Minutes for Uganda Malaria Surveillance Program (UMSP): Strategic Planning Retreat-12th-13th Jan 2017

Introductions: Self introduction by participants

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Welcome remarks/objectives of the Meeting-Prof. Moses Kamya

Welcome remarks: Appreciated attendees for sparing time; despite other commitments

Overall Goal: Improving the relevance of UMSP surveillance to meet current surveillance needs. Surveillance covers; drug efficacy, nets, entomology, M&E

Questions

1. What are the current surveillance needs for Uganda?

2. What is UMSP doing?
3. How do we need to make adjustments to meet the current surveillance needs (Improve our relevance)?

Outcomes

1. List of surveillance needs for malaria control
2. List of strategies of how UMSP surveillance can strengthen HMIS
3. Modified UMSP surveillance model
4. Strategies and approaches to strengthening UMSP surveillance

Objectives

1. To understand the current NMCP malaria surveillance needs: perspectives of the NMCP and partners.
2. To understand how HMIS/DHIS-2 has evolved over the years in terms of collecting and reporting malaria surveillance data
3. Review the UMSP Malaria Reference Center Surveillance model to be relevant to current malaria surveillance needs.
4. To develop strategies for strengthening UMSP activities resulting in generation of high quality malaria surveillance data.

Key highlights:

- How can UMSP supplement NMCP malaria surveillance needs?
- Strengthening UMSP and its contribution to HMIS/DHIS-2
- Need to review the current UMSP model, assessing how it can be improved, adopting surveillance that is actionable; generating data that can be used at the data collection level, improving the district response

Day 1: Session 1 (Session Chair-Dr. Anne Gasasira)

Overview of UMSP malaria surveillance program- Dr. Arthur Mpimbaza

- UMSP formed in 2001
- Bridging the gap between MU-UCSF & MOH-NMCP
- UMSP has evolved from 6 sentinel sites to 21 Malaria Reference Centers

Goals of UMSP

1. To implement a multi-site surveillance system in Uganda
2. To build capacity through training & strengthening of infrastructure

3. To integrate results of research into policy by linking researchers, policy-makers, and districts
4. To create a sustainable network of research activities and contribute to malaria control in Uganda

UMSP Accomplishments

- Established a network of researchers and key stakeholders in malaria control in Uganda
- Established a formal link with the Uganda Ministry of Health Malaria Control Program to enable evidence-based national policy
- Established a network of facilities for malaria surveillance and conduct of operational research.
- Conducted state-of-the-art research on malaria, creating an impressive publication list and influencing antimalarial drug policy in Africa
- Prioritized training of public health leaders in Uganda
- Built capacity for laboratory diagnosis and molecular studies of malaria in Uganda.

Activities

- Surveillance at Malaria Reference Centres (21)
- Acute Febrile Illness Surveillance
- Laboratory studies of host genetic polymorphisms
- Bed net studies
- Drug efficacy studies
- PBO Net evaluation

Recommendations/Actions

- UMSP has vast expertise and experience that can be harnessed to support the National Malaria Control Program in malaria control.
- Some key areas highlighted included: The Acute Febrille Illness Surveillance Programme, the insectary in Nagongera, expertise in immunology and gene research (HRP2 deletions and false RDT negative test results)

Malaria surveillance: Global context & priorities- Mr. Paul Mbaka and Dr. Damian Rutazaana

- Global Technical Strategy 2016-2030, surveillance is the 3rd of 5 principles. *Transform surveillance into a core intervention*
- Spirit behind GTS is to eliminate malaria by 2030. We have 13 years left. Each country should have strong surveillance in areas close to elimination and strengthened surveillance in high burden areas

- Eliminate malaria by 2030-A world free of Malaria-Advancing from control to elimination

- Surveillance as an intervention encompasses
    - Track disease and programmatic response
    - Take action in response to the data received

- Why surveillance
    - Advocate for resources
    - Allocate resources
    - Assess progress
    - Account for funds
    - Evaluate
    - Learning

- Surveillance in areas of high transmission
    - Focus on aggregate data
    - Action is population wide
    - Information should be accurate
    - Cases and deaths confirmation
    - Sentinel surveillance is key

- Low transmission areas
    - Appreciate heterogeneity
    - Targeted interventions
    - Vigilance for epidemics

- Areas of elimination
    - Investigate individual cases
    - Private sector, informal sector
    - Monitor risk of importation
    - High resources

- List of surveillance priorities
    - Investment in Routine Information systems
    - Collection of necessary data for understanding disease trends and overall program performance.
    - Development of national strategic plans that take into account the epidemiology and heterogeneity of malaria in a country.
    - Monitoring the implementation of national malaria strategic plans at regular intervals
    - Ensuring that surveillance systems are monitored

- Bare minimum indicators should include; confirmed malaria cases, inpatient cases& deaths, TPR, % cases due to malaria, % of cases with diagnosis of malaria at

discharge, %of in-patient deaths due to malaria, annual blood examination rate, % of suspected cases that have had a diagnostic test, completeness of HF reporting

- Other indicators include; OPD cases, entomology surveillance (EIR, Vector density, sporozoite rates, insecticide resistance, vector behaviour)

Reactions (Questions, answers and comments)

Question: **How accurate are the measurements of malaria specific death when post mortem is not confirmed?**
Response: We still have issues with the confirmation of malaria deaths. Once a patient is diagnosed with malaria somewhere along the continuum of care their death is attributed to malaria. Final confirmation may not be possible
Comment: Surveillance for mortality is better in the out-patient setting. In the inpatient setting the threshold for detecting malaria is low given that the patient is very sick. Recently reports have shown that several cases are reported as malaria warranting report of malaria outbreak, but on further investigation this is not true
Comment: It is hard for routine surveillance to capture population level mortality. We need other methods like verbal autopsy, MIS.

