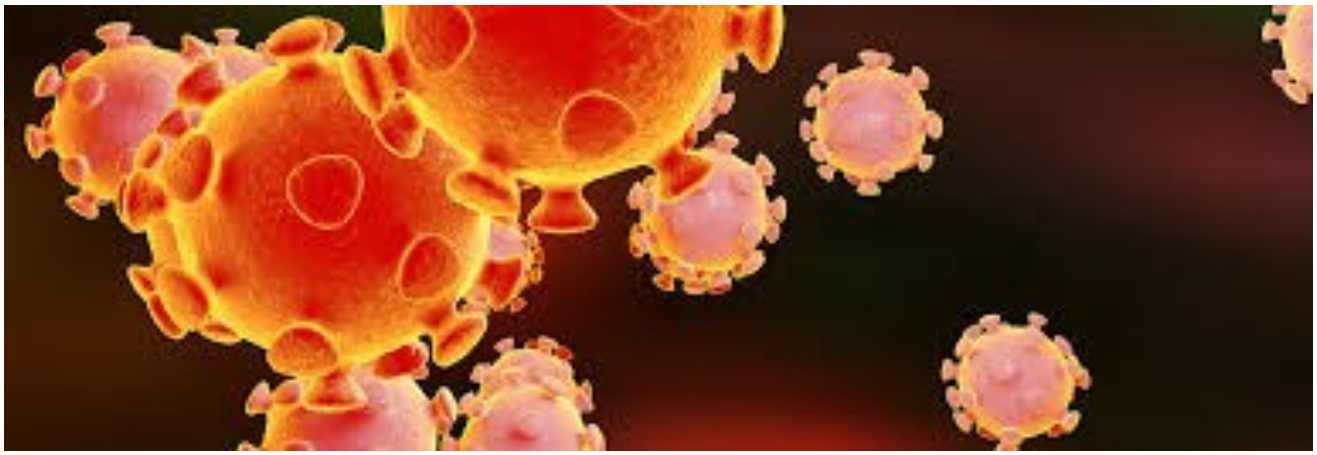
MRC/UVRI and LSHTM Uganda Research Unit

HEARTBEAT

The Quarterly Newsletter of the MRC/UVRI and LSHTM Uganda Research Unit Jan- April 2020



Coronavirus Disease 2019 (COVID-19)

"The virus infects and replicates in the upper airway and is spread in fluid droplets released by sneezing or coughing

Prof. Matthew Cotten
Senior Virologist
MRC/UVRI & LSHTM Uganda Research Unit
& MRC-University of Glasgow Centre for Virus Research, Glasgow, UK

Coronavirus Disease 2019 (COVID-19) is an upper respiratory infection caused by Severe Acute Respiratory Coronavirus 2 (SARS-CoV-2). The disease and virus were first noted in China in December 2019, possibly linked to a seafood market in Wuhan. The virus rapidly spread throughout the world, facilitated by global airline traffic.

Four months later there are more than 2 million cases reported globally with greater than 175,000 deaths. This articles summarizes the current knowledge of the virus and associated disease, how the virus spreads, the efforts to control the pandemic.

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Pamela Nabukenya Wairagala
Head of Communication and Engagement

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Editorial

Dear Readers,

This edition of the Newsletter comes to you in the midst of the COVID-19 pandemic and subsequent lockdown in the country. WHO declared the Coronavirus outbreak a Public Health Emergency of International Concern on 30 January 2020 and a pandemic on 11th March, 2020 after more than 118,000 cases had been reported in more than 110 countries and territories around the world. The Pandemic has taken its toll on the world; with deaths surpassing more than 175,000 by mid-April, four months after the Corona virus had first been detected in the Chinese province of Wuhan.

In response, the Uganda government issued guidelines to control the spread of covid-19 including the suspension of public and private transport and a 14-days lockdown starting mid-March. The lockdown has since been extended by 21 days which will on 5th May, 2020. We will keep you updated of further guidelines from the government.

In our cover article, Prof. Matt Cotton, a senior Virologist at the Unit shares with us the current knowledge of the virus and associated disease, as well as the efforts to control the pandemic. Do not miss this very informative piece and the numerous resource sites shared therein.

It's not been all about COVID-19 and nothing else at the Unit; we bring you updates from some of the meetings that were held during this quarter as well as work from 4 staff who completed and graduated from their PhD programmes.

And never underestimate the influence of a parent, especially a mother on their children. For Sheila Balinda, a suggestion from her mother that she might become a medical doctor led her to pursue a career in science, and like they say, the rest is history...Read about her post-doc work here.

Non Communicable Diseases are on the rise globally and Uganda is no exception, and the numbers are indeed staggering. We share an article on NCDs and hopefully, it will get you thinking about simple lifestyle changes you could make to reduce being at risk.

