Case Management Working Group (RBM CMWG)
12th Annual Meeting, 22-25th August 2023
Holiday Inn Accra Airport, Accra, Ghana

Co-Chairs: Larry Barat & Noella Umulisa
Coordinator: Konstantina Boutsika
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Day 1

Session 1: Introductions, Objectives, Key Updates

Meeting Introduction:

Dr Noella Umulisa, PMI Impact Malaria/Jhpiego Rwanda, Co-Chair CMWG

Objectives of 12th RBM CMWG Annual Meeting:

- To provide updates on state of the art and hot topics in malaria case management.
- To convene country representatives and malaria partners to share experiences and evidence on best practices for improving malaria case management.

Opening Remarks from:

- Dr Peter Olumese, WHO Global Malaria Programme
- Dr Michael Charles, CEO, RBM Partnership to End Malaria (virtual)
- Hon. Dr Patrick Kuma-Aboagye, Director General, Ghana Health Service

Meeting Opening:

Hon. Dr. Patrick Kuma-Aboagye, Director General, Ghana Health Service

Welcome all Malaria Program representatives and partners to this CMWG meeting in Accra, Ghana. According to the 2021 World Malaria Report, the Africa Region contributes 90% of malaria cases and deaths globally, with 80% of these in children under 5. In Ghana, we have seen a slight increase in cases from 2020 due to the COVID-19 pandemic, but recovery to pre-pandemic numbers is almost certain. Case fatality rates have decreased by 50% since 2019. Ghana forges towards elimination. Our new 2024-2028 strategy will be incorporating post-discharge PMC, IPT in school children (IPTsc), and the scale up of vaccinations.

Progress towards Malaria Elimination in Ghana:

Dr Keziah Malm, NMEP, Ghana
Presentation: Click Here

Current Progress in Ghana

Between 2002-2022, there has been an 82% reduction in parasite prevalence and a 97.5% reduction in malaria deaths in all ages. Case fatality rate in children under 5 is now at 0.03%. Although malaria-related admissions increased due to the pandemic, we saw a 20% reduction in outpatient cases. Reduction in malaria parasite prevalence has decreased from 22.5% in 2011 to 8.6% in 2022. Due to this progress, there was a unanimous call by partners and stakeholders for Ghana to progress towards elimination. We therefore have a new strategic plan, the NMESP, for 2024-2028 where we aim to:

1. Reduce malaria mortality by 90% by 2028 (using 2022 as a baseline).
2. Reduce malaria incidence by 50% by 2028 (using 2022 as a baseline).
3. Eliminate malaria in 21 districts with very low burden malaria by 2028.

New Interventions in the NMESP 2024-2028 Strategic Plan

We will continue with our current interventions: IPTp, distribution of LLINs, LSM, SBC, entomological and epidemiological surveillance, research, quality case management and effective leadership at all levels. Our new interventions are stratified by zoning districts into very low burden (VLB) vs. moderate-to-high burden (MTH) districts. In VLB districts, we will start an MDA program, administer single low dose primaquine (SLDP), and enhance entomological and epidemiological surveillance. In MTH districts, we will expand IRS, SMC, vaccination, and administer post-discharge malaria chemoprevention (PDMC) and IPTsc. Our

rationale for IPTsc is that we observed a shift in epidemiology of malaria, where cases were increasing in children over the age of 5.

Role of Case Management in Elimination
We have updated policies and guidelines to continuously disseminate information and ensure adherence. Using SLDP in VLB districts, we can block transmission. Ghana has always had a multiple first-line (MFT) drug approach, as we do not want one drug to exert enough pressure to encourage resistance. Ghana is part of a consortium which will systematically introduce MFT in several countries.

Technical Updates from WHO Global Malaria Program:

Dr Peter Olumese, WHO GMP
Presentation: Click Here

Update to WHO Malaria Guidelines
In 2021, WHO changed the way guidelines are presented. Pre-2021, there were intervention-specific guidelines. Now, the guidelines have been consolidated in a single document, "the WHO Malaria Guidelines" available online here: https://www.who.int/publications/i/item/guidelines-for-malaria. The sections included are prevention, case management, elimination and prevention of re-introduction, and surveillance. This is a living guideline and will be continuously updated as evidence becomes available.

Pre-referral treatment with rectal artesunate: a Field Guide 2023
An implementation field guide is being developed by the WHO to help support the deployment of pre referral treatment, particularly Rectal Artesunate (RAS) as pre-treatment of severe malaria. The expected publication date is by end September 2023.

Next Steps
- Strengthen all aspects of the cascade of care.
- Ensure support for adequate supply chain management and referral systems, address barriers to referral completion.
- Promote effective community sensitisation.

Update from RBC Partnership to End Malaria:

Dr Peter Olumese, Co-Chair CRSPC
Presentation: Click Here

RBM Partnership Board
There have been major structural changes of the RBM partnership board setup. Notably, it has moved to a constituency-based board, of which there are 9 country seats in total. 6 are for Africa, 2 for Asia, and 1 for Latin America and the Caribbean.

Upcoming Meetings
To address best practices for mitigating the impact of COVID-19 on malaria, there will be CRSPC sub-regional annual meetings, occurring 3-6th October 2023 for East and Southern Africa in Kampala, and 20-23 November 2023 for West and Central Africa in Abidjan, Côte d'Ivoire.

Question & Answer: Session 1

Peter Olumese, WHO, and Keziah Malm, Ghana

Adam Nothem, PMI Impact Malaria: To Peter, the CARAMAL Project revealed the importance of the continuum of care. At PMI Impact Malaria, we prefer the term "pre-referral intervention" over "pre-referral treatment" to ensure that caregivers and treatment providers are clear that IV/IM artesunate/RAS are interventions and an initial step before treatment. How do the WHO feel about this language use, and will there be any plans to adjust it?

Peter Olumese, WHO: There have been no discussion so far. We see treatment as an intervention. It's more important to effectively communicate what we are doing at a community-level.