Question: Is there any assessment of asymptomatic/submicroscopic malaria?
Response: Our current surveillance need is for control and is based on confirmed cases. At elimination level we would then go into looking at asymptomatic cases given that these are now a reservoir
Response: In the advent of IRS, many cases are averted and hence we turn our focus towards sub microscopic cases as these may result into onward transmission. We need to prepare IRS districts and other areas of low transmission for context specific surveillance. Risk mapping and focalized responses are needed to detect areas where there are problems for targeted response

Question: Have we included age categorisation?
Response: Age is included in the details and is important as is spatial distribution

Question: How do we ensure that surveillance can elicit an action in a timely manner?
Response: Action occurs under a framework where there is capacity; need to understand the problem/response, and funding. Response needs to be enabled, capacitated and funded. We are writing a grant to include an epidemic response division. We need to synchronize and coordinate responses of the response teams. Currently for response we have; IDSR, Epidemiological Surveillance Division, NMCP, and the Public Health division. We need to coordinate our actions. Moving forward we need to assess the response capacity of the country. In addition, actions need to be categorized given that there are

some that are beyond our reach, but there are others that are within our control and can cause immediate change

Response: We need to assess the response capacity in the country including Infectious Diseases Surveillance Response; epidemiological response, Surveillance, Monitoring and evaluation response and others. We have these response teams, but they are not well coordinated

Question: In high transmission areas we should go for aggregate data. What is the advantage of aggregate data?

Response: In these high transmission areas we have huge numbers of cases; the system may not be able to track the cases in these thousands down to each individual. If this is possible, it should be done. That large numbers is the same reason we look at deviations from the normal. When cases are few we can closely study the individual and their contacts.

Response: In some special circumstances like in the Epidemic in Northern Uganda where we are wondering whether the cases may have come from neighbouring areas a study of individuals may help us understand the malaria situation better. This kind of assessment cannot be conducted routinely.

Response: As we look at aggregate data once we identify problems as part of action we need a deeper analysis to understand what is happening to the individuals.

Summary: All agreed that this individual level assessment is needed in special circumstance including; in low transmission areas, pre-elimination, following the roll out of highly efficacious control interventions, and in epidemics. However, we need to consider the return on investment and the practicability of the method.

Question: How do we strengthen interface for action at our level?

Response: Are we communicating effectively and is this communication reaching the appropriate audience? How do we hold actors accountable?

Response: The surveillance team need to look at the data routinely and draw their own monthly normal channels. We need to map the deaths, where are they from, and investigate these cases. We need to know what the data is telling us and understand the picture

Question: How do we customize our surveillance in *'special'* areas & can surveillance follow the interventions that are ongoing? Are we looking at what is happening in the East as we implement IRS?

Response: We do not have centres in Bugiri and in some other Eastern districts that are being sprayed. We are interested in exploring means of tapping into the HMIS to provide this information?

Response: Our reference centres have followed the IRS in the North. It is also important o watch the East, but we are limited by resources

Other Comments
- We need to monitor exposure rates of populations, drug resistance, parasite resistance

- We need to monitor the surveillance system; we need to ensure that people understand what to report and that reports are valid.
- We need to step up the reference centres. We still have several weaknesses including quality of diagnostic testing. There is a health system intention to make malaria surveillance better and hence improve the quality of the picture.
- Since we are relying on testing the RDTs need to undergo periodic testing to ensure that they are specific and sensitive to inform the program
- Malaria is heterogeneous and focalized requiring tailored surveillance programs. From the risk mapping some areas have moved to pre-elimination. We need to intensify surveillance and build capacity for response in these areas
- Routine surveillance may not be applicable in tracking community indicators
- As we roll out vector control interventions we need to look more into entomological surveillance (For discussion in the afternoon)
- MTRAc reports have evolved over the past 3 years. Presentation of data is very important to elicit response.

Recommendation/Actions

Malaria reference centres
- We need to look at the whole country, analyse the malaria risk map and prioritize the areas for surveillance. We should then consider placing the 25 surveillance sites/additional sites (funds allowing) on the basis of the malaria map to cover the whole country in the best way. All epidemiological zones need to be represented.
- As we consider moving (scaling down) from one surveillance site to set up another, we need to ensure that residual capacity is in place to support the surveillance site from which we are exiting (scaling down). This capacity building will ensure that we maintain our gains.
- We should also allow for flexibility in our surveillance system so that we can trigger enhanced surveillance to respond to special situations like epidemics and M&E/surveillance of highly efficacious interventions like IRS. As part of the IRS exit strategy we need to enhance surveillance in these areas
- Ultimately given the limited resources we need to build a model where there is Good

HMIS for whole country, enhanced HMIS for some zones, complimented by sentinel surveillance sites spanning across the epidemiological zones

- Entomological surveillance should be given as much attention as the Clinical-Outpatient/inpatient surveillance

Strengthening Data use

- Effective communication and presentation of data findings are very important tools that can be used for eliciting response
- Surveillance teams should constantly review the data and provide reports through weekly or quarterly bulletin and an assessment of action taken with what was shared

Day 1: Session 2 (Session Chair-Dr. Damian Rutazaana)

Surveillance system assessment for accelerated malaria reduction in Uganda
Dr. Dan Kyabayinze