I hope you enjoy this edition and as always, look forward to your feedback. Do follow us on our various communications platforms for updates on what's happening at the Unit.

God bless you all, #StayHomeStaySafe

Comments from the Director

Prof Pontiano Kaleebu
Director - MRC/UVRI and LSHTM
Uganda Research Unit

Dear Colleagues,

Greetings from the Director's office and welcome to this edition of the Unit's Newsletter.

This edition comes out at a particularly unprecedented time, not only for the Unit but the entire world as we face the Coronavirus disease (COVID 19) pandemic. As a result, the Unit has had to make some adjustments, in line with the national guidelines including suspending non-COVID19 related research and advising staff to work from home. This was in line with the government guidelines to limit non-essential movement by suspending both private and public transport. Critical Unit functions have continued through this period, with limited access to the Unit facilities in Entebbe and at the field stations and most staff working from home. I appreciate all the staff that have continued working to ensure business continuity.

I am aware that this period is challenging to all of us, not only because of the lockdown, but the anxiety that comes from being in unpredictable circumstances and the risk that the pandemic poses. I however would like to urge you to adhere to the guidelines issued by the government, through the Ministry of Health and the HE the president, in a bid to control the spread of the pandemic.

I am glad to inform you that as part of the efforts to support the national COVID19 response plan, the Unit with funding from MRC/UKRI will support the UVRI with 10,000 diagnostic tests. Our labs and personnel are also available to avail further support to the national testing services provided by UVRI, should the need arise.

As you are aware by now, the Unit is undergoing a reorganization process following recommendations by a taskforce that was set up by the MRC (UK) and the LSHTM to address a big financial overspend at the Unit.

The taskforce identified external liabilities linked to the rapid increase in externally funded grants, and inadequate costing and charging out of core services as the main reasons for an overspend of over £1.2m. Independent audits by Price Waterhouse Coopers (PwC) confirmed that there was no fraud, nor was the overspend a result of the Unit's transfer to the LSHTM.

To ensure continuity and sustainability of the Unit's vital work, its business model has been reviewed to reduce its running costs, and consolidate and strengthen its activities.

The following recommendations made by task force, together with an independent scientific advisory board (SAB) have been adopted; (1) Closure of Good Health for Women Platform (GHWP) at Mengo following key populations; and (2) Closure and sale of Mengo field station.

The Mengo research site will be closed on 30th September, 2020. Efforts are on-going o ensure that all stakeholders, including the research participants know of the planned closure and the way forward.

We are in consultation with different partners on the possibility of working with them to continue with some of the projects in another model, including taking care of the patients currently under our care. This approach has some advantage in that research results under this arrangement may be more generalizable as opposed to being specific to a special clinic like our Good Health for Women Programme at Mengo.

I would like to reassure all staff that the Unit will make efforts to mitigate redundancies. Wherever possible, efforts will be made to relocate staff to other Unit sites or to let contracts run to their natural end dates.

Regardless of the actions to be taken, the Unit is committed to following all legal and ethical requirements both for staff and our clients as we reorganize.

It is important to note that the Unit will continue with its theme areas of research, namely HIV and Emerging infections, Chronic diseases and Cancer and Vaccines and Immunity, and that the re-organization will not affect the operations in Entebbe, Masaka and Kyamulibwa where the bulk of our activities are conducted.

Very reassuring also is the commitment from MRC Management Board that the MRC (UK) will provide additional funding to the Unit to enable it to strengthen its operational and compliance activities.

In light of the reorganization, I wish to inform you that Prof Philippe Mayaud, Head of Programme HIV Epidemiology and Intervention and Head of HIV and Emerging Infections Theme ceased to be the head of programme and theme at the Unit at the end of February 2020 and returned to LSHTM. He will however continue to be the PI of the ABBOTT studies in Mengo and Masaka and participate in the drafting of papers for the work he had been involved in and made significant contributions to. Thanks to Prof Mayaud for his contributions during the time he has been part of the Unit.

On this note, Dr Eugene Ruzagira was requested to take on the leadership roles of the HIV Epidemiology and Intervention Programme in the interim. Myself and Prof Janet Seeley will give him support in these new roles. In the interim, I will lead the HIV and Emerging Infections Theme.

To further strengthen the management and

leadership of the General Population Cohort (GPC), Dr. Joseph Mugisha was appointed GPC Coordinator. All research projects planning to access the GPC data, samples or the cohort should be discussed with him at application stage.

I congratulate Dr. Ruzagira and Dr. Mugisha and thank them for accepting these roles and request that you support them in these new assignments.

