Public Health Fellowship Program

Leadership For Health

THE UGANDA PUBLIC HEALTH FELLOWSHIP PROGRAM (PHFP)

Field Epidemiology Track 2015/2017

Centers for Disease Control and Prevention
Center for Global Health

PREFACE

The Uganda Public Health Fellowship Program (PHFP) has so far enrolled 31 Fellows under the Field Epidemiology Track (FET) since 2015; 10 in 2015, 10 in 2016 and 11 Fellows in 2017. Over the past 2 years, Fellows have conducted over 40 outbreak investigations on diseases of public health importance; thereby contributing to their effective management and control. Fellows 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.

Over the past two years, Fellows presented 66 papers at national and international conferences; two of them received awards for outstanding presentation. In May 2016, Dr Christine Kihembo. (Cohort 2015) received the 2016 Jeffrey P. Koplan Award for Excellence in Public Health at the 65th Epidemic Intelligence Service Conference in Atlanta, Georgia, for her poster presentation entitled, "Risk factors for Podoconiosis in Kamwenge District, Western Uganda, 2015". In August 2016, Dr Fred Nsubuga (Cohort 2015) won an award (2nd Runner-up in the Best Oral Presentations Category) at the 6th AFENET Conference in Abuja, Nigeria, for his presentation entitled, "Measles transmission facilitated by exposure at crowded healthcare facilities, low vaccine effectiveness and failure to vaccinate in Kamwenge District, Western Uganda, April to August, 2015".

Fellows have made significant appearances in the local media, contributing feature articles on key topics of public health importance. In another very important stride, the Public Health Fellowship Program rejuvenated the Ministry of Health Bulletin code-named the Uganda National Institute of Public Health Quarterly Epidemiological Bulletin where Fellows have participated very effectively as editors and article contributors. Four volumes have so far been produced since the Quarterly bulletin was rejuvenated over the past 2 years. Fellows have submitted sixteen manuscripts to reputable peer-reviewed journals. This report presents the profiles of Cohort 2015 Fellows and their achievements over the two-year period of training. Enjoy your reading!

Lilian Bulage
Bsc. (Technology - Biology) (KYU), MHSR (Mak),
+256 782623624 / 701623620
lbulage@musph.ac.ug,
lilian.bulage@gmail.com

Host mentors
Mr. Steven Aisu
Executive Director, Central Public Health Laboratories

Mr. Isaac Ssewanyana
Laboratory Manager,
Central Public Health Laboratories.

Mr. Atek Kagirita
Central Public Health Laboratories

Academic Mentor
Dr. Victoria Nankabirwa
Lecturer Makerere University School of Public Health

ABOUT THE FELLOW

Lilian Bulage has a biological science background from Kyambogo University and a Master of Health Services Research from Makerere University. Prior to joining PHFP-FET, Lilian worked at the National Tuberculosis and Leprosy Program (NTLP) specifically at the National Tuberculosis Reference Laboratory (NTRL); a South African National Accreditation System (SANAS) accredited and WHO Supra-National Reference Laboratory.

At NTRL, Lilian worked as a Laboratory Scientist in-charge of External Quality Assurance (EQA) activities for the South Eastern TB Zone.

In-addition, she worked as a secretary in-charge of the NTLP Tuberculosis Research and Innovations Forum. She had publications about Tuberculosis, titled, "The Quality of Tuberculosis Services in Health Care Centres in a Rural District in Uganda: The Providers' and Clients' Perspective, and Quality of Sputum Specimen Samples Submitted for Culture and Drug Susceptibility Testing at the National Tuberculosis Reference Laboratory-Uganda, July-October 2013" as lead author.

Outside NTLP, Lilian was a member of the WHO National Stop transmission of Polio (NSTOP) where she actively participated in conducting active surveillance activities. She joined the PHFP-FET in January 2015 and was based atthe Central Public Health Laboratories (CPHL), Ministry of Health for her field placement.

Achievements at host institution While at CPHL

1. Lilian evaluated the laboratory response to the 2015 typhoid outbreak in Kampala. The Laboratory played its roles successfully, however there were gaps in logistic supply, limited human resource (both in number and specialized staff such as microbiologists) and overall coordination of the response.

2. She also conducted a descriptive analysis of viral load surveillance data (August 2014-July 2015). The analysis revealed that second time testers (non-suppressed on first time testing and underwent intensified adherence support for 6 months) registered the highest non-suppression rate. Young age, poor adherence and having active TB increased the risk of virological non-suppression.

3. Lilian conducted a follow up study titled, "Factors Affecting Quality of Care for Virologically Non-suppressed HIV Positive Patients in Jinja, Buikwe and Iganga Districts: A Baseline Assessment" to understand some of the findings revealed in the descriptive analysis.

4. She also played a key role in coming up with draft 1 of the CPHL/UNHLS 2015-2020 draft strategic plan and later on participated

in its subsequent write ups and reviews by different stakeholders.

5. She spearheaded the write up of the 2015 Microbiology Laboratory Annual Report. Lilian participated in many other activities at CPHL including; development of the bio-safety and bio-risk training curriculum and manual, bio-safety and bio-risk health facility baseline assessment tools, review of the National Health Laboratory Test Menu, development of the operational plan for shifting of CPHL from Buganda road to its state of the ART Structures in Butabika, Writing of monthly and quarterly monitoring and evaluation reports for viral load and early infant diagnosis.

Program specific achievements
At the PHFP-FET, Lilian;

1. Led an epidemiological study titled, "Risk factors associated with typhoid intestinal perforations during a large outbreak of typhoid, Kampala Uganda, 2015".

2. Led investigations in a complex setting titled, "Investigation of a measles outbreak in a refugee population: Rwamwanja Refugee Settlement-Kamwenge District, July 2015", "Rapid Health Assessment of Newly Arriving Refugees at Rwamwanja Refugee Settlement, and Rapid Assessment of a Suspected Measles Outbreak at Rwamwanja Primary School".

   Given the complex setting Lilian was dealing with, she was given an opportunity to be mentored by the overall CDC director, Dr. Thomas Frieden.

3. Led an investigation titled, "Cholera Outbreak Caused by Drinking Contaminated River Water, Bulambuli, Uganda, March 2016".

4. Participated in a measles outbreak investigation in Kamwenge district, Western Uganda.

5. Participated in a typhoid verification activity in Lyantonde and Rakai Districts

6. Participated in an investigation titled, "A Large and Persistent Outbreak of Typhoid Fever Caused by Consuming Contaminated Water and Street-vended Beverages: Kampala, Uganda, January - June 2015".

7. Presented at both national and international conferences.

8. Submitted manuscripts titled, "Factors Affecting Virological non Suppression among HIV Patients on Antiretroviral Therapy in Uganda, August 2014-July 2015", and "Modifiable Risk Factors for Typhoid Intestinal Perforations during a Large Outbreak of Typhoid Fever, Kampala Uganda, 2015" to peer reviewed journals.

Published new paper articles titled, *Uganda makes more strides in the health laboratory sector"*, and "Antimicrobial resistance: One of the greatest challenges to global public health".

Published articles in the UNIPH Quarterly Epidemiological Bulletin titled, "An overview of the laboratory response to the 2015 typhoid outbreak in Kampala, Uganda," "Risk factors associated with typhoid intestinal perforations during a large outbreak of typhoid, Kampala Uganda, 2015," "HIV Viral Load Sample Delivery Times, Rejection Rates and Results Dispatch Turnaround Time, August 2014-July 2015, Uganda".

Other achievements

9. Participated in the training and mentorship of the Frontline FETP trainees.

10. Played a key role in revamping the ministry of health epidemiological bulletin currently known as the Uganda National Institute of Public Health Epidemiological Bulletin as part of the editorial team.

Summary of planned study: Factors Affecting Quality of Care for Virologically Non-suppressed HIV Positive Patients in Jinja, Buikwe and Iganga Districts: A Baseline Assessment

Introduction: Viral load (VL) testing improves monitoring of patients' response to HIV therapy. According to the World Health Organization

(WHO), more than 70% of non-suppressed clients should re-suppress after 6 months intensified adherence support (IAS). However, only 50% re-suppressed on 2nd time testing at 6 months of follow up.

We established whether virologically non-suppressed patients underwent IAS for 6months, identified structural and process issues affecting service delivery for non-suppressed clients, estimated outcomes at end of 6 months period of IAS, and assessed patient and provider perspectives on what else is needed for effective provision of IAS.

Methods: Data collection was based on Donabedian model of quality of health care that evaluates structures, processes and outcomes of health care. We extracted data from clients' files, ART card and, CD4 and VL daily activity register. We interviewed clients who had received their 1st VL result between Aug 2014 and Dec 2015 (427) at 10 health facilities. We interviewed ART clinic in-charges, expert clients and laboratory staff (33).

In-addition, we used a checklist and an observation guide to obtain additional data. Primary outcome in the study was % virological suppression status at 6months. The secondary outcomes were % that underwent IAS (monthly visits to health facility), % that submitted 6months follow up sample and % of eligible clients switched to 2nd line ART.

Results: Of the 282 clients interviewed, 20% (57/282) had high, 28% (79/282) had moderate, and 48% (139/282) had low knowledge about VL and VL testing services. of the 378 clients, only 39% (137/378) underwent IAS for the recommended 6months, 28% (106/378) 4-5 times, 17% (63/378) 1-3 times and 16% (59/378) not conducted, and 1% (3/378) LTFU/Died.

42% (162/379) did not submit FU sample at 6months, 43% (90/207 tested successfully) non-suppressed on 2nd time testing, 62% (56/90 non suppressed) not switched to 2nd line, 38% (13/34) switched immediately after 1st VL result, and 56% (65/117) of suppressed clients had been switched immediately after 1st VL result. 14/31 health workers (HW) did not know standard results turnaround time (TAT).

Clients, dislikes about VL testing services were, that knowing VL results causes; stress, worry, scares, discourages and increases stigma. Health workers disliked IAS being recommended without counselors at health facilities, IAS period is short, mis-allocation of results and VL testing services being very far from clients. Some of the reasons for not switching clients were, client given second chance on IAS, patient feels well, patient unreliably adherent to 1st line therapy and patient is concerned about 2nd line therapy side effects.

Conclusion: Non-adherence to guidelines for monitoring response to ART using VL and limited knowledge about VL among both non-suppressed clients and health workers was observed. We recommended that the AIDS Control Programme and CPHL come up with performance indicators for monitoring response using VL. The info gathered in this study could guide formulation of clients' IEC materials.

Lessons learned, key skills/competences acquired and next steps

Lilian says, the fellowship program has re-emphasized the importance of team work, leadership, good managerial skills and the uniqueness of each health problem that are key in results achievement.

As evidenced by the achievements listed above, Lilian gained/strengthened her skills in field outbreak investigations, field outbreak investigations report writing, data analysis including analysis of public health surveillance data, manuscript writing, communication and leadership.

"My decision to join the PHFP-FET has made me a disease detective competent in surveillance, outbreak detection, investigation and response in all kinds of situations including in emergency and complex settings, CPHL has greatly improved my knowledge and skills in laboratory based health systems" she says. Lilian intends to focus on Health Laboratory Surveillance/Epidemiology and Infectious diseases Surveillance/Epidemiology including HIV and Tuberculosis.