- Surveillance as a core intervention towards a malaria free world by 2030
- Improved surveillance, monitoring and evaluation, as well as stratification by malaria disease burden are required to optimize the implementation of malaria interventions
- There are 10 steps to strengthen the malaria surveillance and Response system
- The purpose of surveillance system assessment is to strengthen the Malaria Surveillance, Monitoring and Evaluation within the context of the Health System Strengthening towards actualizing the goals of Uganda Malaria Reduction Strategic Plan-UMRSP (2014 – 2020)
- Preliminary findings show reduced malaria burden, but there are still some challenges such as the recent outbreaks in Northern Uganda.
- There is strong commitment and essential documents are already in place (e.g. Malaria Epidemic Response Guidelines)
- Malaria Surveillance strategic guidance at country level is needed
- District and community level engagement with NMCP is weak
- There are challenges with cross border-malaria

HMIS in Uganda/Uganda Journey Towards eHealth - Dr. Eddie Mukoyo

- Uganda Health information system (HIS) was designed in 1985
- HIS has evolved following various reviews done in 1992, 2001, 2005, 2010 and 2014. It's now known as the Health Management Information System (HMIS)
- HMIS addresses the Issue of synergy and the challenges of vertical programs; and crisis management.

- Common monitoring arrangements have been set up and the National league table streamlined from an ambitious 1000 indicators to 19 agreed indicators
- HMIS is reviewed every five years
- In 2010, the Ministry of Health (MOH) Uganda setup an electronic Health Management Information System (eHMIS) at district and health sub-district levels, including some Regional Referral Hospitals
- In 2012 MOH identified, evaluated and approved the DHIS2 as a robust e-HMIS platform that was customized to manage routinely collected data in the country
- Joint data reviews; validation rules and clean data sets have been realized and for the first time; the last financial year was based on a clean data set.

Rationale for integrated eHMIS/DHIS2 is:

- Multiple HIS/M&E systems
- Inability to authoritatively state level of health sector performance
- Difficulty determining inter-district reporting and performance
- Limited analysis with often conflicting statistics
- Overall erosion of trust in the old system
- New focus on information for Action

Situation of DHIS2 in Uganda-Mr. Prosper Bahumbize

- DHIS2-District Health Information Software Version 2; Is a tool to improve health data demand and use in Uganda
- Open source Software-Community system-hosted in-country and managed/maintained by MoH-Division of Health Information (DHI)
- Customized with all HMIS reporting tools
- Rolled out to all 116 Districts, Regional Hospitals, over 100 Health Units
- The system can plot data on individual health facilities and comparisons can easily be made

Strengths

- Integrated (All diseases, programs, MoH and partner reporting needs)
- Political and stakeholders' commitment (MoH endorsement, Partners support)
- Increasing focus on the strengthening of national Health Information Systems in Uganda
- Appreciation of the system by all users (MoH, Districts, Facilities, Partners)
- Zero rated URL by MTN Uganda
- Active DHIS2 community team members in Uganda
- Awesome analytics, dashboards and easy to use
- Constantly evolving quarterly releases with requirement from the community users

Challenges

- Data quality resulting from paper registers and manual tallying and aggregation
- Poor and unevenly developed infrastructure
- Fragmented health programs and donor initiatives
- Limited Capacity (HR and training)
- Information use culture
- Constant changes/emerging new data demands resulting from policy changes (The tool is changing but the training is not coming in at the same rate)
- DHIS2 was introduced in 2012-but would not be able to draw trends before 2012-such those from 1985

Untapped DHIS2 potential –Uganda

- Individual records – case based surveillance
- Mobile data capture and mapping of cases
- Outbreak detection – thresholds – seasonal and non-seasonal combined with SMS and email alerts
- Integration with other systems to enrich HMIS routine data – surveys, logistics,
- GIS presentation - overlying routine data with external base layers

Malaria surveillance in Uganda: What are the gaps? What is needed? Dr. Jimmy Opigo

- We need to ensure that surveillance goes beyond counting/watching to action
- There is need to clarify the differences between surveillance, M&E and operational research
- Surveillance for diseases targeted for elimination is well structured (e.g. one polio case is taken seriously) unlike malaria which is still endemic
- There is need to strengthen the coordination between the several actors
- The World Health Organization (WHO) has made surveillance a core strategy
- Surveillance system assessment should be done in order to operationalize surveillance
- The surveillance system for Uganda is not a one size fits all, some areas are high burden, and other areas are not very high burden. There is need for tailored surveillance approaches commensurate to malaria endemicity.
- Response centers should have a decentralized system that addresses area specific needs
- We should work on improving the quality of diagnosis and have field assessment of Rapid Diagnostic Tests
- Information sharing should be advanced through a portal that doesn't replace or duplicate DHIS2.
- There is a need to identify the capacity building needs

- We need to define the scope and frequency of surveillance
- The biggest gap in surveillance is in the private sector- Malaria testing levels are less than 30 percent in the private sector-Yet HMIS is based on confirmed tests
- Customize a form for the private sector which is shorter and specific to their needs
- We need an automatic system that aggregates the e-capture data, increasing timeliness, reducing workload and error rate
- The country should be stratified for surveillance action, ensuring that there is residual capacity in the stable sites (malaria reference centers) as increased training is done in the routine surveillance sites

Recommendation/Action

The surveillance system in Uganda is under development, three strategies need to be worked out namely;

1. Risk stratification,
2. Broaden malaria surveillance,
3. Increased Monitoring & Evaluation

Day 1: Session 3 (Session Chair-Dr. Peter Thomas)

HMIS/DHIS 2 Methods

Question: Looking at the setup of HMIS/DHIS 2, are there gaps that can be taken into account to improve the setup of surveillance in the future?