Congratulations also to Gyaviira Nkurununngi upon successfully defending his PhD and receiving the Garnham Medal, which is awarded annually to an outstanding research student completing a doctoral thesis in the area of basic or laboratory science at the London School of Hygiene and Tropical Medicine (LSHTM). Congratulations also to the following staff that have successfully defended and graduated with PhDs; 1) Nicholas Bossa (Makerere University), 2) Moses Egesa (Makerere University), 3) and Angela Nalwoga (LSHTM). The Unit is committed to promoting the capacity development of our staff and I encourage staff to explore the available opportunities through the Unit's Training and capacity building programme.

On a sad note, the Unit lost one of its long serving staff, Ms. Sulainah Nakasagga on 26th January, 2020. Sulainah was a GPC Survey clerk and was based at the Unit's Kyamulibwa field station, where she had worked with the Unit since its inception in 1989. We send our condolences to the bereaved family.

I take this opportunity to welcome staff that have joined the Unit during this period and I wish them fruitful careers at the Unit. I also would like to appreciate individuals that have worked with the Unit and left in the same period. Thank you for your contribution towards fulfilling the Unit's vision.

I encourage you to keep safe from COVID19. Together, we'll get through this.

Coronavirus Disease 2019 (COVID-19)

Important virus and disease features. The virus infects and replicates in the upper airway and is spread in fluid droplets released by sneezing or coughing. The virus has some stability in the environment, so surfaces contaminated by the virus may serve as a source for new infections. If a person touches a contaminated surface and then touches the nose, mouth or eyes a new infection may occur. The virus is disrupted by soap and water, detergents, dilute bleach or >70% alcohol hand sanitizers [1] so frequent handwashing or sanitizing is a good way to prevent virus transmission (*see Figure 1*).

sample. There is very little virus detected in blood or urine. Equally important are serological methods to determine if someone was infected or exposed to the virus in the recent past and if this exposure resulted in a protective immune response.

Why is SARS-CoV-2 so concerning?

This coronavirus strain has never circulated in humans so there is no immune protection against the virus in the community.

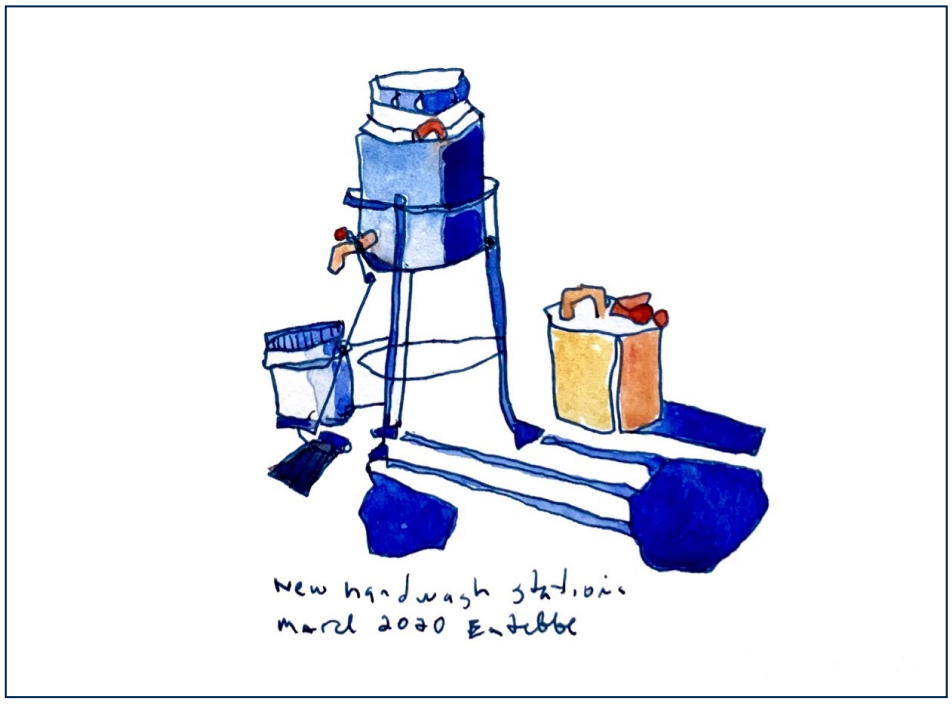

Figure 1 Hand wash stations at all entrances of The Unit.

Current diagnostics.

Methods of detecting if a person is currently infected with SARS-CoV-2 currently use real-time PCR detection of viral RNA in respiratory samples. Shortly after the SARS-CoV-2 were shared on 10 January 2020 [3], a sensitive and specific PCR assay was developed by Berlin scientists [4]. Standard samples that have been found to contain high levels of the virus are nasopharyngeal swab, oropharyngeal swab, sputum. Faecal samples may also be a useful

Initially the virus was reported to have an R0 >2-3 which means that each` infection will cause 2-3 new infections. With no interventions, this resulted in rapid spread of the virus through populations. Infected people, either detected or undetected, can spread the virus.