Steven Ndugwa Kabwama
BSc. (Food Science & Technology) (Mak), MSc PH (SDU),
+256753024727
snkabwama@gmail.com,
skabwama@musph.ac.ug

Host Mentor

Dr. Sheila Ndyanabangi
Principal Medical Officer,
Mental Health and Substance Abuse, Ministry of Health

Academic Mentor

Dr. David Guwatudde
Associate Professor,
Makerere University School of Public Health

ABOUT THE FELLOW

Steven Ndugwa Kabwama, holds a BSc in Food Science & Technology and MSc Public Health. He previously worked on several value-chain enhancement projects. For example he worked as a Project Facilitator with Save the Children & JOBS International in Nakasongola District, Uganda, which aimed at improving nutrition, food security and farmers' incomes through establishing food-based microenterprises. He later worked as a Research Assistant at the Presidential Initiative on Banana Industrial Development which aimed at improving the livelihoods of farmers involved in the banana value chain. In 2011, he was the recipient of the Danish State Scholarship at the University of Southern Denmark to pursue his MSc Public Health (Global Health Specialization). After completing the degree, he was hired to work as a Research Assistant at the University of Southern Denmark, where he was an instructor and tutor for advanced epidemiology and applied biostatistics. He was also a course coordinator for the introductory course in epidemiology and biostatistics for new students. From the work he did there, he published a paper on the association between HIV/AIDS related knowledge and perception of risk for infection. Steven's interest is quantitative analysis and translation of data into information.

Achievements at the host site

Steven was based at the Mental Health and Control of Substance Abuse section, Ministry of Health for his field placement. The section is involved in activities related to policy formulation on mental health and control of substances of abuse such as tobacco, alcohol and other substances.

- Coordinated drafting of the Uganda Alcohol Control Policy and Alcohol Control Bill. This entailed the coordination of the inputs of various stakeholders and ensuring that the policy is furnished with latest data and statistics on alcohol use and its effects in Uganda.
- Participated in drafting of the regulations to guide the implementation of the newly passed Uganda Tobacco Control Act 2015.
- Analyzed national survey data on alcohol and tobacco use. The data on alcohol use were added to the Alcohol Control Policy while the data on tobacco use will be added to the Tobacco Control Policy and the Tobacco Control Strategic plan. From this work, Steven has published two papers in peer reviewed journals: the alcohol paper in Global Health Action, and the Tobacco paper in BMC Tobacco Induced Diseases. From this work he also presented a paper at the National Field Epidemiology conference 2016.
- He analyzed data from the Global Adult Tobacco Survey.
- Steven also won a TEPHINET Non-Communicable Diseases mini grant which he used to implement his final project. The project was a baseline survey about the attitudes, awareness and practices related to the Uganda Tobacco Control Act 2015. This project was embedded into a bigger project

to assess compliance with Uganda's Tobacco Control law in hospitality establishments in Kampala. Findings from this project were disseminated to civil society organizations and other partners involved in tobacco control to inform implementation of the new law.

Program specific achievements

Steven was involved in a number of outbreak investigations and response.

- Led in investigating a large typhoid outbreak that affected Kampala and neighboring districts in 2015. From the investigation, he prepared an abstract that was presented at the EIS Conference in Atlanta 2015. From this work, he led the drafting of a manuscript that was peer reviewed and published in BMC Public Health journal.
- Led in investigation of a mysterious bleeding illness in Hoima and Buliisa Districts. From this work he developed an abstract that was presented at the AFENET conference in Abuja, 2016, and again at the 2nd National Field Epidemiology Conference 2016. From this work still, he developed a manuscript that was reviewed, cleared and submitted to PLoS One for publication.
- Led an evaluation of the Acute Flaccid Paralysis surveillance system for the districts in Uganda bordering South Sudan. The rationale of the evaluation was because there have been previous importations of Wild Polio Virus from neighboring countries into Uganda, porous borders and the insecurity in South Sudan.
- He also led the investigation of an outbreak of Rift Valley Fever virus in Kabale District in Southwestern Uganda.

He wrote a newspaper article about why the government was right in passing a law banning the smoking of Shisha. The article was published in The New Vision on August 11 2015.

Planned Study Summary: Awareness, Attitudes and Current Practices Related to Uganda's Tobacco Control Act 2015 in Restaurants and Bars in Kampala City – Findings from a Baseline Survey

Introduction: On 19 September 2015 the President of Uganda signed the Tobacco Control Bill 2014 into the Tobacco Control Act 2015. This study sought to assess attitudes and awareness about the Act and current practices related to tobacco use and tobacco smoke exposure in public places prior to implementation to provide baseline information for assessment of impact.

Methods: The study involved 216 interviews and observations from 218 randomly selected establishments around Kampala City. A structured questionnaire was used to guide observations and interviews.

Results: 61.5% of respondents were either unaware about the law or had a misconstrued message and 72.3% didn't know it required them to make establishments 100% smoke-free. Among respondents that self-acknowledged having sufficient information, 70.2% got it from media such as Radio, TV and print media. 39.4% agreed that the law would lead to financial losses and 37.9% felt clientele loss would hamper implementation. In 50% of establishments, tobacco products were allowed to be smoked on premises and 63% of these had designated smoking zones. 26.6% had in-door smoking and 39% had smell of tobacco smoke on premises. 11% had visible tobacco promotion and sponsorship signs.

Discussion and Conclusions: Although the new law has come into force, the public is still not very aware about it. For it to achieve its objectives, it needs to be disseminated especially through media to people to know what's required of them. Also, business owners' fears of economic consequences of enforcing the law need to be allayed. It's meant to promote public health and economic losses (if any) are small compared to the disease burden from inhalation tobacco smoke. The Act bans designated smoking zones and the public needs to be educated on their ineffectiveness in protection against tobacco smoke exposure. No-smoking signs deter initiation of smoking where it is prohibited and the public should be encouraged to institute them. Owners of public places need to be educated on the meaning of a public place being 100% smoke free and the banning of tobacco advertising,

promotion or sponsorship as stipulated in the law.

Lessons learned over the duration of the fellowship and next steps

Steven acquired skills in outbreak investigation, control and response. Specific skills he acquired include the formulation of proper case definitions, analysis of line-list data to generate testable hypotheses and the development of analytical studies to test hypotheses. He also learnt how to utilize outbreak investigation findings to inform public health action.

Steven acquired skills in policy analysis and policy development. These are skills he acquired as he worked on the development of the alcohol policy and engagement in the development of regulations to guide implementation of the Tobacco Control Act 2015.

He also acquired skills in data analysis. Steven had to analyze national data on alcohol and tobacco use. He analyzed data from the WHO STEPS survey and the Global Adult Tobacco Survey. He generated information that was added to the alcohol and tobacco control policies that were being developed by the program.

Steven also acquired skills in scientific writing. From the survey data he analyzed, he wrote two papers that were submitted and published in peer reviewed journals. He also learnt how to write and coordinate with other researchers while writing. In addition, he also acquired skills in the critical review of scientific content.

He also gained skills in scientific oral communication. From the presentations he made at national and international conferences, he acquired skills in scientific oral presentation.

His next step is to grow a career as an epidemiologist where he will be able to use data about the distribution of disease in order to inform public health interventions.

Christine Kihembo, MBChB, MIPH
Epidemiology and Surveillance Division,
Ministry of Health
C/O BOX 2255, Kampala
+256772 895480, +256701 201083
jckihembo@gmail.com or jckihembo@yahoo.com
Skype: christine.kihembo

Host Mentors
Dr. Monica Musenero,
Assistant Commissioner, Epidemiology and Surveillance
Ministry of Health, Uganda

Dr. Issa Makumbi
Head, Public Health Emergency Operations Centre
Ministry of Health, Uganda

Academic Mentor
Dr. Frank Kaharuza
Lecturer, Makerere University School of Public Health

ABOUT THE FELLOW:

Christine Kihembo holds a master's degree in international Public Health from the University of Sydney, Australia and Bachelor of Medicine and Bachelor of surgery from, Makerere University, Uganda. Prior to joining the fellowship program, Christine had worked at the Infectious Diseases Institute (IDI) in various capacities; including provision of clinical care to over 10,000 patients living with HIV AIDS; lead medical officer for the Anti-retrovirals for AIDS related Kaposis' Sarcoma clinical trial. While working as the learning Innovations manager at the AIDS Treatment Information Centre- IDI, Christine spearheaded the establishment of several training programs including the East African clinician training in Especially Dangerous Pathogens (EDPS). It is this work on EDPS that ignited her interest in field epidemiology

Christine joined the Uganda Public Health fellowship Program in January 2015 and was hosted at the Epidemiology and Surveillance (ESD) Division Ministry of Health for the two year apprenticeship. Christine was part of the team that strives at having robust and sustainable systems for forecasting, early detection and response to epidemics, emergencies and other priority diseases so as to improve disease prevention and public health response at all levels. She led the weekly analysis and dissemination of the national public health surveillance data for prompt public health action. While at ESD, Christine led and participated in the rapid response and investigation of various disease outbreaks, led and supported various capacity building initiatives and participated in the development of several national policy guidelines/documents. She evaluated the Uganda national typhoid surveillance system, 2012-2014 as reported in HMIS/DHIS2 and was part of the team that evaluated the re-vitalised IDSR implementation in Uganda to inform future IDSR direction in the country. Christine also spearheaded the establishment of the quarterly epidemiological bulletin of National Institute of Public Health (NIPH) that showcases epidemiological evidence for policy and decision making and highlights epidemiological data of importance nationally and globally. She conducted a study to determine the trends of Anti-microbial resistance patterns in Kampala whose results will inform the global health security implementation in Uganda.

Key Fellowship Responsibilities and Achievements

Was as a team member of the rapid response team in case of outbreaks and public health

events – outbreak investigation, contact tracing and incident team leadership.

After spending only two weeks on the fellowship program, Christine and her colleagues found themselves on the streets of Kampala investigating a mysterious acute febrile illness that had killed one person and sickened scores. Christine was part of the Ministry of health (MoH) rapid response team (RRT) that investigated and responded to call that turned out to be a large typhoid outbreak in the city. The outbreak was driven by consumption of contaminated water and locally made and vended drinks. The MoH RRT working in collaboration with key partners and stakeholders like KCCA, National water and sewerage cooperation, WHO, UNICEF and the US CDC managed to control the outbreak before it could spread else where.Consequently, she conducted a literature review on strategies to deal with antibiotic resistance during typhoid outbreaks in developing settings. The information helped in the implementation of the enhanced laboratory surveillance during this outbreak

Subsequently, Christine took the lead in several rapid response and outbreak investigations including;

- Typhoid verification exercise in Nakaseke and Luwero districts which ruled out a suspected typhoid outbreak and recommended use of standard case definition and laboratory strengthening in typhoid surveillance.
- A reported outbreak of elephantiasis in Kamwenge district, Western Uganda. The elephantiasis turned out to be podoconioisis-a neglected tropical illness due to chronic exposure of bare feet to irritant volcanic soils. Subsequently, a capacity building program for health workers in the region was launched in collaboration with Vector control Division, MoH and Malaria consortium to facility care, management and surveillance of Podoconiosis in the region.
- The Cholera outbreak in Mutufu prison and Sironko district in Eastern Uganda in January-March 2016 was driven by consumption of contaminated gravitation flow scheme (GFS) and river water. The RRT recommended flushing and treatment of the GFS systems, treatment of household drinking water in addition to extension of the safe piped system in town council areas. The interventions facilitated control of the outbreak in the district.