Response: We need to strengthen the source of the data to produce good quality data. Often forms are considered as source of data forgetting the clinicians who are central to the data collection process. Clinicians have a poor attitude towards data collection; they have sub-standard practice when managing fever cases with all fevers being treated as malaria. In addition, poly pharmacy is a common practice. This is so at HC III&IV and beyond. **Response**: Sentinel sites have evolved into reference centers however it takes some time and considerable effort to build testing rates and to change attitudes. It's prudent to invest in strengthening the source of the data because 'Garbage in, Garbage out'. There is need to assess data quality of data; diagnosis and prescription practices-there are lots of gaps in management of cases. We need to do the following;

- Hold quality workshops, does automation brought closer to the health facility reduce or increase error?
- We need to improve the capacity of Health workers to appropriately diagnose and

manage malaria
- Build capacity of health workers for quality data capture (record proper diagnosis)

Question: At what level do we share data and how is feedback to end users given?
Response: Data is collected by the Health Worker, however the MoH officials interface with the district who in-turn take on the responsibility of addressing the HWs. Unfortunately, the biostatistician may be engaged and the HW is never made aware of what the data is saying.

Response: Making the data meaningful to the person collecting the data is essential to promote ownership of data lacking in the health facilities. A follow-up on how this information trickles down to the HF needs carried out.

Question: How do we include other malaria indicators in the DHIS-2 e.g. nets, vector and control.
Response: There is an effort to build a malaria portal in the form of a dashboard and bring this to the MoH in the way of a server
Response: DHIS-2 is flexible; we can introduce as many indicators as possible and customize dash boards. Other interventions like vector control can also be included once a case for this is made. This may require addendum to certain policies and guidelines. There are smaller addendums to deal with additional interventions such as the Community health surveillance system- (Picking data using phones at community level)
Response: Routine activities like nets given in antenatal or immunization should be included in the HMIS- Many partners are struggling to get this information

Question: Can malaria have a portal accessible to others?
Response: The portal we need is not only epidemiological, it should have all policies, reports, a dashboard, should assist with mapping of partners and services, should have the ability to run calendar systems with bookings, coverage of interventions, email communication, linking new researchers and new findings and analysis of other sources of information. It should have a program management system, situation room capabilities, information-access and a user friendly platform-not duplicating DHIS2. This needs to be debated. This is an information access and use issue. This needs to be looked at as a National portal. With a data warehouse feeding into the national portal with malaria being the entry point.

Question: Malaria deaths happen in the community - How can a robust malaria system track these deaths? Where is Uganda in terms of vital statistics? How do we accurately assess mortality?
Question: How do we track the goals of the Global Technical Strategy as well as the UMRSP?
Response: The first goal is to reduce deaths to near zero. We suspect that our measure for mortality is not accurate. What do we need to do to improve this?
Response: National Identification Registration Authority (NIRA) is decentralizing. National birth and death registration can now be done at the district. Verbal autopsy is being considered at community level. In addition, Uganda has come up with the mandate for

registration of people aged 0-16 years. All migrants staying in Uganda for over 3 months will be required to be registered. There are discussions to have the NIRA data base linked to NMCP.

Response: There's a new law in Uganda implemented through the; a new body using Unique Identifiers to deal with vital statistics

Response: There is a project in Eastern Uganda doing demographic surveillance- We need to look into this to determine the costs

Question: How do we address the accuracy of data?
Response: We can do the following;

- Developing validation rules in the system
- Training and supervision of HWs
- Data quality tools
- Hold regular data meetings to analyse the data, understand it and use it.
- Partners can support districts

Other system issues remain that hamper accurate diagnosis of malaria
- Staff do not trust results of RDT
- Staff continue to dispense ACTs without any question

This change needs to be managed carefully given that the change agents need to be handled carefully

Response: Data use is the best approach to clean data. We need to promote data use as a core intervention. Data needs to be presented to people in a way they understand it. They need to understand what information they can derive from the data.

- HMIS has registered major gains are on timeliness and completeness-but the issue of accuracy is still lacking.
- Capacity building on data quality tools is required, supporting districts organize data validation in priority areas- holding regular quarterly meetings to look at the data-look at the capacity of the health workers and support them with partners, validation rules, apply validation rules to clean the data, data clerks need to be empowered to validate data
- Data use is the best approach to clean data-data use should be a priority-what information products are relevant from what environments to avoid 'Monitoring a patient to death'. Ownership of the data should be promoted.

Question: What incentive is required for data use? Can we learn from the TB Program?
We need to tell the HWs what to measure. We need to decentralize malaria by giving them some goals to achieve. What are the malaria metrics we have given them?
Response: M&E framework was written, but it yet disseminated and there is still debate on which indicators to capture. We need to do the following;

- Improve data quality
- Provide clear indicators for HWs to collect and watch
- Data feedback
- Understand what malaria data is collected, develop matrices and then DHIS-2 can provide dash boards for HF use

Improving malaria surveillance in Uganda

- In some places we need localized surveillance to trigger response however in high transmission areas this is not relevant

- How do we develop an integrated cross-sectoral surveillance that is a model? How do we expand surveillance to include environmental surveillance, behavioural surveillance? If possible, environmental surveillance, human behavior surveillance could be integrated into cross-sector surveillance. No country doing this as a model-e.g. outdoor sleeping behavior- Tap into other expertise, operational research

