzi

3:50-4:00 pm Perspectives of integrated PrEP and harm reduction services for people who use drugs – Ms. Brenda Kamusiime

4:00-4:10 pm Implementing PrEP delivery for diverse populations in Uganda – Dr. Timothy Muwonge

4:10-4:20 pm DISCUSSION

### **PLENARY SESSION II**

**Sub-Theme: Access to Testing: Point of Care Testing and Process Innovation** Dr. Derek Armstrong

4:20-4:30 pm Increasing access to POC STI testing – Dr. Rosalind Parkes-Ratanshi and Dr. Agnes Kiragga

4:30-4:40 pm TB diagnostics and clinical research – Dr. Lydia Nakiyingi

4:40-4:50 pm The role of implementation science in improving access to point of care diagnostics - Dr. Stella Zawedde-Muyanja

4:50-5:00 pm DISCUSSION

### **PLENARY SESSION III**

**Sub-Theme: Tailored Therapy: Using Pharmacokinetics to Solve HIV and TB Treatment Challenges** Dr. Derek Sloan

5:00-5:10 pm Priorities and progress in pharmacokinetics – Dr. Catriona Waitt

5:10-5:20 pm Evidence - based dosing in complex populations – Dr. Christine Sekaggya-Wiltshire

5:20-5:30 pm DISCUSSION

### **PLENARY SESSION IV**

**Sub-Theme: Cryptococcal Meningitis: Counting down to Zero Deaths by 2030** Dr. Fiona Cresswell

5:30-5:40 pm AMBITION talk – Dr. David Lawrence and Dr. Jane Gakuru

5:40-5:50 pm End Cryptococcal Meningitis death – Prof. David Meya

5:50-6:00 pm Discussion

6:00 pm Departure

## Day Two: Friday, February 25, 2022

12:00-2:50 pm **INDIVIDUAL MENTORSHIP BREAKOUT SESSIONS** Ms. Aidah Nanvuma  
2:50-2:59 pm **BREAK (CHECK CONNECTIONS AND PRESENTATIONS)** Mawazi and Edward

### PLENARY SESSION V

**Sub-Theme:** Emerging **Technologies for Infectious Diseases Prevention, Control and Management** Dr. Agnes N. Bwanika  
3:00-3:05 pm The drones technology in the pandemics – Dr. Rosalind Parkes-Ratanshi  
3:05-3:10 pm TB technologies – Dr. Hope Mackline and Dr. Clara Wekesa  
3:10-3:15 pm The pyramid of data science – Dr. Martin Balaba  
3:15-3:25 pm Experience of Uganda Ministry of Health in adopting Tech during the pandemic – Dr. Paul Mbaka  
3:25-3:30 pm DISCUSSION

### PLENARY SESSION VI

**Sub-Theme:** **Big Data as a Game Changer for Global Health** Prof. Engineer Bainomugisha  
3:30-3:35 pm Air quality and associations with the transmission of Infectious Diseases – Dr. Ronald Galiwango  
3:35-3:40 pm Mining of community pharmacy data to estimate un prescribed drug purchases during the COVID-19 Pandemic – Dr. Agnes Kiragga  
3:40-3:45 pm Chatbot: A natural language processing tool for COVID-19 communication – Dr. Daudi Jjingo  
3:45-3:50 pm SARS-CoV-2 genomic surveillance in Africa: successes, challenges, and lessons learned – Dr. Gerald Mboowa  
3:50-4:00 pm DISCUSSION

### PLENARY SESSION VII

**Sub-Theme:** **Mitigating COVID-19 and its Impacts – Engaging Communities to Make Good Choices** Dr. Isa Makumbi  
4:00-4:10 pm Infodemics and misinformation – Ms. Tracy Ahumuza  
4:10-4:20 pm Dial COVID: Remote mitigation through telephone symptom surveillance in refugee settlements in Uganda – Dr. Timothy Muwonge  
4:20-4:30 pm Mobilizing prioritized groups for COVID-19 vaccination – Ms. Judith Nanyondo  
4:30-4:40 pm DISCUSSION

### PLENARY SESSION VIII

**Sub-Theme:** **Ongoing Challenges in HIV Malignancies** Prof. Jackson Orem  
4:40-4:50 pm Liver cancer in Uganda in the setting of HIV – Prof. Ponsiano Ocama  
4:50-5:00 pm Updates on HIV-associated Kaposi' sarcoma – Dr. Aggrey Semeere and Dr. Helen Byakwaga  
5:00-5:10 pm Cervical Cancer Screening in the community – Dr. Miriam Laker-Oketta and Dr. Miriam Nakalembe  
5:10-5:20 pm DISCUSSION

### PLENARY SESSION IX

**Sub-Theme:** **Accelerating and Sustaining Progress against the HIV epidemic in Uganda: an Implementation Science Approach** Dr. Fred Semitala  
5:20-5:30 pm Innovating and scaling up of HIV prevention and care delivery approaches in challenging times – Dr. Nelson Kalema  
5:30-5:40 pm Frailty in a geriatric cohort on long-term antiretroviral treatment in Uganda – Dr. Barbara Castelnovo  
5:40-5:50 pm DISCUSSION  
5:50-6:00 pm Wrap-up and Closing Remarks from ED  
6:00 pm DEPARTURE

# ACKNOWLEDGEMENT

This event was successful because the prolific contributions of the following

## **Event Organizing Committee**

**Research Program** - Paul Gonza, Henry Onen, Stephen Okoboi, Barbara Castelnuovo, Julian Paul Kabogoza, Aidah Nanvuma and others

**Communication Unit** - Tracy Ahumuza, Kenneth Mulindwa, Rebecca Nakitandwe, Abubaker Kazibwe

**Information Services** - Richard Senono, Medi Sekitty, Mawazi Odoa, Edward Onen

**Global Health Security Program** Program-Peter Babigumira, Ivan Lumu

## **Event Report Documentation**

**Programs Documentation & Utilisation Unit** - Asiimwe Caroline & Nyapendi Winfred

## **Event Sponsor**

Dr. Andrew Kambugu- The Sande- McKinnell Executive Director.

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