She also participated in the rapid response and investigation of the Malaria outbreak in northern Uganda, Measles outbreak in Kiruhura district, Mysterious crippling illness in Ibanda district, Carbamate Poisoning in Kagadi districts among others

From Dec 2015 to Dec 2016, Christine was responsible for the production and dissemination of the MoH national weekly epidemiological bulletin. The bulletin highlights key epidemiological events from national IDSR priority public health events and conditions as reported from districts via the sms bases mtrack health management information (hmis) system to key stakeholders for prompt public health action. The bulletin also acts as a feedback mechanism to the districts.

She also provided technical support to the public health emergency operations centre team in verifying and responding event based public health alerts to complement the indicator based public health surveillance system.

Christine participated in the delivery and follow-up support of the training of district health teams on Integrated Disease Surveillance and Response (IDSR) and International Health Regulation (IHR) and other capacity building initiatives.

As a national trainer, Christine led the delivery of several district based trainings on IDSR/IHR and subsequently led support supervision of IDSR/IHR implementation and health management information system (hmis) in the country. She supported the development and roll-out of RRT training in the country and in collaboration with Malaria consortium Uganda, she supported the development and roll out of training materials for the surveillance and clinical management of Podoconiosis, one of the neglected tropical diseases in the country.

Christine also supported the roll-out of the district based Frontline Epidemiology training in the country right from curriculum adaptation, technical facilitation, mentorship and field support

supervision of mentees.

Surveillance System analysis and Evaluation:
Christine conducted an analysis of the national typhoid surveillance system 2012-2015 via DHIS2 and recommended disaggregation of the surveillance data to more informative age groups, and review of typhoid surveillance thresholds among others. In collaboration with the WHO and CDC, she was also part of the team that designed and conducted re-vitalised IDSR/IHR evaluation in the country to guide future program implementation in the country; an activity. The evaluation identified best practices and key achievements made thus far. Some gaps in funding for IDSR mainstreaming, inadequate human resource for health for implementation at different levels and lack of onsite tools and supplies among others and made recommendations accordingly.

Christine also participated in the 2016 yellow fever outbreak preparedness and response evaluation to inform future responses.

Participate in preparation and dissemination of new policies on disease prevention and control.

Christine was a member of the National Task Force on Antimicrobial Resistance that is working towards developing the National Antimicrobial resistance Action Plan.

She also participated in the development and review of the following national guidelines/policy documents;

- National Antibiotic Resistance Surveillance Plan
- Table-top review of the National Multi-hazard Preparedness and Response Plan.
- Adaptation and review of the national curriculum for case management of Viral Hemorrhagic Fevers and Standard Operating Procedures (SOPs)
- Adaptation and Review of the national curriculum for Rapid Response Teams and SOPs
- Review of the Prevention and Control of Cholera national guidelines.

Other achievements:
Christine is a member of the following; Podoconiois Technical Working Group, Hepatitis B-Surveillance Technical Working group, the National Antimicrobial Resistance Task Force.

Communication, Presentations, Publications and Awards.
Christine wrote and published the following;

- A newspaper article titled " Uganda to rethink Hepatitis B Infant vaccination schedule," which was published in the New vision on 28th July 2015
- Christine spearheaded the development and publication of the quarterly epidemiological bulletin of the National Institute of Public Health (NIPH). The bulletin strives at demonstrating outbreak investigations findings and public health actions taken, studies conducted to provide evidence for policy and decision making and epidemiological data of importance nationally and globally. Four issues of the bulletin had been produced by end of 2016.
- Christine published an article entitled "Risk factors for Podoconiosis: Kamwenge District, Western Uganda."in the NIPH bulletin

Conference presentations.
Christine made the following presentations:

- Christine Kihembo, Ben Masiira et al., "Risk factors for Podoconiosis: Kamwenge District, Western Uganda."An oral Presentation at the first national epidemiology conference in Kampala, Uganda, 12th Dec 2015. The same paper was presented at the CDC Science series held at MOH, Kampala Uganda
- Christine won the Jeffrey P. Koplan Award for Excellence in Scientific Poster Presentation for the presentation made at the CDC/TEPHINET Epidemic Intelligence Scientific conference international night held in Atlanta, Georgia in May 2016. The presentation was titled "Risk factors for Podoconiosis: Kamwenge District, Western Uganda."
- C. Kihembo, J. Routh et al.,"Significant

intermediate resistance to Ciprofloxacin in the large typhoid outbreak in Kampala, Uganda" poster presentation at Joint Annual Scientific Conference organised by the Makerere University College of Health Sciences, Sept 2015

- C. Kihembo et al., Anti-bacterial Resistance Patterns and Trends among Scepticaemic Patients, Kampala 2010-2015. Oral presentation at the 1st Biosafety and Biosecurity, 2nd Epidemiology conference in Kampala, November 2016.

Other abstracts submitted

- C. Kihembo, A Ario et al., Trends in Antimicrobial Resistance of Salmonella species isolated from scepticaemic patients in Kampala, Uganda 2010-2015. Abstract submitted for the upcoming 10th International Conference on Typhoid and Other Invasive Salmonelloses

Manuscript:

Christine Kihembo, Ben Masiira et al., "Risk factors for Podoconiosis: Kamwenge District, Western Uganda." The manuscript was submitted to the American Journal of Tropical Medicine and Hygiene and is under review.

In her own words, Christine says:

"The fellowship has made me realize the critical importance of field epidemiology as in engine in public health. Specifically, I have come to appreciate the critical importance of applying specific timely tailor-made interventions guided by epidemiological evidence in the effective control of outbreaks and public health emergences. The fellowship has not only provided me an opportunity for technical advancement (particularly surveillance, epidemic preparedness, outbreak investigation and response) but also, networking, leadership enhancement and interpersonal growth. I have appreciated the dynamics of working effectively at a national public health setting while harmonizing various stakeholders' interests amidst the fellowship program's targets. I am now resilient enough to take up any leadership challenge in the noble cause of public health advancement. My career prospect is to become an infectious disease control expert particularly through education,surveillance and health system strengthening.

Summary of Planned study

Introduction: In Uganda, bacterial infections are responsible for 20% of all hospital deaths and are a cause of 25% of mortality among children <5years. Rapid Antibiotic Resistance (ABR) emergence has outpaced development of new pharmaceutical agents and ABR is a priority area on global health security agenda. In Uganda, there is no national active ABR surveillance in place with limited published ABR information available. We therefore set out to describe bacterial (non-mycobacterial) etiologies for blood sepsis in Kampala 2010-2015 and characterize ABR patterns among most identified bacteria

Methods: We reviewed all blood culture records from 9 public and private laboratories in Kampala that conduct ABR testing according to Clinical and Laboratory Standards Institute (CLSI) standards. Using a standardized data abstraction form, we collected demographics, organism isolated and ABR susceptibility information over the 6 year period.

We defined high ABR as ≥50 %, Moderate ABR 10-49% and low ABR <10%of identified species (spp) resistant to a drug annually. Multi-drug resistant (MDR) salmonella was salmonella resistant to Cotrimaxazole (COTRIM), Chloramphenicol (CAF) and Amipicillin(AMP), Methicillin Resistant Staphylococcus (MRSA) as staph species resistant to Oxacillin or Cefoxitin

Results: 85% (1525/1794) of gram positives were Staphyloccoccus species; 71% of which were S. aureus, affecting mainly children <5years incidence 215/100,000 and the elderly, incidence 104/100,000. Among Staph spp, resistance to commonly used antibiotics (erythromycin, Tetracycline and CAF) remained high and resistance to CAF reduced from high to moderate levels. MRSA increased from 44% to 81% (X^2= 4.3, p<0.03).

28% (334/1193) of gram negatives were non-specified coliforms, 21% (247/1193) were Salmonella spp. From 2010 to 2016 resistance to traditional first-line drugs for Salmonella (COTRIM, AMP, and CAF) reduced from high to moderate levels. Specifically, ABR reduced as follows: Ampicillin, from 87% to 34%; CAF, from 73 to

32%; CTX, from 80% to 31%. The range of MDR salmonella was 0-20%. 18% (49/247) of isolates had intermediate resistance to Ciprofloxacin, a preferred first line alternative drug. Intermediate ABR to Ciprofloxacin increased from 0 in 2010 to 39% in 2015.

Overt Ciprofloxacin resistance range was 0-17%; all of which were Nalidixic acid resistant. ABR to Ceftriaxone ranged 0-17%. All species tested susceptible to Cefepime, a 4th generation cephalosporin.

Ciprofloxacin and Ceftriaxone susceptibility testing was done in only 79% of Salmonella spp.

Conclusions and Recommendations:

Salmonella and Staphylococcus spp with high level Methicillin Resistant Staph with were most common cause of septicemia in Kampala. There was rapid increase in ABR to Ciprofloxacin and Ceftriaxone among Salmonella spp whereas susceptibility to traditional first line antibiotics for Salmonella has gradually returned.

We recommend Adherence of laboratories to ABR testing standards and rational use of antibiotics guided by ABR patterns to address the changing ABR picture.

Benon Kwesiga
MBChB (MUST), MPH (Mak),
+256773184371/+256701184371
benon.kwesiga@musph.ac.ug,
benonkwesiga@gmail.com

Host Mentor
Dr. Eddie Mukooyo
Asst-Commissioner
Division of Health Information

Carol Kyozira
Division Health Information

Academic Mentor
Dr. Nazarus Mbona Tumwesigye
Associate Professor
Makerere University School of Public Health

ABOUT THE FELLOW

Benon Kwesiga holds a Master's Degree in Public Health (MPH) from Makerere University and a Bachelor's Degree in Medicine and Surgery (MBChB) of Mbarara University of Science and Technology.

After his academic studies, Benon worked as a Clinician in a Government hospital and later as a Regional Team lead/Monitoring and Evaluation Focal Person in the Uganda Ministry of Health (MoH) – Western Region Performance Monitoring Team. Upon joining PHFP-FETin January 2015, Benon was attached to MoH Division of Health Information (DHI), a one-stop centre of excellence mandated with collection, analysis, interpretation and dissemination of the Health Management Information System (HMIS) data.

DHI facilitates easy access to functional, timely and complete health-related information to enable public health action through performance based decision making at all levels of the health sector. While at DHI, Benon received comprehensive training in the District Health Information System version 2 (DHIS2), a web-based database of Uganda's HMIS data.

Since that training, Benon has conducted data extraction, cleaning, analysis and interpretation of weekly epidemiological surveillance data of diseases prioritised for Integrated Disease Surveillance and Response (IDSR) in Uganda to help in outbreak detection among other uses. Benon led 2 outbreak investigations and was involved in another 5 during this time. He analysed eMTCT surveillance data and conducted a planned epidemiological study on Village Health Team (VHT) member's adherence to reporting requirements in IDSR.

He wrote 3 articles in the Uganda National Institute of Public Health (UNIPH) quarterly epibulletin and wrote a newspaper article. Benon also presented his work at both National and international conferences and has several manuscripts in the pipeline for publication.