- We need a better LMIS

- IDRC can contribute towards a deeper analysis of data

- LLINs are not working as they should; looking at the data the impact lasted 6-8 months not accounting for data quality. There were differences in the areas. Surveillance sites are in different areas and so they may be able to offer some explanations by going beyond the numbers. This can complement a durability study

- UMSP should understand the nature of data being used within the system-DHIS2 will create the dashboard that can be customized and pushed downwards to the health facility for direct entry

- UMSP has developed a model backed up by the precede model. To change behavior, you must know predisposing factors-training people, enabling factors, social science-tools you need to change behavior-reinforcing factors-e.g. feedback. UMSP is not interfering with DHIS 2 but improving the quality of the data at health facility level with more rigor-Deeper analysis of data using available expertise. The quality of data that can feed into malaria control. That brings in weather, GPS, beyond the monitoring systems, entomological measurements-knowing the behavior of mosquitoes, species change etc. -HMIS much bigger than UMSP-We can bring a lot on table

Recommendation/Action

- Other methods of surveillance like environmental and behavioural surveillance are not straight forward, but need to be considered.
- As a country we need to map what the different stakeholders are doing and how they can improve the system. We need to ensure that the surveillance pieces are complementary. Different partners are doing so many things on surveillance- Improving quality of data- Improving diagnostics-there is need for a holistic approach
- How can we come up with a composite variable that will enable the district come up with measure for the district? For example, how much of the diagnostics are you using, how much do you adhere to the results, how are we documenting/recording deaths? Indicators may include the following; 1) testing rate; 2) treatment-how many were treated this month, 3) Treated negative-those treated but are negative OR 1) Number with fever, 2) number treated appropriately, 3) presumptive treatment

Day 1: Session 3 (Session Chair-Dr. Gloria Sebikaari)

UMSP Malaria Reference Centers (MRC) Model- Dr. Arthur Mpimbaza

- Malaria surveillance was established in 1997-2001-as the East Africa Network for Monitoring Anti-Malarial Treatment (EANMAT) which discovered Apac EIR=1500 infective bites/person/year
- 2001-2006-UMSP & NMCP developed
- Surveillance has grown from presumptive treatment to diagnosis before treatment
- Benefits/outputs of sentinel site surveillance- Testing proportions increased from less than 50% to 100%
- Not treating negative slides still requires attitude change
- Challenges: The initial parallel system UMSP had set up at the sentinel sites was dependent on the case record form without which, it would collapse, inadequate staff in key departments-the lab and Records, High running costs.
- MOH adopted recommendations in the case record form showing individuals diagnosed and treated for malaria-After policy change
- The current MRC Model is embedded in HMIS, has high testing rates, automated generation of HMIS report.
- MRCs have limited geographical coverage-more breadth than depth and are threatened by RDT stock outs
- A trip to Otuke and Bugiri trip is being organized and funded by ABT associates to investigate the low impact of IRS in these

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Question: How do you deal with unique identifiers, do you have referrals, how are you integrating the reports from MRCs
Response: UMSP is working with the normal HMIS report and directly linked to DHIS2

Question: Have you done any quality control with RDTs with microscopy as the standard?
Response: There is no system in place for quality control of RDTs-basic checks were done

Comment: HMIS has real time data capture with dashboards that can be generated daily to see how they link to DHIS2. This has improved worker attitudes exemplified by; health workers coming on time at each service point, increased team work, reduced waiting time for each patient, and no shortcuts given that the system is linked to all service points, reception, nurse, lab, clinician and pharmacy.
Comment: Real time data entry is something that we have thought about. MRCs duplicate the register in electronic format for efficient submission.
Comment: In DHIS2 you do data validation but what do you measure that against? You need the primary source to validate the data. Individual records are useful for validation. Real time data capture has challenges of having staff on site to capture the data real time.
Comment: There is information that doesn't go through DHIS2, that UMSP has presented here (e.g. monthly confirmed cases treated) which are not in DHIS2. There is need for more engagement with UMSP/NMCP
Comment: Making surveillance more relevant will require linking UMSP to DHIS2, developing alert systems upon reaching certain thresholds
Comment: UMSP should fast track its data into DHIS2; MTRACK (mobile track) submits data using a phone-can also be used
Comment: UMSP focuses on the nitty-gritty of getting high quality data-in Malaria and doesn't interfere with DHIS2.

Question: Is the information captured at the MRC site as good as the routine?
Response: MRCs don't replace routine reporting but increase emphasis. You don't need 100% accuracy to make decisions therefore MRCs should not replace the routine.
Response: UMSP is collecting all the information required all in the outpatient register not just malaria. The denominator is all patients.

Comment: In ideal situations there would be no need for MRC's. These in no way MRCs can replace routine reports. MRCs submit the standard information, however they also do certain things with emphasis and provide us with the opportunity to see what to expect when reporting is done well. These sites have a section on malaria that is done well. Is there an opportunity to link information from MRCs with the HMIS?

Comment: UMSP has retrospective data entry in Walukuba.
Response: We are now using the registry-that was the old system
Comment: New information from UMSP on HMIS should be communicated to NMCP. The Otuke example shows data in action, UMSP is an exceptional example of what PMI/CDC wanted to do with getting quality data. It has to exist without incentives

> **Comment:** Tracking interventions-We need to think of models that are responsive to the environments that we are in.

Closing Remarks - Prof. Moses

Thanks for the discussions. The malaria situation in Uganda, is still very alarming-even when we have achieved control we get resurgence in some areas, it's a fragile control. There is need to understand how malaria can be controlled. Continue the discussions to define how malaria can be controlled. Before spraying, children in Tororo had 5 episodes per year. We should relate what we do to malaria control. Our ultimate aim is that children don't die from malaria, or spend more time out of school.

