UGANDA PUBLIC HEALTH FELLOWSHIP PROGRAM

Field Epidemiology Track
Cohort 2020, Summary Book

THE REPUBLIC OF UGANDA
MINISTRY OF HEALTH

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

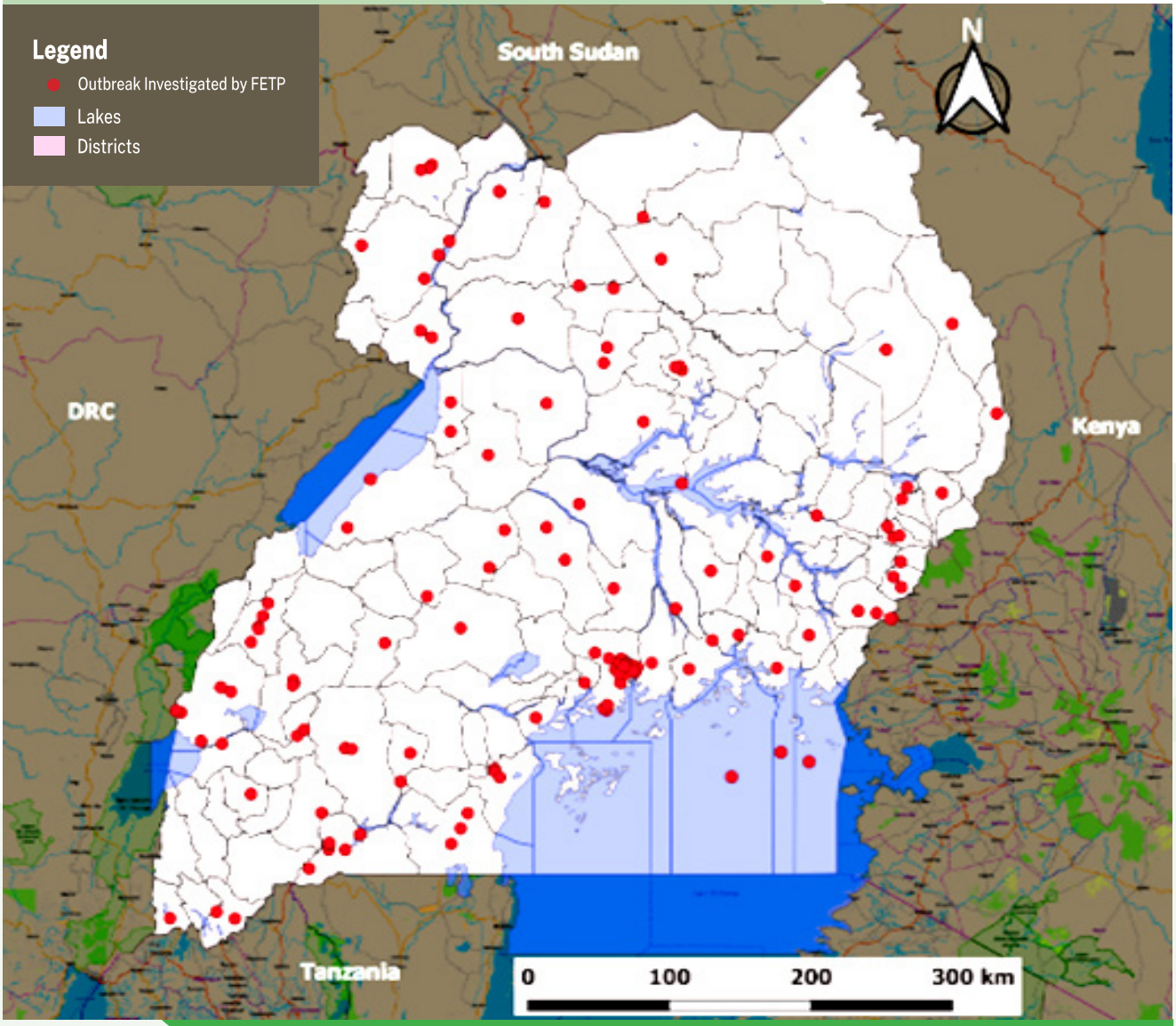
Makerere University
School of Public Health

UGANDA PUBLIC HEALTH FELLOWSHIP PROGRAMME (UPHFP)

A Parternship between Ministry, Makerere University School of Public Health and US Centres for Disease Control and Prevention

UPHFP TRACKS

- Field Epidemiology
- Public Health Laboratory Systems Strenghening
- Monitoring and Evaluation
- Health Informatics and
- Health Economics



Map showing outbreak investigations carried out by Fellows over the Fellowship Period, 2020 - 2021

DISCLAIMER

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PREFACE

The Uganda Public Health Fellowship Program (UPHFP) has enrolled 95 Fellows in Advanced Field Epidemiology since its inception in 2015; with the highest ever enrollment of 15 in 2022. Over the past 7 years, Fellows have conducted over 120 outbreak investigations most of them on high priority diseases of public health importance; thereby contributing to their effective management and control. They have also analyzed public health surveillance data and conducted evaluation of public health surveillance systems with the aim of improving detection of disease epidemic alerts and prompting early response. Within this short span, Fellows have implemented several projects.

In addition, Fellows have made numerous presentations at national and international conferences, winning eight awards including the prestigious CDC Director's Award for Excellence in Public Health and Response at the 2017 and 2021 EIS conferences. Fellows have made significant appearances in the local media, contributing feature articles on key topics of public health importance.

The publication of the Uganda Public Health Bulletin, where Fellows have participated very effectively as editors and article contributors is another tremendous achievement. Twenty four volumes have so far been produced since commencement of the program. In addition, PHFP has continued to contribute to the production of the Malaria Quarterly Bulletin, National TB and Leprosy Program Bulletin and Non Communicable Diseases Bulletin, where the fellows and other MoH epidemiologists and officers publish valuable public health information for consumption by the public and the scientific world.

The program has produced over 150 manuscripts, submitted to reputable peer-reviewed journals; 60 of which have so far been published and the other remaining ones have either been accepted or undergoing peer reviews at various levels.

In this report, we present to you the profiles of Cohort 2020 Fellows and their achievements over the two-year period of training in service while placed within priority programs or institutions of the Ministry of Health.

Dr. Henry G. Mwebesa
Director General Health Services

DEAN'S MESSAGE TO GRADUATING FELLOWS

On behalf of Makerere School of Public Health, I would like to congratulate the 13 graduates who have successfully completed their fellowship in advanced field epidemiology. We are proud of the hard work and dedication you have put forth over the course of your fellowship and are pleased to welcome you to the ranks of alumni of field epidemiology.

You should all be proud not just of your achievement, but also your flexibility, resilience and determination in shifting to online learning to complete your deliverables this past year because of COVID-19. I commend Cohort 2020 Fellows for adapting so quickly in the face of the unexpected challenges and unprecedented circumstances.

Throughout your stay with us, the strong work ethic, resourcefulness and creativity each of you has demonstrated has played a key role in your success, and I'm confident these attributes will continue to serve you well throughout your professional careers.

While much has changed in our world over the past few months, I take great comfort knowing that the you – our next generation of public health leaders, are well prepared to help us overcome the challenges of both today and tomorrow, and to find solutions that will address public health needs in the country.

I look forward to celebrating your success in person alongside family, friends, staff and fellows when circumstances permit. Until then, well done to each of you! Stay safe, stay connected, and take care.

Dr. Rhoda K. Wanyenze

Professor and Dean
Makerere Univesity School of Public Health

Alex Ndyabakira, MPH
Fellow Cohort 2020
Host Site: Kampala Capital City Authority
Mentor: Dr Okello A Daniel, Director Public Health and Environment
Email: andyabakira@kcca.go.ug

Alex Ndyabakira is a medical doctor with postgraduate diploma in project planning and management from Uganda Management Institute and Master of Public Health degree from Makerere University. Before joining the field epidemiology training program, he worked as a project coordinator at Infectious Diseases Research Collaboration where he designed and coordinated implementation of several community trials. He has published about use of incentives to promote health behaviours, HIV care and malaria.

During the fellowship, Alex was hosted at the Kampala Capital City Authority where he led the city COVID-19 response, air quality management and mentored staff in scientific writing through initiation of the KCCA public health bulletin.

Several achievements were attained at the host site for the COVID-19 response and air quality management:

COVID-19 Response

- Training surveillance teams, COVID-19 contact tracing, set up of emergency operations center and investigation of COVID-19 cases. Participated in the development of COVID-19 community surveillance system for transport hubs, arcades and workplaces, operationalized the Kampala metropolitan emergency operations centre for COVID-19. I represented KCCA on national COVID-19 Incident Management Team.

- Did rapid assessment of compliance to preventive measures to inform lockdown relaxation strategies, investigation of workplace COVID-19 clusters in Kampala city hospitals, factories, arcades and formal workplaces, as well as use of Human-centered design approach to develop a community-led COVID-19 strategy for slums in Kampala city.

Air QUALITY Management

- Coordinated and led air quality management for the city
- Participated in drafting of the Uganda air quality regulations, Uganda state of the environment report 2021 which focuses on environment in cities and the EAC air quality standards
- Led the formation of Uganda air quality working group and organized the 2021 air quality awareness week and which included several air quality awareness activities. Also raised and created more awareness about air quality through publishing air quality data on open map, developed a web-based public access link and published articles in the press, UNIPH/ KCCA Bulletin
- With funding from UN Environment and support from Environmental Compliance Institute, I led the development of clean air action plan for KCCA
- Undertook world bank funded training in air quality management, following a competitive selection process
- Appointed expert facilitator for air quality and Health at the University of Winston, Nelson Institute for Environmental Studies
- Appointed on permanent basis as supervisor medical services at KCCA which is a middle management position in KCCA structure.

Program Specific Achievements

- Analysis of longitudinal data from the Kampala city air quality monitoring network to assess its association with prevalence of cardiorespiratory diseases. We found that locations prone to high pollution also present high prevalence of cardiorespiratory diseases. We are using this data to design interventions to promote health in areas affected by high pollution.

- Led the public health response to a COVID-19 outbreak at Masaka Sssaza quarantine prisons which had affected 102 prisoners. We controlled the outbreak and recommended public health interventions to mitigate the risk of future outbreaks
- Participated in COVID-19 risk mapping along Uganda-Rwanda and Uganda Tanzania borders to establish the travel patterns to control importation of COVID-19 early in the outbreak.
- Led investigation of many clusters of COVID-19 outbreaks in hospitals, arcades, factories and formal offices in Kampala city and recommended/ implemented control measures. This was necessary given that these clusters happened at the start of the epidemic
- Presented 2 abstracts at both national and international conferences.
- Published an article about the public's responsibility in cleaning the air we breathe in New Vision, 3 articles in the UNIPH bulletin and 4 articles in the KCCA bulletin. I have co-authored on other 4 articles in the UNIPH/KCCA bulletins
- I have authored two manuscripts that are still being cleared by the PHFP secretariat. I have also co-authored six manuscripts that are at different stages of clearance.
- Conducted a continuous quality improvement project that led to improvement of OPD malaria data quality at Kabwohe HC IV, Sheema district by 80%
- Assessed the HIV/NCD care cascades for hospitals, health center IVs and health center IIIs which showed that care cascades were better at hospitals that at health centers. It also showed that there was no integrated NCD/HIV care at facilities lower than hospitals
- I was a mentor and trainer for the frontline FETP where I supported teams at Naguru referral hospital to implement quality improvement projects at the hospital. I am also member of the city health team and national Maternal and child health working group and division medical officer KCCA.

Next Steps

I have developed passion for urban health programing and in my new role as the supervisor medical services for the KCCA, I will continue implementing all the projects that are still ongoing despite the fellowship training termination. I will continue taking lead on air quality management as well as NCDs in the city, ensuring publication of the quarterly bulletin as well as mentoring the KCCA staff in scientific writing. As a visiting lecturer for air quality planning and Health at University of Wisconsin, USA, I will continue to foster collaborations with all partners in this sector.

Epidemiological Study

COVID-19 outbreak at a quarantine prison, Central Uganda, September 2020

Background

During September-October 2020, an outbreak of COVID-19 occurred at Masaka Ssaza, a COVID-19 quarantine prison (holding center for newly-sentenced persons before transit to their host prison) in Central Uganda. We investigated to identify factors associated with introduction and spread of infection in Masaka Ssaza prison.

Methods

We defined a case as PCR-confirmed SARS-CoV-2 infection in a prisoner/staff at Masaka Ssaza prison during September-October 2020. A control was defined as a prisoner or staff at Masaka Ssaza with a negative test during the same timeframe. We reviewed prison medical records to identify case-patients and interviewed prison staff to understand possible avenues of introduction of infection and opportunities for spread. We conducted a case-control study interviewing prisoners and staff to determine factors associated with spread of the infection. Logistic regression was used to assess factors associated with infection.

Results

The index case was Inmate A, a 33-year-old male who entered the prison on September 16, 2020. On September 23, Inmate A learned that a colleague with whom he had close contact before imprisonment had died of COVID-19. He immediately reported this to prison authorities, prompting mass RT-PCR testing of all 254 prisoners at the prison on September 30, revealing three cases, including Inmate A. Additional follow-up testing of 251 prisoners confirmed 98 cases on October 15. On October 29, testing of 153

prisoners confirmed one case. The overall attack rate was 40/100. Ward-specific prisoner density ranged from 0.3-2.1 prisoners/m2 and prisoners were observed to congest at ward entrances and at mealtimes. Face mask ownership among case-patients was 35%. Using a face mask all the time was protective (aOR= 0.03: 95% CI 0.01-0.09). Residing in Ward 6 was associated with increased odds of infection (aOR=7.4; 95% CI 1.6-3.4).

Conclusion

COVID-19 was likely introduced into Masaka Ssaza prison by an infected incoming prisoner. The outbreak may have been amplified by congestion in wards and at mealtimes and low use of preventive measures. Importantly, consistent use of face masks was protective. Unrestricted access to handwashing facilities, facemask use, and strict adherence to 'do not enter another ward' rules could mitigate risk of future outbreaks.

Key words: COVID-19, Quarantine prison, Uganda

PICTORIAL NARRATIVE

Alex briefing UPDF officers at KCCA, during a morning meeting before field work. These were part of the 40 officers who had been deployed at KCCA to beef up surveillance and contact tracing of returning travelers, at the start of the COVID-19 response

Alex taking oath at Golf Course Hotel Kampala, upon being appointed into public service as a supervisor medical services for the Kampala Capital City Authority. Looking on is the Director of Public Health and Environment, also the host mentor Dr Okello A Daniel.

Alex takes a picture with the US ambassador to Uganda during her visit to the Uganda National institute of Public Health. He briefed the ambassador about the projects that the fellows had undertaken in support of the national COVID-19 response.

Alex takes a picture with the US ambassador to Uganda during the launch of the intermediate FETP, at Mansion Hotel in Jinja city. Alex received a prize from the ambassador for the great work as a mentor for this program

Alex (in while top) takes photo with the NEMA ED Dr Okurutu, KCCA Director of Public Health and Environment Dr Daniel Okello and Professor Beinomugisha of Makerere University Soft ware Center during the press conference to mark the 2021 air quality awareness week at Uganda media center

Aggrey Byaruhanga
MLT (Mak), BSc (Mak), MPH (Mak),
Advanced Field Epidemiology Fellow
(MakSPH, MOH & CDC)
Host Site: AIDS Control Program
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FELLOW'S PROFILE

I hold a Master of Public Health, Bachelor of Science in Environmental Health and a Diploma in Medical Laboratory Technology all from Makerere University. I joined this program in 2020 and what captured my mind is the hands-on training in applied epidemiology and public health leadership. I have aquired vast knowledge and skills in project planning and management, epidemic preparedness and response, coordinating response to public health emergencies, surveillance, international health regulations, scientific writing skills, large database management and analysis, and implementing quality improvement projects in health service delivery. These have enabled me to significantly contribute to epidemic preparedness, control of communicable and non-communicable diseases, participate in disease intelligence and take lead in outbreak investigations in Uganda. With no doubt, I have attained a spirit of excellence and problem-solving skills in my practice as an epidemiologist. During my time as a Fellow, I was attached to the STI/AIDS Control Program (ACP). While there, I led various national level trainings and supervisions, supporting mainly the strategic information and the prevention arms of the program notably the HIV Recency Surveillance Project.

Key Achievements at ACP

- National trainer HIV Recency Surveillance project.
  - Trained health workers on the implementation of Recency in the regions of South western, Northern, Kalamoja, Eastern and Central region.
  - Led site activation teams for Recency testing in various health facilities in the same regions.
- National trainer for Covid-19 surveillance: Conducted various trainings in Private health facilities in Kampala, Mulago National Hospital. I also supported 8 districts of Bunyoro region as a supervisor, contact tracing for COVID-19
- Participated in the ACP M&E strategic plan writing
- Part of the writing team for the HIV epidemiologic status Report

Outbreak investigations and other projects

- I led an investigation of a cluster of COVID-19 cases among workers in a factory making personal protective equipment in Buikwe district, Uganda
- I also led health worker trainings in 5 districts of Bugisu sub region (Namisindwa, Bududa, Sironko, Manafwa and Bulambuli) on how to detect malaria out breaks using malaria channels
- I designed and implemented three projects, one looking at the COVID-19 Testing Turn Around Time (TAT) & the effect of COVID-19 on Early Infant Diagnosis and Viral Load Test TAT in Government Health Laboratories in Uganda, 2020,

Secondary, an economic evaluation estimating the cost of managing COVID-19 patients in government health facilities in the first three months of the COVID-19 pandemic in Uganda

Thirdly, Predictors of HIV free survival among HIV exposed infants up to 18 months of age in Rwenzori region sub-region, Uganda, 2019 – 2020

- I co-investigated an outbreak investigation of measles in Isingiro district, south western Uganda, 2020
- I co-investigated an epidemiological characterization of COVID-19 cases in Northern Uganda, 2020
- I participated in a study Assessing the Insecticide Treated Mosquito Nets ownership and utilization and barriers associated, immediate after mass campaign and 6 months post mass campaign in Kyegegwa district, Uganda, 2021
- Participated in an Investigation of Malaria Deaths in Kikuube District, Western Uganda, 2021

- Participated in the formulation COVID-19 Infection Prevention Control policy (IPC) in collaboration with Ministry of Health, Centers for diseases Control & Prevention and Infectious Diseases Institute, 2020

Aggrey Byaruhanga, Conducting training on HIV Recency Testing at Infectious Diseases institute (IDI), Kampala, 2021

Conference Presentations

- Oral Presentation on Estimating the cost of managing a COVID-19 in government hospitals during the first three months of Covid-19 pandemic in Uganda, at the 6th National Field Epidemiology Conference, Kampala, 2020
- Oral presentation on Investigation a cluster of COVID-19 cases among workers in a factory making personal protective equipment in Buikwe district, 2020 at the 7th National Field Epidemiology Conference, Kampala, 2021
- Poster presentation on Investigation a cluster of COVID-19 cases among workers in a factory making personal protective equipment in Buikwe district, 2020 at the 1st International Conference on Public Health in Africa organized by African Union and Africa CDC, 2021

Written Communication

- Editor of issue 4 volume 5 October-December, 2020 Uganda National Institute of Public Health (UNIPH) epi bulletin
    - Authored one article in the UNIPH epi bulletin
    - Estimating the cost of
- Managing a COVID-19 patient in government hospitals during the first three months of the pandemic in Uganda
- Policy Brief: Counting deaths in Uganda: history, challenges, and what is currently being done amidst COVID-19 Pandemic
- Newspaper Article: Why we should maintain social distancing during the COVID-19 pandemic on 29th April, 2020

Manuscripts Written

- Investigation of a cluster of COVID-19 cases among workers in a factory making personal protective equipment, Buikwe district, 2020 in BMC Public Health under review
- Estimating the cost of managing COVID-19 patients in government hospitals during the first three months of the pandemic in Uganda, 2020, under CDC clearance
- Predictors of HIV free Survival among HIV Exposed Infants through 18 months of age in Rwenzori Sub-region, Western Uganda, 2019 – 2020 under CDC clearance
- COVID-19 Testing Turn Around Time (TAT) & the effect of COVID-19 on Early Infant Diagnosis and Viral Load Test TAT in Government Health Laboratories in Uganda, 2020 under CDC clearance

Skills/Lessons Learnt

During the fellowship, I learnt and developed the following skills

- Conducting outbreak investigations
- Project desining, implementation monitoring and evaluation
- Scientific writing and presentation; Manuscripts, Abstracts and Policy Briefs
- Editorial skills for scientific articles
- Public speaking
- Data collection and analysis with different soft ware
- Networking skills
- Evaluating and strengthening surveillance systems

Next Steps

I hope to use all the aquired knowledge and skills to impact my community through expert service where need arises. I also hope to mentor those after me in this program if given an opportunity to do so.