Fellow's achievements at host site

- Comprehensive training in DHIS2 and training of District level health workers on the same.
- Weekly analysis of epidemiological data of diseases prioritised for Integrated Disease Surveillance and Response (IDSR) in Uganda.
- Participation in concept development of the balanced scorecard approach in MoH and its pilot activities.
- Participation in IDSR trainings.
- Participation in the compilation of the Annual Health Sector Performance Reports (2015/16)

Program-specific achievements (key deliverables)

- Descriptive analysis of Uganda's eMTCT surveillance data in DHIS2 between 2012 and 2015.
- Outbreaks investigations: Led 2 and participated in 5.
- Wrote 3 articles in MoH UNIPH quarterly Epibulletin

- Wrote 1 newspaper article in Uganda New Vision
- Two presentations at national conferences and 1 at an international conference.
- Manuscript undergoing review in a peer reviewed journal
- Conducted a planned study: Village Health Team functionality and adherence to reporting requirements in IDSR, Kasese, Uganda

Summary of planned study

Title: Village Health Team functionality and adherence to reporting requirements in Integrated Disease Surveillance and Response, Kasese, Uganda

Background: Uganda and particularly Kasese District has a high number and frequency of disease outbreaks whose detection and reporting at community level is usually absent or delayed. Most outbreaks in Kasese are detected at health facility level although the earliest point of detection should be at community level, an indicator of a poorly functioning community surveillance system.

According to the Community Based Disease/ Event Surveillance system in Uganda, Community Health Workers (CHWs), commonly referred to as Village Health Team members (VHTs), are expected to play a key role in Community Based Surveillance so as to enable early detection and response to priority diseases/events at community level to the nearest health facility.

This study aimed to assess CHW functionality and adherence to Community Based Disease/ Event Surveillance (CBS) guidelines as well as factors associated with it in Kasese to identify ways of enabling CHWs to improve CBS.

Methods: This mixed methods cross-sectional study was carried out among CHWs and key health officials in Kasese District. Using multi-stage randomized cluster sampling a total of 203 CHWs were selected and interviewed. Proportions of CHW functionality and adherence to CBS guidelines were calculated. Association between CHWs adherence to CBS guidelines and several factors derived from existing evidence was assessed.

Results: The mean age of the CHWs was 40 years (range: 24-70) with equal sex distribution. Only 1/3 (65%) had studied beyond secondary school. Almost all (98.5%) were currently functional while 94% owned a mobile phone and 89% owned and used a CHW book. Only 84% had received initial training upon recruitment while most had received refresher training of some sort.

73.4 % had been supervised in the previous 3 months while only 59% of CHWs had been properly recruited during a village meeting. 57% felt that CHW work was too much while most (84%) walked on foot to do their work.

All VHTs offered health education to families during home visits, 77% kept records of home visits, 67% referred patients, and 63% reported unusual health events while 56% possessed adequate knowledge of Community Case Definitions (CCDs).

Using a composite variable we found that only 58% of VHTs were adequately adhering to CBS guidelines. After multivariate analysis, not having studied beyond primary school (OR=1.9, CI=1.02-3.5), not owning a CHW book (OR=3.4, CI=1.2-9.4) and not being supervised during work (OR=2.7. CI=1.4-5.2) were associated with poor adherence to CBC guidelines.

Conclusion: VHTs are not adequately adhering to MoH guidelines for CBS and several reasons for this have been identified. Proper recruitment, adequate and continuous training and sustained support supervision of CHWs would help improve CBS in Uganda and similar settings.

Lessons learnt over the course of the fellowship

Key skills/competencies acquired

- Analysis and interpretation of surveillance data including use of epiinfo, STATA and QGIS mapping software. Comprehensive skills in routine analysis of weekly epidemiological surveillance data for IDSR priority diseases in Uganda.

- Comprehensive practical experience in outbreak investigation.
- Scientific writing and presentation skills– abstracts, power point presentations (at National and International Conferences) and manuscripts.
- Training others in field epidemiology principals. Leadership and team building skills.
- Participating in building partnerships between various stakeholders: Ministry of Health, Makerere University School of Public Health, CDC and other Development Partners.

Next steps in career

Having acquired advanced skills in field epidemiology, his career plan is to become an accomplished epidemiologist in communicable and non-communicable diseases.

Richardson Mafigiri
BScZoology (Mak), MSc (International Infectious Diseases Management) (Mak),
+256752673050/+256789979573
rmafigiri@musph.ac.ug,
rmafigiri@gmail.com

Host Mentor
Dr. Moses Sakor
District Health Officer
Rakai District Health Office

Dr. Godfrey Kigozi
Head of Research Department,
Rakai Health Services Program

Academic Mentor
Dr. Fred Makumbi
Associate Professor, Makerere University School of Public Health

ABOUT THE FELLOW

Richardson Mafigiri holds a MSc in International Infectious Diseases Management from Makerere University in collaboration with University of Ghana-Legon and a Bachelor of Science degree in Zoology and Chemistry from Makerere University. After his under graduate degree, Richardson taught sciences (Biology and Chemistry) in many schools in and outside Uganda.

Thereafter, he worked as a research assistant at Makerere University College of Veterinary Medicine and Noguchi Memorial Institute of Medical Research at University of Ghana 2012-2014. In 2015, Richardson joined the Uganda Public Health Fellowship Program (PHFP), and his host institution was Rakai District Health Office (DHO) and Rakai Health Sciences Program (RHSP).

While at the host sites, he worked with the District led HIV programming which aimed at training district health workers to manage and execute HIV/AIDS care and treatment services. He also worked with RHSP which is the District Implementing Partner where he acquired extensive knowledge and skills in monitoring and evaluation of HIV/AIDS projects, day to day management of Non-government Organization and local government.

As a resident, Richardson conducted a number of outbreak investigations for instance; measles, typhoid, food poisoning and bleeding illness. With the PHFP, he acquired fellowship training in field epidemiology and gained key skills in surveillance, data management and analysis, leadership, management and report writing. At the host institution, Richardson also participated in many activities and trainings in health related fields and data management. He was assigned to monitor timely and complete reporting of health data from health facilities in the district.

Achievements at the host site

1. Worked with the bio statistician at RHSP to manage, analyse and interpret data
2. Analysed HIV data from Open MRS
3. Developed key indicators of performance measurement for some diseases and tracer medicines in health facilities
4. Analysed secondary data on HIV services uptake among youths in fishing communities of Kasensero in Rakai District and presented the results at national conferences.

Program specific achievements (Key Deliverables)

1. Submitted a manuscript entitled "HIV and services uptake among youths in Kasensero landing site and surrounding communities in Rakai district, south western Uganda" to the BMCPublic Health journal
2. Conducted a planned study entitled "Household sanitary practices and diarrheal diseases among children under-five in Kakuuto Sub-county, Rakai District
3. Mentored Frontline FETP trainees

4. Conducted descriptive analysis of the health surveillance data on perinatal mortality in Rakai district between 2012 and 2015.
5. Conducted several outbreak investigations such as Risk factors for measles death among children in Kyegegwa District, Western Uganda; Investigation of a bleeding illness in Hoima and Buliisa Districts, Western Uganda; Typhoid outbreak in Kampala 2015; Food poisoning among school going children in Namutumba district
6. Published a newspaper article in the New Vision Daily "Tuberculosis is an increasing public health problem in Uganda"
7. Presented at national and international conferences

Summary of planned study

Under-five diarrheal disease mortality and household sanitary practices in Kakuuto County Rakai District, April 1st, 2014-March 30th, 2016

Introduction: Limited data about PAF due to the household sanitary practices associated with diarrheal diseases mortality among children under five years of age. This study assessed household sanitary practices associated with diarrheal diseases mortality among U5 and suggested suitable interventions to direct policy to enhance decline in diarrheal diseases mortality among children U5 year in Kakuuto County.

Methods: A community based case-control design. Cases were mothers with anU5 child who died and controls were mothers with a child U5 years who were alive between April 1, 2014 and March 31, 2016. Controls were randomly picked from neighboring households which had a child <5 years. No controls were selected from the same household with a child-case. Trained VHTs identified households with deceased children, and surviving children that were recruited in the study.

A list of cases and controls was generated. Questionnaires were administered by well-trained research assistants. Data were collected on respondent's demographic characteristics and household sanitary practices and child health.

Data analysis: Data were edited and checked for completeness, accuracy and uniformity before analysis, then stored into a password protected computer only accessible by researchers. Chi square was used to compare variables for cases and controls with sanitary practices, P-values <0.05 was considered significant.

At 95% CI, odds ratios for the association of children U5 diarrheal diseases mortality and sanitary practices was determined.

Results: Majority 98% (n=386) of the households had the latrine compared to 2% (n=9) who never had the latrine, P<0.05. Despite the high latrine coverage, only 42.4%(n=32)of cases and 51% (n=204) of controls reported that they washed their hands all the time after visiting the latrine.

Conversely, 46.0% of cases and 43.1% of cases washed their hands some of the time but not always.

Factors that were significantly associated with diarrheal diseases mortality after adjusting, for potential and suspected confounders were; no latrine in a household (adjusted Odds Ratio [aOR] = 48, 95% CI, 2.9-309); never washing hands after visiting the latrine aOR=24 (95% CI, 1.4-405); sweeping the compound once in a week, aOR= 5.3 (95% CI, 1.03-27) or twice a week, aOR= 3.8 (95% CI, 1.03-14); and spending time 30 to one hour fetching water from water source, aOR= 6 (95%CI, 1.1-31).

36.2% of all cases among children U5 were attributable to irregular washing of hands after visiting the latrine, 33.4% were attributable to taking between 30 and 60 minutes fetching water, 26% was attributable to never wash hands after visiting latrine, 18.2% was attributable to irregular sweeping of the compound and least 7.8% was attributable to lack of latrine in household.

Conclusion: Diarrheal diseases mortality among children Under-five years of age in Kakuuto County are caused by not washing hand after visiting latrine, spending a lot of time fetching water, and lack of latrine in households.

Key skills/competences acquired, and next steps

i. Conducting outbreak investigation in communities

ii. Writing field investigation reports

iii. Organizing and leading the outbreak investigation processes

iv. Writing manuscripts

v. Organizing and presentation of the finding of the outcome in conference

vi. Data organisation, management and analysis.

vii. Making outbreak investigation maps using QGIS software

viii. Scientific writing of abstracts and result presentations

ix. Project monitoring and evaluation

x. Communication through writing manuscript, report writing and making oral presentation in the audience. e.g. conferences

Fred Nsubuga
MBChB (Mak), MPH (UCU), Dip PAM (UMI),
+256782016836, +256702016836
Fred.nsubuga@musph.ac.ug, frediericknsubuga@yahoo.co.uk

Host Mentors
Dr. Robert Mayanja, Program Manager,
Uganda National Expanded Program on Immunization, Ministry of Health

Dr. Ben Opar, Program Manager,
Uganda National Expanded Program on Immunization, Ministry of Health

Dr. Henry Luzze, Assistant Program Manager,
Uganda National Expanded Program on Immunization, Ministry of Health

Dr. Immaculate Ampaire, Senior Medical Officer,
Uganda National Expanded Program on Immunization, Ministry of Health

Academic Mentor
Dr. Henry Kasasa
Senior Lecturer, Makerere University School of Public Health

ABOUT THE FELLOW

Dr. Fred Nsubuga holds a Bachelor' degree in Medicine and Surgery (MBChB) from Makerere University College of Health Sciences, a Master of Public Health from the Uganda Christian University Mukono and a post graduate diploma in Public Administration and management from UMI. Fred has over 8 years of experience in management of patients and 5 years in health services management.