A small subset of the infected individuals is unable to control the virus from damaging their bodies, leading to a disturbingly high mortality in vulnerable populations.

Factors associated with more severe infections are age >60 years, heart problems, smoking. Even with a low percentage of severe cases, the total number of people infected by the virus is very high and the subset of complicated infections is overwhelming our health care systems.

Figure 2. Traffic in Kampala

What can be done to control the virus? We have three tools to control a viral epidemic: antiviral drugs, vaccines and quarantine/social distancing to prevent spread of the virus to new susceptible individuals. With drugs and a vaccine some months away, the current goals are to slow the spread of the virus to conserve hospital resources and to protect vulnerable populations. Health officials are using quarantine measures, social distancing, increased handwashing and efforts to limit movement and avoiding large social gatherings (Figure 2). The overall strategy is to reduce the number of severe cases to levels that our hospitals can manage, at least until treatments or vaccines are available.

There are large global efforts to identify new drugs. The WHO Solidarity trial https://www.who.int/emergencies/diseases/novel-coronavirus-2019/global-research-on-novel-coronavirus-2019-ncov/solidarity-clinical-trial-for-covid-19-treatments will accelerate the comparison of 4 drug regimens with standard of care, gathering important information about efficacy.

Initial efforts were to repurpose existing drugs including hydroxychloroquine (originally developed against malaria), remdesivir (developed to inhibit the Ebola virus RNA polymerase) and lopinavir/ritonavir (HIV protease inhibitors) perhaps with interferon beta.

Thinking more broadly, the Wellcome Trust/Bill & Melinda Gates Foundation/Mastercard Drug Accelerator effort https://www.gatesfoundation.org/Media-Center/Press-Releases/2020/03/COVID-19-Therapeutics-Accelerator will facilitate development and testing of new drugs and has the cooperation of a number of pharmaceutical firms to test extensive compound libraries to identify new anti-COVID-19 drugs.

The second major hope is a protective COVID-19 vaccine. This may be more challenging; the human immune response to the four common human coronaviruses is complex, allowing yearly re-infection but perhaps blunting infection severity. Human challenge experiments with another coronavirus 229E demonstrated a weak immune response that resulted in milder infections with the same virus 1 year later [2]. Groups are working hard to develop potential vaccines against the new coronavirus. Progress with vaccines can be monitored with this tracker from the Vaccine Centre at the LSHTM (https://vac-lshtm.shinyapps.io/ncov_vaccine_landscape/).

han and these data greatly facilitated generating PCR diagnostics, as well as protein reagents from serological work. Currently there are more than 8000 SARS-CoV-2 sequences publicly available in the GISAID data base [7], this is a rich resource for researchers trying to understand and help control the virus.

Open websites exploring these data (Nextstrain https://nextstrain.org/ncov/global) and reporting novel observations and analyses (Virological,org http://virological.org/) provide open forums for rapidly communicating information.

Figure 3. SARS-CoV-2 Sequencing

Keeping track of the virus globally

Many internet sites provide daily updates of COVID-19 global picture. The Johns Hopkins CSSE COVID-19 Dashboard [5] provides a particularly useful tool for following the virus https://coronavirus.jhu.edu/map.html.

Changes in SARS-CoV-2 proteins are monitored and reported at CoV-GLUE [6] http://cov-glue.cvr.gla.ac.uk/ - /home.

Full genome data from the new virus were quickly made available by scientists from Wu-

What is clear from the sequence data is the massive and rapid movement of the virus globally, with multiple strains from different geographical locations observed in each country. We are currently sequencing all available COVID-19 samples using Nanopore technology. This will provide information on where the virus/infection came from and will generate a database of Uganda SARS-CoV-2 sequences to facilitate tracing the virus movement through the country (***see Figure 3***).

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Strengthening Uganda-UK Research Collaboration

Prof. Moffat Nyirenda (2nd Right) Head of NCD theme at the Unit with visitors from NIHR

A team from NIHR-GHR visited the Unit in January to discuss opportunities to strengthen collaborative research between Uganda and the UK. They met with researchers at the Entebbe based MRC/UVRI and LSHTM Uganda Research Unit and also visited partner and collaborating institutions, including Makerere University.

Speaking at the meeting in Entebbe, Prof Pontiano Kaleebu expressed gratitude to the NIHR for their support towards the Unit's research on non-communicable diseases (NCDs). He however decried the low capacity for research in Africa. "The limited funding for research in Africa makes retaining talent and skilled staff a challenge, resulting in a limited critical mass of mid and senior level researchers", he said. He noted that the need to understand local context makes it harder to rely on support from partners in the north.