Aggrey Byaruhanga presenting findings at 7th Uganda National Field Epidemiology Conference and findings from an Investigation of a Cluster of COVID-19 cases among Factory X Workers in Buikwe District, Uganda

Immaculate Akusekera

Bachelor of Veterinary Medicine, MSc CEB Muk
Host Site: National Animal Disease Diagnostics and Epidemiology Centre, Entebbe Uganda
Host Mentor: Dr. Deo Ndumu Birungi
Email: iakusekera@musph.ac.
Tel: 0788109081/0700345335

PERSONAL PROFILE

Dr. Immaculate Akusekera holds a bachelors degree of Veterinary medicine and a Master of Science in Clinical Epidemiology and Biostatistics from Makerere University. During the two years fellowship training, she has gained skills in investigation of public health emergencies, non-scientific communication, scientific communication, or dissemination. She developed her leadership skills, skills in reporting of public health events and analysis of public health surveillance data. She also trained and prepared policy briefs during her stay on the fellowship. She interfaced and used analysis software like epi-info & STATA for analysis of the data that was generated during the implementation of the various projects, she therefore improved the analysis skills gained during her masters education. She additionally disseminated her findings by sharing several articles for publication in the Ministry of Health quarterly epidemiological bulletin, technical reports, and manuscripts. She has implemented several projects including a quality improvement project, one HIV project, COVID 19 projects and Anti microbial Resistance projects during which she developed a skill of coordination, organizing meetings, leading implementing teams successfully. She has developed a career in one health issues and AMR and she has implemented projects and write ups around this subject matter.

Before she joined the program, Immaculate worked as the District Veterinary Officer in Kibaale District. The investigations led during her stay on the program included: measles outbreak in Nakivaale refugee settlement, COVID 19 cluster among Health Care workers, Malaria mortality in Kakumiro, an assessment of bed net coverage and usage in Kibaale, time to graduation and factors associated among orphans and vulnerable children supported by Baylor in the Rwenzori region, KAP towards AMR among farmers, KAP towards COVID 19 during the early phases of the pandemic and response to the first community case (case with no known travel history in Masindi) Additionally, she supported the surveillance of COVID 19 deaths and cases in Fortportal, Mubende regional referral hospitals.

She is currently supporting the mentorship of field epidemiologist trainees from Entebbe regional referral hospitals and is an editor for the National One Health bulletin.

Achievements at the Host site: National Animal Disease Diagnostics and Epidemiology Centre (NADDEC- Entebbe)

- Analyzed and described the trends and distribution of the monthly surveillance reports from the District Veterinary offices to the National animal disease and diagnostics center in Uganda;2016-2020.Following the analysis,she designed a project to improve reporting from selected districts that had recorded zero reporting during the analysis period.
- Participated in the review of the reporting tools used by the district staff.
- She supported and participated in the evaluation of One health institutions in Uganda. This was led by the ILRI/BMZ One Health Research, Education, Outreach and Awareness Centre (OHRECA) whose outcome was to help OHRECA know where to focus efforts in partnering with the government and other one health stakeholders in Uganda.
- She supported the compilation of the National one health bulletin which they successfully published on 10 September and are still supporting the editing.
- Drafted guidelines that would be followed while around animals during the COVID 19 pandemic. These were urgently needed since a lot was unknown regarding the role of animals in the transmission of the deadly virus.
- Drafted SOPS to be followed while vaccinating animals against FMD and other diseases during the COVID 19 epidemic since the vaccination was also a potential source of spread of the virus among the animal handlers and the veterinarians

Fellowship program specific achievements
Mentored intermediated fellowship

- Participated for two days in a workshop during which the Field Epidemiology training programme for the intermediate trainees was launched by the Hon Ambassador of the US. Following this launch, she was allocated a group of trainees to mentor from the Entebbe Regional Referral Hospital. She supports the team to conduct their epidemiological investigations and compile their reports
- She trained frontline field epidemiology trainees from the 19-24 September in Mbarara.
- Participated in the scientific writing training where she enriched her skills of writing Public Health Bulletins (PHB)
- She participated and applied skills in writing policy briefs using existing data following a highly mentored data to policy training organised by the U.S CDC, following the training they developed and disseminated a policy brief "Adopting compulsory vaccination of dogs in Uganda" to eliminate rabies deaths in Uganda.
- Supported the National COVID-19 response team with compiling a detailed literature review write up and report to help inform decisions while responding to the rising number of Health care worker infections in Uganda.
- She was an editor for the July-September 2020 UNIPH Epidemiological Bulletin
- Conducted a malaria surveillance training with emphasis on malaria Normal channel drawing and use for detection of outbreaks in Eastern Uganda.
- She investigated COVID 19 cases in Fort portal and Mubende isolation centres and also built capacity for the district teams to epidemiologically investigate future COVID 19 cases
- She supported compilation of qualitative data for all COVID 19 deaths in Uganda
- During her stay on the program, She led the following investigations:
    - Improving monthly reporting of Veterinary surveillance data from Kibaale District to the ministry (NADDEC), Uganda May 2021
    - Lead an investigation of a COVID-19 hospital-initiated cluster in Abim Hospital in October 2020.
    - KAP on COVID-19 during the early phases of the epidemic in Uganda, April 2020
    - Trend and spatial distribution maternal deaths in Uganda over the last 5 years
    - Knowledge Attitudes and practices towards Anti-Microbial resistance and Use among selected farmers in Nakaseke and Wakiso Districts, September 2021
    - Measles outbreak in Nakivaale refugee settlement in Isingiro District, Febraury 2020
    - Predictors and Time to Graduation from Orphans and Vulnerable Children (Ovc) Programmes in Fort-Portal Region, Uganda: June 2021

- Co-Investigator on the following outbreak investigations:
    - Investigated malaria Insecticide treated bed net ownership and utilisation in Kibaale District following a mass distribution.
    - Investigation for the Malaria mortalities and morbidities in Kakumiro District; Jan 2020 to May 2021.
    - I was actively involved in response to the first COVID 19 Community case in Masindi District May 2020. Our team was particularly supporting the district with follow up of contacts, data management, quarantine set up, surveillance, reporting and leadership for response.
    - Co investigated COVID-19 Knowledge, Attitudes and Practices among Refugees in Nakivaale refugee camp

Conference Presentations at the Field Epidemiology conferences held in Kampala 2020 and 2021

- Measles outbreak in Nakivale refugee settlement: Isingiro district, Uganda, February 2020
- COVID-19 cluster within health facilities in Abim District, Uganda: October 2020

Publications and manuscripts written

Manuscripts:

Missed opportunities for isolation of measles case-patients propagated a measles outbreak in Nakivaale refugee settlement Uganda: February 2020

Delayed COVID-19 suspicion and long result turnaround time led to a HCW cluster in, Abim District, Uganda: October 2020

Epi-bulletin articles in the National Institute of Public Health quarterly bulletin:

- Submitted an article entitled "COVID-19 cluster within health facilities in Abim District, October

2020" for publication in the NIPH epidemiological bulletins.
- Published a Newspaper article in new vision on 24 Nov 2020 on "The public has the biggest role to play in slowing down the rising trend of anti-microbial resistance

Summary of Measles outbreak investigation in Nakivaale refugee settlement

Measles outbreak propagated by not isolating measles case-persons: Nakivaale refugee settlement, Isingiro District, Uganda: February 2020

Background: On 20 February 2020, four months after a single-dose mass measles immunization campaign targeting children 9 months-17 years in Uganda, a measles outbreak was reported in Nakivale refugee settlement in Isingiro district, southwestern Uganda. We investigated the outbreak to determine its scope, identify risk factors for transmission, and recommend evidence-based control measures.

Methods: We defined a case as an acute illness characterized by a generalized maculopapular rash lasting ≥3 days and fever, plus one or more of: conjunctivitis, cough, and/or runny nose in a Nakivale refugee settlement resident. A confirmed case was a suspected case with measles-specific IgM (+). We reviewed medical records and conducted active community case-finding. In a case-control investigation involving probable case-persons and age- and neighbor- matched controls, we evaluated possible exposure factors for association with illness. We calculated one-dose vaccination coverage by calculating the percentage of controls with a one-dose self-reported vaccination history.

Results: We identified 79 case-persons (attack rate [AR]=6.3/10,000), including five confirmed cases; 21 (32%) had arrived at the camp after the vaccination campaign had completed. Forty-four (56%) case-persons reported no measles vaccine history, of whom 24 (55%) were camp residents during the vaccination campaign. Children <5 years (AR=27/10,000) were the most affected age group, while children aged 5-18 years and those >18 years had similar attack rates (2/10,000). Rushasha sub-county residents (AR=45/10,000) were the most affected by the outbreak. The epidemic curve revealed a propagated outbreak with a 29-month-old index case, a longstanding camp resident who was reportedly vaccinated in the recent campaign, having onset on 7 December 2019 (6 weeks after the campaign). Among all exposures evaluated, only sharing a household with a case-person was associated with infection (43% of case-persons vs. 24% of controls, OR=2.9; 95% CI=1.2–4.7). Self-reported vaccination history against measles was not protective (OR=0.5; 95% CI=0.2-1.6). The single-dose vaccination coverage was estimated at 46%.

Conclusions: Only household exposure to a case was associated with illness in this measles outbreak. Vaccination status was not associated with case status; the reasons are unclear but may relate to limitations of self-reporting or vaccine challenges. Vaccination coverage was below the required herd immunity levels of 95%. We recommended supplemental measles vaccination of all susceptible camp residents, vaccination of all new camp arrivals, community health education on signs and symptoms, and early detection and isolation of measles cases.

Key lessons learnt during the fellowship

- Improved communication skills; Train and mentor health teams.
- Presentation skills; clearly presented my investigations in conferences
- Improved scientific writing skills (proposal/ protocol writing, report and manuscript writing skills have greatly improved)
- Project Management (Gained experience in conducting projects to completion)
- Improved data analysis skills especially advanced analysis
- Expanded professional Network (Got to know a number of persons instrumental in my profession)
- Improved analytical skills (Deeper understanding of elements)
- Public speaking

NEXT STEPS

I plan to continue supporting the Districts and the country with my enriched skills of epidemiology and also continue supporting the One Health initiative in Uganda.

PICTORIAL AND NARRATIVE

Immaculate Akusekera (dressed in yellow dress) assessing bed net use and coverage in Kibaale District following a mass bed net distribution.

Immaculate (standing in a black dress) training FETP frontline epidemiologists in Mbarara

Immaculate (dressed in a black and yellow blouse) investigating the measles outbreak in Nakivaale refugee settlement, Isingiro District.

Immaculate (dressed in a black dress) during a response to the first community case of COVID-19 in Masindi District; here they were supporting the mass screening in a closed community where the case had contacts.

Bob Omoda Amodan

BEHS (MUK), ADHSM (IUIU), MPH (MUK), MSc (IHE-Delft) & Advanced Field Epidemiology Fellow (UPHFP)
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Host Institution: Ministry of Health, Uganda National Expanded Program on Immunization.
Host Mentors: Dr. Alfred Driwale

FELLOW'S PROFILE

Bob Omoda Amodan holds a Master of Public Health Degree from Makerere University, School of Public Health. Before joining the fellowship program, he pursued another Masters in Sanitation from the Netherlands. Bob has worked with both government and nongovernmental establishments for over 10 years. He has implemented and managed several public health interventions ranging from surveillance, improving institutional and household WASH services, immunization, Nutrition, HIV, neglected tropical diseases, and malaria in Busia, Teso, Karamoja and West Nile sub-regions in Uganda. The practical aspects critically linking the above-mentioned public health programs with epidemiology/ surveillance, and scientific communication were clear gaps exhibited during his career before he joined this fellowship program.

The fellowship has made Bob gain advanced outbreak detection and investigation skills, multitasking abilities, policy briefs and funding proposal development, scientific writing, presentation and publication skills, rapid management/leadership and technical capacity building abilities, operational and strategic planning, clear and timely documentation, healthcare systems strengthening, coordination and advocacy skills. Additionally, Bob is proud of the strong research methods, large database management and analysis (Epi info, STATA, SPSS), and GIS mapping skills, among others.

Whereas Bob has written and published a number of manuscripts, bulletin, and newspaper articles, he is also a scientific reviewer in PLoS ONE, BMC Public health and Journal of Public health in Africa. In addition, Bob is a very interesting presenter, who has made presentations in both national and international conferences, including NFEC, PEPFAR summit, E. African FETP conference, FETP international Nights, IANPHI webinar and ICEID. Notably, he got a best presenter award in the East African FETP conferences on COVID-19 in November 2020.

Bob's supervisors and peers recognize that he is a hardworking, jolly, outgoing, respectful, and above-all, honest person. He speaks his mind easily, and has very strong team-work and negotiation skills. Following his accomplishments in the fellowship program, Bob has no doubt that he will excel as a Public health specialist and Epidemiologist for enhanced global health security.

Host Site Achievements

Host site: Uganda National Expanded Program on Immunization

The Uganda National Expanded Program on Immunization (UNEPI) is a national program that mainly targets infants and women of childbearing age. Immunization is among the most successful and cost-effective public health interventions in preventing a child from dying before celebrating his or her first birthday. It is a priority intervention within Uganda's minimum health care package, which directly contributes to the Ministry of Health vision and goal.

The program offers the following services:

1). Routine Immunization services which are provided through static (health facilities), outreaches services (strategic community based monthly post).
2). Supplemental Immunization Activities (SIAs) which are organized periodically to interrupt the transmission and spread of diseases like measles or polio eradication and MNT elimination.
3). Accelerated routine immunization.
4). Surveillance and Outbreak response

To support the role of UNEPI, I was involved in the following:

- I joined UNEPI during COVID-19 outbreak. One of first roles was participating in the development of the National guidelines for management of COVID-19 in April, and June 2020 revised version.
- To increase access and demand for immunization services in the country, the fellow took lead in the understanding the Knowledge, attitudes and barrier to uptake of COVID-19 vaccine among Ugandans in February 2021 before the vaccine became available. The findings were presented to the National Risk communication and vaccine committee. It was impactful in such a way that our recommendations were received for inclusion in the Information, education, and communication materials for COVID-19 vaccine. He also wrote two newspaper articles, titled: "Rush for a COVID-19 vaccine when it becomes available to the public" And "Access to vaccines is a human right". All those articles emphasized that government will provide COVID-19 vaccine and people should demand for the service. This study resulted in written products such as:
  - ✓ **A report** -submitted to the UPHFP.
  - ✓ **Manuscript titled:** "Knowledge, Attitudes and Barriers to Uptake of COVID-19 vaccine in Uganda, February, 2021". Authors. **Bob Omoda Amodan**, Patricia Thiwe Okumu, John Kamulegeya, Alex Ndyabakira, Geoffrey Amanya, Daniel Jacob Emong, Aggrey Byaruhanga, Job Morukileng, Alfred Driwale, Alex Riolexus Ario, Julie R. Harris, *Under journal review*
  - ✓ **Conference presentation titled:** "Knowledge, Attitudes and Barriers to Uptake of COVID-19 vaccine in Uganda, February, 2021". Presented at FETP international nights on 26 May 2021; at PEPFAR science summit on 11 June 2021; and at The International Association of National Public Health Institutes (IANPHI) webinar on 28 September 2021.

    To ensure availability of potent and effective vaccines for the public and building EPI management capacity at all levels, the fellow was involved in giving support supervision for COVID-19 vaccination campaigns in Kapchorwa, Terego, Tororo and Soroti districts in between June to December 2021. During this activity, the fellow was involved in giving technical support ranging from cold chain maintenance, microplanning, social mobilizations and demand creation, and administration of the vaccine.
- Following the isolation of Circulating vaccine derived polio virus in Kampala sewage, national polio campaign was recommended. In this activity, the fellow supported districts of Mbale, Budaka, and Pallisa on Polio vaccination preparedness in December 2021.

Fellowship Program-Specific Achievements

1. Outbreak investigations and response

The fellow led and participated in several outbreak investigations. First, a measles outbreak was reported in Nakivale refugee settlement, Isingiro district in March 2020. He was asked to co-lead the investigation, which later discovered that the outbreak was due to overcrowding at the reception centre of the refugee settlement.

In May 2020, the fellow was involved in the investigation of the first community transmission case of COVID-19 in Masindi district. During this outbreak investigation the findings concluded that the index case could have got the infection from the track drivers since he was always involved police night patrol on the highway. The recommendations for this investigation were presented to the IMT for COVID-19. Indeed, the fellow went ahead to build capacity and manage contact tracing and establishment of a community-based surveillance system using Health Assistants. His experiences in this task are well documented in one of his manuscripts and EPI bulletins. This investigation resulted into written products such as:

- ✓ **Report,** the investigation report was written and submitted to UPHFP
- ✓ **Epi-bulletin, titled:** "Contact Tracing and Community-Based Surveillance for COVID-19 Using Health Assistants, Masindi District, Uganda, May 2020" published in the UNIPH bulletin Volume 5| Issue 4| October – December 2020
- ✓ **Manuscript, titled:** "Contact Tracing and Community-Based Surveillance for COVID-19 Using Health Assistants, Masindi District, Uganda". Authors: BO Amodan, I Akusekera, G Amanya, J Namayanja, D Kadobera, A Driwale, L Bulage, AR Ario, JR Harris", Under peer review in JPHA
- ✓ **Conference presentation titled:** "Contact Tracing and Community-Based Surveillance for COVID-19 Using Health Assistants, Masindi District, Uganda". presented during the East Africa FETPs Conference, November 18, 2020.