Prior to joining the Public Health Fellowship Program, Fred worked as the District Health Officer of Buvuma District Local Government, senior medical officer at Buvuma Health Center 1V and medical officer Kitgum region for Marie stopes Uganda.

During his fellowship training, Fred was posted to the Uganda National Expanded Program on Immunization (UNEPI) which is responsible for ensuring that the Ugandan population is free of vaccine-preventable diseases.

While at UNEPI, Fred was involved in many program activities including supplemental and national immunization campaigns, review of national guidelines, outbreak investigations of vaccine preventable diseases, he led a study that compared static and outreach immunization strategies in Uganda.

He also conducted a study that assessed factors that affect immunization data quality in Kabarole district. Fred presented at both national and international conferences and got an award as a second runner up for oral presentation during the AFENET conference in Abuja.

As a result of the fellowship program, Fred has enhanced his communication skills, leadership and management, outbreak investigation, and use of Epi Infor software in data analysis. Fred's future plan is to be a vaccine preventable disease (VPD) epidemiologist. In summary the fellowship program has improved his analytical, leadership, programming, communication and outbreak investigation skills.

Achievements at host site

- Fred conducted descriptive analysis of measles surveillance data using both case-based surveillance and passive surveillance data (eHMIS) from 2012-2015
- Trained Gulu regional teams on polio end game to prepare for IPV introduction, switch

and SIAs

- National supervisor and trainer during the Sub National Immunization Days for polio in Lamwo District
- Conducted a training on surveillance during the implementation of house to house polio campaign
- Led study that compared the proportion of children reached using static and or outreach immunization strategies in Uganda
- Participated in the updating of the immunization in practice manual
- Compiled national report on sub-national immunization days
- Presented on a ground round the management of measles outbreak at national level

Program-specific achievements (Key deliverable)

- Team member for outbreak investigation that assessed "Risk factors for measles death: Kyegegwa District, Western Uganda"
- Conducted a study titled: Factors that affect immunization data quality in Kabarole district, Uganda
- Conducted descriptive analysis of measles surveillance data 2012-2015
- Conducted a study to assess the factors that affect immunization data quality in Kabarole district, Uganda
- Conducted a measles outbreak investigation in Kamwenge district, Western Uganda
- Team member for Rapid Assessment of a Suspected Measles Outbreak at Rwamwanja Primary School
- Team member for measles outbreak investigation in Rwamwanja refugee settlement
- Team member for an evaluation of AFP surveillance system in Uganda
- Team member for typhoid verification in Pallisa District
- Led a typhoid verification exercise in Bukwo
- Fred participated in an investigation of a febrile outbreak

Summary of planned study

Factors that affect immunization data quality in Kabarole district, Uganda, July 2016

Introduction: Reliable and timely immunization data is of great value if it is to inform decisions at all levels and improve program performance. Inadequate data quality may impair our understanding of the true vaccination coverage and may hinder our capability to meet the program objectives. It is therefore important that data quality is regularly assessed to ensure good performance, sound decision making and efficient use of resources. Analysis of national immunization data from January-April 2015 showed that Kabarole district had inconsistent diphtheria, pertussis, tetanus, hepatitis and heamophilus influenzae type b (DPT3-HepB-Hib) vaccination coverage. The cause of this data discrepancy in this district was not known. This study therefore sought to establish sources of immunization data quality gaps and establish factors that influence immunization data quality in Kabarole district.

Methods: This was a cross-sectional mixed methods study that was conducted from 9th-16th July, 2016 in 49 health centers that provide immunization services in Kabarole District. Data were collected using a structured questionnaire which we administered personally.

The verification factor was estimated by dividing the recounted DPT3<1 year by reported DPT3<1 year. The quality of data collection processes was measured using quality indices for the 3 different components (recording practices, storage and reporting practices, monitoring and evaluation).

These indices were applied to the different levels of the health care service delivery. Quality Index score was estimated by dividing the total question or observation correctly answered by the total number of answers/ observations of a component as the denominator.

Results: The 2015 data quality audit conducted in Kabarole District found that the majority of our respondents were nursing assistants 32% (16/50) and enrolled nurses 26% (13/50). All the health centers' reports were timely between January and June and from November to December. The

timeliness and reporting rates remained above 60% between August and October. The mean health center verification factor was 87±27.

Sixty five percent (32/49) of the health centers had consistent data, 27% (13/49) over reported and 4% (2/49) underreported. The factors that affect immunization data quality under the data dimension include; arithmetic errors 20% (10/49) and inability to have a single view of immunization data 53% (26/49). The other items used for tallying immunization data included exercise books and plain papers.

Quality index (QI) scores varied at all levels of health service delivery. Mean QI for the 49 health centers that conduct immunization was 61% ±26. The factors that affected the data collection process were: Recording component; omission of tally sheet data into HMIS reports 29% (14/49), irregular update of vaccine and injection material control book (VIMCB) 22% (11/49), storing/ reporting; poor storage practices like lack of designated storage place, lack of files for keeping records, tally sheets not arranged in order, limited of access to records because incharge has moved with the key 6% (3/49), missing tally sheets 27% (13/49), monitoring and evaluation; inability to classify target population according to immunization strategy 100%, catchment area maps not displayed 61% (30/49), graphs showing coverage and drop out rates not displayed 41% (20/49), involvement of the community during planning rare done 4% (2/49). There was a weak positive correlation between the health center verifaction factor and quality index though this was not statistically significant (r=0.014; p=0.92).

Conclusion: There were two sources of immunization data quality gaps namely; data dimension and data collection processes. The factors that contributed to inadequate data quality included arithmetic errors, inability to have a single view of immunization data, missing tally sheet, irregular update of VIMCB, lack of designated storage place, lack of files for keeping records, tally sheets not arranged in order, limited access to records because in-charge is away and inability to classify target population according to immunization strategy We recommend that subsequent immunization data quality audits address the two sources of data quality gaps.

Lessons learned, key skills/ competencies

Fred says, the fellowship program has epitomized to him the importance of team work, leadership and good managerial skills. He says, if these are not well nurtured, achievement of results becomes a nightmare.

Key skills/competencies

Field outbreak investigation: Fred led one outbreak investigation and participated in 6 others. In one of the investigations he conducted in Kamwenge district between April-August 2015, he showed that the measles outbreak resulted from low vaccination coverage, sub-optimal vaccine effectiveness and exposure to measles patients in health centers.

Field outbreak investigation reports: Fred wrote several outbreak investigation reports which he submitted to UNEPI, AFENET and PHFP

Analysis of Public Health Surveillance Data: He analyzed measles surveillance data 2012-2015 and demonstrated how different communities could use the number of measles cases in their communities to set thresholds to be able to detect local outbreaks in their areas. He also showed that measles is a rare disease in Uganda (<10%), which is good sign for elimination but MOH/UNEPI needs to improve on surveillance if Uganda needs to achieve measles elimination by 2020.

Manuscript writing skills: Fred submitted one article in a peer reviewed journal and is working on his second manuscript.

Communication: He has made several presentations at both national and international conferences and also participated during ground rounds that involve vaccine preventable diseases.

Leadership: He spearedheaded an operational research that aimed to compare static and outreach immunization strategies and associated factors in Uganda, and has been representing UNEPI/MOH in several district campaigns. He is also the director of an association of Field Epidemiologists without Borders, available; http://www.fewb.org.

Oguttu David Were
BBLT, Msc. (Zoology/ Parasitology) Dip Med. Entomology,
+256 782 495847
dguttu@gmail.com

Host Mentors
Mr. David Okumu
District Health Officer,
Tororo District Health Office

Dr. Kiyingi Herbert
Centers for Diseases Control and Prevention Uganda

Academic Mentor
Dr. Victoria Nankabirwa
Lecturer, Makererer University School of Public Health

ABOUT THE FELLOW

David is a Parasitologist with first degree training in Biomedical Laboratory Technology, Master of Zoology/Parasitology and a diploma in Medical Entomology and Parasitology. In 2001, he started working as a Laboratory technician at the Vector Borne Diseases Control Division, Ministry of Health and later as a Parasitologist until 2014. He was one of the national field supervisors of Indoor Residual Spraying and entomological surveillance (bionomics and insecticide susceptibility) until 2014.

From 2007-2014 he led molecular surveillance of onchocerciasis elimination using Ov16 & O-150 techniques, and monitoring Entomological inoculation rate (EIR) of Malaria parasites in communities using Pf. CS ELISA. In 2013 he was selected a health Lifeline hero in river blindness elimination action in Uganda; http://www.aljazeera.com/programmes/lifelines/2013/10/david-oguttu-elimination-being-achieved-201310231152666497 8.html. David was also a Central supervisor/Trainer, Neglected Tropical Diseases (NTD) Control Program, Ministry of Health. In 2010 he led rapid mapping of schistosomiasis, STH and Lymphatic filariasis in South Sudan.

As a Field Epidemiology Fellow 2015-2016, he was hosted by the National Malaria Control Program-Tororo Site. He led and participated in several outbreak investigations.

a) Host site achievements

- Strengthening use of HMIS surveillance data to monitor disease trends in the district
- Established malaria surveillance thresholds at district and subcounty levels and trained the malaria focal person and resource centre team to update the thresholds each year.
- Strengthened Health information sharing by initiating the Tororo Health Bulletin which will be published quarterly.
- Improved epidemic preparedness and detection through vigilant surveillance and enhancing community awareness. We prevented cholera outbreaks in Tororo during April-May 2016 while all neighboring districts suffered the disease outbreak
- Responded and verified five disease outbreak rumors in Tororo District
- Capacity building in data management and analysis using Epi-Info
- Coordinated implementation of the CDC Hepatitis B Antenatal Screening Integration and Immunization of Newborns (BASIIN): Pilot Project
- Conducting radio talk shows on priority public health issues
- Monitoring susceptibility of malaria vectors to insecticides used in LLINs and IRS

b) Fellowship deliverables accomplished

- Led investigation of cholera outbreak in Kaiso,

Hoima District in October 2015

- Led Hepatitis outbreak investigation in Napak District
- Team member in 4 outbreak investigations and responses (Typhoid Kampala, Nebbi and Moyo, Malaria in Northern Uganda and cholera in Namayingo District)
- Oral presentation at two national scientific conferences
- Abstract accepted for poster presentation at IMED conference, Vienna, Austria November 2016
- Two articles in NIPH bulletin
- One News paper article on Abortions caused by gender based violence
- Completed two manuscript drafts to be submitted to peer reviewed journals
- Descriptive analysis of the malaria surveillance data in Tororo District 2012-2015

Planned study summary

Introduction: Malaria a huge public health problem despite implementation of universal coverage of Long Lasting Insecticide treated Nets (LLINs), Indoor Residual spraying (IRS), and prompt case management at health facilities. The proportion of asymptomatic people hosting malaria parasites as reservoirs in the community is not known in Uganda. Furthermore, daily individual exposure time before sleeping under a net is not well documented. It is also unclear whether introducing active community malaria testing and treatment can contribute to reduction in malaria parasite prevalence in settings with active IRS. We aimed to determine the prevalence of symptomatic and asymptomatic malaria in the community after four rounds of IRS, estimate daily person exposure time to mosquito bites before sleeping under LLIN and assess the effect of active testing and treatment on community malaria parasite prevalence. Secondary objective was to describe relationship between malaria incidence and indoor biting Anopheles.