Prof. Moffat Nyirenda, head of the NCD theme at the Unit said that their ongoing work shows that that it is important to focus on early childhood, as it has been noted that factors that happen then predispose one to NCDs, late in life. "Our work is continually showing that a life-course approach is key in understanding, diagnosing and managing NCDs", he noted.

The NIHR team noted that the NIHR portfolio represents strength in NCDs and health systems and were glad with the work that is being done at the Unit. They noted that NIHR looks for impact of the research that is being funded.

Researchers noted the limitations in technology which make diagnosis difficult and very expensive and emphasized the need for prevention rather than treatment, especially in resource limited settings. They however noted that most of the NCDs could be prevented and emphasized the need to understand the social aspects of health to inform the design and implementations of research.

Characterizing Kidney disease in Uganda and Malawi

Some of the researchers at the ARK Network workshop in Entebbe

Researchers in Kidney disease from Uganda, Malawi and South Africa met in Entebbe to analyze data from their respective sites and to discuss ways of strengthening their collaboration.

As the key recipients of the 1st round of the GSK Africa NCD Open Lab grant, researchers from Malawi, South Africa and Uganda have in the last three years set up a collaboration dubbed the African Research in Kidney Disease (ARK Network) between the London School of Hygiene and Tropical Medicine, Malawi Epidemiological Research Unit, the Witwatersrand University and the MRC/UVRI and LSHTM Uganda Research Unit to characterize kidney disease in the three countries.

In Uganda, researchers screened 5500 participants from the Kyamulibwa based general population cohort and found that one in five people 18 years and above had an abnormality in their kidney function. 1100 participants were then recruited under the ARK network.

Each of the three sites recruited about 1000 participants using shared protocols to establish the best way to measure kidney function.

Researchers at the workshop noted that NCDs have become a major cause of morbidity and mortality. For example, 22% of the Unit's cohort participants above 18 years in Kyamulibwa where found to have hypertension in 2013, while among participants above 50 years, the prevalence of hypertension was a glaring 40%. Other NCDs like diabetes mellitus, cancer and chronic respiratory diseases are quite prevalent among the Unit's cohorts.

Kidney disease is a big problem affecting one in every ten adults worldwide, with the World Health Organization (WHO) estimating that 5-10 million people die annually from kidney disease. The high cost of treating kidney disease makes it a tremendous economic burden, especially in resource limited settings. Unfortunately, the best way to estimate kidney disease in sub-Saharan Africa has not yet been established.

Non communicable Diseases: A silent killer in Uganda

By Grace Godfrey Sseremba

Non-communicable diseases (NCDs) have proved to be a major public health concern globally. Also known as chronic diseases, they are medical conditions or diseases that are by definition non -infectious and non-transmissible among people. They often progress quite slowly and last for long periods of time. NCDs represent 46% of the global burden of disease leading to an estimated 40 million deaths each year, comparable to 70% of all deaths globally (WHO 2017).

An estimated over 80% of NCD premature deaths occur in poor countries, two-thirds of which are associated with childhood conditions or behaviors initiated as youths, moreover 17% increase in death is likely to happen over the next ten years (WHO 2017).

NCDs are s chronic, also referred to as 'lifestyle' diseases; they are not transferable from one person to another either through direct contact or vectors. They include diabetes, cardiovascular diseases, cancers, chronic kidney diseases and chronic respiratory disease (MoH 2016). In Uganda, like elsewhere in the world, NCDs are increasingly becoming common, mainly due to lifestyles changes.

The magnitude of NCDs among children, adults and the aging is high, though they are more common among adults and older persons. NCD risk factors are genetic, physiological, environmental and behavioral. They include unhealthy diets, physical inactivity, substance abuse and/ or misuse among others. According to WHO an estimate of 15 million of all deaths caused aby NCDs among people of 30-69 years emerge from unhealthy activities engaged in during their youthful age between 10-24 years.

Unfortunately, while the risk factors for NCDs are known, Uganda lacks up to date data on incident and prevalence as well as on morbidity and mortality due to NCDs. There is need to increase awareness on how to avoid or manage NCDs, especially among the rural communities that have for long believed the misconception that NCDs are 'diseases of the rich', as increasingly NCDs are being realized and diagnosed among the rural poor.

Today, we have a unique opportunity to act on this momentum and accelerate our efforts to help change the lives in this situation in Uganda. Ending NCDs requires a collective effort working across all sectors and at all levels.

What can be done? It requires everyone's effort to;

- Make diet changes; i.e. eating a balanced diet: with less or cholesterol free.
- Change lifestyle; e.g. avoid smoking and excessive alcohol consumption
- Regular medical check-up; i.e. always visit a health facility to assess health condition
- Adherence to medication; i.e. regular intake of medicines as directed by a medical personnel whilst maintain good adherence.