In May 2020, the Dean of School of Public health, Makerere University Kampala requested the UPHFP to nominate two fellows to support and coordinate an International Citizen Project (ICP) to assess adherence to preventive measures and their impact on the COVID-19 outbreak in low- and middle-income countries. Bob was asked to lead the project. During this task, he successfully implemented the project, and resulted into the following written products:

- ✓ **Epi-bulletin, titled:** "Level and determinants of adherence to COVID-19 preventive measures in the first stage of the outbreak, Uganda" published in the UNIPH bulletin Volume 5| Issue 3| July – September 2020
- ✓ **Epi-bulletin, titled:** "Level and determinants of adherence to and satisfaction with use of face masks as one of the COVID-19 preventive measures in the first stage of the outbreak, Uganda" published in the UNIPH bulletin Volume 6| Issue 1| Jan – Mar 2021
- ✓ **Manuscript, titled:** "Level and determinants of adherence to COVID-19 preventive measures in the first stage of the outbreak, Uganda". Authors: Bob Omoda Amodan, Lilian Bulage, Elizabeth Katana, Alex R. Ario, Joseph N. Siewe Fodjo, Robert Colebunders and Rhoda K. Wanyenze", published in International Journal environmental research and Public health (IJERPH). DOI: 10.3390/ijerph17238810
- ✓ **Manuscript, titled:** "Level and determinants of adherence to and satisfaction with use of face masks as one of the COVID-19 preventive measures in the first stage of the outbreak, Uganda". Authors: Bob Omoda Amodan, Lilian Bulage, Elizabeth Katana, Alex R. Ario, Joseph N. Siewe Fodjo, Robert Colebunders and Rhoda K. Wanyenze", Accepted and yet to be published in Journal interventional epidemiology and Public health (IJIEPH).
- ✓ **Co-authored Manuscript, titled:** "Factors associated with access to food and essential medicines among Ugandans during the COVID-19 lockdown: a cross-sectional study". Authors: Elizabeth Katana, Bob Omoda Amodan, Lilian Bulage, Alex R. Ario, Joseph N. Siewe Fodjo, Robert Colebunders and Rhoda K. Wanyenze", Accepted and yet to be published in Journal interventional epidemiology and Public health (IJIEPH). DOI: 10.11604/JIEPH.supp.2021.4.2.1147
- ✓ **Co-authored Manuscript, titled:** "Violence and discrimination among Ugandan residents during the COVID-19 lockdown". Authors: Elizabeth Katana, Bob Omoda Amodan, Lilian Bulage, Alex R. Ario, Joseph N. Siewe Fodjo, Robert Colebunders and Rhoda K. Wanyenze", Published in BMC Public health. DOI: https://doi.org/10.1186/s12889-021-10532-2
- ✓ **Co-authored Manuscript, titled:** "Adults' Acceptance of COVID-19 Vaccine for Children in Selected Lower- and Middle-Income Countries". Authors: Suzanna Awang Bono, Ching Sin Siau, Won Sun Chen, Wah Yun Low, Edlaine Faria de Moura Villela, Supa Pengpid, Bob Omoda Amodan, Mina C. Hosseinipour, Housseini Dolo, Joseph N. Siewe Fodjo, and Robert Colebunders, Published in Vaccines. DOI: https://doi.org/10.3390/vaccines10010011
- ✓ **Co-authored Manuscript, titled:** "Factors Affecting COVID-19 Vaccine Acceptance: An International Survey among Low and Middle-Income Countries". Authors: Authors: Suzanna Awang Bono, Ching Sin Siau, Won Sun Chen, Wah Yun Low, Edlaine Faria de Moura Villela, Supa Pengpid, Bob Omoda Amodan, Mina C. Hosseinipour, Housseini Dolo, Joseph N. Siewe Fodjo, and Robert Colebunders, Accepted and yet to be published in vaccines. DOI: 10.3390/vaccines9050515
- ✓ **Conference presentation titled:** "Level and determinants of adherence to and satisfaction to COVID-19 preventive measures in the first stage of the outbreak, Uganda". presented at the 6th National Field Epidemiology Conference, 2020 and the East Africa FETPs Conference, November 18, 2020.

The fellow supported an investigation of COVID-19 outbreak among health workers in Abim district in September 2020. The findings indicated that there was a low COVID-19 suspicion index, and poor IPC compliance among health workers, and delayed laboratory turnaround time. In the same month, the fellow led the investigation of scabies outbreak in the same district. During his investigation, he found that the outbreak was associated with overcrowding, inadequate knowledge on scabies prevention and treatment, sharing of bathing materials and bathing in the stream. Recommendations were made to the national task force, and world vision to inform response to the outbreak.

The other important outbreak investigations that the fellow led was the COVID-19 outbreak among Indian residents in Buikwe and Bugiri district in April 2021. This investigation found that the outbreak was imported from India, and it was the beginning of the second wave of COVID-19 in Uganda. Whereas the fellow did not do the genome sequencing samples of the cases, this investigation pointed out the likely importation of the Delta variant.

As part of the national response team, the fellow has also been involved in many other disease/ event responses, including:

- Risk mapping, and population movement/ connectivity across boarders' patterns for COVID-19 along the Tanzania and Rwanda borders with Uganda in June 2020
- COVID-19 case data reconciliation and capacity building of surveillance stakeholders in investigation and reporting of COVID-19 in August 2020
- Malaria outbreak detection capacity building of district staff in western Uganda in September 2020
- Assessment to understand experiences, perceptions & attitude towards ANC and iCCM services in Adjumani and Moyo, December 2020
- Understanding the driving factors of malaria deaths at community and facilities in Agago district in May 2021
- Preparedness assessment and population movement/connectivity across boarders' patterns for Plague along the DR Congo with Uganda in August 2021

2. Epidemiological Study

The fellow conducted an EPI study entitled: "Factors associated with mental and psychosocial wellbeing of healthcare workers in refugee settings during COVID-19 pandemic in Uganda, 2020" from 3 to 17 September 2020.

Background: Uganda hosts over 1.4 million refugees, with over 90% of them coming from South Sudan and Demographic Republic of Congo. Twelve (12) districts of Uganda host refugees. COVID-19 was reported in many refugee settlements. Uganda's refugee settlements, which hosts 18 quarantine centers were also integrated into local communities. Several of the preventive strategies currently proposed by the WHO such as isolation and social distancing were not feasible or difficult to implement in refugee settlements because of overcrowding and other associated factors.

HCWs working in refugee settlements are at high risk of acquiring COVID-19 infection. Moreover, they can transmit the infection while still asymptomatic to patients who are at high risk of severe COVID-19 disease because of underlying diseases or because of old age. It was therefore critical to assess the mental and psychosocial wellbeing of HCWs in order to identify their needs, and provide supportive interventions to reduce the impact of COVID-19 on their psychosocial state.

Methods: The fellow conducted a cross sectional study among Doctors, Clinical Officers, Nurses, Laboratory staff, Health Inspectors, Health Assistants, Public Health Officers, Dentists, Health educators, Radiographers, Counsellors, Records Assistants, Theatre staff, Stores staff and Cleaners in 35 health care facilities from 7 refugee settlements across the country. The primary outcome measure was the mental and psychosocial wellbeing of HCWs during the COVID-19 pandemic, which was assessed using the Hospital Anxiety and Depression Scale for the diagnosis of anxiety and depression.

Results: In total, 346 healthcare workers participated in the assessment, with mean age of 30.5±6.4. Almost half (n=165, 48%) of the respondents were in the age group of 25-29 years, and 144 (42%) were catholics. Among 346 respondents, 174 (50.3%) were female, 188 (54%) were lining with partners, and 105 (30%) were nurses or midwives. In this study the fellow found that A quarter (22%) of the respondents had anxiety, and half (49%) had depression. Overall, over half (55%) of the respndents had either anxiety or depression or both, indicating poor mental and psychosocial wellbeing. There was a significant difference in mental and psychosocial wellbeing in all the 7 refugee settlements (X2=14.18, p=0.03). During multivariate analysis, living far away from HCF (aOR: 2.56, 95% CI: 1.17–5.59), experienced flu in the past two weeks (aOR: 2.42, 95% CI: 1.21–4.82), and giving triage services at health facility (aOR: 2.19, 95% CI: 1.19–4.00) increased odds of having anxiety among healthcare workers. Having workmates who always respected basic rules of handwashing (aOR: 0.08, 95% CI: 0.01–0.47) decreased odds of having anxiety among healthcare workers. During multivariate analysis, not living with partner (aOR: 0.62, 95% CI: 0.39–0.99), and giving clerking services at the health facility (aOR: 0.53, 95% CI: 0.32–0.86) decreased odds of having depression among healthcare workers.

During modelling, the crude and adjusted odds ratios of depression among those giving clerking services at the health facility increased by over 10%, indicating that its effects on the outcome was distorted by confounding variables, including having had a running nose. The final model controlled for confounding, and later assessed for interaction on multiplicative scale.

The effect of interaction among the statistically significant variables was tested using the sex as the main predictor variable for depression. The tests for interaction indicated there was no statistically significant effect (p>0.05) on depression.

Conclusion: The study recommeded that there was need for healthcare workers to have job rotational

shifts, get accomodation within health facilities, and adopt staying with partners and family memebers to improve on their mental health status. He further recommended that trainings and on job monitoring of IPC should be scaled up, inaddition to having dedicated counselling service provision at the health facility.

The mental and psychosocial wellbeing of healthcare workers study among refugees resulted in the following products:

- ✓ **A report -**submitted to the UPHFP.
- ✓ **Manuscripts, titled:** "Factors associated with mental and psychosocial wellbeing of healthcare workers in refugee settings during COVID-19 pandemic in Uganda, 2020". Authors: Bob Omoda Amodan, Patricia Okumu Thiwe, Lilian Bulage, Daniel Kadobera, Alex Riolexus Ario, Julie R. Harris, under internal review

3. HIV Study Project

There was little information known about the birth outcomes experienced by HIV positive pregnant mothers who attended ANC and maternity in Rwenzori sub region between January to December 2020. The fellow therefore established the factors associated with birth outcomes among pregnant women in Rwenzori region, Uganda. The study involved data abstraction from the ANC, maternity and ART registers.

This study found that 23% HIV positive mothers had pre-term birth, 6% had still birth, 10% had low birth weight babies, and 5% had intrauterine growth restrictions. Additionally, the study revealed that level or ownership of healthcare facility, type of residence, number of ANC visits, parity, time to ART initiation, current ART regimen, and WHO staging were significantly associated with pre-term birth.

The study also indicated that mother's age, gestational age, number of ANC visits, mother's weight, and birth weight were significantly associated with stillbirths. Furthermore, mothers age, number of ANC visits, birth weight, and current ART regimen were associated with stillbirths.

LASTLY, the study showed that mothers age, residence, and mothers' weight, was associated with intrauterine growth restriction.

The HIV study resulted into written products such as described below:

- ✓ **A report -**submitted to the UPHFP.
- ✓ **Manuscript, titled:** "Birth outcomes of infants born to pregnant women living with HIV in Rwenzori region, Uganda, Jul 2021". Authors: Bob Omoda Amodan, Job Morukileng, Aggrey Byaruhanga, Peter Ohms Oumo, Daniel Kadobera, Lilian Bulage, Peter Elyanu, Alex Riolexus Ario, Julie R. Harris. Still in first draft.

4. Descriptive Analysis

At the fellowship program, analysis of surveillance data is one of the critical tasks. In this task, the fellow conducted a descriptive analysis titled: "Trends of Key Surveillance Performance Indicators of Acute Flaccid Paralysis, Uganda, 2015–2020"

Background: Polio (or Poliomyelitis) is disease caused most commonly by wild poliovirus (WPV). Poliovirus infection can cause irreversible paralytic disease, presenting as Acute Flaccid Paralysis (AFP). A sensitive AFP surveillance system, in which AFP cases are evaluated to determine if they are true AFP or non-polio AFP (NPAFP), is key for tracking polio eradication. Sensitivity is defined by meeting an annual NPAFP rate/100,000 population <15 years of ≥4/100,000, and an annual stool adequacy (SA) rate (defined as ≥80% of AFP cases with 2 adequate stool samples collected ≥24 hours apart ≤14 days after onset of paralysis and arriving at the laboratory in good condition). We describe Uganda's AFP surveillance performance between 2015-2020, based on the WHO-recommended indicators.

Methods: We performed a descriptive analysis of national AFP surveillance data, 2015-2020. We evaluated proportion of AFP cases reported that were true AFP, and changes in NPAFP and stool adequacy (SA) rate over the study period. We evaluated the trends in achieving the targeted NPAFP and SA rates from 2015-2020. We used QGIS to illustrate patterns in NPAFP and SA rates across districts and subregions.

Results: Among 3,605 AFP cases reported and investigated countrywide from 2015-2020, 3,475 (96%) were true AFP cases. District reporting was near-complete (97-100% each year). Overall, the mean NPAFP rate changed from 3.1/100,000 in 2015 to 2.1/100,000 in 2020. Less than 40% of districts met the NPAFP target rate in all years. The proportion of districts achieving the NPAFP target rate of ≥4/100,000 significantly declined from 35% in 2015 to 20% in 2020 (OR=0.5; 95% CI: 0.3-0.8). The mean annual SA rate nationally was 88% from 2015-2020. Only 66% of districts achieved the SA target rate of ≥80% in the study period. The proportion of districts with SA rate ≥80% significantly increased from 68% to 80% between 2015 and 2020 (OR=1.9; 95% CI: 1.1-3.4).

Conclusion: The SA rate was achieved and improved over time from 2015-2020. Most districts reported AFP cases. However, there was a decline in the NPAFP rate from 2015-2020 and few districts achieved the target rate. The suboptimal AFP surveillance system performance leaves the country at risk of missing ongoing poliovirus transmission. The fellow recommended that a further study to understand the causes of suboptimal performance. In addition, he recommended health worker training on active AFP searches, intensified supportive supervision, and periodic review meetings with districts to assess AFP surveillance performance.

The descriptive analysis of AFP surveillance data resulted in written products and a Quality Improvement project as described below:

- ✓ **A report** -submitted to the UPHFP.
- ✓ **Poster presentation, titled:** "Trends of Key Surveillance Performance Indicators of Acute Flaccid Paralysis, Uganda, 2015–2020" presented the 7th National Field Epidemiology Conference on 29 October 2021.
- ✓ **Manuscript titled:** "Trends of Key Surveillance Performance Indicators of Acute Flaccid Paralysis, Uganda, 2015–2020". Authors: Bob Omoda Amodan, Annet Kisakye, Patricia Thiwe Okumu, Sherry Rita Ahirirwe, Daniel Kadobera, Alfred Driwale, Alex Riolexus Ario, Under journal review
- ✓ **Epi-bulletin, titled:** "Trends of Key Surveillance Performance Indicators of Acute Flaccid Paralysis, Uganda, 2015–2020", published in the UNIPH Epi-bulletin Volume 6| Issue 2| April – June 2021
- ✓ **Quality** Improvement (QI) project

The above descriptive analysis of AFP surveillance data informed the design of the fellow's quality improvement project, titled: "Improving Acute flaccid paralysis (AFP) surveillance in Pallisa district: June–September, 2021"

After the descriptive analysis, Pallisa district was one of the districts that did not met all the key AFP surveillance requirements (i.e. Annualized Non-polio AFP Rate of at least 4 per 100,000 children under 15 years of age and Stool adequacy rate of at least 80%). The fellow thereafter designed a Quality Improvement project that aimed at improving AFP surveillance in Pallisa district from June to September 2021. The fellow aimed at increasing the NPAFP rate from 1.06 to 4 per 100,000; Stool adequacy rate from 33% to 80%; and reporting rate from 50% to 90% between July 2021 to September 2021.

The fellow supported the project improvement team to undertake the following sets of activities:

Conducted a district entry meeting: This involved all the DHT members. The main purpose of this activity was to create stakeholder buy-in for the project and communicate its modalities.

Orientation of health information assistants and surveillance focal persons: The health workers including health information assistants and surveillance focal persons were oriented on AFP surveillance.

Problem identification and analysis: This was done in order to identify the root causes of the poor AFP surveillance and hence develop targeted interventions for causing improvement. The following were the root causes of the sub-optimal AFP surveillance performance:

- ✓ Poor motivation among VHTs and health workers on AFP surveillance
- ✓ Knowledge gaps among surveillance focal persons
- ✓ Poor attitude among the staff
- ✓ Lack of transport
- ✓ Presence myths and stigma on AFP
- ✓ Inadequate funding
- ✓ Inadequate specimen collection containers
- ✓ Lack of weekly or daily active search

Logistics and supplies support: I supported the district surveillance officer to distribute HMIS tools necessary to support AFP surveillance data compilation and reporting. He also gave support supervision and mentorship to health workers on data management, and further ensured feedback and review meetings were held.

The fellow reported that the QI project was successful as indicated below: The non-polio AFP rate stagnated at 1.06 per 100,000 children <15 years for the first two months of the project intervention, and later increased to 2.11 in August and later 2.64 per 100,000 children <15 years in September 2021. The stool adequacy rate stagnated at 33% for the first two months of the project intervention, and later increased to 100% in August and September 2021. Additionally, the reporting rate stagnated at 50% for the first two months of the project intervention, and later increased to 100% in August and September 2021.

The fellow would like to share a few lessons learnt as follows:

- Setting targets on number of AFP cases identified by each healthcare facility surveillance focal point person will increase participation and

thus high NP-AFP rate
- Training of VHTs and setting up of community-based surveillance systems, and availing of AFP case definitions improved AFP surveillance
- A specialized training on stool sample collection, and transportation improved stool adequacy surveillance performance indicators
- Liaison of healthcare facility surveillance focal point persons with HCF in-charges to conduct continuous medical education (CMEs) at facility level increased vigilance and knowledge of AFP surveillance
- Conduct active record search for AFP on weekly basis by healthcare facility surveillance focal point persons improved AFP surveillance

The fellow also recommends the following to improve AFP surveillance:

- There is need for the Ministry of Health and WHO to train health staff, intensify supportive supervision, and hold review and feedback meetings with districts.
- Healthcare facility surveillance focal point persons should conduct regular community sensitizations (among churches, traditional healing and burial sites) on AFP reporting and referral
- WHO should ensure timely payment of transport and per diem refunds of the health workers transporting the samples
- Strengthen community-based surveillance systems for AFP case identification and reporting
- The District and Healthcare facility surveillance focal point persons should hold monthly review meetings
- Partners and MoH should incentivise AFP surveillance at health facility level, not just at district only

5. Newspaper Articles

The follow published 2 articles in the local newspaper: They included:

- ✓ "Rush for a COVID-19 vaccine when it becomes available to the public" published on 03 February 2021
- ✓ "Access to vaccines is a human right" published on 10 May 2021

6. Policy Brief

The fellow has been taking lead in developing a yellow fever vaccination policy brief. The policy is in its final stages of drafting.

Key lessons learned during the fellowship

- ✓ Logically conducting an outbreak detection and investigation
- ✓ Multitasking with high levels of efficiency
- ✓ How to develop impacting policy briefs and funding proposals/ concepts
- ✓ Excellent scientific writing, presentation and publication
- ✓ How to design and implement quality improvement projects
- ✓ Capacity building and healthcare systems strengthening
- ✓ Large database management and analysis (Epi info, STATA, SPSS), and GIS mapping

Next Steps

- To Look out for critical and fast running epidemiology and disease surveillance jobs and contracts
- To continue accomplishing research articles drafted during the fellowship, and engage further in global health security interventions and research
- To continue supporting the FETP intermediate mentees
- To make sure that there is linkage between all public health programs and epidemiology/ global health security

PICTORIAL AND NARRATIVE

Bob interacting with a respondent in the field

Figure 2. Bob building capacity health workers of Kapchorwa District in October 2021 on moderna COVID-19 vaccine.

Daniel Jacob Emong

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FELLOWS PROFILE

Daniel Jacob Emong is a cohort 2020 advanced field epidemiology fellow with a background in Biomedical Laboratory Technology. I hold a Master of International infectious Disease Management from Makerere University. I have over time gained interest in Tuberculosis (TB) and HIV/AIDS. During my time as a public health fellow, I was hosted at The National TB and Leprosy Program (NTLP), Ministry of Health for a two-year apprenticeship.

I have conceptualised, designed and implemented studies in Tuberculosis including TB treatment outcomes among adult TB/HIV co-infected patients in Kampala Metropolitan, Uganda 2018-2020. At NTLP, I was able to carry out investigations to guide programme decisions. I have extensive knowledge in Tuberculosis and HIV/AIDS patient care, capacity building and health systems strengthening. Through this experience, I have built my confidence and extensive competence in designing study protocols and, implementing them, writing reports, abstracts, PowerPoint presentations, manuscript writing, data analysis, publication skills and investigating outbreaks including Rift Valley Fever and COVID-19 response.