Methods: We conducted a cluster randomized trial involving twenty villages in Osukuru and Magola sub-counties of Tororo District. At baseline we screened 50 under fives and 50 adults per village for malaria using Rapid Diagnostic Tests (RDT) and prepared blood slides to quantify parasitaemia using microscopy. We classified malaria positive individuals as symptomatic or asymptomatic. The villages were randomly assigned to intervention or control arms in equal proportion. We collected data on LLIN use and exposure period before using a net. In the intervention villages we introduced active malaria testing and treatment to cover all people in households. After six months we shall compare malaria prevalence in the intervention and control clusters. We described the relation between malaria incidence and indoor Anopheles density using routine surveillance data and entomological monitoring data.

Results: The prevalence of asymptomatic malaria after four rounds of IRS was 14%; higher among children <5 years (21%) than adults (7.0%). A large number of people (90%) stay outdoors up to 21:00 hours exposed to malaria vectors before sleeping under bed nets. After four rounds of IRS indoor biting malaria vectors were successfully controlled, but malaria incidence stayed in the population at a moderate endemic level.

Conclusions: Community malaria prevalence in Tororo reduced to a moderate endemic level after four rounds of IRS. Moderate malaria parasite prevalence after successful control of indoor Anopheles, presents a silent risk of malaria resurgence after halting IRS. Active malaria testing and treatment at community level should be done to reduce the disease prevalence to low endemicity and prevent resurgence after IRS is halted.

Skills and competences acquired

- Setting and monitoring surveillance thresholds of endemic and rare diseases
- Establishment, evaluation and utilization of public health surveillance systems
- Applied epidemiologic methods (data analysis and reporting)
- Disease outbreak investigation, control and prevention

- Design, conduct, analysis, and interpretation of various types of epidemiologic studies
- Implementation of the international health regulation through the Uganda IDSR
- Effective Communication in varying epidemiologic situations
- Using research findings to inform policy through policy briefs, press release.
- Importance of disseminating study findings to different forms of audience through journal publications, bulletins, community meetings and conference presentations
- Management of staff, performance monitoring and appraisal
- Building team work among staff and conflict resolution
- Leading field teams to achieve objectives of the task in time
- Planning and budgeting for public health activities
- Conducting support supervision and mentorship
- Advocacy for public health interventions to get support from multidisciplinary actors
- Designing and implementing public health interventions
- Monitoring and evaluation of a public health interventions
- Establishing partnerships to advance public health programs

Lessons learnt

i. Public health activities require strong multidisciplinary team work
ii. Efficient public health laboratories are important in epidemiologic investigations
iii. Inland cross-border points of Uganda lack capacity required to implement IHR
iv. Translation of public health research findings into policy is inadequate in Uganda

Next career steps

Seek funding to complete the malaria and hepatitis intervention evaluation in Tororo

Hope to work with the Ministry of Health in malaria and other vector borne diseases surveillance, control and elimination

Hope to participate in outbreak investigations and control in Uganda and beyond.

Allen Eva Okullo (MPH, BSC(ZOO))
allenokullo.c@gmail.com;
+256 772399943

Host Mentors
Dr. Albert P Okui (RIP)
Program Manager National Malaria Control Program,
Ministry of Health

Dr. Jimmy Opigo
Program Manager National Malaria Control Program,
Ministry of Health

Dr. Myers Lugemwa
ational Malaria Control Program,
Ministry of Health

Academic Mentor
Dr. Joan Kayongo
Associate Professor, Makerere University School of Public Health

ABOUT THE FELLOW

Allen Eva Okullo has a Masters degree in Public Health from the International Health Sciences University, Kampala and a Bachelors Degree in Zoology/Pschology from Makerere University Kampala.

During the fellowship period, she was placed under the National Malaria Control Program which was her first choice of preference, given her profound interest in malaria. Thus, not surprisingly, she has had a great deal of achievements. She regards her experience as having been very fulfilling and worthwhile. Prior to joining the UPHFP, she worked as a Technical Officer with a consultancy firm called Montrose. Her roles in this position involved managerial and technical support to health projects for the Ministry of Health and a wide range of multilateral and unilateral organizations. One of her fondest memories is that when she told her former boss at Montrose that she saw herself as an epidemiologist five years from the time. True to what she said, January 24th 2017 marks its fulfillment!

Fellow's Achievements
Achievements at host site

- She was the lead editor of the Uganda Malaria Quarterly Bulletin in November 2015, and has since produced four issues; Introduced innovations in the Uganda Malaria Quarterly Bulletin such as the production of maps to showcase malaria burden in all districts in terms of incidence and Test Positivity Rate (TPR); graphs showing trends in TPR in the 10 epidemic districts; and upcoming events in malaria;
- The only person who mapped and presented to the National Task Force (NTF) the burden of malaria in terms of incidence and TPR down to sub county level by week in all 10 affected districts, during the heat of the epidemic in 2015, this helped NMCP to target resources;
- Along with NMCP staff, quantified ACT needs for the 10 epidemic districts and shared the results with task force members under the mentorship of Dr. Ambrose Talisuna, a Ugandan malaria expert as a guide in supporting the National Malaria Control Program to control the malaria epidemic
- Actively participated in the control of the malaria epidemic as a rapid response team member sent out to strengthen response at the district level, as well as being a member of the incident management team responsible for coordinating all response activities;
- Assessed and provided support supervision for management of Malaria In Pregnancy in two districts of Mbarara & Ibanda with a team from President's Malaria Initiative (PMI)/USAID;
- Worked with Anna Minta, an Epidemic

Intelligence Surveillance (EIS) Officer on a study titled 'Assessment of risk factors for malaria outbreak, Uganda 2016'; Along with Anna; cleaned key malaria HMIS data for Uganda for period July 2015- Feb 2016 under the mentorship of a world renown malaria expert, Dr. Albert Kilian;

- She provided data on malaria indicators for Uganda to Prof. Bob Snow (World renown malaria guru) at the KEMRI Welcome Trust Research Programme for development of the Uganda malaria profile, she has also been mentored by him on a few malaria studies;
- Produced a huge dataset of malaria incidence data for all the sub counties in Uganda, 2015, a key requirement by Against Malaria Foundation (AMF) which facilitated the provision of 10.4 million LLINs for the upcoming mass net campaign in Uganda 2016/17;
- Conducted an analysis with PMI/USAID showing the trend in malaria incidence in northern Uganda during a period when a key intervention was implemented in Sept/Oct 2015 along with other multiple analyses;
- Provided malaria data and performed analysis for Jennifer Ross, a Forgarty Global Health Research Fellow, working on a Project titled 'Estimating the impact of cotrimoxazole prophylaxis on malaria burden in Kenya and Uganda';
- Provided health facility data for a project titled 'Improving the quality of health facility data to monitor trends in malaria burden; Effectiveness of the Improvement Collaborative Approach' led by Nelli Wester camp, an EIS Officer;
- Became a co-author on a publication entitled, 'The challenge of using both long lasting insecticide bed nets and intermittent preventive therapy among pregnant women in Uganda' and a co-author on another upcoming publication entitled, 'Factors associated with malaria parasitaemia among children under 5 years in Uganda: A secondary data analysis of the 2014 Malaria Indicator Survey dataset', with the lead author, Humphrey Wanzira;
- Supported the iCCM national coordinator in developing training materials for iCCM, participated in meetings with partners to guide planning and rolling out of iCCM, contributed ideas to the research agenda, in particular, a need for evaluation of the plan for roll out;
- An active team player in the development of the first ever Uganda Malaria portal;
- Coordinated district micro planning activities in Uganda prior to distribution activities for the 2017 Long Lasting Insecticidal Net mass campaign for period Sept 2016- Dec 2016;
- She is coordinating the development of a malaria epidemic prediction model using climate data on behalf of the National Malaria Control Program in conjunction with WHO, CHAI Uganda and a senior software developer from Eco Health Alliance in New York, USA

Program-specific achievements

- Performed a descriptive analysis of malaria incidence among under 5yr olds in relation to malaria control interventions;
- Submitted a manuscript titled, 'Malaria incidence among children less than five years during and after cessation of Indoor Residual Spraying in Northern Uganda: a descriptive study'
- Wrote a protocal for her planned study entitled, 'Factors associated with malaria illness in three districts of Northern Uganda, 2015', This protocal was cleared by the IBR at Makerere University School of Public Health and approved by the Uganda National Council for Science and Technology.
- Led the investigation of a suspected guinea worm outbreak in Isingiro district
- Participated in the investigation of a number of disease outbreaks such as typhoid, cholera, and suspected viral hepatitis
- Performed a comparative cost analysis on prevention and control of a cholera outbreak
- Made three oral presentations at national conferences, and the first and second national field epidemiology conference
- Obtained a second runner up prize for a project on malaria whose idea she pitched at the IMED2016 (International Meeting on Emerging Diseases and Surveillance 2016) pre-conference MIT Hackathon event in Vienna, Austria
- Made an oral and poster presentation at the IMED2016 conference in Vienna, Austria. The oral presentation was on a project developed while at the pre-conference Hackathon activity

on creation of an epidemic prediction model for Uganda using climate data

- Published two articles on malaria in the New Vision Newspaper in 2015
- Has been an editor for four issues of the Ministry of Health quarterly epidemiological bulletin
- Trained the 2015 cohort over a 2 day period on map making using QGIS for epidemic investigations and health programming; in addition has made a number of maps for FETP fellows in both 2015 and 2016 cohort as well as for UPHFP secretariat members

Summary of planned study

Title: Factors associated with malaria illness in three districts of Northern Uganda, 2015

Introduction: Malaria continues to be a huge public health threat worldwide with an estimated 3.3 billion people at the risk of being infected. An epidemic of malaria was confirmed in 11 districts of the Northern part of Uganda in June 2015. Ten of the eleven districts had Indoor Residual Spraying for a minimum of five years but had not had spraying for six months in five of the districts and twelve months in five of the remaining districts prior to the epidemic. This study was conducted to identify factors associated with malaria illness in two epidemic and a non epidemic district of Northern Uganda in 2015 in order to make recommendations to alleviate future malaria epidemics.

Methods: The study was a comparative cross sectional study which used both quantitative and qualitative methods of data collection. This involved the study of three districts, Arua and Gulu which had a malaria epidemic in 2015 and Moyo, a neighboring district which didn't have an epidemic. Household interviews were conducted in the three districts to determine possible host behavioral and knowledge factors for malaria illness. Key Informant Interviews were conducted at the national and district level to assess systems and environmental factors that could be associated with malaria illness in the three districts.