Degu Mehari, Ethiopia: To Ghana, in your new strategy, you are deploying primaquine for low transmission areas only. Why not cover regions of higher transmission too? What are your criteria for classifying "low" vs. "high" transmission areas? When do you plan to eliminate malaria?

Keziah Malm, Ghana: Our decision to use primaquine in low-transmission areas was based on expert recommendations.

Peter Olumese, WHO: Primaquine for transmission blocking is for low and very-low transmission settings. WHO will be having a review at the end of the year where we discuss and investigate specific circumstances for primaquine use in other transmission settings.

Keziah Malm, Ghana: Difficult to say when we will eliminate because we are now starting our new 5-year phase! We used multiple indices to stratify regions into "low" vs. "moderate" vs. "high" transmission, including parasite prevalence and access to healthcare at the district-level.

Daouda N'Diaye, Guinea: To Ghana, how many years spanned the reduction of parasite prevalence from 27.5% to 8.5% in Ghana? Are these figures only from high endemic zones?

Keziah Malm, Ghana: The data are not homogenous across regions. We report the averages. The average parasite prevalence across Ghana in 2011 was 27.5%, and this reduced to 8.5% in 2022. In 2022, the range was between 2-15% when looking across all regions.

Anonymous, Online: To Peter, is there any practical guidance from the WHO on multiple first-line therapies for malaria? Are there countries that have implemented it? Is there any guidance for healthcare workers?

Peter Olumese, WHO: We don't have a recommendation or a definition of multiple first-line treatment. It is listed as one of the potential options to be explored in fight against antimalarial resistance. Countries should continue to focus on the effective deployment of antimalarials already in their in guidelines while these potential new options are properly evaluated.

Keziah Malm, Ghana: To give the experiences of Ghana, we initially had multiple drugs in use for first-line treatment of malaria. We had artesunate -amodiaquine (AS+AQ). We called it first-line alternatives. If patient didn't tolerate these, we give AL. We want to be more deliberate with the choice of drugs we send and where we send them.

Olusola Oresanya, Nigeria: To Ghana, do you have any plans to introduce Perennial Malaria Chemoprevention (PMC)? What are you using to cover children that are not eligible for Seasonal Malaria Chemoprevention (SMC)?

Keziah Malm, Ghana: For children not eligible for PMC, we give the malaria vaccine. We have considered PMC in the past but it is not an intervention which is implemented in Ghana currently. SMC is for 7 out of 16 regions in the country.

Peter Olumese, WHO: We don't have a specific strategy for PMC. We are looking at studies to try and define number of doses and cycles, unfortunately most ongoing deployment studies are not designed to answer these questions.

Prudence Hamade, Malaria Consortium: To Ghana, what strategies are you using to address the needs of very remote populations? Peter pointed out that access is one of the driving forces for malaria elimination. In Ghana, there are mobile populations crossing borders. Do you have strategies for cross-border movements, particularly with language barriers as Ghana is surrounded by French speaking countries?

Keziah Malm, Ghana: Local languages are the same in the villages along the Ghana-Togo border, for example. In the current strategic plan, we have emphasised cross-border initiatives and a harmonisation of SMC.

Daouda N'diaye, Guinea: To Ghana, what was the rationale of abandoning your 2021-2025 strategy and making your new 2024-2028 strategy? Couldn't it have been a subject of reflection and lessons learned?

Keziah Malm, Ghana: We changed our strategy because we are dynamic! We performed a mid-term review of our strategic plan and because it didn't have an elimination focus, we thought it was best to create a new strategic plan to include this.

Anonymous, Online: To Peter, you spoke about WHO making recommendations to move away from quinine. Is it because of side effects or effectiveness? I haven't seen any reports on quinine resistance.

Peter Olumese, WHO: We have evidence that quinine is actually deleterious in pregnancy. There is a 40% increase in negative pregnancy outcomes with quinine. Our recommendations reflect that there are drugs that are better options both in effectiveness and safety to quinine.

Session 2: Drug Resistance

Global Status of Drug Resistance:
Charlotte Rasmussen, WHO GMP, Diagnosis, Medicine, and Resistance Unit
Presentation: Click Here

Artemisinin Partial Resistance
Candidate markers for artemisinin partial resistance are available on the GMP website. Gold standard for monitoring drug efficacy is therapeutic efficacy studies (TES). WHO still recommends TES done in sentinel sites at least once every 2 years.

Resistance Situation in Africa

In early 2022, in a review conducted by experts, artemisinin partial resistance was confirmed in Rwanda, Uganda, Eritrea. However, there was a poor coverage of data. The spread looks different to that of the Greater Mekong Subregion in South East Asia. From the Horn of Africa, the K13 mutation R622I has been identified in Ethiopia, Eritrea, Sudan, and Somalia. Delayed parasite clearance associated with R622I has only been found in Eritrea. In Uganda, markers of artemisinin partial resistance are found in most samples, with differences distinguishing Northern and Southern Uganda. In Tanzania, a TES performed in 2022 identified a high proportion of R561H, evidencing artemisinin partial resistance. Treatment failure rate was <10%. *There is no confirmed partner drug resistance in Africa.*

Current Strategy
In November 2022, a strategy was launched to respond to antimalarial drug resistance with actions at the global, regional, and local level. There are 20 proposed interventions and four pillars in the strategy. We are continually working to update data available on malaria threat maps. WHO plans to convene a regional stakeholder meeting to align on intervention priorities to support countries responding to resistance. WHO plans to reconvene subregional networks of antimalarial drug resistance and surveillance.

Panel Discussion on Country Experiences with Responses to Drug Resistance:

Gerald Rukundo (Uganda), Regina Kandie (Kenya), Jules Mugabo (Rwanda)
Chair: Noella Umulisa, CMWG Co-Chair

Noella Umulisa, Jhpiego Rwanda: What is your country's current situation regarding drug resistance?