I have led two outbreak investigations and participated in 4 others. I have also been part of the COVID-19 response and control activities. I have undertaken several short courses and improved my skills in using data to develop policies, data analysis using statistical and spatial packages like STATA, SPSS, EPI Info and QGIS; Event-based surveillance and case-based surveillance.

Achievements at the Host Site

- The fellow supported the monitoring and evaluation team at the program with TB performance reviews and mentorships in the country
- Conducted e
- A conducted training and support supervision of health facilities implementing electronic Case Bases Surveillance System (eCBSS) in Kampala and Wakiso at the host site
- Conducted training of regional trainers on TB catch-up campaign in Lango subregion to find all missing people with TB during 2021 and sustain the activities to reach all the people who require TB prevention, diagnosis and treatment in line with the national strategic direction of reducing TB incidences towards ending the TB epidemic by 2030 at the host site
- I actively participated in editing radio and television scripts for TB drama awareness on stigma and discrimination while at the host site.
- I supported the Social and Behaviour Change Communication team in developing a concept for the “Community-Based Media catch up campaign To END TB”
- I led in the development of the information, Education and Communication (IEC) materials for “Community-Based Media catch up campaign To END TB”
- Conducted assessments why there was low uptake of Tuberculosis preventive treatment in Mulago national referral hospital and Hoima district
- Conducted quality improvement projects to optimise uptake of Tuberculosis preventive treatment in Mulago national referral hospital and Hoima district.
- Conducted two epidemiological studies ***“Effect of community differentiated service delivery models on retention and viral suppression among***

stable HIV clients in Wakiso districts, Uganda, 2021 and TB treatment outcomes among TB/HIV coinfected patients being treated in Kampala Metropolitan region, Uganda, 2018-2020 "

- Actively participated in the development of Tuberculosis and leprosy data management and analysis guidelines 2020/2021
- Conducted Verification of the alleged T.B outbreak in Tororo district, 2020

Fellowship Program-specific achievements

- The fellow has been an editor on one issue of the Uganda National institute of public health
- Led investigator/principal in the effect of COVID-19 pandemic on seeking for HIV/AIDS, tuberculosis, malaria, and maternal and child health services, Uganda, 2020
- Led investigator/principal in an investigation of Malaria Insecticide-treated bed net ownership and utilisation in Kaliro district following a mass distribution
- Led investigator/principal in Rift Valley Fever outbreak investigation in kyegegwa district between 6th and 9th September 2021
- Led investigator/principal in Epidemiological Investigation of a Rift Valley Fever Outbreak in Humans and Livestock in Moyo district, March 2021
- Co-investigator in the investigation of Brucellosis outbreak in Moyo district, March 2021
- Co-investigator in the investigation of Outbreak of foodborne disease linked to contaminated anyoya (snack) prepared by a food vendor, Obongi district, Uganda, August 2021
- Co-investigator in the investigation of transmission of COVID-19 associated with clustering during Church activities, Omoro District, Northern Uganda, October 2020.
- Co-investigator in the investigation of
- Co-investigator in the investigation of Measles outbreak in Nakivale Refugee Camp in Isingiro district. This investigation was led by Immaculate Akusekera, a PHFP cohort 2020
- Co-investigator in an investigation of COVID-19 among truck drivers in Uganda. (The Truckers Protection Project)
- Co-investigating a suspected community case transmission of COVID -19 in Rakai district
- Co-investigator in Epidemiological investigation of risk factors associated with Malaria death in Kitgum district

Conference Presentations

- Oral presentation on the TB treatment outcomes and associated factors among TB/HIV co-treated patients aged ≥ 15 years in Kampala Metropolitan, Uganda 2018-2020
- Oral presentation on the Effects of COVID 19 pandemic on essential health service delivery in Uganda, 2020

Publications and Manuscripts

- Effect of community differentiated service delivery models on retention and viral suppression among stable HIV clients in Wakiso districts, Uganda, 2021
- TB treatment outcomes among TB/HIV coinfected patients being treated in Kampala Metropolitan region, Uganda, 2018-2020
- Factors affecting uptake and completion of Isoniazid Preventive Treatment (IPT) among contacts under the age of five years at Mulago national referral hospital, Uganda 2021.
- Effect of COVID-19 pandemic on seeking for HIV/AIDS, tuberculosis, malaria, and maternal and child health services, Uganda, 2020
- Rift Valley Fever Outbreak in Humans and Livestock in Moyo district, March 2021
- Rift Valley Fever outbreak investigation in kyegegwa district, September 2021

Summary of Epidemiological Study: TB treatment outcomes among TB/HIV coinfected patients being treated in Kampala Metropolitan region, Uganda, 2018-2020

Background: There are 1.4 million persons infected with HIV in Uganda and 40% of those are coinfected with TB. WHO targets ≥90% TB/HIV treatment success by 2025. However, the TB treatment outcomes of TB/HIV co-infected patients need to be optimized. We described the epidemiological characteristics and treatment outcomes of co-infected patients during 2018-2020.

Methods: We conducted a retrospective cross-sectional study in all TB-infected patients ≥15 years of age who tested positive for HIV and were initiated on TB/HIV co-treatment between 2018-2020 in six districts of Kampala metropolitan in Uganda. We considered at least one hospital with the highest volume of HIV patients. We abstracted demographics and treatment outcomes from TB and HIV registers. TB treatment

success was defined as patients who were cured or those who completed 6 months' treatment as per the WHO guidelines. We described the patients' characteristics and treatment outcomes.

Results: Of the 317 TB/HIV patients on co-treatment during the study period, 202 (64%) were male and 136 (43%) were aged 25-34 years. In total, 265 (84%) had treatment success between 2018-2020, including 44% who completed treatment and 40% who were cured. Among the 44 (14%) who had unsuccessful treatment, 29 (65%) died, 9 (3%) were lost to follow-up, 7 (2%) failed treatment and 7 (2%) were not evaluated.

Conclusion: The TB treatment success rate was very close to the national TB treatment success target of 85%. We recommended continued evaluation to identify factors associated with TB treatment failure.

Key Lessons Learnt during the fellowship

PHFP has presented an opportunity for hands-on learning experience in field epidemiology and public health leadership with the skills and competencies acquired from this practical experience and mentorship with supervision from technical experts in the ministry and fellowship program are priceless. During the fellowship, I leant and developed the following skills:

- National disease outbreak investigations to establish sources of the outbreak, the causes and inform early prevention and control interventions
- Leadership skills of managing studies and responding to disease outbreaks
- Assessments of sub-optimal health and behaviour outcomes
- Scientific writing of manuscripts, abstracts, Policy briefs, and newspaper articles
- Designing and implementing quality improvement projects
- Evaluating surveillance system
- Presentation skills
- Networking

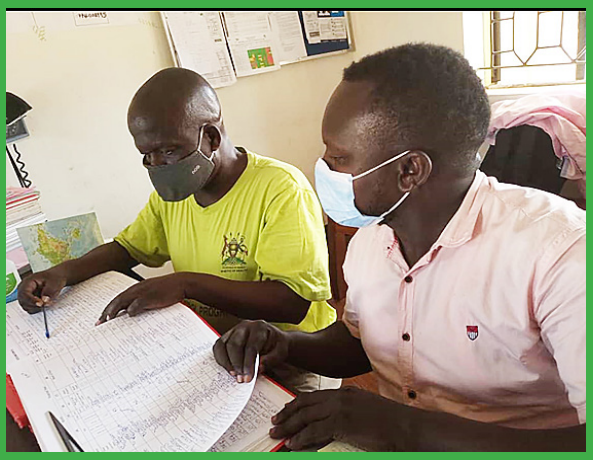
Next Steps

Leveraging on my knowledge, experience and skills obtained before and during the public health fellowship period, I hope to further my career in the field of epidemiology through service at national and international levels. I plan on publishing all the work done during the fellowship period in peer review journals.

PICTORIAL AND NARRATIVE

On the left; Daniel Jacob Emong obtaining a blood sample from suspected rift valley fever case during the response to RVF outbreak in Moyo District

On the left; Daniel Jacob Emong I leading sensitization drive and risk Communication for RVF at Kyegegwa community radio during the response to RVF outbreak in Kyegegwa District



On the right; Daniel Jacob Emong reviewing medical registers to Identified suspected RVF cases in dufile HC III, Moyo District

Geofrey Amanya

MSc. CEB (MUK), MSc (Ghent University), Field Epidemiology Fellow (UPHFP)
HOST SITE: Butabika National Mental Hospital
Host Mentors:
Dr Brian Byamah, Mutamba
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FELLOW'S PROFILE

Geofrey Amanya holds a Master of Science in Clinical Epidemiology and Biostatistics from Makerere University. I joined this program in 2020 and what captured my mind is the training through service in applied epidemiology and public health leadership. I have been equipped with knowledge and skills through a hands-on experience. The program has complemented my previous training by engaging me in large dataset analyses, scientific writing, national level meetings, scientific presentations, trainings to mention but a few, hence building my capacity. I have attained a spirit of excellence and problem-solving skills in my practice as an epidemiologist. During my time as a Fellow, I was attached to the Butabika Hospital. While there, I led various trainings and supervisions, supporting mainly the strategic information and the prevention arms of the program and data systems reviews.

Key Achievements

- National trainer eIDSR trainer.
- Supported Case management pillar
- Published with the program
- Drafted Policy papers
- GIS Trainer

Program-specific deliverables

Outbreak investigations and other projects

- I led an investigation of an outbreak of COVID-19 in HBC Rwenzori Region.
- I also led an investigation of COVID-19 in Mental health clients Butabika Hospital
- I supported a POPCAB and Risk boarder mapping for COVID-19, Sep 2019
- I supported Malaria deaths surveillance in LUKA districts
- Supported malaria activities in Kakumiro districts'
- I co-investigated an outbreak of Measles in Isingiro distrct, Uganda, March 2020
- I co-investigated an outbreak of Anthrax Outbreak in Rubirizi distrct, Uganda, March 2020
- I co-investigated an outbreak of RVF in Moyo distrct, Uganda, June 2021
- I co-investigated an outbreak of Brucellosis in Moyo distrct, Uganda, June 2021
- I co- investigated the first outbreak of COVID-19 in school, Kampala, Uganda, November 2020
- I analyzed program data on Graduation of OVC
- I analyzed Risk factors for Comorbidities among Hospitalized clients at C19TUs
- I supported a project for Implementing descriptive project on Drug and alcohol abuse Butabika Uganda, January-December 2018
- I implemented QI activities on Cervical cancer

Conference Presentations

- Oral presentation on Classification of Anthrax as a public good disease at the Inaugural One health conference African Union, African CDC, October 2021
- Oral presentation on individual risk and house hold risk factors for COVID-19 in Home based care at the National Field Epidemiology Conference and HBC Sub Pillar, Kampala 2021.
- Oral presentation on Cost effectiveness Cost effectiveness of Airport screening Programmes of Airport screening Programmes at the National Field Epidemiology Conference, Kampala, 2020

Written Communication

- Editor of Volume 4 issue 2 October-December 2020 Uganda National Institute of Public Health (UNIPH) epi bulletin
- Authored three articles in the UNIPH epi bulletin
- Drug and Alcohol Abuse Butabika Hospital, Uganda, July-September 2020
- Individual risk and house hold risk factors for COVID-19 in Home based care Jan -March 2021

- Cost effectiveness of Airport screening Programmes October-December 2020

Policy Brief

- Classification of Anthrax as a public good disease
- Cost effectiveness of Airport screening Programmes
- Epidemiological characterization of first and second wave

Newspaper Article

- Why aren't diseases like HIV and Malaria, which still kill millions of people annually not pandemics, published in the New Vision dated 19 July 2021
- Flying Blind, Importance of data in Outbreak managements

Manuscripts written

- Manuscript on Factors Risk factors for Comorbidities and risk factors associated with poor outcomes amongst 10,390 hospitalized COVID-19 cases, Uganda, 2021 Undergoing review by Scientific reviewer
- Manuscript on Factors Investigation of an outbreak of COVID-19 among clients attending psychiatric clinics at a national referral mental hospital, Uganda Undergoing review by Scientific reviewer
- Manuscript on Factors Individual and household risk factors for COVID-19 infection in households of infected persons in home-based care in western Uganda, 2020, Undergoing CDC Review
- Manuscript on Factors Cost analysis for outbreak investigation and Cost-effectiveness analysis for re-classifying Anthrax as a public good disease in Uganda, 2021 Undergoing Scientific review
- Manuscript on Factors Cost effectiveness and decision analysis for evaluation of the national airport screening options in COVID-19 surveillance in Uganda, 2020 Undergoing CDC Review
- Manuscript on Factors Predictors of graduation from HIV/AIDS orphans and vulnerable children (OVC) programmes in Rwenzori region, Uganda. Undergoing Scientific review

Abstract for the Home Based Care outbreak in Rwenzori region

Title: Individual and household risk factors for COVID-19 infection in households of infected persons in home-based care in western Uganda, 2020

Authors: Geofrey Amanya*1, Peter Elyanu2, Richard Migisha1, Daniel Kadobera1, Alex Riolexus Ario2, Julie R. Harris3

Organizational affiliations.

[1]Uganda Public Health Fellowship Program, National Institute of Public Health, Ministry of Health, Kampala, Uganda

[2]Baylor College of Medicine, Kampala, Uganda

[3]Division of Global Health Protection, US Centers for Disease Control and Prevention, Kampala, Uganda

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Abstract

Background: During November 2020, an increase in COVID-19 cases was reported among household members of COVID-19 patients managed using the home-based care (HBC) strategy in western Uganda. We identified factors associated with COVID-19 infections among these household members.

Methods: We conducted a case-control and cohort study. Cases were PCR-confirmed SARS-CoV-2 infections diagnosed from 1-30 November 2020 among persons in HBC in Kasese or Kabarole Districts. We compared case-households (≥1 secondary case) to control-households (no secondary cases). The cohort included all case-household members. Data were captured by in-person questionnaire. We used logistic regression and generalised linear regression to calculate odds ratios and risk ratios.

Results: We identified 78 case-households and 59 control-households. Case-households were larger than control-households (mean 5.8 vs 4.3 members, p<0.0001). Having ≥1 household member per room (OR=4.3, 95%CI 2.0-9.6) and a coughing primary case-patient (aOR=8.0, 95%CI 2.1-30.5) increased odds of case-household status. Assessment for suitability for HBC reduced odds of case-household status (OR=0.4, 95%CI=0.2-0.8). Being ≥40 years of age (OR=1.4, 95%CI 1.1-1.9), interacting with the primary case-patient (RR=1.6, 95%CI 1.2-2.2), and self-described lack of knowledge about HBC (RR=1.5, 95%CI 1.2-1.8) increased individual risk.

Conclusion: Household and individual factors influence secondary infection risk in HBC. Decisions about HBC should be made with these in mind.

During the fellowship, I learnt and developed the following skill sets:

- Conducting outbreak investigations
- Evaluating and strengthening surveillance systems
- Project desining, implementation monitoring and evaluation
- Scientific writing and presentation; manuscripts, abstracts and policy briefs
- Editorial skills for scientific articles
- Public speaking
- Data collection and analysis with different soft ware
- Networking skills
- Balancing work and family and multitasking
- Time management duri project implementation

Next steps

I hope to use all the knowledge and skills acquired to impact my community through expert service where need arises or an oportunity presents. I also hope to mentor those after me in this program if given a chance.

Geofrey during Observation of IPC etiquette Butabika Hospital

Donned during the setting up of quarantine centers, during the first community COVID outbreak in Masindi

HBC outbreak in Rwenzori region

PICTURES AND NARATIVE

Geofrey carrying out an interview during the household outbreak of COVID-19 kasese December 2020

Ignatius Wadunde

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Tel: +(256) 704 902 283
Host site: Uganda Cancer Institute (UCI)
Host mentors: Dr. Noleb Mugisha, Dr. Jackson Orem

FELLOWS PROFILE

Ignatius Wadunde holds a Master of Public Health and a Bachelor's degree in Bio-Medical Laboratory Technology from Makerere University. Before joining the Fellowship program Ignatius worked for the Infectious Diseases Research Collaboration as a Laboratory scientist, Makerere University School of Public Health as a Research supervisor and conducted various field assignments for Ministry of Health, Uganda ranging from immunisation activities to outbreak investigations and response. During His time as a Field epidemiology fellow at the Uganda Public Health Fellowship program, He has been attached at the Uganda Cancer Institute where He gained skills/ experience in community cancer screening and sensitization, leadership and public health response to including data analysis, interpretation and use. The fellowship program has enabled Ignatius to gain technical expertise in field epidemiology skills that include: outbreak detection, investigations and response, evaluation of public health surveillance systems, project development and implementation, leadership and management, capacity building, scientific writing and communication skills.

Achievements at host site

While at the host site, I was involved in several activities that included

- I analysed surveillance data at the Comprehensive Community Cancer Program (CCCP) at the Uganda Cancer Institute
- I participated in community cancer awareness programs of the CCCP on cervical and breast cancer.
- I trained the data team at the CCCP on cancer data management.
- I evaluated of the surveillance system with the data staff at the CCCP at Uganda Cancer Institute

Program specific deliverables

Descriptive analysis of surveillance data

I conducted a descriptive analysis of COVID-19 surveillance data among truck drivers' in Uganda in 2020. Overall, 139 cases were registered. All cases were males with age ranging from 22 to 68 years (mean age = 37 years). About three quarters (74%, n=103/139) were asymptomatic. Majority(97%, 135/139) of cases were tested at the points of entry. Above average, (66%, 96/139)) of the cases reported to have entered Uganda from South Sudan through Elegu POE. We recommended continued testing of truck drivers for COVID-19 at the points of entry before entry to Uganda.

Outbreak investigation projects

- Led investigation on High-Risk exposures among truck drivers testing positive for COVID-19 at Uganda borders -2020
- Led investigation on Epidemiological investigation of confirmed cases of COVID-19 at Mbale regional referral hospital - 2020.
- Led the training District Health Teams (DHTs) on developing and interpreting malaria normal channels to detect malaria outbreaks in Uganda - 2020
- Led an investigation on barriers and facilitators to care and management among persons with diabetes during COVID-19 pandemic in Uganda, 2020: Patients and health workers perspective.
- Led an investigation on Rapid SARS-CoV-2 antigen (SD Biosensor) test in comparison with Real Time (RT-PCR) for diagnosis of COVID-19 in a secondary school, Kampala, Uganda: November - 2020
- Led an investigation on factors associated with testing positive for COVID-19 among students, teachers and support staff in a secondary school, Kampala, Uganda: November - 2020

- Led an investigation on early cases of SARS-COV-2 infection in a secondary school, Kampala, Uganda: Epidemiology and lessons learnt -November - 2020
- Participated in investigation on early cases of SRAS-Cov-2 infection Uganda: epidemiology and lessons learnt from risk based testing approaches -March April 2020
- Participated in an investigation of COVID-19 in Aswa Hydro Electricity power plant in Pader district -2020
- Participated in the investigation of Measles outbreak in Nakivale Refugee Camp in Isingiro district - 2020
- Participated in an investigation of psychosocial impact of COVID-19 among health workers in Uganda - 2020
- Participated in the investigation of Jinja-Buikwe COVID-19 cluster – May 2021
- Participated in the investigation of COVID-19 deaths in Kampala metropolitan area – 2021
- Participated in a baseline evaluation of Malaria Insecticide treated bed net ownership and utilisation in Jinja district following a mass distribution, March-2021
- Led an endpoint evaluation of Malaria Insecticide treated bed net ownership and utilisation in Jinja district following a mass distribution, October-2021
- Participated in an assessment of preparedness of border districts to respond to Plague in West Nile region, Uganda, August - 2021

Epidemiological study

After investigating the impact of COVID-19 on the care and management of patients with diabetes during the pandemic, I conducted a follow-up epidemiological study to assess for factors associated with adherence to anti-diabetic medication among persons with diabetes during the COVID-19 pandemic, Uganda, 2020. The level of adherence to anti-diabetic medication was sub-optimal, (68%, 157/228) and the commonest reasons for missing doses were drugs running out at one, forgetfulness and transport challenges. Experiencing side effects reduced adherence (AOR=3.0 95% CI:1.6-5.8). We recommended the need to send reminders to patients, and promote counseling to improve adherence to diabetes treatment.