NOTE: Remember your health, is your responsibility

Researcher Spotlight: Sheila Balinda

For Sheila Balinda, her mother was, and still is, her greatest supporter. In fact, it was her mother's suggestion that she might become a doctor that she thinks led her to pursue a career in science.

Balinda joined the Medical Research Council/Uganda Virus Research Institute (MRC/UVRI) in 2015 after receiving her Ph.D. in virology through a joint program between Makerere University in Uganda and the University of Copenhagen, which was funded by the Danish government's development cooperation Danida. Now she is in the midst of her post-doc at the MRC/UVRI and London School of Hygiene and Tropical Medicine Uganda Research Unit in Entebbe.

One focus of her research is characterizing the degree of viral recombination that is happening among newly HIV-infected individuals in the country. The virus in Uganda is primarily clades A and D, with some viral recombinants. But Balinda's research has shown that the majority (71%) of transmitted founder viruses—the viral variants that are responsible for establishing an infection—inferred from 30 acute infection samples collected from IAVI's Protocol C study were actually clade A/D recombinants. This striking level of viral recombination has obvious implications for vaccine design.

Balinda is now comparing these six- to eight-year-old samples from Protocol C with samples collected more recently to see how the viral dynamics may have changed in that time. Although the analysis is still underway, so far she is finding that there is still a high level of ongoing viral recombination, with both clade A/C and A/D recombinants identified from these more contemporary acute-infection samples.

To do this work, Balinda spent time at Emory University in Atlanta learning how to isolate and amplify whole viral genomes. She feels fortunate to work at MRC/UVRI and to have access to state-of-the-art equipment and facilities available at this virology center of excellence, including next-generation genetic sequencing, as well as generous and talented mentors both in Uganda and abroad.

But that doesn't mean there aren't any challenges. "The main challenge is getting the assays up and running," she says. During her time at Emory she felt she could solve any problem right away. "When you come back to Uganda, it's a completely different story. But it's through such experiences that you grow as a person and as a scientist."

Balinda is one of the post-docs in IAVI's Vaccine Immunology Science and Technology for Africa (VISTA) program, funded by the U.S. Agency for International Development (USAID) and is also the recipient of a path-to-independence award from sub-Saharan African Network for TB/HIV Research Excellence (SANTHE) that allows her to recruit and mentor a master's student. With this support, she is now forging her career as a virologist. "I'm hoping to become a principal investigator or group leader in a research area relevant to Africa, secure independent funding, and continue to grow."

Gyaviira receives Garnham Medal for outstanding PhD research

Gyaviira Nkurununngi at his graduation ceremony at LSHTM's graduation ceremony on 20th February, 2020

"This award is a great achievement that I am very proud of, as it underlines the Immunomodulation and Vaccines (IVac) Programme's team ethic, collaborative efforts and outstanding peer and supervisory support. It emboldens me to further support and mentor peers and other up-and-coming scientists".

Unit scientist Gyaviira Nkurununngi was the recipient of the Garnham Medal at the at the LSHTM'S graduation ceremony held on 20th Feb 2020 February in recognition of his outstanding PhD research.

The Garnham medal is awarded annually to an outstanding research student completing a doctoral thesis in the area of basic or laboratory science. This year, this was jointly awarded to Gyaviira for his thesis on helminth-allergy associations in Uganda, and to Helen Wagstaffe for her work on the effect of viral vaccines on natural killer cell effector function.

Gyavira's work provides important insight into mechanisms underlying the complex epidemiological helminth-allergy trends in tropical countries such as Uganda. This is important for approaches aimed at reducing the impact of the on-going epidemiological transition on allergy prevalence in the tropics and for therapeutic strategies against allergy-related diseases.

The work produced several key results with regard to the emerging epidemic of asthma and allergy-related disease in low-income countries, and the role of helminth control and elimination in this process.

First, the work indicates that helminths are unlikely to be the only mediator of urban-rural differences in allergy risk, but strongly supports the idea that the balance between categories of antibodies (such as allergen-specific and total IgE) is associated with allergy disease outcomes. Second, this work highlights the difficulty of determining whether an allergy-related condition is truly "atopic" in an environment where agents, such as helminths, induce large quantities of cross-reactive carbohydrate (CCD)-specific antibodies which result in false-positive responses to tests (such as the standard ImmunoCAP assays) which use crude antigen extracts for antibody capture.