Gerald Rukundo, Uganda: Studies carried out between 2017-2020 revealed mutations associated with reduced parasite clearance in North and East Uganda. The districts where the mutations were identified were at the border. We need to evaluate further whether these are cross-border mutations. Therapeutic efficacy studies(TES) are therefore being carried out and results will be disseminated soon.

Regina Kandie, Kenya: There is a history of chloroquine resistance in Kenya. Between 2004-2014, samples were collected across African countries, and there were no mutations associated with Artemisinin Resistance . From 2020 to date, there are samples that have shown hotspots of mutations that we need to monitor this closely.

Jules Mugabo, Rwanda: Rwanda has documented the emergence of artemisinin partial resistance in 2 TES (2013- 2015, 2018). AL remains efficacious (above 95%).

Noella Umulisa, CMWG Co-chair: What is your country doing to respond to confirmed artemisinin partial resistance?

Gerald Rukundo, Uganda: We are continuing with TES and overseeing optimal use of diagnostics and antimalarials. Monitoring the quality of antimalarials on market. We have intensified our vector control measures in areas where we suspect resistance to minimize spread of drug resistance parasites.

Regina Kandie, Kenya: Like Uganda, Kenya has been conducting TES across the country for early detection and determining burden and spread. We have engaged partnership for technical assistance to conduct molecular studies. We perform quality checks on antimalarials administered through post-marker surveillance.

Jules Mugabo, Rwanda: In 2020, we revised our guidelines based on WHO recommendations. Dihydroartemisinin Piperaquine (DHA-PPQ) has been introduced as the second line treatment for uncomplicated malaria . Currently, the NMCP is discussing how to introduce multiple first-line options to mitigate resistance. We are trying to promote rational use of diagnostics and drugs. CHWs have been trained to ensure they understand how to correctly prescribe antimalarials. Home visits are also being conducted by CHWs to ensure patients are taking medicine correctly. The NMCP is also performing quality control of diagnostics and drugs. We are strengthening laboratory networks and now have the capacity to perform molecular surveillance in-country. We are coupling health facility surveys with molecular surveillance. Finally, we are adapting our Malaria Indicator Survey which is planned to be conducted in October-December 2023 to include molecular surveillance.

Noella Umulisa, CMWG Co-Chair : What are the main challenges you have faced in your country when it comes to responding to drug resistance?

Regina Kandie, Kenya: Retrieval of molecular data is slow and standardisation of procedures according to WHO protocols is poor. We lack a formal drug resistance strategy and capacity. We hope to use genomic data to inform decision making.

Jules Mugabo, Rwanda: The NMCP introduced DHA-PPQ, which was never actually used due to procurement issues. Suppliers are not interested in giving small quantities, as we only use it for specific cases. There are delays in implementing TES. Previously, we implemented TES in 6 months, now it has taken 3 years due to decrease of malaria cases. We share borders with DRC, Tanzania, and Uganda, which are high burden. We need to strengthen cross-border collaboration to ensure synchronised and coordinated responses.

Gerald Rukundo, Uganda: We share the same challenges as Kenya and Rwanda. I wish to add that we have low coverage of surveillance systems on efficacy and resistance. We are mainly focusing in East and North part of the country considering they areas with high malaria transmission and have the mutations associated with reduced parasite clearance. We also lack adequate funding to increase sites for TES.

Question & Answer: Session 2

Gerald Rukendo (Uganda), Regina Kandie (Kenya), Jules Mugabo (Rwanda)
Chair: Noella Umulisa, CMWG Co-Chair

Olugbenga Mokuolu, USA: To Rwanda, have you officially adopted an elimination mode? Several of the guidelines you described are written within a control context. What are you planning to do with prevalence dropping? Are you adopting a new strategy?

Jules Mugabo, Rwanda: We are observing a steady decline of malaria incidence from 2017 to date. We are still in control phase. We hope in the future (next few years), we will move towards elimination.

Noella Umulisa, Jhpiego Rwanda: In 2012-2017, Rwanda implemented pre-elimination in certain districts. We didn't have all the means to push a pre-elimination agenda, so we moved back to control. We now want to ensure that we are sustaining interventions in all districts appropriately, and then we can think about elimination. .

Olugbenga Mokuolu, USA: To Uganda, to what extent are you able to address the high consumption of artesunate injection that is used frequently in treatment of uncomplicated malaria in many settings as part of the measures towards addressing resistance? AND

Felicia Amoo-Sakyi, Ghana: To Uganda, beyond increased consumption of artesunate injections, are there any drivers of resistance you have identified in country?

Gerald Rukundo, Uganda: In some rural health facilities, particularly in the private sector, we recently found out that there was a misuse of artesunate. It was being used to treat non-severe forms of malaria. We have since developed guidelines no proper usage of artesunate. We also routinely engage private sector to follow national treatment guidelines.

Olugbenga Mokuolu, USA: To Charlotte, to what extent are you able to access TES from local contexts, as opposed to just what has been published in a journal?

Charlotte Rasmussen, WHO GMP: Where we are directly involved with the TES, we get access to locally acquired data. We have threat maps, and we are launching a new threat map that shows ongoing plan studies that will be shared with country officers. We are planning surveillance meetings where we can discuss key gaps in data availability and help in planning.

Busiku Hamainza, Zambia: To Charlotte, when we look at the review, one of the findings was that there was not enough geographical representation for TES data. What is enough in terms of representation at the country-level? Secondly, can we combine TES with *hrp2/3* gene deletion surveillance?

Charlotte Rasmussen, WHO GMP: Our current recommendation is to establish 4-6 sentinel sites per country, and have a study at minimum, every 2 years. We are starting to ask countries to also look at hrp2/3 deletions using the samples obtained when conducting TES. However, the samples collected for TES are not obtained in a way to get enough information on hrp2/3 deletion prevalence. Therefore,hrp2/3 deletion surveillance cannot be replaced with TES, but it could be important additional information.