Quality improvement project

- Results from the epidemiological study to assess for factors associated with adherence to anti-diabetic medication among persons with diabetes during the COVID-19 pandemic showed that Lira Regional Referral Hospital registered had the lowest level (59%) of adherence to anti-diabetic medication among persons with diabetes during the COVID-19 pandemic Basing on this finding, I found it necessary to conduct a quality improvement project entitled: "Improving adherence to antidiabetic medicine among persons with diabetes at Lira regional referral hospital, 2021." Together with the health workers, we assess reasons for the low adherence, generated and implemented practical solutions to increase on the level of adherence for improved patient treatment outcomes. We called the patients to remind them come for medication and conducted adherence counselling and health education on the need for adherence and implications for non-adherence, during medication refills. The level of adherence increased from 59% to 79% by August 2021.

Epidemiological bulletins

- Training District Health Teams (DHTs) on developing and interpreting malaria normal channels to detect malaria outbreaks in Uganda.
- High-risk exposures among truck drivers testing positive for COVID-19 at Uganda borders: A qualitative study-2020
- Rapid SARS-CoV-2 antigen (SD Biosensor) test in comparison with Real Time (RT-PCR) for diagnosis of COVID-19 in a secondary school, Kampala, Uganda: November - 2020

Newspaper article

- COVID-19: Which people need to take extra precautions" It was published on the New Vision newspaper.

Policy brief

- Participated in the policy brief on introduction of yellow fever vaccine into routine immunisation schedule in Uganda, 2021

HIV study

- I conceptualised and implemented an HIV study entitled "Barriers and facilitators to retention in HIV care for persons on community Differentiated Service Delivery (DSD) models in Uganda, 2021". The facilitators identified included: easy access to medication, less waiting time at facility, good adherence support and reduced transport costs. The barriers identified included: stigma and

relocation of clients especially in urban settings. Suggestions by health workers to improve retention in HIV care included: integration with NCD services, sensitisation clients, building community structure and empowering the community pharmacies among others

Conference presentations

- Oral virtual presentation at the PEPFAR summit a study entitled: "High-Risk Exposures Among Truck Drivers Testing Positive for COVID-19 at Uganda Borders: A Qualitative Study – 2020"
- Oral virtual at 6th Uganda National Field Epidemiology conference: "High-Risk Exposures Among Truck Drivers Testing Positive for COVID-19 at Uganda Borders: A Qualitative Study – 2020."
- Oral semi virtual at 7th Uganda National Field Epidemiology conference: "Outbreak of COVID-19 in a secondary school in Kampala, Uganda – 2020."
- Oral virtual at 8th East African Health and Scientific conference: "Factors associated with adherence to anti-diabetic medication among persons with diabetes in Uganda, 2020."

Manuscripts

- "High-risk exposures among truck drivers testing positive for COVID-19 at Uganda borders: A qualitative study-2020" (CDC clearance)
- "Rapid SARS-CoV-2 antigen (SD Biosensor) test in comparison with Real Time (RT-PCR) for diagnosis of COVID-19 in a secondary school, Kampala, Uganda: November – 2020" (At PHFP Secretariat)
- "Factors associated with adherence to anti-diabetic medication among persons with diabetes during the COVID-19 pandemic, Uganda, 2020" (at PHFP Secretariat)
- "Factors associated with testing positive for COVID-19 among students, teachers and support staff in a secondary school, Kampala, Uganda: November – 2020" (At PHFP Secretariat)
- Co-author: "Psychosocial impact of COVID-19 among health workers in Uganda – 2020" (Published in BMC psychology)
- Co-author: "Early cases of SRAS-Cov-2 infection Uganda: epidemiology and lessons learnt from risk-based testing approaches -March April 2020" (published in journal of globalisation and health)

Wadunde Ignatius (middle) with the health workers at the COVID-19 isolation and treatment unit at Kabale Regional Referral Hospital.

Summary of the COVID-19 project:

Factors associated with testing positive for COVID-19 among students, teachers and support staff in a secondary school, Kampala, Uganda: November, 2020

Background:

Following school closures in Uganda in March 2020 in response to COVID-19, the government re-opened schools to candidate classes on October 15, 2020 with strict COVID-19 guidelines. On October 27, 2020, Secondary School X in Kampala, Uganda reported their first case of COVID-19. By November 17, 2020, 32 confirmed cases were reported in the school. We set out to determine the outbreak extent and factors associated with COVID-19 infection in the school.

Methods

We conducted a cross-sectional study employing quantitative methods of data collection. We used an interviewer-administered questionnaire to collect data on socio-demographics and COVID-19 potential risk factors information from all students, teachers, and support staff at the school. Nasopharyngeal samples were taken from the interviewees and tested using RT-PCR to identify SARS-COV-2 infection. We conducted logistic regression to identify factors associated with infection.

Results

Of the 361 respondents interviewed: 76% (265/361) were students, 10% (36/361) were support staff, and 4% (15/361) were staff. Thirty one percent (110/361) of the respondents tested positive over the 3-day

study period; students had the highest attack rate (32.5%; 101/311)., 90% (328/361) of respondents were asymptomatic at sample collection. The attack rate was 45% (81/180) among those who reported participating in gatherings at school and 45% (74/166) among those who reported spending time in shared areas. Among those who reported attending gatherings, 88% (229/260) mentioned that they attended the Catholic chapel at the school. 78% (188/241) of those who reported exposure to shared areas said it occurred in the dining hall. Being a support staff (AOR: 3.1, 95%CI: 1.2-8.5) and being in Senior Four class (AOR: 1.8, 95%CI: 1.1-3.1) were associated with testing positive for COVID-19.

Conclusion and Recommendations

There was widespread of COVID-19 infection at Secondary School X in Kampala during November 2020. Being a support staff or a student of Senior Four class were associated with testing positive for COVID-19. In order to mitigate the spread of the COVID-19 infection, we set up an isolation and treatment center at the school to treat mild and moderate COVID-19 cases.We recommended intensifying daily screening, testing and isolation of symptomatic cases and their contacts, discouraging gatherings, and introducing shifts at the dining halls.

Students of school X filling questionnaires before they tested for COVID-19

Key lessons learnt during the fellowship

- Outbreak detection, investigation, response, and control
- Scientific writing; concepts proposals, manuscripts, abstracts, policy briefs, epidemiological bulletins and newspaper articles
- Leadership and management skills acquired from various projects led and assigned
- Designing and implementation of continuous quality improvement projects
- Interpersonal skills with personnel of different cadres and race
- Communication skills including scientific presentation.

Next steps

- Publish pending work done during the fellowship in peer reviewed journals
- Use the knowledge, skills and experience gained to nurture a career in epidemiology and impact society nationally and internationally through available institutions of government and international organisations.

Job Morukileng

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Host Institution: Ministry of Health Reproductive Health Division
Host Mentors: Dr. Mutumba Robert

FELLOW'S PROFILE

Job holds a Master of Public Health Degree from Makerere University College of Health Sciences, School of Public Health. Before joining the fellowship programme, he worked with International Rescue Committee (IRC) and Baylor College of Medicine Children's Foundation where he managed and implemented public health projects focusing on improving maternal and child health (MCH), HIV and malaria in Teso and conflict affected Karamoja region in Uganda. During his involvement in public health project management and implementation, he realized gaps in his capacity to investigate and provide evidence-based recommendations to the public health problems that significantly affected the communities he was serving (such as outbreaks, side effects of MCH project services like family planning and immunization). To address this gap, he joined the Public Health Fellowship Programme (PHFP).

During the two years of the fellowship, Job has appreciated the role of several statistical methods and research designs in field epidemiology and public health. He has gained skills in managing research projects, developing policy briefs, collecting data, managing and analyzing data (Epi info, STATA, SPSS), mapping (QGIS), scientific writing, and report writing. He has written manuscripts, published bulletin articles, led outbreak investigations and implemented a quality of care improvement project.

Host site achievements

Host site: Ministry of Health Reproductive Health Division

The Reproductive Health Division (RHD) is one of the divisions under the Maternal and Child Health (MCH) department of Ministry of Health, Uganda. RHD covers antenatal care, family planning, emergency obstetric care, neonatal care and cancer of the cervix. The mandate of RHD is to guide planning, standardization, implementation, monitoring and evaluation of RH services provided by the government, nongovernmental organizations (NGOs), faith-based organizations (FBOs), community-based organizations (CBOs), private for-profit sectors and communities in Uganda.

Several policies and legal frameworks obligate the Government of Uganda to enhance the Reproductive Health (RH) status of all Ugandans by increasing equitable access to RH services and by improving the quality, efficiency and effectiveness of the services at all levels.

To support the role of the reproductive health division, I was involved in the following:

- I joined the RH division at the time COVID-19 response was not integrated in the routine delivery of RH services, one of the initial activities I participated in, was the development and review of guidelines for the management of pregnant, breastfeeding women and infants in the context of COVID-19 in May 2020
- Following interruption of planned activities in the RH division due to restricted movements (COVID-19 measure), there was need to review and adjust the division plans and budgets. I participated in the review process in July-September 2020 quarter.
- One of my main areas of interest in the RH division was integration of health care services. Integration of health care services is one of the most cost effective, efficient and the most recommended approaches for service delivery. I was involved in many activities in this area. Initially, I participated in the assessment (including development of ODK assessment tools) of integration of sexual reproductive health and rights (SRHR), HIV and

sexual gender-based violence (SGBV) services in Amudat, Bududa, Isingiro, Gulu, Kampala, Katakwi, Namayingo and Yumbe Districts. The assessment identified some gaps in the implementation of integration strategy. To address these gaps, I participated in the direct mentorship of 20 health care workers in Katakwi District on integration of SRHR, HIV and SGBV services (December 2020 and August 2021). In addition, I supervised six clinical mentors from Soroti Regional Referral Hospital (SRRH) during integration of SRHR, HIV and SGBV clinical mentorship of health workers in Usuk H/C II, Toroma H/C IV and Katakwi Hospital. Following the above mentorship, I compiled and submitted facility clinical mentorship reports to the implementing partner on behalf of the MoH. As part of the RH division secretariat, I participated in organizing the first virtual and physical SRHR, HIV and GBV conference held from 4 to 5 Feb 2021. Prior to the conference, I reviewed and provided feedback for five abstracts submitted for presentation during the conference. During the conference, I led a team of six rapporteurs and compiled and submitted the conference report. Our assessment of integration of services further revealed gaps in collection of forensic evidence for SGBV. To address this gap, I and several other staff were trained as national trainers for collection forensic evidence for SGBV. We further reviewed and adjusted the national training manual for collection of forensic evidence for SGBV.

- The other area of interest to me at RH division was maternal and perinatal death surveillance and response (MPDSR). The MPDSR strategy emphasises identifying and reviewing all maternal and perinatal deaths, deriving lessons from the reviews and suggesting appropriate strategies to reduce avoidable maternal and perinatal deaths from the identified causes. To contribute to the MPDSR strategy, I participated in writing the MPDSR annual report for 2020 and in organizing a conference for the dissemination of the MPDSR report findings for the year 2020. This MPDSR report revealed that postpartum hemorrhage (PPH) was the cause of about 50% of all maternal deaths in Uganda. Consequently, we developed and launched an activity framework for reducing maternal deaths due to PPH in Uganda in March 2021. This activity framework for reducing maternal deaths due to PPH inspired one of my newspaper article, titled 'Ministry of Health renews commitment to reduce deaths due to PPH; a major single cause of maternal death in Uganda' (Published by the New Vision Newspaper on April 2, 2021). As part of monitoring progress towards improving MPDSR, I attended weekly virtual meetings for reviewing maternal and perinatal death surveillance and response (MPDSR) progress in Uganda. In addition, I participated in the development of the national training manual for MPDSR and led in the designing and formatting of the manual in April 2021. To support planning at the division, I led the development of the national MPDSR costed workplan for 2021 to 2025
- Additional engagements at the division included participating in the review and update of the Maternal and Child Health (MCH) passport/Mothers passport to align with new Health Management information system (HMIS) tool and user guide for the MCH passport, participating in the results-based financing (RBF) health facility verification in Bwindi community hospital, Kikagati Hospital, St. Karoli Lwanga Hospital, Bishop Comboni Hospital, Kissizi Hospital and Kambuga Hospital.

Fellowship program-specific achievements

7. Descriptive analysis

- The first activity I did after joining the RH division (host site) was to perform a descriptive analysis of preterm birth data from the District Health Information System (DHIS) to determine the trend of preterm birth admissions in Uganda from 2015-2019. Finding showed that nationally, annual incidence of preterm births admissions/1,000 Live Births (LB) has significantly been increasing (OR=1.3, CI=1.32-1.33) with the mean annual incidence of 10/1,000 LB. The annual incidence similarly increased significantly in all the four regions (central OR=1.5, CI=1.5-1.5; eastern OR=1.3, CI=1.2-1.3; western OR=1.2, CI=1.2-1.2 and Southern OR=1.2, CI=1.2-1.3). The mean annual incidence was highest in central 12/1,000 LB and lowest in the east (7/1,000 LB). We observed minimal clustering in the distribution of annual incidence at district level. We concluded that the incidence of preterm birth admissions is increasing nationally and regionally. There is need to plan for and prepare health facilities to manage preterm births. Equipping health facilities and building capacity of health workers to manage preterm labour should be prioritized.

The descriptive analysis of preterm data resulted in written products and a QI project as described below

- A report -submitted to the UNIPH.
- Poster presentation, titled 'Incidence of Preterm Birth Admissions in Uganda, 2015-2019' presented during the 8th East African Health and Scientific Conference, November 2021
- Manuscript, titled 'Incidence of Preterm Birth Admissions in Uganda, 2015-2019. Authors: Job Morukileng, Wilberforce Mugwanya, Robert Mutumba, Maureen Katusiime, Aggrey Byaruhanga, Doreen N. Gonahasa, Bob Omoda Amodan, Steven Kabwama, Daniel Kadobera, Lilian Bulage, Alex Riolexus Ario. Under journal review
- Epi-bulletin, titled 'Incidence of preterm births admissions on the rise in Uganda, 2015-2019, published in the UNIPH Epi-bulletin Volume 6| Issue 2| April – June 2021
- Quality Improvement (QI) project

The above descriptive analysis of preterm data inspired the design of my quality improvement projected. After the descriptive analysis revealed that the annual incidence of preterm births admissions has been increasing in the past five years, there was need to ensure that the quality of care for the preterm babies is optimized. I designed a QI project that aimed to improve the proportion of new born babies who are assessed and classified for prematurity in Kawempe Referral Hospital in Uganda. The summary of the QI project is below.

Kawempe Referral Hospital has one of the highest incidences of preterm birth admissions in Uganda. For preterm babies to receive quality care, all babies need to be identified through adequate assessment at birth. However, in Kawempe referral Hospital, only 72% of new-born babies where adequately assessed for prematurity and classified as preterm or at term as per the guidelines on the maternity register. This QI project aimed to increase the proportion of babies who are adequately assessed and classified as term or preterm from the current 72% to 95% between July 2021 to September 2021.

- Midwives were mentored on how to assess new-born for prematurity using the gestation age during weekly QI meetings. In addition, documentation of the assessment on the maternity register was regularly reviewed and the gaps/errors discussed and correct.
- This QI project was successful and the proportion of the babies who are adequately assessed and classified as term or preterm increased from 72% to 96.6% between July 2021 to September 2021.

8. Outbreak investigations Lead Investigator

- I led the Covid19 risk mapping and population movement study along Uganda-Rwanda borders and Uganda-Tanzania borders, May 2020.
- This investigation resulted into written products such as;
- Report, the investigation report was written and sub-mitted to UNIPH and IDI
- Epi-bulletin, titled 'Covid19 risk mapping and population movement study along Uganda-Rwanda borders and Uganda-Tanzania borders, May 2020' published in the UNIPH bulletin Volume 5| Issue 3| July – September 2020
- Manuscript, titled 'Covid19 risk mapping and population movement study along Uganda-Rwanda borders and Uganda-Tanzania borders, May 2020' authors: Job Morukileng, Geoffrey Amanya, Bob Omoda, Alex Ndyabakira, Lilian Bulage, Danniel Kadobera, Ario Alex Riolexus.: Under PHFP review
- Conference presentation titled 'Covid19 risk mapping and population movement study along Uganda-Rwanda borders and Uganda-Tanzania borders, May 2020' presented during the 6th Uganda Annual National Field Epidemiology Conference, November 4, 2020
- Second conference presentation titled 'Covid19 risk mapping and population movement study along Uganda-Rwanda borders and Uganda-Tanzania borders, May 2020' presented during the East African FETPs Conference on COVID-19 Response, November 18-19, 2020

Led an investigation of anthrax outbreak associated handling and consuming meat from a cow -Kapchorwa District, May 2021.

The following products resulted from this investigation;

- An investigation report: submitted to UNIPH and Kapchorwa District
- Manuscript, titled 'Anthrax outbreak associated handling and consuming meat from a cow -Kapchorwa District May 2021'authors: Job Morukileng, Josephine Namayanja, Fred Monje, Nelson Chelangat, Alfred Mwanga, Martin Obenyo, Fred Makasu, Joshua Buule, Joshua Kayiwa, Herbert Isabirye, Musa Sekamatte, Daniel Kadobera, Lilian Bulage, Alex Riolexus Ario, Julie R. Harris. Under CDC review

- Conference presentation titled 'Anthrax outbreak associated handling and consuming meat from a cow -Kapchorwa District May 2021' presented during the 7th Uganda Annual National Field Epidemiology Conference November 4, 2021
- Follow-on study. There were questions that were not answered by the anthrax outbreak investigation. This resulted in the design of a follow-on study to understand the knowledge, attitudes and practices of the community regarding anthrax. We conducted this in November-December 2021

- COVID-19 case investigation in Bombo and Moroto region. This resulted in a written report submitted to UNIPH secretariat

Co-investigated the following outbreaks

- Measles outbreak in Nakivaale refugee settlement in Isingiro district in February 2020
- Measles outbreak in Nakaseke District September 2021
- COVID-19 cluster outbreak investigation in Moroto Prison, October 2020
- COVID-19 deaths investigations in Kampala metropolitan area, Feb 2021

Other epidemiological studies and response activities

- I led thed team that trained the District Health Teams (DHT) in five districts of Lango region (Dokolo, Apac, Kole, Alebotong and Oyam) on developing malaria normal channels to enhance early detection of malaria outbreaks. This activity targeted districts that experienced malaria outbreaks during 2019.

This activity resulted in:

- A written report -submitted to the UNIPH
- Epi-bulleting, titled 'The Uganda Public Health Fellowship Program Trains District Health Teams in five Districts of Lango on Early Detection of Malaria Outbreaks, September 2020' published in the UNIPH bulletin Volume 6| Issue 1| January – March 2021
- Conducted contact tracing for COVID-19, established quarantine centers and activated district task forces in Rakia, Arua, Kiryadongo (refugee camp) and Kyotera. The contact tracing exercise and risk mapping in Isingiro (Nakivale refugee settlement) triggered the need to assess the knowledge, attitudes and practices regarding COVID-19 among refugees. Consequently, I designed an epidemiological study to assess the knowledge, attitudes and practices regarding COVID-19 among refugees as summarized below.