Logistic regression analysis was performed to identify factors which were associated with the risk of suffering from malaria in both the epidemic and the non epidemic district. Bivariate analysis was used to identify factors that were independently associated with the risk of an individual having malaria in either the epidemic district or the non epidemic district. Multivariate logistic regression analysis was used to identify factors that remain significantly associated with the risk of acquiring malaria in the epidemic and the non epidemic district. Qualitative data from KII's was transcribed, key categories identified and organized into themes which were related to the objectives of the study.

Results: A total of 728 respondents were interviewed from the epidemic and non-epidemic districts, 375 (51.5%) and 353 (48.5%) respectively. of the respondents in the epidemic districts, 77.6% (291) knew the mode of malaria transmission as compared to 92% (325) in the non-epidemic districts. In the epidemic districts, 254 (67.9%) of the respondents were consistently sleeping under a mosquito net compared to 329 (93.2%) in the non epidemic districts. In the epidemic districts, 3.7% of the respondents used mosquito nets for more than three years as compared to the non epidemic district where no respondent used a net beyond three years.

In the epidemic area, factors found to be significantly associated with being a malaria case were; sex where females were more likely to be malaria cases (AOR =1.6[1.1-2.5]); not knowing vomiting as a sign and symptom of malaria (AOR=1.6 [1.0-2.4]); lack of money to purchase anti-malarial drugs where those who had money were 0.7 times less likely to get malaria (AOR= 0.3 (0.1-0.7)]; and frequency in use of a mosquito net where the use of nets three to four times a week seemed to have a protective effect over daily use (AOR=0.4 (0.1-0.9)].

In the non epidemic district, respondents who thought malaria cannot be prevented by sleeping under a mosquito net were 2.4 times more likely to acquire malaria (AOR=3.4 [1.0-10.9]) which was the only significant association. Key informant interviews revealed that the epidemic in Gulu district was mainly attributed to withdrawal of IRS and inadequate BCC. In Arua district, much of the increase in cases was attributed to inflation of figures in DHIS2, however, an influx of refugees from Sudan was noted in two sub counties. There was also a lot of misconceptions about prevention practices for malaria. In Moyo (non epidemic), KII's revealed a wide range of malaria interventions implemented but indicated a need to strengthen BCC.

Conclusion: There is inadequate knowledge on transmission and prevention of malaria in the epidemic area studied. Programmatically, the epidemic has been attributed to withdrawal of IRS in Gulu and to both an influx of refugees and inflation of aggregated figures in DHIS2 for Arua. There is need to strengthen BCC on malaria in all the communities especially the epidemic districts of northern Uganda. There is need to enforce and implement an adequate withdrawal strategy during and after implementation of IRS. Emphasis should be put on accuracy of data presented in DHIS2 to adequately reflect actual figures.

Lessons Learned, skills/competencies acquired and next steps:

Over the course of the fellowship Allen acquired a number key skills and competencies. These were skills in: outbreak investigations; map making using QGIS; data entry and analysis using EPI INFO 3.7 and STATA; quality presentation and making of power point slides; team work; writing skills for abstracts, bulletin and newspaper articles; writing of manuscripts; project planning and management; and networking skills. After the fellowship program, Allen will be moving on to manage the first ever malaria portal under development by the National Malaria Control Program, WHO, and CHAI.

Gerald Pande
+256 772-932792 / +256 701-932792
pandegerald@yahoo.co.uk

Host Mentors

Dr. Joshua Musinguzi
Program Manager, AIDS Control Program, Ministry of Health

Dr. Wilfred Kirungi
Senior Medical Officer AIDS Control Program Ministry of Health

Academic Mentor

Dr. Fred Makumbi
Associate Professor, Makerere University School of Public Health

ABOUT THE FELLOW

GERALD PANDE holds a Master of Public Health and Bachelor of Environmental Health Science degrees from Makerere University. Gerald was hosted at STD/AIDs control programme, Ministry of health. AIDS control program (ACP) is located in the department of national disease control in the MoH, under the directorate of clinical and community health service. ACP provides leadership for implementation of the national health sector HIV response. During the fellowship programme, Gerald actively participated in the programme activities, worked with different partners and conducted outbreak investigations. Although Pande had worked as the Assistant District Health Officer at Nakaseke District, where he managed several outbreaks. He had never led successfully an outbreak investigation. In his own words." The fellowship programme has built my skills and capacity in outbreak investigation; I managed to lead a cholera outbreak investigation which stopped cold after only 10 days and there was no further transmission afterwards. In comparison, elsewhere in Kasese District, an outbreak like this would usually last much longer, and often spread to other places".

Fellowship Achievements at the Host Site

He was a part of the organizing committee for the two regional campaigns (Teso region -Soroti and central region- Masaka) on the elimination of the mother to child transmission. These committees would sit twice a week and I wrote an article following the overall theme for the campaigns "Male involvement in the reproductive health of their families"

He was selected to be part of the team working with Fhi 360-Nairobi. Under the East African community which sits in Arusha – Tanzania, many activities were agreed upon to be done together among the East African countries. One of the activities being done by Fhi 360- Nairobi under this umbrella is to have treatment and HIV care along the transport corridor (Burundi, Rwanda, Tanzania, Kenya and Uganda). Following this, 10 cross boarder points (hot spot) were selected to establish treatment center. Entry meetings were held in (Busia, Maraba – Uganda, Busia, Maraba-Kenya and Rakai and Kasesero)

He also participated in the birth cohort training. The overall goal of this cohort training is to strengthen the capacity for monitoring of eMTCT and EID programs in Uganda through the use of cohort data with the ultimate goal of improving health outcomes for mothers and infants across the HIV continuum. This will help to improve retention of mothers and their infants in the eMTCT & EID programs in order to reach elimination.

He has also been participating in the weekly review meeting for option B+ that sit every tuesday to review the progress toward having less than 5% of new infections among the babies.

Program-Specific achievements

He evaluated the surveillance system for 12-month retention in care among HIV clients on ART in Uganda and I submitted a report "Twelve

month retention in care among HIV clients on ART in Uganda as reported in the HMIS (2011-2014)

He has participated in 5 outbreak investigations (including two cholera outbreaks and a typhoid outbreak)

I also published a bulletin in the quarterly MoH bulletin. The article ''A cholera outbreak in a fishing village in Kasese, Western-Uganda caused by drinking contaminated water from a fenced lake shore collection area".

His planned study was entitled ''Evaluation of the Community-Based HIV Service Delivery Models used to reach Sex Workers along Malaba-Kampala Highway.

He prepared three abstracts and were accepted for oral presentation

- Abstract submitted at the 16th USHS annual scientific conference held at hotel Africana, 6th-7th August 2015. ''Prevalence and factors associated with hypertension and diabetes among adults in Nangabo sub-county, Wakiso district-Uganda"
- Submitted an abstract to the 11th joint annual scientific health (JASH) conference held at Speke resort Munyonyo, 23rd-25th September 2015,'' "A point source cholera outbreak in Katwe Kabatoro Town Council June- July 2015"
- Abstract submitted at the international night conference 2016 entitled ''A cholera outbreak caused by drinking contaminated water from a fenced lake shore water-collection site – Kasese District, western Uganda, June 2015" This conference took place between 2-5th may 2016 in Georgia-Atlanta , USA
- He made national epidemiology conference which was held on the 14th/11/2016 at the Sheraton hotel "Evaluation of the community based HIV services delivery models used to reach sex workers along Malaba-Kampala highway

Print Media

''Male involvement is critical in elimination of Mother to Child Transmission in Uganda" this was published in the new vision of Aug, 20, 2015

Manuscript Submitted for Publication

A Prolonged, Community-Wide Cholera Outbreak Caused by Drinking Water Contaminated by Sewage in Kasese District, Western Uganda

Cholera Outbreak Caused by Drinking Contaminated Water from a Lakeshore Water-Collection Site – Uganda, June 2015

Lessons Learned

He has acquired knowledge in public health surveillance. This has been gained through analysis of Dhis2 data. I have also acquired the skills in response to public health emergencies. This has been obtained during the response to outbreaks that I have participated in.

He has also developed a study protocol and a report which has been every useful for me to acquire the competence in conducting planed epidemiology studies. Through the presentation that I made both at national and international, newspaper, MoH bulletin & manuscript preparation I was able to gain knowledge in scientific communication. Lastly, I have acquired the competence in leadership and management through planning and management of field assignments and support supervision to the district during my placement. ''Iam ready to use the skills acquired to service the public to the highest standard".

Summary of Planned study

Introduction

Sex worker's community based HIV/AIDS service delivery models put in place by Ministry of Health and its development partners include: Static facility services. These are located in hotspot areas (where the actual buying and selling of sex takes place) and sex workers can easily access the HIV services without incurring transport costs, services are provided daily and for long working hours (from 9am-10am). However, since the inception of these HIV service community based models no evaluation has been done to know the most efficient model used to reach sex workers. This evaluation aimed at assessing the effectiveness of these models and identifying challenges in the implementation of these models.

Methods

This assessment adopted across-sectional study design using quantitative (interview with sex workers) and qualitative (interview MoH staff, health workers, district health team members, program staff at different levels involved in delivery of HIV care services) data collection methods. Effectiveness of the model was the proportion of sex workers who have had an HIV test in the last 12 months through different models and the proportion of HIV positive sex workers linked to care in through different models

Results

The majority of the sex workers 71.7% (327/456) reported to have taken HCT services in the past 12 months from a static facility. Of those linked into care, 90.1% (120/132) reported to have been linked through static mechanism and 88.6 % (117/132) of those in linked into care were on ART. Challenges faced by the providers include: Stock out of testing kits, Some people do not trust results given during outreaches especially if blood is drawn from a finger. Most outreaches are monthly which makes linkage to care hard because FSWs are mobile. The sex workers also faced challenges that included: Long waiting hours (especially in static clinics), Some places do not have specific clinics for FSW, Stigma and discrimination is still high among FSW and low facilitation for peer educators.

Conclusion

All the three service delivery models are being implemented, Static service delivery model had the highest number of FSWs tested for HIV and linked into care and community based HIV service delivery model faces challenges: lack of logistic and unfriendly service

Ben Masiira
MBChB (Mak), MScEpi (LSHTM),
+256782897922, +256704594004
ben.masiira@musph.ac.ug

Host Mentors
Dr. Monica Musenero
Assistant Commissioner,
Epidemiology and Surviellance Division, Ministry of Health.