Prudence Hamade, Malaria Consortium: To all, especially Rwanda, could donors like PMI support South-South visits, such as from Rwanda to Cambodia? Cambodia and the GMS encountered problems with TES, so they followed-up every patient who presented with *P. falciparum* malaria was followed-up.

Standeur Kaly, Senegal: What do you (all) think of the triple therapy AL + proguanil for antimalarial drug resistance?

Olugbenga Mokuolu, USA: The ongoing Deploying Triple ACTs (DeTACT) Study is a four-arm study that looks at the efficacy, safety, and tolerability of two ACT combinations coupled with an additional existing antimalarial drug. As the study is still ongoing, we are not yet able to make a statement on triple therapies. However, there is some evidence that has already shown that using a triple ACT reduces treatment failure rate.

Anonymous, Online: Is resistance research currently being carried out annually in these 3 countries? If so, which partners support them?

All: In Uganda, Rwanda, and Kenya, TES studies are being supported by PMI.

Open Floor:

Olugbenga Mokuolu, Nigeria: There is poor data quality in many countries that doesn't correctly reflect disease burden. Nigeria is yet to be mentioned and yet it has 30% of malaria

burden in Africa. Fortunately, it has a national malaria repository where all the data are deposited. Countries need to be open to help when neighbouring ones have unique problems needing to be addressed. Some countries are perpetually stranded on some issues e.g., on IRS.

Karen Barnes, SA MEC: Our focus is in Southern and East Africa, working through the Great Lakes Malaria Initiative and Southern African Development Community. We aim to expedite sharing of synthesis of data on resistance, and a parallel stream of global evidence of potential solutions that can be locally adapted to our regions. We have tools and resources we hope can be used to disseminate information. We have a programme that can help evaluate the uptake and utility of these resources. Reach out to me if you want to get involved and work with us!

Session 3: HRP2/3 Deletions, Program Implications, & Response

Global Response to HRP2/3 Deletions

Deus Ishengoma, MESA
Presentation: Click Here

Hrp2 Deletions
WHO has issued guidance on how to investigate suspected false-negative RDT results and is encouraging a harmonised approach to mapping HRP2/HRP3 deletions. Updated versions will be released by September 2023 and will be discussed at ASTMH (10th October 2023).

Community of Practice (CoP)
We set up a CoP (https://mesamalaria.org/resource-hub/community-practice-pfhrp23-gene-deletions) to mobilise and provide peer and technical support on *pfhrp2/3* deletions. This was launched in March 2023. In June 2023, the first event had >360 registrants spanning 70 countries. At the CoP MESA Forum in June, Uganda presented how they implemented national surveys and the challenges encountered. We have compiled a list of resources we encourage you to visit, including joining the CoP (https://ow.ly/iMsy50OY4wJ).

Panel Discussion on Responses to HRP2/3 Deletions:

Degu Mehari (Ethiopia) and Samatar Kayad Guelleh (Djibouti)
Chair: Peter Olumese, WHO

Peter Olumese, WHO: What is the situation in your country regarding HRP2/3 deletions and your response to it?

Degu Mehari, Ethiopia: A study performed in different parts of the country revealed mutation prevalence is up to 14.9% across different regions. Once we detected hrp2/3 deletions, we collaborated with policy makers, applying an evidence-based approach, and changed to a non-hrp based RDT for use in 2 hrp2/3 deletion high prevalence regions: Amhara and Gambella. Tigray was excluded due to conflict in the region. We procured 5000 non-hrp2 based RDTs for use in those regions. The test has 75% panel detection score.

Samatar Guelleh, Djibouti: In Djibouti, hrp2 deletions are at extremely high prevalence, of around 85-86%. We sought the support of the WHO and the CDC to change our RDT in 2021, and now use a pLDH-based RDT instead. However, this test is more expensive, and so we had to make some adjustments to support its use. We are now strengthening the capacity of lab technicians so that we can emphasise microscopy and therefore have a secondary method of diagnosis. We have a pool of trainers who were trained at the WHO and are

involved in monitoring of deletions. People have lost their trust in health facilities due to misdiagnoses, so the media and doctors have been speaking to the community to inform them about these deletions and thus regain their trust.

Peter Olumese, WHO: It is great that you sought to regain the trust of your communities. At what point did you decide to change RDT? Were these RDT changes implemented regionally or nationally?

Degu Mehari, Ethiopia: In Ethiopia, our studies investigating the deletions took quite a long time as transmission is unstable. Once we obtained results, we had discussions and concluded that we needed to change RDT. Initially, we prioritised regions with high prevalence of deletions. After 1 year, we hope to have a national roll-out, supported by PMI and Global Fund. We only use one type of non-hrp2 based RDT to detect *falciparum* and *vivax* malaria, because of operational demands and cost implications.

Olusola Oresanya, Nigeria: To Deus, how do you decide whether to move from project mode to surveillance? How are you integrating surveillance, so that you are not just in "project mode"? Is it integrated into TES, or is it stand-alone?

Deus Ishengoma, MESA: Surveys are in project mode based on everywhere I have knowledge of. As the problem is still new, not many countries have undertaken nationwide surveys. We are therefore providing technical and peer support so they can do so. In countries where we have done studies, such as in Tanzania, the magnitude and demand for national surveillance is overwhelming. In Tanzania, surveys were performed in project-mode from the research and NMCP communities. As the nationwide survey is too expensive, we recommended they do not repeat the study, but focus on higher prevalence areas. We recommend that countries at least perform a baseline study. We have not integrated hrp2 deletion surveillance in other studies in Tanzania because they utilise different protocols.

Germaine Ekoyol, Cameroon: With these deletions, shouldn't we try and improve the quality of microscopy, particularly as it's been the gold standard? In Cameroon, we wanted to deploy a pf/pan RDT , but the funders declined because it was too expensive. What can we do in these cases?

Deus Ishengoma, MESA: We are happy to support countries to know the status of hrp2 deletions, so that, when they are forced to make a change to RDTs, the funders can also see the dangers if the country does not make a change.