UMSP Retreat-Day two (13th January 2017)

Recap of Day 1-Prof. Moses Kamya

- Summary of presentations given and discussions held on Day 1
- Need for understanding vector behavior after interventions have been rolled out

Day 2: Session 1 (Session Chair-Dr. Ann Gasasira)

Strength, Limitations and opportunities of Malaria Research Centers (MRCs)-Arthur

Strength

How MRCs can support UMSP

- Validation of data to improve quality
- Provides more information but needs to be shared adequately
- Follow trends on impact of interventions
- Entomological surveillance across the sites
- Population based studies are done periodically, but MRCs can help in modelling to give us picture at the community level in between surveys
- Provide in depth elaborate data that is well accessed
- MRCs provide high quality data that is complimentary
- Add on data beyond TPR (entomology, immunology, parasite resistance, insecticide resistance)

- PRISM will carry out surveillance for drug and insecticide resistance at 10 surveillance sites across Uganda. This information should be made accessible to NMCP. IDRC will need to harmonize work across different projects to ensure that a more holistic picture of surveillance data is presented to NMCP
- Individual data to adjust for factors that affect TPR
- We have over 3million data points in the database. This data should be accessible to others to study/investigate more about changes in trends in a certain area. This may help us determine whether there are other sources of bias. We need to ensure that the groups get together periodically and look at the data
- Build capacity for other sophisticated analysis like time series
- We need to move into Real Time Data entry using tablet computers
- Higher level training for members of NMCP/MoH to manipulate the data. Fogarty International Centre (FIC) training grants can be expanded to include capacity building training for MOH/NMCP teams
- Support the MRCs where we are to report data into the DHIS. This can be explored further so that data reporting is electronic and real time, however there is need for further debate with the MoH resource centre. QC measures like checks are needed. It aggregates immediately, gives data real time
- Electronic system needs to be interoperable. Digital systems available include; FIONET Electronic system and Electronic app developed by PACE
- Tracing patients who get recurrent malaria
- Microscopy validity of RDTs
- Use of finger print technology for unique identifiers at the HF level. This may give us the opportunity to have longitudinal data for an individual
- We need to think beyond health facility surveillance into other things like spatial surveillance given that heterogeneity needs to be studied further. As transmission goes down malaria becomes more focal and targeting malaria interventions becomes more attractive. We need adaptive surveillance to make decisions.
- We need to look closer into the data that we have to do some spatial mapping; where are cases coming from? Which villages? This is an opportunity that is readily available
- Heterogeneity and risk mapping is where surveillance is going. This will be of interest to many global players including ALMA…As we look towards eliminating malaria by 2030 from 47 countries we need to switch focus to include this.
- What form of surveillance do you leave as you scale back interventions e.g. stopping spraying in Eastern Uganda (Surveillance as part of the IRS Exit strategy)? This would enable us to target our IRS to certain specific foci. This should be linked to interventions and the capacity to elicit interventions. Watching cases at the HF will not give us the picture. In Tororo incidence of malaria is very low given IRS, however when cross sectional surveys are done up to 20% of the children have parasites. This may explain why malaria came back when spraying was withdrawn in the North

- Is there a role doing cross sectional surveys as art of surveillance given that these people are in the community with malaria parasites and may not visit the HF.? Unfortunately, these are expensive
- Other scholars are considering adding testing mothers at ANC visits
- Could we consider testing schoolchildren? This could be tagged to school bed net distribution
- Surveillance in areas that are low prevalence. We need to agree on the form of surveillance.
- For thoughts by NMCP- Screening households to improve households ....Old nets can be cut and sewn to block off eaves.
- Use risk map to assess criteria for new MRCs-Oversample areas where interventions are happening.
- We need to evaluate the contribution made by sentinel sites to malaria control. If they were not there would it matter?
- Sentinel sites address the data quality problem from Routine surveillance sites and provide a bench mark for their evaluation since decisions concerning malaria control are based on this data. For example: The Otuke problem; where a limited impact of IRS has been observed was highlighted from sentinel site data
- NMCP needs more information from UMSP surveillance other than test positivity rates. This could be shared in the M&E Technical working group
- How can we link entomological surveillance to the sentinel sites/epidemiological surveillance?
- MRCs are providing data to follow trends, mapping interventions, providing confidence in the data collected, intervention evaluation and effect
- MRCs provide valid data for overview in between community surveys; quality testing practices and recording. They should be linked to DHIS2 and used to validate DHIS2 data
- UMSP is providing a lot of in-depth analysis of data as an easy and quick access point for elaborate analysis of these data.
- MRCs are the gold standard to routine surveillance and act as a mirror for the routine centers.
- MRCs collect data beyond mobility and mortality and provide a better outlook of the malaria situation beyond test positivity rates. There is more data that can be collected.
- How can we look at this data differently?
- In the long term the PRISM model for surveillance looking at different aspects of malaria such as vector transmission, epidemiology, entomological surveillance, molecular work, immunology-can be used for UMSP surveillance
- In context of current agenda; it's important to work within existing systems and complementing them for sustainability. Serving the needs of HMIS, strengthening it, adding more value and addressing the surveillance needs of the Ministry.
- Tapping into the extra expertise and opportunities available within IDRC can enhance UMSP and NMCP surveillance
- Since the PRISM project was built on UMSP, there should be a linkage between the two as opposed to viewing them as separate projects