Summary of Epidemiological Study:

The Epidemiological study was titled 'Knowledge, Attitudes, and Practices of Adult Refugees towards COVID-19, Nakivale Refugee Settlement, Uganda, July 2020' was inspired by the COVID-19 contact tracing, quarantine and risk mapping activities that I participated in during the initial phase of COVID-19 outbreak. The abstract of the study is summarised below.

Background: Nakivale Refugee Settlement (NRS) in Uganda is home to >130,000 refugees from several countries in the surrounding region. Beyond living in settings with high risk of outbreaks due to crowding and poor living conditions, refugees have limited access to health information given competing priorities and language barriers. On 20 April 2020, the first COVID-19 case in NRS was reported. We assessed knowledge, attitudes, and practices about COVID-19 among refugees in NRS to inform appropriate control interventions.

Methods: From 20 July–1 August 2020, we conducted a cross-sectional survey among refugees from randomly-selected households in NRS. We adapted a pre-existing questionnaire and administered it to adults ≥18 years of age. We asked participants about their knowledge of COVID-19 symptoms, transmission and prevention, their attitudes about specific preventive measures, and their protective practices. We calculated percentage scores and used Bloom's cutoff of ≥80% to categorize and generate composite variables for knowledge, attitudes, and practices. Scores <80% were categorized as 'inadequate knowledge', 'inadequate practices,' and 'negative attitudes. We performed weighted Complex Sample Design Analysis in Epi Info to identify factors associated with adequate knowledge and adequate practices.

Results: Among 824 refugees, 486 (57%) had inadequate knowledge, 542 (68%) had negative attitudes, and 667 (84%) inadequate practices. Knowledge gaps included not knowing that COVID-19 can present without symptoms (49% did not know

this) and that COVID-19 can be less severe in children (65% did not know this). Refugees expressed a negative attitude towards staying home (56%) and not touching one's face (66%). For hygiene practices, most did not purchase (83%) or use (78%) hand sanitizer. Receiving COVID-19 related messages via posters [Adjusted Prevalence Ratio (APR)=2.9, CI 1.7-4.8] or mobile loudspeaker [APR=1.9, CI 1.5-2.5] and having attained secondary level of education [APR=1.4, CI 1.1-2.0] were associated with adequate knowledge. Having positive attitudes [APR=1.4, CI 1.1-1.8] was associated with increase in adequate practices.

Conclusion: About 6 in 10 persons evaluated had inadequate knowledge, 7 in 10 had negative attitudes and 8 in 10 had inadequate practices towards COVID-19. Risk and behavior change communication on COVID-19 prevention measures in NRS may be improved by using popular media channels like posters and mobile loudspeakers to disseminate the messages.

The COVID-19 KAP study among refugees resulted in the following products

- **Conference Presentations,** titled 'Knowledge, Attitudes, and Practices Towards COVID-19 among Adult Refugees, Nakivale Refugee Settlement, Uganda, July 2020'presented during the East African FETPs Conference on COVID-19 Response, November 18-19, 2020

- **Manuscripts, titled 'Knowledg**e, Attitudes, and Practices Towards COVID-19 among Adult Refugees, Nakivale Refugee Settlement, Uganda, July 2020. Authors: Job Morukileng, Immaculate Akusekera, Gerald Okello, Bob Omoda Amodan, Lilian Bulage, Daniel Kadobera, Steven Ndugwa Kabwama, Julie R. Harris, Alex Riolexus Ario, under conflict and health journal review

Newspaper articles

- Stigma associated to COVID-19 may jeopardize control efforts (publication not established)

- Ministry of Health renews commitment to reduce maternal deaths due Postpartum Haemorrhage (PPH); a major single cause of maternal death in Uganda (Published by the New Vision Newspaper on April 2, 2021)

- When did you last check your blood pressure? (Published by the New Vision Newspaper on May 17, 2021)

Policy brief

Participated in developing a policy brief on improving access to malaria community case management services for children under five years of age in Uganda. Currently the integrated community case management of malaria facilitates the Village Health Team (VHTs) members to attend reporting, and drug restocking meetings on quarterly basis. However, this model affects restocking of malaria drugs used by the VHTs to treat children in the community. Up to 62% of the VHT experience stockout of malaria drugs and are not able to treat children at community level. This policy proposes to increase the frequency of VHT reporting and restocking meetings to monthly basis to minimize stockout at VHT level.

9. HIV Project

- **Title:** Determinant of retention in care among HIV exposed infants in Rwenzori region, Western Uganda
- **Retention of mother-baby pairs** in early infant diagnosis (EID) care is high in Rwenzori region at 85%, enabling 73% of the HIV Exposed Infants (HEI) to get the first DNA-PCR test at two and 94% to receive nevirapine prophylaxis within one day month post-delivery and leading to only 3% of HEIs turning positive for HIV at 18 months. In addition, being a mother aged ≥25 years old and attending two or more ANC visits were associated with increased retention in EID care. Having four or more children was associated with reduced retention in EID care. Implementing partners in Rwenzori region and the Ministry of Health should identify and closely follow-up mothers younger than 25 years, those that are not completing their ANC visits and those that have given birth to four or more children to ensure that they are retained in care.

Key lessons learned during the fellowship

- I have learned to multi-task to be able to execute my fellowship projects as well as host site tasks a midst other competing priorities. This has sharpened my decision-making skills and has helped me to appreciate the importance of

planning and priority setting when faced with overwhelming pressure at work.

- Working at the host site improved my leadership and management skills through assignments
- Outbreaks detection, investigation, response, and control.
- Scientific writing (manuscripts, newspaper articles, policy briefs, bulletin articles etc.) and presentation skills at both national and international audiences.
- Analysis, interpretation and evaluation of surveillance data to improve health
- Development of surveillance systems
- Development and implementation of Quality Improvement projects

Next steps

- To identify an appropriate opportunity that will utilize the skills I have gained from the fellowship especially focusing on investigating health events and providing appropriate recommendations
- To continue advancing my knowledge and skills in epidemiological studies and management of public health projects
- To proceed with process of sharing findings of multiple studies conducted during the fellowship through publications, bulletins and presentations
- To participate in any public health response at any level when called upon.

PICTORIAL AND NARRATIVE

Figure 1. Left to right; suspected anthrax case; Chelangat Paul, Lab Technologist Kween District and Job Morukileng, PHFP fellow taking off a swab from an anthrax eschar for laboratory test in Kween District during an anthrax outbreak investigation

Figure 2. Job Morukileng, a PHFP fellow training midwives in Kawempe Referral Hospital on quality of care improvement process

Figure 3. Peter Oumo left, Job Morukileng second left and Lilian Bulage far right, during investigation of community transmission of COVID-19 with Masaka Regional Referral Hospital COVID-19 treatment team. April 2020

Josephine Namayanja

BVM, MVPM
Host Site: National Animal Disease Diagnostics and Epidemiology Centre, Entebbe Uganda
Host Mentors: Dr. Deo Ndumu Birungi and Dr. Serugga
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Tel:+256774761010

Fellow's Profile

I hold a Bachelor of Veterinary Medicine and Master of Veterinary Preventive Medicine of Makerere University, Kampala. During my two years of the fellowship, I have gained skills in scientific writing, leadership, communication, reporting of public health events, and analysis of public health surveillance data using computer software including Excel, Epi-info, & STATA. In addition, I gained competencies in the first steps of transforming data into policy by preparing policy briefs. I prepared several articles for the Uganda National Institute of Public Health (UNIPH) quarterly epidemiological bulletin, technical reports, newspaper articles, and manuscripts. I have gained experience in conducting trainings, conducting epidemiological investigations, and quality improvement projects. I have also gained skills in extracting, cleaning, and analyzing secondary data.

Before joining the fellowship, I worked as a Veterinary Inspector at Entebbe International Airport for the Ministry of Agriculture Animal Industry and Fisheries in the Department of Animal Health. My role was to ensure that all live animals and animal products were free from diseases before they are allowed into or out of the country. Because of my interest in Epidemiology, I was given special assignment to manage data at the National Animal Diseases Diagnostics and Epidemiology Centre (NADDEC). It is from there that I was identified to participate in an International Training Programme (ITP) in animal health, food safety and antimicrobial resistance in the animal food value chain: "Healthy livestock – Safe food" which took place in Uppsala and Jönköping, Sweden in May to November, 2019. The training was organized by the Swedish National Food Agency (SLV), the Swedish National Veterinary Institute (SVA), the Swedish Board of Agriculture (SJV) and the Swedish University of Agricultural Sciences (SLU) on behalf of the Swedish International Development Agency (Sida). Through this training, I acquired knowledge on disease surveillance, crisis management of zoonotic diseases, control of foodborne zoonoses, and prevention of antimicrobial resistance in the animal food chain.

I also completed a graduate fellowship in infectious Disease Management supported by USAID and Minnesota University – implemented by Makerere University School of Public Health and College of Veterinary Medicine, Animal Resources and Biosecurity. During the fellowship, I was attached to the Division of Veterinary Public Health, Ministry of Health where I participated in a number of activities. These included Yellow Fever outbreak investigations in Rukungiri, training of VHTs in Community-Based Disease Surveillance (CBDS) in Adjumani and Masaka Districts, and training of District Health Teams in Integrated Disease Surveillance and Response (IDSR) in Gomba District. I also led a team of Health educators to mobilize communities for Yellow Fever Mass Vaccination in Kalangala District.

Achievements at the Host site: National Animal Disease Diagnostics and Epidemiology Centre (NADDEC- Entebbe)

- Drafted guidelines and SOPs to protect Veterinary practitioners and farmers from COVID-19 while working with animals during the pandemic.
- Received and reviewed articles for the establishment of the One Health Epidemiological bulletin. The articles were then compiled and the first issue of the One Health Epidemiological bulletin was published.
- Drafted SOPs for FMD surveillance during quarantine period. These were used to guide livestock farmers, veterinary professionals and livestock traders to prevent further spread of

FMD to other parts of the country which had not been affected.
- Analysed the NADDEC surveillance data for the year 2019 and the trends of district report submission from 2015-2020. From this analysis, I developed a QI project to improve the monthly report submission from Masaka district to NADDEC.

Fellowship program specific achievements

- Lead Investigator on the following outbreak investigations:
  - COVID-19 Cluster in Achwa Hydroelectricty Power Plant in Pader District, Northern Uganda-October 2020
  - Suspected Brucellosis outbreak in Dufile and Lefori sub counties, Moyo district, March 2021
- Co-Investigator on the following outbreak investigations:
  - Measles outbreak in Nakivaale Refugee settlement in Isingiro district, February 2020.
  - Investigation of the first community COVID-19 case in Uganda, Masindi district, May 2020
  - Suspected Rift Valley Fever outbreak in Dufile and Lefori sub counties, Moyo district, March 2021
  - Suspected Anthrax Outbreak Associated with Handling and Consuming Cow Meat - Kapchorwa District, April 2021
  - Measles outbreak in Semuto sub county, Nakaseke district, September 2021
- Wrote a policy brief entitled "Enforcing Compulsory Mass Dog Vaccination to Reduce Human Deaths from Dog Rabies in Uganda". This was presented to the National One Health Platform and is under discussion by the various relevant stakeholders.
- Conducted a 6-month project to improve monthly submission of surveillance reports from Masaka district to NADDEC. By the end of the project, there was an increase in report submission from 40% in May 2021 to 80% by November 2021. There was also an improvement in the timeliness of the report submission.
- Conducted an epidemiological study to assess the knowledge, attitudes and practices of zoonotic diseases among livestock farmers in Kiboga district, September 2021.
- Analyzed surveillance data on Trends and Distribution of animal bites and deaths due to suspected human rabies in Uganda, 2016-2020.

Other activities involved in:

- Led the Anthrax Community Assessment study in Kapchorwa and Kween, November-December 2021
- Training of District Health teams of Kole, Apac, Dokolo, Alebtong, Oyam and Lira on early detection of malaria outbreaks through development of malaria normal channels
- Reviewing of articles for the publication of the UNIPH quarterly bulletin
- Participated in a project entitled "Using the human centered design (HCD) approach to increase uptake of COVID-19 preventive measures and develop community led surveillance among dwellers of informal settlements in Kampala Metropolitan"

Conference Presentations

- Association between Perceived risk of infection with COVID-19 and protective behaviour among adults in Uganda, May 2020 at the 6th National Field Epidemiology Conference, 4th November 2020.
- Investigation of a COVID-19 Cluster in Achwa Hydroelectric Power Plant, Pader District, Uganda- October 2020 at the 7th National Field Epidemiology Conference, 29th October 2021.
- Investigation of a COVID-19 Cluster in Achwa Hydroelectric Power Plant, Pader District, Uganda-October 2020 at the 8th East African Health & Scientific Conference from 17th-19th November 2021.

Publications and manuscripts written

Manuscripts:

- Set up and management of quarantine centres during the early phase of the COVID-19 epidemic, Uganda: A case of COVID-19 in Masindi District, May 2020
- Association between Perceived risk of infection with COVID-19 and protective behavior among adults in Uganda, May 2020
- Investigation of a COVID-19 Cluster in Achwa Hydroelectric Power Plant, Pader District, Uganda-October 2020

Newspaper articles:

- Submitted a newspaper article entitled 'Pay attention to COVID-19 patients without symptoms which was published by Nation Media on 27 May 2020.

Bulletin articles

The National Institute of Public Health quarterly bulletin:

- Set up and management of quarantine centres during the early phase of the COVID-19 epidemic, Uganda: A case of COVID-19 in Masindi District, May 2020
- Association between Perceived risk of infection with COVID-19 and protective behaviour among adults in Uganda, May 2020

The One Health Epidemiological Quarterly bulletin:

- Trends and Distribution of animal bites and deaths due to suspected human rabies in Uganda, 2016-2020.

Summary of Epidemiological Study:

Investigation of a COVID-19 Cluster in Achwa Hydroelectric Power Plant, Pader District, Uganda- October 2020

Abstract

Background: Achwa Hydroelectric Power Plant (AHPP) in Pader District, Uganda introduced multiple measures starting in April 2020 to reduce risk of COVID-19 introduction and spread. These included testing of visitors/returnees to AHPP for COVID-19 on arrival, enforcement of regular hand washing, face mask use and, maintaining ≥2 metres distance from others. Despite these measures, on October 3, 2020, a COVID-19 cluster was reported at AHPP. We investigated to identify factors facilitating spread and recommend control measures.

Methods: A confirmed case was a positive RT-PCR for SARS-CoV-2 in a person who lived, worked at, or visited AHPP from August-October 2020. We reviewed routine COVID-19 test results from the medical records of AHPP to find cases and develop the line list. We performed environmental assessments and conducted a retrospective cohort study among AHPP employees.

Results: Among 525 employees in six residential camps at AHPP, we identified 105 case-persons (overall attack rate (AR)=20%); mean age was 32 years (range, 18-60 years). The index case-person delivered supplies to AHPP from Kampala on August 10, 2020, interacted directly with two employees, and left immediately; his positive result returned on August 17. The second case-person was an employee who travelled to Gulu City from August 5-8; his sample was collected on August 15 and tested positive on August 25. Alnour camp was both the most congested, with all workers sharing a single dining area, and the most affected (AR=61%) camp. Risk was higher among persons sleeping >2 per room (~20x20 feet in size) than those who slept ≤2 per room (adjusted relative risk=1.2, 95%CI=1.1-1.5).

Conclusion: Crowded employee living conditions facilitated the spread of COVID-19 at AHPP. Long test turnaround time also likely enabled spread of COVID-19 at AHPP. We recommended decongesting sleeping areas at the station and continued surveillance for early detection and management of infections.

Key lessons learnt during the fellowship

- Improved communication skills; Train district veterinary officers openly and with confidence
- Presentation skills; presented my investigations at both local and international conferences
- Improved scientific writing skills (proposal/ protocol writing, manuscript writing)
- Improved data analysis skills
- Expanded professional network (Got to know several persons instrumental in my profession)
- Ability to multitask
- Public speaking (with a lot of opportunity to present in different fora and to different researchers)

PICTORIAL AND NARRATIVE

Josephine Namayanja, fellow cohort 2020 interviewing a parent to one of the case-patients during the Measles outbreak in Nakivaale refugee settlement, Isingiro District in February 2020.

In October 2020, we set out to investigate a COVID-19 cluster at Achwa Hydroelectricity Power Plant. Josephine, Fellow cohort 2020 interviewing one of the managers of the Power Plant on the preventive measures in place to control the spread of the disease at the plant premises.

Josephine, fellow cohort 2020, training Oyam district health team on development of Malaria normal channels in March 2020.

Josephine, Fellow 2020, reviewing medical records of Dufile HCIII during a suspected Brucellosis outbreak in March 2021.

Interview with a community member of Kapsinda sub county in Kapchorwa district on consumption of meat from a dead cow during the Anthrax outbreak in May 2021.

Elizabeth B. Katana

Advanced Field Epidemiology (UPHFP), MSc CEB (Mak), BSMR (Mak)
Email: ekatana@musph.ac.ug
Mobile: +256780384997
Host Institution: Kampala Capital City Authority, Directorate of Public Health and Environment (City Hall, Kampala)
Host Mentors: Dr. Daniel Ayen Okello

FELLOW'S PROFILE

I hold a Master of Science in Clinical Epidemiology and Biostatistics from the Clinical Epidemiology Unit, School of Medicine, College of Health Sciences at Makerere University. During the two years of this fellowship, I have learned and built skills in field epidemiology and community engagement in both rural and urban settings. I have appreciated the role of several statistical methods and research design approaches in field epidemiology, public health, and clinical practice. Some of these approaches included mapping, sampling, project management, policy reviews and development, study designs, research methods, data collection techniques, data management, scientific writing, and reporting.

I prepared articles for publication and dissemination in the Ministry of Health quarterly epidemiological bulletin, technical reports, and manuscripts. I have gained experience in organizing meetings and trainings, conducting epidemiological investigations and quality improvement projects, and enriched my skills and expertise in abstraction, collection, cleaning, analyzing and triangulating survey data.

Before joining the fellowship, I participated in field epidemiological investigations and support supervision for antimicrobial resistance (AMR) surveillance at regional referral hospitals in Eastern Uganda with the Infectious Diseases Institute-Global Health Security Programme (IDI-GHSP). I also participated in Tuberculosis surveillance including community and hospital investigations for Drug-Resistant Tuberculosis in the Karamoja region and monitoring and evaluation of iCCM activities and reporting functions of Village Health Teams in Nakapiripirit district while working with Doctor's with Africa (CUAMM).

Achievements at the Host site: Kampala Capital City Authority, Directorate of Public Health and Environment (City Hall, Kampala)

KCCA is a semi-autonomous governing body of Kampala Capital City on behalf of the central government. The Directorate of Public Health and Environment at KCCA has the mandate to facilitate and provide support to ensuring healthy and productive citizens, and a clean, habitable and sustainable community for Kampala. One of its five core functions is to plan, conduct research, develop and monitor the implementation of strategies on epidemiology and disease control including emergency management, vaccination/immunization, testing treatment, and health impact assessment surveys.