Olugbenga Mokuolu, Nigeria: In a place like Djibouti or Ethiopia, was the HRP2 deletion rate increasing, or was just a discovery? Have you noticed any patterns which may be useful for other countries?

To share the experience of Nigeria, we had a national survey on HIV, which was supported by several partners. We took that opportunity to have a sub-population of the samples that were taken to detect hrp2 deletions in samples that were malaria positive. We recorded a deletion prevalence of less than 2%. This calls for a better understanding of the drivers and determinants of hrp2 deletions to help us see patterns emerging and therefore guide the way some of our recommendations are made.

WHO made a call for studies on hrp2 statuses in different countries. In view of the scale of hrp2 deletions in the Horn of Africa, shouldn't surveillance be expanded to other countries?

Larry Barat, PMI Impact Malaria/PSI: There are very few alternatives to hrp2 RDTs for detecting *falciparum* malaria (i.e., non-HRP2 based RDTs). The sensitivity of these tests is much lower than the hrp2-based RDTs, so our panellists didn't make the decision to change RDT lightly.

There has been a survey in DRC that found hrp2 deletions solely in asymptomatic people. There is therefore no doubt that hrp2 deletions are circulating across Sub-Saharan Africa. HRP2 deletions are being seen in Latin America and Horn of Africa which are low prevalence areas, characterised by low multiplicity infections. We do not want to abandon what is a much better test unless there is a strong reason to do so.

Day 2

Session 4: Visit to Shai Osudoku District Hospital

Dr Kennedy Brightson, Medical Superintendent SODH

Shai Osudoku District Hospital (https://www.sodhospital.org)
Shai Osudoku is a small district of ~110,000 people but has 30% of the services for the entire region. The population is mainly farmers and traders. There are 39 facilities in the district, of which 22 offer malaria case management. Interventions so far include distribution of ITNs (free for pregnant women and children) so every household has at least 2 bed nets, IPTp-SP, and larval source management and IRS. Beyond that, there is surveillance, M&E, procurement and supply chain management, and SBCC. For testing, we perform microscopy and RDTs. Some facilities do both. We have 5 health centres, of which 2 perform both, and the the rest use RDTs. There are OPD services 24/7. The hospitals handle complicated cases. All facilities stock antimalarials and ACTs. The NMEP continuously supplies the hospital with RDTs.

SODH History
The hospital began as a health post, but after 15 years, we saw a need to increase the scope of healthcare. In 2009, it was upgraded from a Health Centre to a District Hospital. We currently have >140 beds, >10 wards, and 2 operating theatres. Because of our facilities, we serve patients spanning 4 districts. We won an award as the best hospital in malaria case management in 2012. In 2014, we became a sentinel site, in collaboration with the NMEP. Our strategy now is to prioritise RDTs to reduce waiting times for patients.

Hospital Mission:
- To provide quality health care services responsive to the needs of all manner of people living in the district and its environs
- To implement approved health sector policies and prudently manage all resources available for the provision of services.
- To provide a conducive environment for all categories of staff to offer their best to clients.

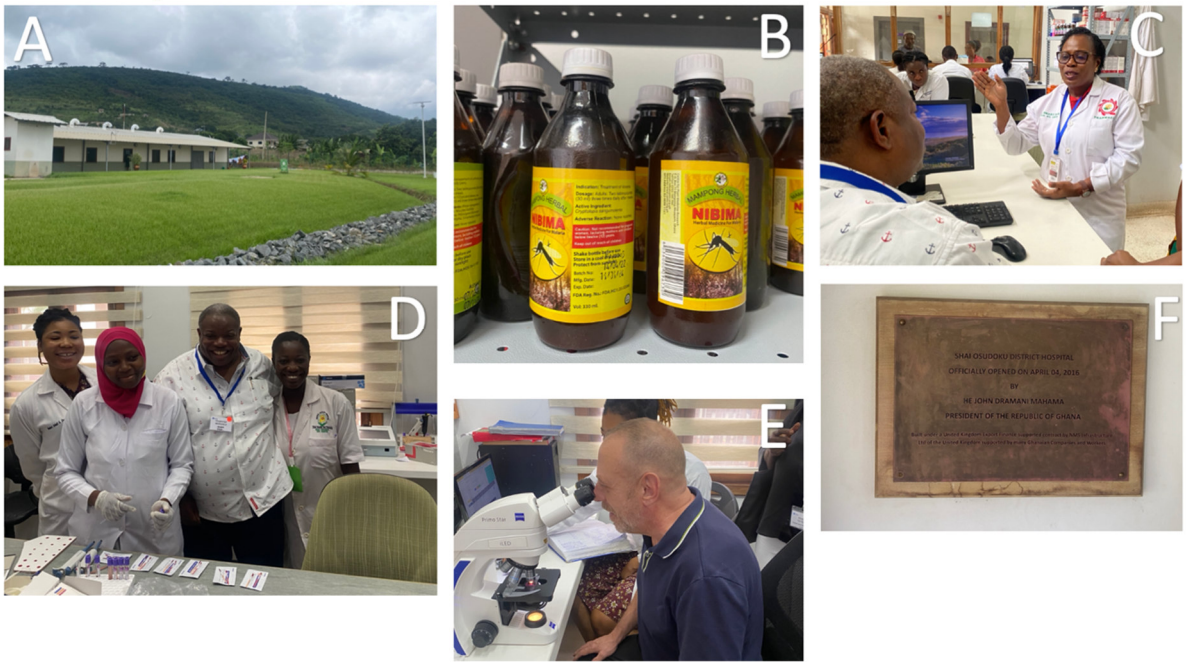
Some Indicators
- Malaria is in the 3rd most common disease of all treated at the hospital.
    - Last year, it was at 11%, this year, 9%.
    - Cases tested per 1000 population is decreasing.
- MiP
    - There is a correlation between IPTp-3 and malaria cases: when more women take up to IPTp-3, there are less malaria cases.
    - However, we have had stockouts of SP, and when this occurs, we encourage women to buy in the community.