Dr. Issa Makumbi, Head Public Health Emergency Operations Center, Ministry of Health

Academic Mentor
Dr. Frank Kaharuza
Lecturer, Makerere University School of Public Health

ABOUT THE FELLOW

Ben Masiira holds a Bachelor of Medicine and Bachelor of Surgery from Makerere University and Master's Degree in Epidemiology from London School of Hygiene and Tropical Medicine. He had 7 years of experience in clinical research before joining the Public Health Fellowship Program in 2015. He was attached to Epidemiology and Surveillance Division of Ministry of Health which has a mandate of spearheading preparedness and response to Public Health Emergencies and spearheading disease epidemiology and surveillance. During his 2 year placement, Ben gained knowledge and hands on experience in disease outbreak preparedness and response and planning and implementation of disease surveillance strategies. He worked with and built networks with key health partners involved in prevention and control of priority diseases and conditions. Although Ben had been in management positions before joining the fellowship program, he had never had a formal training in leadership and management. *"This fellowship has empowered me with skills that have made a much better public health leader. Without effective public health leadership at all levels, Uganda remains at higher risk of recurrent disease outbreaks and other Public Health Events".*

KEY ACHIEVEMENTS AT HOST SITE

- Wrote a concept to study risk factors for childhood obesity in Kampala City which was selected
- Wrote a protocol on typhoid intestinal perforations during an outbreak of typhoid outbreak in Kampala City which was accepted for funding and implemented it
- Principal Investigator of the typhoid intestinal study
- Was critical in re-activation of the Ministry of Health weekly epidemiological bulletin
- Wrote and disseminated the weekly epidemiological bulletin between April and December 2015
- Part of the five member team that designed and conducted an evaluation of the re-vitalized IDSR program in Uganda in 2016
- Supervision of a team of 10 research assistants during data collection for IDSR evaluation
- Participated as a team lead in investigating typhoid fever outbreaks in Moyo and Nebbi districts
- Led several teams that conducted IDSR monitoring in the districts of Uganda
- Led a team that evaluated the response to the yellow fever outbreak in Kalangala
- Trained as a national trainer for training Rapid Response Teams in Uganda
- Was part of the team that designed and implemented Pre-Term Birth Surveillance in Uganda

KEY PHFP ACHIEVEMENTS

Descriptive analysis of public health surveillance data

Analyzed 15 year surveillance data on animal bite injuries that are used as a proxy for human rabies infection in Uganda and a comprehensive report was written and disseminated to the relevant stakeholders.

Disease outbreak investigation reports

- Measles outbreak in Kiruhura District in September 2015
- Non filarial elephantiasis (Podoconiosis) in Kamwenge District in November 2015
- Yellow fever outbreak in Masaka District in April 2016
- Investigation of Typhoid Intestinal Perforation outbreak in Kampala City; January to June 2015

Articles in the Quarterly MoH Uganda National Institute of Public Health Epidemiological Bulletin

- Effect of Integrated Diseases Surveillance and Response training on notification of epidemic-prone communicable diseases in Uganda. Published in October-December 2015 bulletin.
- Highlights of Yellow fever outbreak in Masaka District. Published in January-March bulletin.
- Long term trends and geographical distribution of animal bite injuries and deaths due to human rabies infection: analysis of 2001-2015 epidemiological surveillance data in Uganda. Published in April-June 2016 bulletin.

Articles in newspapers

Wrote two articles which were published in the New Vision newspaper:

- The Typhoid outbreak in Kampala City is an opportunity to fix its sanitation and sewage system
- Utilization of Strategic Timing of ART study results to eliminate HIV in Uganda results to eliminate HIV in Uganda

Abstracts for conference presentation

Wrote five abstracts three of which were accepted for presentation:

- Risk Factors Associated with Typhoid Intestinal Perforations during a large typhoid outbreak: Kampala Uganda, 2015. This was an oral poster presentation at the 2016 AFENET Conference in Abuja, Nigeria.
- Secular trends and spatial distribution of animal bite injuries and rabies deaths in Uganda; 2001-2015. This was an oral presentation at the Uganda Bio-Safety and Field Epidemiology Conference 2016.
- Rapid assessment of risks to public health among refugees from Burundi at Nakivale and Oruchinga refugee camps: Isingiro District, May 2015. This was an oral presentation at the Uganda Field Epidemiology Conference 2015.

Manuscript

- **Wrote a manuscript titled** "Temporal trends and spatial distribution of injuries and deaths due to human rabies infection from animal bite: Analysis of 2001-2015 epidemiological surveillance data in Uganda".

SUMMARY Of PLANNED STUDY

Trends of priority infectious diseases in Uganda – Analysis of weekly Epidemiological Surveillance Data, 2011-2015

Background: Infectious diseases are estimated to kill up to 13 million worldwide each year, majority of whom are the developing world. In Uganda, 54% of the disease burden is attributed to infectious diseases. In 1998, WHO/AFRO introduced Integrated Disease Surveillance and Response (IDSR) as an intervention to reduce the impact of infectious diseases, through early detection and response to disease outbreaks. After almost 15 years of IDSR implementation in Uganda, there is limited documentation on how the disease trends have changed in the country.

Objectives: To describe trends and

geographical distribution of priority infectious diseases in the country from 2011-2015.

Methods: District weekly epidemiological data on 8 major priority infectious diseases was analyzed. Line graphs were used to describe trends of different diseases and maps to describe the geographical distribution of cases. Ordinal regression analysis was used to test if observed difference across years were significant at P<0.05.

RESULTS

Typhoid: A total of 344,133 suspected typhoid cases were reported in the country between 2011 and 2015. The incidence of typhoid fever (per 100,000 population) significantly increased from 164 to 518 in Central region (p=0.001), 105 to 145 in Eastern region (p=0.03), 168 to 245 in Northern region (p=0.02) and 129 to 199 in Western region (p=0.04).However, only the Central region (Kampala City) had a confirmed outbreak in 2015. Nighteen out of 112 districts (17%) exceeded the surveillance alert threshold of ≥20 suspected typhoid fever cases 50% of which were districts in the Central region.

Malaria: Up to 43,160,075 cases of malaria were reported from health facilities in Uganda. The annual malaria incidence (per 1,000 population) was 341 in Northern, 330 in Eastern, 256 in Central and 239 in Western region. From 2011 to 2015, there was a significant decrease in the incidence of malaria from 341 to 160 (p<0.001) in Central and 398 to 252 in Eastern (p<0.001). Although the incidence decreased from283 to 180 in Western region, this was not statistically significant (p=0.06). In the Northern region, malaria incidence decreased from 373 in 2011 to 304 in 2014 and then sharply increased to 377 in 2015. Analysis of malaria normal channels showed that a total of 33 out of 112 districts experienced malaria outbreaks of which 52% were in the Northern region, 27% from Western, 15% from Eastern and 6% from Central region.

Dysentery: A total of 239,076 Dysentery cases were reported from districts across the country. The annual average incidence (per 100,000 population) was 259 in Northern, 204 in Central, 170 in Western and 153 in Eastern region. There was a significant decrease in the incidence from 374 in 2011 to 259 in 2015 (p=0.02) in the Northern region and a non significant decrease from 163 to 153 in Eastern region (p=0.99). Although not statistically significant, the incidence increased from 144 to 204 (p=0.45) in Central and 162 to 170 in Western region (p=0.62). The districts with the highest incidence included: Otuke (848), Kapchorwa (800), Zombo (751), Mubende (733), Alebtong (584), Kalangala (553), Nwoya (516), Bukwo (516), Hoima (510), Bukomansimbi (492), Abim (464) and Nakasongora (453).

Measles: The total number of laboratory investigated suspected cases was 10,195 in Uganda out of which 1,651 (14%) were confirmed measles cases. Of the confirmed measles cases, 52% were from Western, 28% from Central, 11% from Eastern and 9% from Northern region. Overall, a total of 89 districts (79.4%) had at least one confirmed case in during the study. In 2015, the number of districts with ≥1 confirmed measles cases was 16 (14.3%) in Central of which 9 had ≥3 cases, 16 (14.3%) in Western of which 10 had ≥3 cases, 7 (6.3%) in Northern of which one had ≥3 cases and 7 (6.3%) in Eastern region of which one had ≥3 cases.

Acute Flaccid Paralysis (AFP): From 2011 to 2015, 2,641 stool samples from suspected patients with AFP were sent from districts to the national reference laboratory at Uganda Virus Research Institute. Out of these samples, 803 (30.4%) were submitted from Eastern, 723 (27.4%) from Central, 626 (23.7%) from Western and 489 (18.5%) from Northern region. The most important indicator of the sensitivity of the polio surveillance system was above the recommended WHO-AFRO Non-Polio AFP target rate of ≥2.0 per 100,000 population below 15 years in 68.8% of districts. No case of wild polio virus was isolated from any these samples. Three cases of Vaccine Derived Polio virus (VPD) were isolated from districts of Kamuli, Kween and Kisoro in 2014.

Cholera: A total of 8,723 cholera case-

patients and 191 deaths were reported in Uganda. Of the cholera cases, 52% were from Western, 30% from Northern, 13% from Eastern and 5% from Central region. Overall, 25 districts experienced cholera outbreaks in Uganda with the highest number of cholera cases observed in the districts of Nebbi (2,075), Hoima (1,426), Buliisa (1,129) and Kasese (814). Most of the districts that experienced cholera outbreaks are located along the Democratic Republic of Congo-Uganda border with a few districts in the Central region (Kampala and Wakiso) and along the Kenya-Kenya border.

Animal bite injuries: These are used as a proxy of human rabies infection in Uganda. The total number of animal bite injuries treated at health facilities was 82,072 of which 28.6% were reported from Northern, 27.5% from Central, 24.0% from Western and 19.9% from Eastern region. The average annual incidence of animal bite injuries (per 100,000 population) was 58 in Northern, 50 in Central, 49 in Western and 41 in the Eastern region. Although not statistically significant, there was an increase in the incidence of animal bite injuries in all regions.

Meningococcal meningitis: Out of 1,850 suspected meningococcal meningitis case-patients, 31% were reported from Northern, 27% from Eastern, 25% from Central and 17% from Western region. The average annual incidence (per 1,000 population) was 1.6 in Northern, 1.2 in Central, 0.7 in Western and 0.5 in Eastern region. Confirmed outbreaks occurred in Kiryandongo and Amuru districts in 2012.

Conclusion and recommendations: Uganda remains at a significant risk of outbreaks from typhoid, malaria, dysentery, cholera, measles, meningococcal meningitis and rabies infection. However, the country has made significant progress in the fight against poliomyelitis evidenced by lack of any confirmed wild polio viruses during the 5 years of the study. More funding should be committed in the area of infectious disease prevention to lower the current disease burden and consolidate on achievements gained.

LESSONS LEARNED, COMPETENCIES ACQUIRED AND NEXT STEPS

During the 2 year fellowship, I came to appreciate that Field Epidemiology and Public Health is not all about how much knowledge you have but how you translate the knowledge to solve public health problems affecting populations. Each public health challenge is unique and there is no single magic bullet that can solve it and therefore there is need for a multi-disciplinary approach and a constant need to think outside the box.

This fellowship has been transformational in my life. I have been able to apply the theoretical skills acquired during my training into practice at national level. At the same time I have managed to build networks with high level individuals in Ministry of Health and other organizations. I have been able to appreciate the role of disease surveillance in prevention and control of communicable and non communicable diseases. I look forward to pursue a career as an expert in disease epidemiology and disease surveillance and fulfill my dream of contributing to disease prevention and control in resource limited settings.

FOR MORE INFORMATION ABOUT THE PROGRAM, PLEASE CONTACT:

Dr. Alex Ario
Field Coordinator
Public Health Fellowship Program
Ministry of Health
4th Floor, Lourdel Towers
Plot 1, Lourdel Rd, Nakasero
P.O. Box 7072, Kampala-Uganda
Tel. 0772 363 348
Email: riolexus@musph.ac.ug

Joseph KB Matovu
Training Manager
MakSPH-CDC Fellowship Program
Makerere University School of Public Health
Plot 30A, York Terrace, Kololo
P.O. Box 7072, Kampala-Uganda
Tel. 0772 972 330
Email: jmatovu@musph.ac.ug