- Following the inception of the COVID-19 pandemic in March 2020, I participated in the establishment of an Emergency Operations Center (EOC) for COVID-19 response and surveillance at the KCCA Directorate of Public Health and Environment.
- As part of the EOC team, I actively participated in the establishment of an emergency toll-free call center at KCCA that aimed at enhancing the COVID-19 response and ensuring continuity of access to essential health and social services in Greater Kampala during the COVID-19 response and lockdown, March to June 2020.
- During this time, as part of the EOC and call centre team, I actively participated in a project on the use of photovoice and community survey for rapid assessment of compliance to COVID-19 prevention measures in Kampala Metropolitan during the early phase of easing the lockdown restrictions in April 2020
- Basing on the findings from the project on compliance to COVID-19 prevention measures, I participated in the development of protocols for the phased COVID-19 lockdown lifting in Kampala

- To ensure compliance to the COVID-19 prevention measures and adherence to the developed lockdown lifting protocols, I participated in a project on the use of the human-centered design (HCD) approach to increase uptake of COVID-19 preventive measures and develop community-led surveillance among dwellers of informal settlements in Kampala Metropolitan
- To strengthen community surveillance for COVID-19, I investigated the risk factors for COVID-19 illness among community surveillance teams in Kampala Metropolitan
- To control the risk factors for COVID-19 illness among the community surveillance teams, I monitored their use and availability of COVID-19 Personal Protective Equipment (PPE) in the five divisions of Kampala
- I participated in COVID-19 Infection Prevention and Control (IPC) measures surveillance and development of IPC protocols for health facilities in Kampala in collaboration with the Infectious Disease Institute Kampala
- Following the increased community transmission and confirmation of multiple clusters of COVID-19 cases in Kampala Metropolitan in August 2020, I investigated clusters of COVID-19 at formal workplaces in Kampala (large offices including banks, motor vehicle dealerships and media houses)
- Investigated clusters of COVID-19 at informal workplaces in Kampala (factories, construction sites, markets, arcades and taxi parks)
- Following investigation of these clusters, I participated in strengthening and monitoring COVID-19 surveillance at Kampala arcades and taxi parks

Fellowship program-specific achievements

- Lead Investigator on the following outbreak investigations:
  - COVID-19 clusters at Kampala private hospitals, August to September 2020
  - COVID-19 workplace clusters at formal and informal workplaces in Kampala, July to September 2020
- Co-Investigator on the following outbreak investigations:
  - Measles in Nakivaale refugee settlement in Isingiro district in February 2020
  - An outbreak of COVID-19 at a clothing and textiles factory in Buikwe district, September 2020
  - COVID-19 case investigations (community and health facilities) in Kampala, Kayunga, Mukono, Wakiso and Mukono districts, August to September 2020
  - COVID-19 death investigations in Kampala Metropolitan, February 2021
- Participated in the COVID-19 Health Facility Operational Readiness Assessment in the Urban Setting of Kampala and Wakiso Districts, Uganda, April 2020
- To inform COVID-19 Health Facility Operational Readiness, I participated in a project on estimating the cost of managing COVID-19 patients in Uganda from March to June 2020
- Participated in the ICP-COVID (International citizen project) initiated by researchers at the University of Antwerp and MakSPH to conduct surveys on adherence to the public health measures and their impact on the COVID-19 outbreak in April 2020
- Policy brief on compulsory screening of measles vaccination status among under-fives to reduce missed opportunities of vaccination (MOV)
- Conducted an HIV study on Evaluating the implementation of integrated HIV and Cervical Cancer (CaCx) management at Baylor supported HIV clinics in western Uganda
- Conducted a Quality Improvement project on; Improving iCCM/VHT Data Quality and Reporting in Adjumani District
- Conducted an epidemiological investigation on; Determinants of non-retention in care (Loss to follow up) among newly diagnosed Hypertension and/or Diabetes Mellitus patients at Kangulumira HC IV, Kayunga District, 2018 – 2019

Conference Presentations

- Using photovoice and community surveys to assess compliance to COVID-19 prevention measures during the early phase of easing the lockdown restrictions, Kampala Metropolitan, May 2020: 6th Uganda Annual National Field Epidemiology Conference November 4, 2020
- Level of and factors associated with failure to access social and essential health services among Ugandans during the COVID-19 lockdown, April 2020: East African FETPs Conference on COVID-19 Response, November 18-19, 2020
- Violence and discrimination among Ugandan residents during the COVID-19 lockdown: Infectious Disease Institute (IDI), Kampala, Research Forum, August 2021

- Use of toll-free call center for COVID-19 response and continuity of essential services during the lockdown in Greater Kampala, 2020: 7th Uganda Annual National Field Epidemiology Conference on October 2021
- Use of toll-free call center for COVID-19 response and continuity of essential services during the lockdown in Greater Kampala, 2020: 8th East African Health and Scientific Conference, November 2021

Publications and manuscripts written

Manuscripts:

1. Katana E, Amodan BO, Bulage L, Ario AR, Fodjo JNS, Colebunders R, et al. Factors associated with access to food and essential medicines among Ugandans during the COVID-19 lockdown: a cross-sectional study. Journal of Interventional Epidemiology and Public Health [Internet]. 2021 Oct 28 [cited 2021 Nov 10];4(4). Available from: https://www.afenet-journal.net/content/series/4/2/4/full/
2. Katana E, Amodan BO, Bulage L, Ario AR, Fodjo JNS, Colebunders R, Wanyenze RK. Violence and discrimination among Ugandan residents during the COVID-19 lockdown. BMC Public Health. 2021 Mar 8;21(1):467.
3. Under journal review: Use of toll-free call centre for COVID-19 response and continuity of essential services during the lockdown in Greater Kampala, 2020

Epi-bulletin articles in the National Institute of Public Health quarterly bulletin:

- A cluster of COVID-19 at a formal workplace, Kampala Central, August 2020: description of cases and response measures: Volume 6| Issue 2| April – June 2021
- A cluster of COVID-19 at a secondary hospital, Kampala, Uganda, during phase four of the epidemic: Volume 6| Issue 1| January – March 2021
- Incidence and factors associated with experiencing violence or discrimination among Ugandans during the COVID-19 lockdown, April 2020: Volume 5| Issue 3| July – September 2020
- Level and failure to access food and essential health services among Ugandans during the COVID-19 lockdown, April 2020: Volume 5| Issue 3| July – September 2020
- The role of PHFP Field Epidemiology Fellows in the response to the COVID-19 pandemic in Uganda, 2020: Volume 5| Issue 2| April – June 2020

Summary of Epidemiological Study:

Use of a Toll-free Call Center for COVID-19 Response and Continuity of Essential Services during Lockdown, Greater Kampala, Uganda, 2020

E. Katana[1,2*], A Ndyabakira[1,2], D.N. Gonahasa[1], R. Migisha[1], G. Amanya[1], A. Byaruhanga[1], I. Chebrot[2], C. Oundo[2], D. Kadobera[1], L.Bulage[1], AR Ario[1,3], DA Okello[2], JR Harris[4];

[1]Uganda Public Health Fellowship Program, Ministry of Health, Kampala, Uganda, [2]Directorate of Public Health and Environment, Kampala Capital City Authority, Kampala Uganda, [3]Uganda National Institute of Public Health, Ministry of Health, Kampala, Uganda, [4]Division of Global Health Protection, US Centers for Disease Control and Prevention, Kampala, Uganda

Background: Establishment of a call center during public health emergencies is essential in reducing unnecessary calls to emergency telephone systems and providing relevant information to the public. Following the introduction of COVID-19 in Uganda, a total lockdown was initiated on March 30 and lifted in stages through June 30, 2021. On March 25, a toll-free call center with two hotlines was set up at Kampala Capital City Authority to respond to public concerns about COVID-19 and the lockdown. Call-related data were entered into a database. We documented the set-up and use of the call center and key concerns raised by the public during COVID-19 lockdown.

Methods: We abstracted data on incoming calls between March 25-June 30, 2020 from the database. We summarized the call data into categories and conducted descriptive analysis of the public concerns raised during the different phases of the lockdown.

Results: Of the 10,167 calls made, 6,578 (65%) were about health services access, 786 (8%) about social services access, and 1,375 (14%) about COVID-19 concerns. Among the 6,578 calls about access to health services, 2,152 (33%) were requests for ambulances for non-COVID emergencies, 1,155 (18%) were about persons stranded at health facilities, and 1,004 (15%) were about mothers in labor. Among the 786 calls about social services, 405 (52%) were requests for food and relief items and 158 (20%) were about price hikes for basic goods. Fifty-three percent of the 1,375 calls about COVID-19 response were seeking COVID-19 disease-related information and 360 (26%) were reporting COVID-19 suspected cases. There were no calls about COVID-19 emergencies.

Conclusion: The toll-free call center was used by the public during the COVID-19 response. Calls indicated gaps in health and social services associated with the lockdown. Continuity of essential services amidst an epidemic-related lockdown should be planned accordingly.

Key words: call center, hotline, Uganda, COVID-19

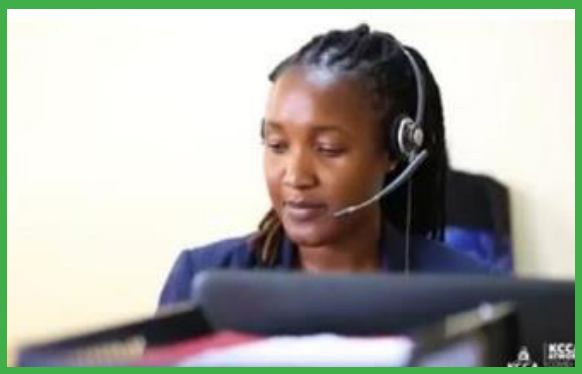
Key lessons learned during the fellowship

- Appreciated the approaches and diverse comparison that exists in research conducted between urban and rural populations, public health interventions, and programs
- Through my attachment at KCCA, I have appreciated key urban health epidemiology concepts including exposures or interventions that affect urban dwellers such as noise pollution, waste management, smoking and tobacco control, risk communication, among others.
- Improved communication skills; conducted training for surveillance teams in Kampala
- Public health bulletin writing
- Community engagement
- Networking
- Presentation skills and public speaking; presented abstracts at both local and international conferences
- Built interpersonal skills, team building, proactiveness, and networking
- Improved skills in design and coordination of studies
- Grants writing skills and approaches

Next steps

- To continue training and learning with a focus on epidemiological analyses, statistical methodology, research methods, and clinical epidemiology
- To share and teach the acquired skills from this fellowship program to other public health professionals.

PICTORIAL AND NARRATIVE



In March 2020, we participated in the establishment of a toll-free call center for COVID-19 response and continuity of essential services during the lockdown in Greater Kampala. It was set up at the emergency operations center of the Directorate of Public Health and Environment at the Kampala Capital City Authority headquarters at city hall in Kampala. It was directly manned by a team of call attendants, clinicians, and epidemiologists in collaboration with rapid responder teams including ambulance and KCCA community vehicle drivers who formed the field-based teams. As shown above, Elizabeth, as part of the epidemiologists on the call center team, was responding to a phone call.

Evaluation of HIV and NCD data at the HIV clinic of Fort Portal Regional Referral Hospital as part of our assessment on the implementation of integrated HIV and Cervical Cancer (CaCx) management at Baylor supported HIV clinics in western Uganda.

Conducted a Quality Improvement project on; Improving iCCM/VHT Data Quality and Reporting in Adjumani District

Patricia Thiwe

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Host Institution: National Malaria Control Division, Ministry of Health
Host Mentors:
Dr. Damian Rutazaana
Dr. Daniel Kyabayinze

FELLOW'S PROFILE

Patricia Thiwe holds a Bachelor of Environmental Health Science and Master of Public Health from Makerere University, School of Public Health. During her two years of the fellowship, she was hosted at the National Malaria Control Division (NMCD), Ministry of Health where she was part of the team that is charged with malaria prevention and control in Uganda. Patricia gained skills in Epidemiology including disease outbreak investigation, response to public health emergencies, design and implementation of operational research, data analysis, scientific writing, and communication among others

Prior to joining the fellowship programme, Patricia worked as an Assistant District Health Officer-Environmental Health in Nebbi District where she oversaw environmental health services in the district.

Achievements at the Host site: National Malaria Control Division

- Analyzed surveillance data on Trends and distribution of malaria in pregnancy in Uganda, 2015-2019. Our analysis showed a significant overall decline in the incidence of malaria in pregnancy between 2015 and 2019. It also showed that Acholi, Lango, Teso and Karamoja regions had the highest incidences of malaria in pregnancy throughout the five-year period.
- Developed and disseminated weekly malaria reports which highlights district malaria status and informs early intervention in case of any gaps.
- Participated in analyzing data for the malaria annual report 2020/2021
- Lead editor for three quarterly malaria bulletins that are usually dissemination to malaria stakeholders in the country. These bulletins highlight key malaria indicators in the country and is based on routinely collected data from health facilities through the DHIS2 platform.
- Implemented a quality improvement project on improving iCCM reporting and data quality in Zombo District.
- Participated in building capacity of district health teams in central region on malaria surveillance, particularly in monitoring detection of malaria outbreaks using normal channels and coordination of responses to detected outbreaks.
- Participated in data collection for an assessment on ITN ownership and utilization in Dokolo District,
- Participated in malaria mortality surveillance in Nebbi District.

Fellowship program specific achievements

- Lead Investigator on the following outbreak investigations:
- Epidemiological assessment of COVID-19 cluster among attendees of a farewell party at a church in Omoro District, Uganda, October 2020
- Characterization of COVID-19 cases among children in Lacor Hospital, June-Sept 2021
- Participated in the following outbreak investigations:
  - Measles outbreak in Nakivale Refugee camp in Isingiro District in February 2020
  - Malaria mortality in Nebbi District in May 2021
- Wrote a policy brief on Frequent Commodity Restocking by Village Health Teams to Improve Community Management of Childhood Malaria in Uganda
- Conducted an HIV study on Uptake of HIVST among male partners of women attending ANC in Kampala region, 2020.
- Analyzed surveillance data on Trends and distribution of malaria in pregnancy in Uganda, 2015-2019.
- Conducted an epidemiological study on Impact of Covid-19 on Utilization of Immunization Services in Mityana District.
- Editor of the UNIPH Epi Bulletin Volume 5, Issue 4

Conference Presentations

- Factors affecting COVID-19 district surveillance data reporting during the first phase of the pandemic, Uganda at 6th Field Epidemiology Conference in Kampala, September 2020.
- Investigation of a COVID-19 cluster among attendees of a farewell party at a church in Omoro District, Uganda, at 7th Field Epidemiology Conference in Kampala, October 2021 and 8th East African Health and scientific conference

Publications and manuscripts written

Manuscripts:

- Factors affecting COVID-19 district surveillance data reporting during the first phase of the pandemic, Uganda
- Investigation of a COVID-19 cluster among attendees of a farewell party at a church in Omoro District, Uganda

Newspaper articles

The following articles were published in the New Vision

- Did you know that zero malaria starts with you?
- Handwashing: Clean hands save lives

Epi-bulletin articles in the National Institute of Public Health quarterly bulletin:

- Factors affecting COVID-19 district surveillance data reporting during the first phase of the pandemic, Uganda
- Investigation of a COVID-19 cluster among attendees of a farewell party at a church in Omoro District, Uganda

Summary of Epidemiological Study:

Investigation of a COVID-19 cluster among attendees of a farewell party at a church, Omoro District, Uganda, 2020

Background: On 2 October 2020, a cluster of COVID-19 infections was reported in Omoro District, Northern Uganda. Despite government directives banning public gatherings, many infected persons had reportedly attended a farewell party at Church X on 5 September. We investigated to determine the source of infections, understand the outbreak magnitude, and identify risk factors for transmission.

Methods: We defined a case as a positive PCR for SARS-CoV-2 virus in a respiratory sample from an Omoro District resident, taken from 4 September to 5 October 2020. We developed a line list by reviewing records and interviewed the index case-patient, church farewell party attendees, and several community members to ascertain possible exposures. We conducted a retrospective cohort study among the 62 farewell party attendees.

Results: We identified 23 confirmed case-patients (74% male; median age 36 years) in Omoro District, including 12 in the Church X cluster. Illness onsets ranged from 23 August to 29 September. Fifteen (24%) farewell party attendees were infected. The index case, Mr. A, was a businessman active in Church X with onset on 23 August. Mr. A had no travel history but had multiple traveller clients. He attended the farewell party and multiple Church X services in August. In total, 17 (74%) case-patients had exposure to Mr. A. The second case-patient, Mr. B, had onset on 1 September. He was also active in Church X, frequently interacted with Mr. A, and attended the farewell party. All 23 cases had contact with Mr. A, Mr. B, or their contacts. Close contact with Mr. A (RR=2.4; 95% CI=1.1-5.8) or Mr. B (RR=2.6; 95% CI; 1.2-6.7) at the farewell party was associated with infection.

Conclusion: A social event at a church and lack of adherence to government directives provided an opportunity for spread of COVID-19. Improved adherence to national guidelines and government directives for COVID-19 and enforcement of adherence to standard operating procedures for COVID-19 could avert similar clusters in the future.

Key words: COVID-19, cluster, Church, Uganda

Key lessons learnt during the fellowship

- Outbreak detection, investigation, response and control
- Scientific writing (grant proposals, proposals/ protocol writing, manuscripts, abstracts, policy briefs, Newspaper articles and bulletin articles)
- Data analysis using Epi info, STATA, QGIS, and interpretation of results
- Presentation and communication skills at both national and international levels
- Multitasking
- Public speaking
- Improved analytical skills (Deeper understanding of elements)
- Public speaking (with a lot of opportunity to present to different fora and researchers)

Next Steps

I am looking forward to further my career I field Epidemiology through service with the Ministry of Health and/or other organizations that will allow me leverage the knowledge, and skills obtained during this training.

PICTORIAL AND NARRATIVE

Patricia Thiwe (middle), Peter Oumo (left) and Sr. Angulleta the in-charge paediatric ward, reviewing records during investigation of a COVID-19 outbreak in children's ward in St Mary Lacor Hospital Gulu.

Patricia Thiwe interviewing a nun during a COVID-19 outbreak among attendees of a church event in Omoro District

Peter Omms Oumo
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Host site: National Malaria Control Division
Host Site Mentors:
Dr. Damian Rutazaana
Dr. Daniel Kyabayinze
Dr. Jimmy Opigo

FELLOW'S PROFILE

SP Peter Oumo is a field epidemiologist with a background in environmental health. I hold a Master of Public Health from International Health Sciences University (IHSU). During my tenure as a Public Health Fellow, I have been attached to the National Malaria Control Division (NMCD) of Ministry of Health where I have developed confidence in myself amidst challenges of the lockdown and learnt to work in a dynamic environment. No sooner had I reported to the host site that was the lockdown instituted. We have literally been known as the COVID-19 cohort.