- Relevance of MRCs-e.g. in Northern Uganda-Data presented from MRCs provides checks and balances to routine surveillance, with high quality and increased productivity as an early warning system.
- Surveillance has shifted from poor data to laboratory confirmed data addressing the same metric and it's the only longitudinal data set we have because surveys are done infrequently. It's therefore a rich source of information. UMSP for example has approx. 3.5million records in the data base/data points that are not being fully utilized to understand malaria epidemiology as well as understanding non-malaria febrile illness.
- We should, have a public access website, drilling down into the data and providing platforms to assess whether these are real trends and to also increase productivity from the data set
- Since UMSP is dealing with individual data; sophisticated analysis such as time series analysis can be done with this dataset.
- Technology should be embraced through the use of tablet computers for real time data entry providing a reliable and cost effective alternative to paper based forms using books. MRCs are resource centers that can be used pilot the use of tablet computers for data entry.
- UMSP data can be used for mapping of positive cases as malaria endemicity reduces.
- Improving, timeliness, access and completeness of HMIS data can be promoted by having the data entry occurring at the health facility instead first sending it to the district. HMIS/DHIS2 will enable the health facility staff to see their dash boards and promote utilization of the data. UMSP should liaise with the districts to train health facility staff on DHIS2 and provide access to them
- UMSP has computers available at the reference centers however there are reservations about doing away with the paper based data collection tools. Electronic data entry should be piloted first at the reference centers
- Does piloting electronic data entry affect the routine surveillance system?
- Response from NMCP: Digital devices have several advantages such as inbuilt quality control, real time data collection, and immediate aggregation of data. Other disease programs like HIV are already using electronic data entry. MOH has digitalized the activities of Village Health Teams; therefore, adapting this technology for health workers will be much easier. (Fionet design technology is being used eHealth-it can read the results of an RDT and check of practice of giving antimalarial to negative RDT results). There is an application (App) which has been developed by PACE and now incorporated into DHIS2
- Question: Do reference centers trace individual data?
- Response: there are no unique identifiers for patients-so it's currently not possible to track individual patients-MOH thinking of providing unique identifiers for patients
- Regarding the unique Identifiers-Using finger print technology-can strengthen UMSP surveillance as a unique identifier.
- There is commitment at all levels including prioritization from government funding related to action on malaria
- Since health facility based surveillance is the only source of longitudinal data available, it can be used to assess the impact of interventions. As malaria transmission decreases,

heterogeneity increases dramatically and as malaria goes down it becomes more focal making targeted interventions more attractive.

- Spatial mapping skills are required to develop risk maps; identifying epidemic prone areas, hot spots and use of surveillance as an intervention. Surveillance should be customized to country level indicators.
- As malaria becomes highly focalized especially in areas of IRS, guidance from surveillance systems becomes increasingly pertinent.
- Malaria risk mapping is necessary to understand the opportunities available
- Can you add a behavior component to surveillance?
- There is an opportunity with the PBO Net study that will be conducted in 104 Health sub districts with an expected 10,000 data points, baseline surveys will be conducted at 6, 12 and 18 months, Dried Blood Spots will also be collected. This study can be seen as a surveillance activity
- With reference to funding opportunities-UMSP presence is heavily concentrated in the North and lightly in the East. However, UMSP should explore funding opportunities with inclusion of the rest of the country.
- Current UMSP representativeness is guided by where control interventions are happening.
- UMSP could invest more in areas where interventions are happening, and also maintain its presence in other endemic areas
- WHO-plans to do some work for surveillance and UMSP received WHO funding to maintain the current sites
- Surveillance programs should take advantages of Global fund opportunities
  - Global fund opportunities are tailored for Action and investment for defeating malaria (AIM)-Surveillance, M&E have a component in this-but the framework is not clear-on how the surveillance will be done. There is need to crystalize surveillance plans

Day 2: Session 2 (Session Chair-Dr. Jimmy Opigo)

Strategies to achieve desired surveillance model-

Question: What are the implications of this new approach? How will IDRC/UMSP organize itself? Who will do what? Timely data—how will it be done? In what frequency? How do we envisage this new approach to operate? Which changes will need adjustments? Where will the emphasis be? Change strategies? A number of things will change to fit the model.

- Making UMSP surveillance data publically available is an important tool for increasing visibility and output from the data. No identifying information should be included. It should be a user interactive website, showing trends, maps, downloads. IDRC has collaboration with University of Pennsylvania that has developed a similar website called UPATHDB. We could share with them for development purposes. Making the data public removes the barrier of sharing information and reports

- Information generated should be used for action. It should be readily available and interactive possibly through a portal with dashboards for information sharing.
- Aggregated data is obtained from registers and UMSP has done a good job in backing up these registers to avoid stock outs. It's important to empower the clinical officers and nurses other than just the records person
- Information communicated to the district health officers concerning HMIS/data feedback does not trickle down to the records person or health workers at the lower health facility in some cases.
- The packaging of our feedback should be related to practice, use of anti-malarials, anti-biotics, not just alarms on malaria but should be aimed at influencing change.
- Front line workers namely: Nurses, Clinical officers and records officers should be targeted for training. The training will have the same HMIS objectives, including interpretation and analysis. Training should be more frequent and feedback should be timely. The data collected should be used to empower the health facility.
- Localized information use should be encouraged focusing on a given set of things that we want to change, approaches and arrangement.
- Clinicians need updated training on clinical guidelines and data use to identify malaria hot spots
- For a more responsive UMSP, there's need to engage the districts where the MRCs are located. Put a human face to the data through interfacing when there are significant findings.
- Incentivize data quality by promoting data use practices. MRCs can facilitate this process
- UMSP should continue giving support as well as use the MRCs as centers of excellence for other neighboring districts. The MRCs should build capacity.
- UMSP should strengthen its collaboration with NMCP through providing full access to the data
- The technical working groups should be used as a forum for data sharing
- The information should be packaged in a suitable format for those who make the decisions
- There maybe need for rotation and/or expansion of UMSP- However the magnitude, urgency for expansion, intensity-roadmap, phase in and phase out needs to be determined.
- PRISM/UMSP Marriage should be encouraged because the two projects are inter-dependent. Surveillance provides a bird's eye view for what is happening in Uganda and PRISM has 7year funding for in-depth malaria research.
- Before UMSP took up the sites EANMAT used to do parasite surveillance, entomological surveillance which UMSP should consider
- PMI supports entomological surveillance with Abt is it an issue of data sharing? Are these entomological monitoring linked to the MRC centers?
- The challenge with entomological monitoring is that it's not representative. It is therefore difficult to match entomological data with malaria morbidity data. How do you