- Admissions vs. Deaths
    - Over the past 2 years, the volume of malaria cases we receive is decreasing.

Referrals and Data Management
Cases are referred by CHPS to the health centre. Referrals are done with a form and there is a feedback cascade. All facilities at all levels have a combination of reports and there is data entry on the district health information database. It runs from the facility to sub-district level, district level, regional and national levels. At every point in time, a responsible from the regional and national level can see the data from every facility at every level. There is therefore a vertical chain of feedback. Validation is performed to ensure that data is being compiled correctly.

Onsite Training and Supportive Supervision
OTSS is enforced at the national level, where case management of malaria is observed. Where there are gaps in the facility, an action plan is put together, and then subsequently, measures are discussed and put in place to ensure improvement. We have decided to focus on the integration of malaria case management into other supportive supervisions because over the years, we have lacked funding to perform OTSS. There is refresher training and cross-hospital workshops within the region for capacity-building.

Photo Gallery



A) The view of the SODH grounds from the paediatric ward. B) *Nibima*, developed in Ghana, and found in the SODH pharmacy, is an antimalarial offered as a treatment to those seeking herbal medicines. At the herbal medicine department, we were shown a malaria case successfully treated in a woman who took *Nibima*. C) Olugbenga Mokuolu discussing *Nibima*'s place amongst orthodox medicines with the head of the SODH Pharmacy. We also discussed the subsidised costs of antimalarials for patients. D) Olugbenga Mokuolu with the microscopists and laboratory scientists in the lab at SODH. E) Larry Barat looking at some *P. falciparum* parasites from a SODH patient under the microscope. F) SODH being officially upgraded to a district hospital in 2016 by the President of Ghana.

Session 5: Quality Improvement of Malaria Case Management

Outreach, Training, and Supportive Supervision (OTSS)

Larry Barat (PM Impact Malaria/PSII)
Presentation: Click Here

OTSS

OTSS is a comprehensive quality improvement approach based on supportive supervision. It differs from prior supervision, which was more about audit and facility inventory. This supervision also used competency-based checklists to look at the procedures and determine whether they align with national policies and guidelines. It has been implemented in West, Central, East, and South Africa. Except for Ghana and large parts of Zambia, most countries have not been able to scale this up to a national level.

Cast Study: Niger

The data presented here are from a manuscript that will be presented at ASTMH and as a supplement in the American Journal of Tropical Medicine. In Niger, OTSS is implemented in Dosso and Dahoa regions. Between round 1 and round 4, we saw a 6-point increase for the score in using and reading mRDTS, a 17-point increase in classifying cases as uncomplicated or severe, and a 13-point increase in managing patients with uncomplicated malaria. Adherence to negative mRDTs was strong before the project. Competency scores in other areas progressively improved. For example, for MiP, we saw improvements in both the prevention of malaria and management of malaria cases in pregnant women. In addition, there were improvements in the number of facilities having appropriate guidelines and tools and having at least half of their staff having received malaria training.

Community-Level Quality Improvement: Cameroon

Solange Sotakwo, Cameroon
Presentation: Click Here

Health Workers in Cameroon

We have 9,575 polyvalent health workers distributed across Cameroon's 10 regions. There are some districts that do not have any health workers. Coverage of health workers in some districts is poor. There is a 12-day training for our Community health workers (CHWs), where they are trained under 19 modules, and have a refresher course every 2 years.

Community OTSS in Cameroon

Based on the results of OTSS+ carried out, the NMCP asked the support of PMI Impact Malaria to help develop tools to conduct OTSS at a community level, where CHWs would be evaluated and given personalised feedback. This was trial tested in 20 health areas and 119 health workers were assessed. Pre-implementation, discussions occurred with communities to make them aware of the activities, and so that we could understand their needs.

Key Results

115/119 CHWs had >90% overall performance. 22% of CHWs were able to look out for danger signs. 97% were able to confirm suspected cases of fever with RDTs. 21% were able to refer cases. On the ability to perform RDTs correctly, we realised that 75% of the CHWs were able to perform RDTs, 96% could conduct it correctly, 90% were able to read it, but only 17% able to handle the waste. 94% could provide educational messaging. Availability of essential drugs and drug management was poor.

Problems and Solutions

In areas where scores were low, coaching was provided by health area managers. The trial highlighted the importance of collecting the community's experience. We will continue supervisory visits, assure regular training of CHWs, emphasising on those with weak performance, and improve our supervisory system. Community leaders will be vital to help improve community mobilisation. WhatsApp groups amongst CHWs will aid in the dissemination of information and exchanging of experiences.

Panel Discussion on Successes & Challenges with Quality Improvement

Solange Sotakwo (Cameroon), Stephen Bwalya (Zambia) and Paul Boateng (Ghana)
Chair: Larry Barat, PMI Impact Malaria/PSI

Larry Barat, PMI Impact Malaria/PSI: To Ghana, what are the challenges of implementing a program like this and getting it to scale? What are the challenges of dealing with OTSS and ISS, and the trade-offs that need to be made?

Paul Boateng, Ghana: Ghana has implemented supportive supervisory visits for around 15 years. We continue to undertake supportive supervisory visits with Quality improvement(QI) incorporated is because we realised that there has been an improvement in the quality of our services and indicators. Now, it is more of a policy to support supervision, as opposed to a guideline. At all levels of the healthcare system, QI is integrated and implemented across multiple diseases. There are QI teams across all levels (district, regional, national levels). Support of various partners such as PMI has enabled us to sustain QI as a culture.

Larry Barat, PMI Impact Malaria/PSI: To Zambia, How do you coordinate the multiple partners that are implementing OTSS to ensure harmonisation?