Achievements at the host site

- When I was placed at the host site shortly after the lockdown was instituted, I was hosted at the epidemiology department where I largely supported the publication of the weekly and quarterly bulletins at the National Malaria Control Division which are used as information sources and basis for decision making at national and sub-national levels for malaria response.
- I have also heavily been involved in supporting the routine weekly analysis of malaria surveillance to monitor upsurges of malaria cases through the construction of malaria normal channels using weekly reported DHIS 2 data which is eventually shared in the weekly malaria status of districts to NMCD and respective districts.
- For purposes of sustainability and wide coverage, I participated in supporting districts in Uganda to build capacity by training and mentoring district health teams to construct malaria normal channels as a surveillance tool to detect malaria outbreaks this was conducted in 6 districts in western Uganda, September 2020.
- Through constant analysis of DHIS2 surveillance data, I noticed that there are many deaths occurring due to malaria. I therefore took keen interest in conducting an analysis of trends and distribution of malaria deaths in Uganda using District Health Information System surveillance data between 2015 and 2019. The results of this analysis revealed that there was a significant increase of malaria deaths in 2016 although the malaria deaths generally declined over the years with the biggest decline being in 2018 after the net campaign. Children under 5 years were the most affected and had more deaths. The results of this analysis enabled me to identify and implement a Continuous Quality Improvement project in Iganga district.
- I then conducted a Quality Improvement (QI) project in Bugono Health Center IV in Iganga district 2021 with the aim of improving the identification and management of severe malaria among patients especially children to reduce malaria deaths. Results of the end line assessment indicated that malaria deaths had reduced from 11 deaths reported during 2020-2021 to 00 deaths at the time of assessment with basic interventions of mentoring and training facility teams in early detection of severe malaria.
- I was further intrigued to assess the risk factors associated with malaria deaths in 8 high death burden districts in Uganda, May 2021. This investigation found out that children under 5 years died more than their older counterparts of 5 years and above. Risk factors of malaria deaths included; anaemia, bleeding, hospitalisation, non-use of a mosquito net, convulsions and going into coma and non-receipt of antimalarial drugs after admission. Presence or co-morbidities such as cancer, sickle cell was a risk factor of malaria death.
- I was part of the Malaria Surveillance, Monitoring, Evaluation and Operational Research technical working group (SMEOR) which discussed Strategic

Objectives and its activities during the finalisation of the Uganda Malaria Reduction and Elimination Strategic Plan 2021-2025. This is a national plan with the aim of reducing malaria morbidity and mortality. It is also now advocating for strategies which seek to eliminate malaria in parts of the country.

- While at the host site, I was also involved in several COVID-19 investigation activities and responses. I was involved in the investigation of COVID-19 deaths in Rubaga and Makindye division in Kampala 25th/02/2021-22nd/03/2021, because of continued rise of cases with over 300 cases reported with many deaths occurring all over the country without being investigated. Results of this investigation indicated that 71% of deaths were male and median age was 61 years (IQR: 50-71). Of the 126 deaths, 98 (78%) had an underlying medical condition. Cough 90 (71%) was the most common symptom at first presentation to a health facility. Most case-patients had severe disease 64 (51%) or were critically ill 54(43%).
- I conducted the Novel Oral Polio Vaccine (nOPV) regional trainings as the Central Supervisor for 11 districts in the Jinja region. This was in preparation for the forthcoming National Immunisation Days scheduled to take place in January 2022. The training took place on 11th and 12th November 2021. This saw all the district health teams in the region and the district leadership oriented.

Fellowship program specific achievements

- Evaluation of malaria deaths in Uganda using District Health Information System surveillance data, 2015-2019", December 2020. This eventually led to my quality improvement project in Bugono HCIV as described earlier.
- Investigation of risk factors associated with malaria deaths in 08 high death burden districts in Uganda, May 2021. The 08 districts included: Agago, Apac, Iganga, Kakumirqo, Kikuube, Kitgum, Nebbi and Napak.
- I led the investigation of COVID-19 cases in Gulu and Lira regions, 2020. This was done following the upsurges of COVID-19 cases including the high numbers of truck drivers who were falling sick at the time, with also a big number of accumulated backlogs of un-investigated COVID-19 cases in the country. The purpose was to understand factors that exposed the cases to COVID-19 and provide appropriate public health interventions.
- While we investigated COVID-19 cases in Gulu district, a cluster of COVID-19 among prisoners of Amuru Central Prison with some staff was reported. I led the eepidemiological investigation on the characterization of COVID-19 cluster amongst prisoners from Amuru Central Prison. The results indicated that 150 (100%) of the prisoners were investigated at Gulu Main prison. All 150 (100%) were male since it was a male prison, the mean age was 28 years. 149 (99%) were Ugandan and 1 (1%) South Sudanese. Most of the cases were arrested from Gulu 42 (28%), and Amuru 19 (15%). Most of the prisons case patients were symptomatic 108 (72%), the most common signs and symptoms were; Cough 39 (26%).
- I led the investigation to understand the Effects of COVID-19 on Gender-Based Violence during the Covid-19 lockdown: January 1 to July 30, 2020 in Uganda following the rising cases of GBV cases as reported by police sources. Results indicated the largest increase in reported GBV cases occurred among students and pupils, although incidence generally increased across all population groups during the first lockdown with women, adolescents and students experiencing the greatest burden. GBV associated with alcohol consumption increased substantially. We therefore recommended that awareness and prevention efforts to should focus on alcohol-associated GBV.

Co-investigator

- Measles outbreak investigation in Nakivale refugee camp, Isingiro district, 2020
- Part of the team that investigated the COVID-19 outbreak amongst a cluster of health workers in health facilities in Abim district, October 2020.
- I participated in the investigation of the Truck drivers under the "Trucker Protection Project" in Entebbe, Lira, Gulu and Arua RRHs amid increasing COVID-19 infections among Truck drivers in Uganda 18 May to 4th June 2020.
- Epidemiological case investigation on a confirmed COVID-19 case that was isolated in Masaka Regional Referral Hospital isolation unit, May 2020"
- Characterization of COVID-19 cases among children in Lacor Hospital, June-Sept 2021.

HIV Project

I investigated the effects of COVID-19 on ART services utilisation among people living with HIV and AIDS in the Rwenzori Region, Mid-Western Uganda, 2021. We evaluated effects of the first COVID-19 lockdown on critical metrics of HIV program delivery (retention, viral load coverage, and viral load suppression). The results show that those active on ART were 2266 patients

right before the intervention period. At implementation of the intervention, incidence of those active on art dropped by 500 cases. results also show reductions in proportions of Viral Load Coverage Suppression.

Quality improvement project

We implemented a Continuous Quality Improvement (CQI) project in Bugono Health Center IV in Iganga district with the aim of improving identification and management of severe malaria among patients to reduce on malaria deaths. Interviews with health facility staff indicated multiple challenges, including inability to test all clients due to inadequate reagents, malfunctioning microscopes and testing kits in the laboratory for diagnosis, few personnel in the laboratory to conduct testing, medicines and supplies stockouts, health worker absenteeism, and delays in referral due to a non-functional grounded ambulance. We conducted trainings, mentorships and Continuous Professional Development sessions. Results indicated a tremendous reduction in the deaths in Bugono Health Center IV from the 11 deaths that had been reported in the previous year to 0 deaths after the 5 months of implementation of the project.

Scientific Writing

Articles in the MOH Epidemiological Bulletin

- A policy brief titled "Stopping malaria in its tracks: Empowering Uganda's Village Health Teams to treat malaria in children under 5 at the community level".
- Effects of COVID-19 on GBV during the COVID-19 lockdown: January 1 to July 30, 2020
- Trends and distribution of malaria deaths among the general population, Uganda 2015-2019

Newspaper articles

- Police officers should observe COVID-19 guidelines while on duty

Manuscripts

Lead author

- Characterization of Gender-Based Violence During the COVID-19 Lockdown in Uganda, July 2020

Co-author

- "Trucker Protection Project" amid increasing COVID-19 infections among Truck drivers 18 May to 4th June 2020.
- Measles outbreak investigation in Nakivale, Isingiro district
- A cluster of COVID-19 among children in Lacor Hospital, Gulu district
- Investigation of COVID-19 deaths in Rubaga and Makindye division in Kampala 25th/02/2021-22nd/03/2021, because of continued rise of cases with over 300 cases reported with many deaths occurring all over the country without being investigated.
- The main purpose of this activity was therefore to investigate all confirmed deaths due to COVID-19 in Kampala district.

Conference presentations

- Oral presentation of Characterization of Gender-Based Violence During the Covid-19 Lockdown in Uganda, July 2020 at the 6th National Field Epidemiology Conference, November 2020.
- Oral presentation of Description of Malaria Deaths in Selected Districts in Uganda January 2020—May 2021 at the 7th National Field Epidemiology Conference, October 2021.
- Oral Presentation of Trends and Distribution of Malaria Deaths in Uganda 2015-2019 at the 20th Annual Scientific Conference Program, of Uganda Society for Health Scientists July 2020.

Summary of Epidemiological Study

Description of Malaria Deaths in Selected Districts in Uganda January 2020—May 2021

Introduction: In Uganda, malaria accounts for 30-50% of outpatient visits, 35% of hospital admissions, and 13% of hospital deaths. However, the characteristics of persons who die of malaria in Uganda are not well-described. We investigated the characteristics of malaria deaths in high-malaria-burden districts to inform programming for targeted interventions.

Methods: Cases were defined as death of a hospitalized person with a positive microscopy or rapid diagnostic test for malaria from 1 January 2020-30 May 2021. We used District Health Information System 2 malaria death data to identify districts with the highest case rates in Uganda during this period. We selected 8 high-burden districts from various areas of the country (Agago, Apac, Kitgum, Napak, Nebbi, Iganga, Kakumiro, and Kikuube) and visited all Health Centers (HC) III, HC IV, and general hospitals to abstract data on cases at the facilities. We abstracted data on age, sex, health facility name and level, district, diagnosis, date of admission, and date of death. Mortality rates (MR) were computed using deaths (cases) as numerators and district populations as denominators. We analyzed the data by demographic and geographic characteristics.

Results: Among 273 cases, 157 (58%) were male; median age was 5 years (IQR: 2-13). The overall MR was 11/100,000. Children <5 years had a higher MR than persons ≥5 years old (25.6 vs 7.1/100,000). Agago district had the highest mortality rate (35/100,000) followed by Nebbi District (20/100,000) and Napak district (18/100,000); all three are in the northern area of the country. Most malaria deaths occurred during June-August.

Conclusion: Children <5 years experienced malaria death rates four times higher than older age groups. The highest malaria death rates occurred in northern Ugandan districts. Malaria prevention measures and appropriate clinical management should be heightened amongst children <5 years in these districts.

Key lessons learnt during the fellowship

- Outbreak detection, investigation, response, and control
- Scientific and Public Health Bulleting writing of concepts, manuscripts, abstracts, policy briefs, bulletin articles and newspaper articles, the use of data for policy writing
- Editorial skills for scientific articles including the weekly, monthly, quarterly and epidemiological bulletins.
- Data analysis using Epi info, STATA and QGIS.
- Leadership and management skills
- Designing and implementing Continuous Quality Improvement projects.
- Evaluation a surveillance system
- Communication skills including presentation, written and visualisation

Next Steps

With the skills Peter Oumo has acquired through the fellowship tenure, I hope to further my career in the field of epidemiology through service in an organisation that will provide me with the opportunity to serve and practice my epidemiology and other skills learnt along the fellowship.

PICTORIAL AND NARRATIVE

Peter Oumo and team carrying out COVID-19 case investigations at Gulu COVID-19 treatment unit, September 2020.

The fellow (Oumo Peter) extreme right with fellow epidemiologists in front of Gulu Central prison ready to start the investigations of a cluster of COVID-19 prisoners from Amuru Central Prison.

The fellow conduction an orientation meeting with the management team of Bugono Health Center IV, May, 2021

Dr. Migisha Richard
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Host site: Neglected Tropical Diseases (NTD)
Host site mentors: David Oguttu and Dr. Mubangizi Alfred

Fellow's Profile

Dr. Migisha is an epidemiologist and holds a Bachelor's degree in medicine and Surgery, a Master's degree in Public Health, and a Master's degree in Science in Physiology. Before joining the Uganda Public Health Fellowship Program (UPHFP), I worked as a medical officer in Kisoro District Local Government, and Ntungamo District Local Government, mainly as a clinician for seven years. I am an alumnus of One Health Institute (OHI) of Makerere University, and I have experience in working with infectious disease outbreaks, and non-communicable diseases. I have published more than 20 scientific papers in the field of disease outbreak investigations, zoonotic diseases, and non-communicable diseases including hypertension, diabetes, and cardiovascular diseases. As a member of the National Rapid Response Team, I have been involved in the national response to the COVID-19 pandemic, including leading three COVID-19 outbreak investigations in different parts of the country.

Program-specific deliverables

- I led three outbreak investigations including:
- Investigation of early cases of SARS-CoV-2 infection in Uganda, March -April 2020
- Investigation of COVID-19 clusters in southwestern Uganda, August 2020.
- Investigation of a COVID-19 outbreak at Moroto Prison, Northern Uganda, September 2020

I participated in four other outbreak investigations:

- Measles outbreak investigation in Nakivale Refugee Settlement, Isingiro District, February 2020
- Investigation of COVID-19 among long-distance truck drivers, May–June 2020
- Food poisoning Outbreak in Obongi District, August 2021
- COVID-19 outbreak among contacts of patients in home-based care, Western Uganda, November 2020

I published two COVID-19-related bulletin articles in the UNIPH Epidemiological Bulletin, in the January-March quarter bulletin.

During the early phase of the COVID-19 pandemic in Uganda, I wrote a newspaper article entitled "COVID-19 and tobacco smoking: fighting a double pandemic". This was published in the New Vision.

My HIV project assessed the prevalence and risk factors of high blood pressure among adolescents and young adults (13-25 years) infected with HIV in Rwenzori Region, Western Uganda.

I conducted a quality improvement project. "Improving rational use of medicines at Itojo Hospital, Ntungamo District, Southwestern Uganda"

I participated in drafting a policy brief, entitled "Turning anthrax from a private good to a public good disease"

I made six oral presentations at scientific conferences; four of these oral presentations were at local conferences —three of the abstracts were presented at the National Field Epidemiology Conferences, and one abstract was presented at the June 11, 2021 PEPFAR summit. I made two oral presentations at an international conference (East African FETPs Conference on COVID-19 Response) that was held on November 18, 2020.

I have authored and co-authored a number of manuscripts over the year period. I have written five manuscripts as the lead author, tow of which have already been published in peer reviewed journals.

- Migisha, et al., 2020. Early cases of SARS-CoV-2 infection in Uganda: epidemiology and lessons learned from risk-based testing approaches–March-April 2020. Globalization and Health, 16(1), pp.1-9. – published in BMC

- Investigation of a COVID-19 outbreak, at a regional prison, Northern Uganda, September 2020 – under peer review
- Psychological impact of COVID-19 among health workers in referral hospitals during early phase of COVID-19 pandemic, Uganda – under peer review in BMC Psychology
- Compliance to handwashing among Ugandan citizens during early phase of COVID-19 pandemic: a nationwide survey – under peer review
- High blood pressure and associated factors among HIV-infected young persons (13-25 years), Rwenzori Region, Western Uganda – under clearance at PHFP secretariat

I am a coinvestigator on six other manuscripts, five of which are COVID-19 related:

- Individual and household risk factors for COVID-19 outbreak in home-based care settings in Western Uganda, November-December 2020 – Under CDC clearance
- Estimating the Cost of Treating a COVID-19 patient in government health facilities in Uganda, March to June, 2020 – under CDC clearance
- Investigation of a measles outbreak in a refugee settlement, Isingiro District, February 2020 – under CDC clearance
- COVID-19 outbreak at a quarantine prison, Central Uganda, September 2020 – under CDC clearance
- High-risk COVID-19 among truck drivers testing positive for COVID-19 at Uganda borders, May-June 2020 – under CDC clearance
- Use of a toll-free call center for COVID-19 response and continuity of essential services during the lockdown, Greater Kampala, Uganda, 2020 – under peer review.

Summary of Epidemiological Study:

Psychological Impact of COVID-19 on Healthcare Workers in Referral Hospitals During the Early Phase of the Pandemic, Uganda

Background: Safeguarding the psychological well-being of healthcare workers (HCWs) is crucial to ensuring sustainability and quality of healthcare services. During the COVID-19 pandemic, HCWs working in COVID-19 treatment units may be subject to excessive mental stress. We assessed the risk perception and immediate psychological state of HCWs early in the pandemic in referral hospitals involved in the management of COVID-19 patients in Uganda.

Methods: We distributed paper-based, self-administered questionnaires to HCWs in five referral hospitals from April 20–May 22, 2020. The questionnaire included questions on socio-demographics, occupational behaviors, potential perceived risks, and psychological distress. We assessed risk perception towards COVID-19 using 27 concern statements with a four-point Likert scale. We defined psychological distress as a total score >12 from the 12-item Goldberg's General Health Questionnaire (GHQ-12). We used modified Poisson regression to identify factors associated with psychological distress.

Results: Among 335 HCWs who received questionnaires, 328 (98%) responded. Respondents' mean age was 36 (range 18-59) years; 172 (52%) were male. The median duration of professional experience was eight (range 1-35) years; 208 (63%) worked more than 40 hours per week; 116 (35%) were nurses, 52 (14%) doctors, 30 (9%) clinical officers, and 86 (26%) support staff. One hundred and forty-four (44%) had a GHQ-12 score >12. The most common concerns reported included fear of infection at the workplace (81%) and if a colleague contracted COVID-19 (89%), stigma from colleagues (79%), lack of workplace support (63%), and inadequate availability of personal protective equipment (PPE) (56%). In multivariable analysis, moderate (adjusted prevalence ratio, [aPR]=2.2, 95% confidence interval [CI]: 1.2–4.0) and high (aPR=3.8, 95% CI: 2.0–7.0) risk perception towards COVID-19 (compared with low-risk perception) were associated with psychological distress.

Conclusions: Forty-four percent of HCWs surveyed in hospitals treating COVID-19 patients during the early COVID-19 epidemic in Uganda reported psychological distress related to fear of infection, stigma, and inadequate PPE. Higher perceived personal risk towards COVID-19 was associated with increased psychological distress. To optimize patient care during the pandemic and future outbreaks, workplace management may consider identifying and addressing HCW concerns, ensuring sufficient PPE and training, and reducing infection-associated stigma.

Key skills and competences gained during the fellowship

- Conducting outbreak investigations and response
- Scientific writing skills: manuscript writing, policy briefs, newspaper articles
- Grant writing skills

- Presentation skills
- Leadership skills
- Data analysis
- Designing and implementing quality improvement projects

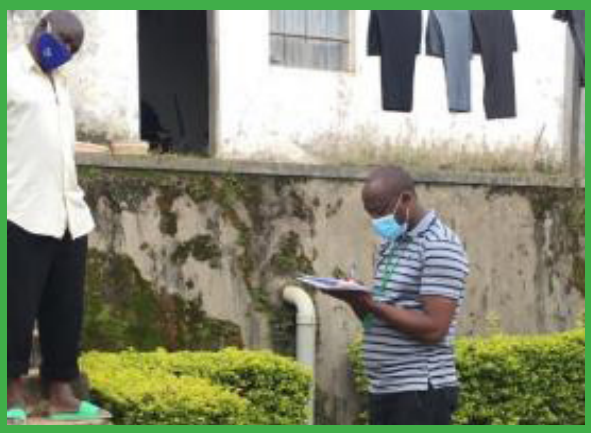
Next Steps

I hope to share the skills and competences gained during the fellowship with the aim of improving public health practice in Uganda.
I hope to further my career in field epidemiology.

PICTORIAL AND NARRATIVE

Richard Migisha (in the middle) dressed in full PPE, set to conduct Epidemiological investigation on confirmed COVID-19 cases at Hoima Regional Referral Hospital, April 2020

Fellows: Richard Migisha (Left) and Daniel Emong (middle) with supervisor; Dr. Benon Kwesiga (Right), conducting retrospective review of case-patient files at Entebbe Grade B Hospital, April 2020



Dr. Migisha conducting an interview with one of the recovered COVID-19 cases managed under home-based care, Kabarole District, December 2020

RIGHT:
Dr. Jude Haris
PHFP Resident Advisor

MIDDLE:
Dr. Ario Alex
PHFP Program Director

LEFT:
H.E. Natalie Brown
US Ambassador

Prime Minister Rt. Hon. Nabanjja handover FETP Graduand Certificate to Dr. Yvette Wibabera

THE REPUBLIC OF UGANDA
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