And third, in a completely novel result, the team identified a specific group of carbohydrate-specific antibodies that are associated with reduced risk of asthma, and which could be further explored, in future, in mechanistic and therapeutic studies.
Speaking about the award Gyaviira said, “This award is a great achievement that I am very proud of, as it underlines the Immunomodulation and Vaccines (IVac) Programme’s team ethic, collaborative efforts and outstanding peer and supervisory support. It emboldens me to further support and mentor peers and other up-and-coming scientists”.

This work was funded by the African Partnership for Chronic Disease Research (APCDR), Royal Society of Tropical Medicine and Hygiene (RSTMH), the European Academy of Allergy and Clinical Immunology (EAACI), and the Wellcome Trust.

Ugandan fishing communities; a sink for or a source of HIV from general populations?

Dr. Nicholas Bbosa

What informed this work?

I used molecular phylogenetic and modelling approaches to study the transmission dynamics of HIV in the fishing communities of Lake Victoria. Fishing communities are disproportionately affected by HIV relative to other high-risk groups and the general population in Uganda. However, the dynamics of how HIV spreads in the fishing communities and other neighbouring inland populations was not well understood although this is important in developing community specific interventions to control disease spread. With several reports documenting high figures for the number of new HIV infections from these communities, they have been thought to act as sources of HIV transmission and possibly driving the current HIV epidemic in Uganda. Nonetheless, evidence was lacking to prove that these communities are indeed sources of HIV-1 transmission.

What are the most important findings of your work?

This work showed that the fishing communities were sinks or net recipients for HIV transmission flow from the neighbouring general population located further inland. This negated the generally held assumption of the fishing communities being viral reservoirs or sources of HIV transmission.

Findings suggest that although fishing communities should be targeted due to the high numbers of new HIV-1 infections, interventions in the fishing communities alone would have limited impact in the local epidemic there.

Therefore, location focused interventions in the fishing communities should not limit the roll out of preventative measures in the neighbouring areas that could constitute of infection sources.

Who might eventually benefit from the findings of your work, and what would need to be done before we could achieve these benefits?

The Ministry of Health and its partners or collaborators involved in shaping public health policies related to HIV intervention in the country. UNAIDS and WHO recommended that countries understand their epidemics and respond by designing appropriate interventions.

Findings imply that HIV prevention ought to be tailored according to the characteristics of the epidemic in the target population in terms of whether a population is a source or sink the effective control of the HIV epidemic.

Bilharzia; which white blood cell components of the immune system target the blood fluke during the early stages of infection?

Dr. Moses Egesa

Bilharzia is a well-known disease affecting the fishing community. The disease is caused by a bloodsucking worm ("the blood fluke") that infests fresh water bodies. Unfortunately, the people in fishing communities need access to these waters to earn a living. A government programme treats those infected in some areas but most will be reinfected within months. A vaccine would help prevent repeated infections.
Although scientists have searched for a vaccine for more than 40 years, there is still no vaccine to use in the affected communities. Studies using mice have shown that the blood fluke is defenceless to the body's immune defences when it has just entered the host skin. My work was to gain a better understanding of how people living in a community where bilharzia is prevalent respond to substances ("antigens") of the blood fluke at the early stage of skin penetration.

The research question of the work examined which white blood cell components of the immune system ("B and T lymphocytes") target the blood fluke during the early stages of infection. In addition, the work also wanted to establish whether these immune responses were linked to people becoming reinfected or not. This work was conducted using blood samples of people living in a community where bilharzia is prevalent in Uganda. This information is useful when selecting the antigens of the blood fluke to consider for further evaluation as vaccine components.

What are the most important findings of your work?

We found that the antigens of the blood fluke induced inflammatory responses. This type of immune response is capable of killing the blood fluke within the skin as shown in mouse studies. Additionally, the human blood proteins ("antibodies") in response to these antigens were detectable. However, the immune responses to the antigens of the blood fluke were not were linked to whether people are reinfected or not.

Who might eventually benefit from the findings of your study, and what would need to be done before we could achieve these benefits?

The findings could be useful to scientists particularly regarding which vaccine antigens to select and prioritize. The blood fluke is a complex organism. This has made selecting the right blood fluke antigen(s) to consider for further evaluation as a vaccine component(s) a challenge. More work is needed to find which antigens of the blood fluke induce an immune response that is linked to whether people become reinfected or not after they have been treated. This would be the "right" antigen(s) to help design a modern bilharzia vaccine.

Determinants of Kaposi's sarcoma-associated herpesvirus seropositivity, viral DNA detection and cellular immune responses in Uganda

Dr. Angela Nalwoga (L)

Kaposi's sarcoma-associated herpesvirus (KSHV) is one of the eight herpes viruses that infect humans. Like other herpesviruses, KSHV infects people for life where it undergoes latency. Frequent viral reactivation from latency leads to infection of other cells as well as the development of KSHV associated disease. Of the eight human herpesviruses only KSHV and Epstein-Barr virus cause cancers in humans.