Steven Bwalya, Zambia: Firstly, you need tools, guidelines, and SOPs so that partners understand the policy. There is an annual meeting with all partners together where we produce a singular harmonised work plan to prevent duplications of efforts. We have a platform where we review our performance altogether with all partners. So, one plan and one implementation approach for one impact.

Molly Robertson, Global Fund: To all, have you experimented with or thought about ways in which you could target supervision so that you are not doing blanket routinely, but instead using the data you have nationally and subrationally to target OTSS in areas with the biggest problems? At what maturity level do you think this is possible? AND Anonymous, Ghana: To comment on Molly's point, there is a coordination between OTSS and ISS. However, we are unable to do OTSS on a quarterly basis because of funding, so we use ISS, and because it is integrated, it is a follow-up to OTSS to address issues that came up during the OTSS visit.

Paul Boateng, Ghana: One of the key things we do is targeting so we can focus on facilities that need more supervision. We do this regularly from national to regional to district level.

Larry Barat, USA: Targeting low performing facilities is very important. We have some new information from an independent evaluation addressing this question. From their analysis, after the 3rd visit, most facilities hit a quality level that is sufficient. Deploying mentoring visits and peer-to-peer approaches in between OTSS visits can target low performing facilities and enable spacing out of visits.

Webby Phiri, Zambia: We saw a picture of the improving OTSS scores, but how does this translate to improved patient outcomes? How can we interpret an improvement in OTSS scores, especially as providers are not the same?

Steven Bwalya, Zambia: If there is a good performance from OTSS, it should correlate with an improvement in patient outcomes and HMIS indicators e.g., decreased mortality rates. Data from OTSS is not meant to be used in isolation. We use the data that facilities passively generate to aid in interpretation of improvements in patient outcomes.

Larry Barat, PMI Impact Malaria/PSI: Our biggest challenge is that the outcomes data we have from case management (HMIS/DHS/MIS data) were developed 30 years ago. Some of the indicators still rely on fever as a proxy for malaria. In Senegal, for example, 98% of fevers are not malaria. Part of the reason why we struggle to link OTSS/HMIS data with patient outcomes is because the outcome indicators are not fit for purpose. Moreover, many countries define a suspected case of malaria as a person who was tested, which is not what was intended. Erin Eckert is leading an assessment of Global Fund monitoring indicators, working with Molly Robertson from the Global Fund, which may shed some light on what indicators may be more appropriate to meet countries' needs.

Prudence Hamade, Malaria Consortium: When you undertake OTSS, you are judging the whole facility. Can you distinguish individual performances e.g., that of a CHW? If you have a big turnover of staff, how do you use this to assess individual performance and improvement?

Paul Boateng, Ghana: During OTSS visits, we observe a staff member undertake a specific activity 3 times. If score 2 isn't better than score 1, we perform a 3rd observation to have some assurance of improvement. Once we take data on individual supervisees, we can look at how we can track their performance evaluate if knowledge/skills have been maintained over time.

OTSS is just one means of improving quality of care. There is a need for us to engage pre-service training, so workers are provided with the right education and up-to-date knowledge. We should also look at other complementary and cost-effective ways to perform OTSS. Going to visits physically is important, but we do not always have funds. We can deploy online meetings with specialists to give feedback on where quality of care could be improved.

Larry Barat, PMI Impact Malaria/PSI: Tracking individuals is hard because of staff turnover. The purpose of OTSS was to track the health system in the delivery of care, not the individual. There are lots of different types of supervision, but the problem with older versions of supervision was that they were not quality improvement, but quality monitoring.

The data we get from OTSS is at the facility level. Countries need to tailor supported supervision to each facility, particularly for smaller ones which won't necessarily have all technical area services. Our goal is that each health facility has a culture of both internal and external improvement. On the laboratory side, we have internal quality improvement, as well, but this is lacking on the clinical side. We should also emphasise pre-service training, but many countries here are trying to do that.

Solange Sotakwo, Cameroon: When a CHW has been assessed and has achieves a low score (<90%), we try to focus on this person so they can improve.

Paul Boateng, Ghana: In our OTSS, we advise that in the feedback sessions, all clinicians are involved so that knowledge is imparted to all clinicians in that facility. This can help bridge any issues with staff turnover.

Steven Bwalya, Zambia: Some of the people you identify in the team who are doing better will continue offering peer-to-peer mentorship to those not doing as well. Virtual platforms have enabled us to participate in malaria meetings at subnational and regional level. Not all follow-ups are in person. We set up virtual platforms for discussions. All facilities need to have a virtual strategy as providing physical copies of guidelines is costly. We ensure that guidelines and SOPs are free to access online too.

Anonymous, Online: You spoke about adding a community component to OTSS and the integrated malaria nature of OTSS. With additional facility-based interventions such as vaccine, PMC, and (Post-Discharge Malaria Chemoprevention) PDMC, what are your thoughts on what is a reasonable number of services to cover? How does addition of these new modules affect the quality, cost, and coverage of OTSS?

Larry Barat, PMI Impact Malaria/PSI: Although OTSS is a standardised approach, how it is implemented varies country to country. There is an increasing push not just to integrate other malaria interventions into supervision, but other diseases too, and Ghana and Malawi are already doing that. The ISS has a malaria checklist, but it is not as extensive as OTSS malaria checklist. Ghana's approach of doing OTSS at one point in the year and ISS at another has been effective.

Paul Boateng, Ghana: We often don't have a choice whether to add a new model but have to because of the challenges/objectives. In Ghana, we want to reduce mortality by 90% before a specific time-period. We need to introduce a new model to improve quality of severe malaria treatment to drive mortality down. We introduced a death audit tool to assist in this goal. We also realised admissions have not reduced, so there is a need to investigate why this is happening, and we are aiming to integrate this into existing systems.