match decrease in vector density to morbidity? How much has the vector contributed to the reduction of malaria? entomological monitoring beyond insecticide resistance

- MOH is in the process of hiring a consultant to identity the level of effort from different partners in the field of surveillance, and who is doing what and where they are in the country
- Understanding malaria mortality requires community surveillance. Test Positivity Rates need to be backed up by community surveys or demographic surveys. This is an exploration area for UMSP
- MOH can consider using low birth weight as a metric to measure the impact of an intervention
- Saving mothers giving life group have a strong community surveillance. Keeping track of deaths outside facilities-an opportunity that UMSP could exploit.
- IDRC is an excellent organization that can put more than context to our data and give it a global perspective, providing useful information that could serve as a guide for NMCP. Evidence based information such as policy briefs, advocacy papers, providing what's new and exciting in malaria, transmission and what's happening on vaccines.
- IDRC is likely to have a dissemination meeting in July/Aug 2017. However, we can also use the M&E technical working group to discuss of some findings from somewhere-some synthesis of new knowledge, making the M&E technical working groups more productive

What do we mean when we see a UMSP that is more responsive?

District, Health centres level
- Provide a human face to the data, interface with the data users at the district level
- How do you build capacity of neighbouring districts? Can UMSP be a resource to build capacity of the neighbouring districts through validation meetings
- Decentralisation of surveillance
- MRCs can become a learning Hub for the surrounding facilities or for the facilities that are reporting through these facilities.
- We need to tease out how to operationalize this kind of cascade to surrounding HFs

At National/central level
- The data should be fully accessible
- Data validation meetings are needed and the findings need to be presented to the M&E TWG. UMSP contact needs to dedicate time for this
- How do you package the messages?

Expansion of UMSP
- We need longitudinal data and hence there is need of continuity of the current MRCs. We should use the terminology expansion to avoid loss of our gains. Each site produces valuable data even if it is very stable. We can shift attention with scaled down efforts at a certain HF as we focus attention to another site.

- Placement should give a national picture in response to the epidemiological zones as well as based on where interventions are being delivered country wide e.g. iCCM

<u>Providing knowledge to NMCP</u>
- Capacity building in leadership (Dissemination meetings, Information on what is good on malaria round the world, providing information on a more routine way, can we use the M&E TWG to disseminate/discuss new findings this can take the form of a journal club) How can we make the M&E

How do we interface with other projects like PRISM that are providing useful information?
- Tapping on the expertise from PRISM including membrane feeding assays, PRISM is now moving into Busia. For now, they can only support one site.
- Re-visit the EANMAT previously at these sites whilst tapping into PRISM
- PMI funds these activities through ABt, do we need more interface so that we remain with weather information and behavioural information
- Mortality data- How do we support enabling factors?
- Community surveillance
- TWG more interactive so that we go beyond updates

Central Message:
- In the short term we need to ensure increased interface between UMSP and NMCP
- UMSP should expand beyond the 21 MRCs taking into consideration areas with high impact interventions and the risk map. We need to look at scenarios, cost implications and which one is better
- UMSP will need to develop a concept containing the current discussions for action. In addition, an operational plan should be developed.
- There is a need to feed health facility data into DHIS2
- DHIS2-feeding should be a separate proposal
- We need to work very closely with MOH, MRCs are excellent but how does the MRC support the 'normal' routine sites- We need to interface the MRCs and what models we can use-cascading
- UMSP should also focus on surveillance of non malaria febrile illness. The issue of acute febrile illness should not be ignored. Investigating non-malaria febrile illnesses will assist in approximating the accurate burden of malaria, reduce wastage of resources in treating all fevers with antimalarials and provide evidence for not treating those with a negative slide with antimalarials and highlighting the challenge of non-malarial febrile illness. In Jinja for example AFI Surveillance is intervening in this attitude change.
- There is no focal person for non-malarial febrile illness in the MOH e.g. who do you go to if there is a salmonella outbreak?
- Data from Acute Febrile Illness (AFI) is being integrated into DHIS2. Linkage is important- The Global health agenda is moving into the direction of adults

- Infectious Diseases Institute (IDI) is widening their work on the Global security agenda-UMSP needs to interface with IDI and the Ministry on non-malaria febrile illnesses such as Salmonella which is currently being observed in some areas.

Closing remarks by Prof. Moses Kamya

IDRC needs to draft a concept that everyone can agree on
IDRC needs to share the data in an appropriate forum.
He appreciated all for taking the time to attend the meeting which had representation from MOH, WHO, ALMA, PMI, USAID and UMSP representation.

Meeting Adjourned 1:10pm on 13ᵗʰ January 2017