KSHV causes Kaposi's sarcoma (KS) cancer and two other B cell lymphomas. KS is a common cancer in HIV infected individuals but also occurs in HIV uninfected individuals. In Uganda, KS is the most common cancer in men and the second most common cancer in women. Mortality in KS patients is very high in Africa (greater than 30% in some areas) therefore prevention of KS development is the best public health intervention to reduce this mortality.

KSHV, the virus that causes KS is very common in Uganda and sub-Saharan Africa but rare in other parts of the world. Understanding the reasons behind the high transmission of KSHV as well as the high occurrence of KS in Uganda and Africa is important in planning ways of preventing transmission of KSHV and development of KS.

What are the most important findings of your research?

KSHV prevalence in rural Uganda was very high with a prevalence greater than 90% in adults compared to a prevalence of 69% in urban Uganda. Malaria infection, anaemia, early age of infection with KSHV, male sex, as well as *S. mansoni* helminth infection were associated with increased KSHV antibody titres. (increased KSHV antibody titres are a marker of viral reactivation and a predictor of KS development). Therefore, these risk factors may favour reactivation of the virus leading to viral spread and disease development.

Additionally, malaria infection was associated with increased KSHV viral load in blood while male individuals were more likely to shed KSHV in saliva than females. The mechanisms behind these associations will be further investigated.

About cellular immune responses to KSHV, we observed very low T cell responses in comparison to other herpesviruses. These responses highly varied between individuals without a dominant KSHV peptide. Mechanisms behind the low T cell responses to KSHV as well as factors affecting these responses are currently under investigation.

Who might eventually benefit from the findings of your study, and what would need to be done before we could achieve these benefits?

The entire African population, as well as HIV infected individuals and people undergoing organ transplant worldwide, would benefit from this research. The high prevalence of KSHV in the region puts a large population at risk of KS and other KSHV associated malignancies. Therefore controlling the identified risk factors play a big role in preventing KSHV acquisition and KS development. These factors may also impact other infections hence the effect may be transferred to other infections as well. Mechanisms behind these associations require investigations before interventions can be advised.

Remembering Sulainah Nakasagga

Sulainah joined the Unit 1989 and worked as a GPC survey clerk till 26th January, 2020 when she passed on.

Commenting about her death, Prof. Janet Seleey said, “I remember recruiting her in 1989. She did her job as the GPC survey clerk brilliantly for over 30 years”.

She was also part of the organizing committee for the Unit’s 30 year anniversary celebrations.

ARRIVALS

No.	Name	Title	Start date	Duty station
1.	Allan Buyinza	Field worker	27/01/2020	Entebbe
2.	Stella Bilibagwa	Nursing officer	01/02/2020	Kyamulibwa
3.	Naziifa Nakiibuka	Nursing officer	01/03/2020	Kyamulibwa
4.	Aggrey Muzira	Field worker	01/02/2020	Kyamulibwa
5.	Gift Ahimbisibwe	Laboratory Technologist	24/02/2020	Entebbe
6.	Angella Namuyanja	Laboratory Technologist	18/02/2020	Masaka
7.	Natalia Nyombi	Medical officer	27/01/2020	Entebbe
8.	Solomon Opio	Laboratory Technologist	18/02/2020	Masaka

DEPARTURES

	Name	Title	Last Day	Station
1	Georgina Nabaggala	Social Scientist	31/03/2020	Mengo
2	Edith Nalwadda	Research Assistant	31/03/2020	Entebbe
3	Billy Mayanja	Senior Scientist	31/03/2020	Entebbe
4	Rogers Salamuka	Office Attendant	31/03/2020	Entebbe
5	Brian Musenze	Field Worker	31/03/2020	Mengo
6	Isaac Kitabye	Field Worker	31/03/2020	Mengo
7	David Mubiru	Field worker	31/03/2020	Kyamulibwa
8	Michael Mulwana	Laboratory Technologist	07/02/2020	Masaka
9	Leo Kibirige	Field Worker	06/02/2020	Kyamulibwa
10	Kenneth Kugonza	DMA	31/01/2020	Mengo
11	Josephine Bayigga	Nursing officer	20/12/2019	Masaka
12	Erisamu Mulali	Field Worker	31/03/2020	Kyamulibwa
13	Joselyne Nansimbe	Medical officer	01/03/2020	Mengo
14	Victor Nanono	Nursing officer	01/02/2020	Mengo
15	Sulainah Nakasagga (Deceased)	Study Cleck	24/01/2020	Kyamulibwa
16	Mandy Mirembe	Scientist B	31/01/2020	Entebbe
17	Barnabas Natamba	Senior Scientist	31/01/2020	Entebbe

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