Day 3

Session 6: PMC and Other Drug-Based Approaches

Update from Plus Project

Lilly Claire Ekobika Ngom Priso (Cameroon)
Presentation: Click Here

Plus Project (https://www.psi.org/project/plusproject/)
PLUS Project aims to reduce mortality and morbidity to malaria and anaemia in children under the age of 2 in countries adopting PMC. A UNITAID-funded project is being implemented in Benin, Cameroon, Côte d'Ivoire, and Mozambique. To date, we have been able to deliver 188,490 doses of SP at 600 health facilities in the 4 focus countries between Nov 2022 and June 2023. We had conversations with care providers to help discuss strengths and areas of improvement. Community engagement has also been vital.

Advice for PMC Implementation:
For countries wanting to implement PMC, you may want to consider that there are matters beyond NMCP control that will take longer to get MoH approval on. You will need authorisations for specific regional PMC if you aren't going to do it at a national level. Community engagement is critical in the uptake of intervention by target groups. We focussed on CHWs, but you may want to engage traditional leaders or other leaders that are influential in the community. Frequent coordination and data review meetings can help improve on data quality. Consistently ask, how can we adjust our implementation based on the data?

Key Links & Dates
If you want to stay connected, join our community of practice. We have a meeting planned on September 27, 2023, have an accepted symposium at the upcoming ASTMH, and planning an in-person meeting in 2024. There will also be a webinar in November.

Question & Answer:

Lilly Claire Ekobika Ngom Priso (Cameroon)
Chair: Jordan Burns, PMI

Standeur Kaly, Senegal: What is the rationale of the implementation Plus Project strategy in the 4 focus countries? How were the 4 countries chosen?

Lilly Claire Ekobika, Cameroon: The implementation is for children under the age of 2. We chose these countries because with the donors, we considered several criteria, such as the incidence of malaria, number of cases, mortality, and the interest of the countries to start implementation. Before the Plus Project, only Sierra Leone had implemented PMC, so countries were sceptical about this strategy.

Peter Olumese, WHO: From a WHO perspective, there is a big gap in study design to help determine which countries should be chosen and what ages are included. WHO recommendation do not state that implementation of PMC is for children under 2 years. There is no age limit given in the recommendation.

Lilly Claire Ekobika, Cameroon: In response to Peter, we started modelling of the project in the 4 focus countries in 2021. This was before the WHO recommendations for PMC were updated. Indeed, WHO previous malaria guidelines recommended IPTi for malaria, which consists of administering a complete SP regimen delivered at the same time as the Expanded Program on Immunization (EPI) at intervals corresponding to the usual immunization schedule for the second and third doses of DTP/Penta3 and for measles vaccination - usually at 10 weeks, 14 weeks and around 9 months of age - for infants at risk of malaria. Since June 2022, WHO have released updated guidelines and there are no longer restrictions about age or drug. This enables countries to work in their own best interests. Stakeholders reflected on what would be best on the country. We are going to evaluate what number of cycles will work in-country.

Panel Discussion on Successes & Challenges with Implementing PMC and Other Drug-Based Approaches

William Houndjo (Benin), Marcellin Dougone (Côte d'Ivoire), Anitta Kamara (Sierra Leone),
Lilly Claire Ekobika Ngom Priso (Cameroon)
Chair: Jordan Burns, PMI

Jordan Burns, PMI: What is the context of PMC in your countries?

William Houndjo, Benin: We identified a PMC model that goes beyond the 3 contacts. We integrated administering of SP at already established contacts (Vitamin A, Rubella, etc.) and are investigating vaccination coverage. We got support from partners with regards to supervision.

The major challenge is lack of drug availability, particularly for Vitamin A and SP. We are also having a paradigm shift. We used volunteers to begin the project, but currently we are recruiting where we assign each one to a home and give them a package. However, we have an insufficient number of personnel. The technical working group meet every 3 months

to talk about progress in community. The advisory committee meets every 6 months to discuss best practices. We review performance monthly.

Anitta Kamara, Sierra Leone: PMC is a nationwide strategy that started in 2016. We integrated the Expanded Program on Immunization (EPI), and other sister programs within the ministry. Stakeholders such as PMI, WHO, and UNICEF are part of this task force. They meet monthly. Each mother has a card for each child they have under the age of 5, and we made sure to integrate PMC into this card so the health worker can record whether the child has received a dose of SP.

We also updated the under 5s register to update the PMC component. We use the EPI They do not have to come to the facility any more than for the 3 scheduled visits. Challenges are that we are having stockouts of SP. Our consumption data and tracking are poor. Health workers split the larger dose drugs into half or quarters manually, so we have a lot of waste. However, trust is very high in the community.

Marcellin Dougone, Côte d'Ivoire: Our strategy focuses on children under 5 because the proportion of deaths linked to malaria in children is greatest at this age. However, delivery of SP to children is for children under 2 years of age. We have 3 districts that we focus on for PMC. We met with authorities from these districts, health workers, and regional health directors so they can be involved in the strategy. Within the community, understanding that SP was beneficial to children was high. The CHWs were trained to ensure that within the homes they visit, if there are children <2 years, they would receive SP. All these processes occurred at the end of 2021 to November 2022.

From November 2022, within the 3 target districts, 116 health sites benefitted from SP. We have 5 contacts, but will be progressively extending them. We liaise with the Ministry of Education to verify if children have had doses of SP when they register at school in September/October. If they haven't, they are sent back to a health service close to the school for vaccination. Challenges are the same as our neighbours in Sierra Leone. When there are stockouts, parents are reluctant to come for a singular dose of SP.

Felicia Amoo-Sakyi, Ghana: To Benin, could you comment on any challenges faced? To Côte d'Ivoire, how many doses of SP are you administering per child? To all, how is pharmacovigilance working?

William Houndjo, Benin: Challenges we faced included lack of availability of SP and handling the side effects. There are also difficulties reaching mothers as they need to cooperate with us to follow the schedule.

Marcellin Dougone, Côte d'Ivoire: We administer 5 doses per child. These doses are combined with routine vaccines and Vitamin A. Across the 116 distribution sites, we administered about 40,000 doses.

Lilly Claire Ekobika Ngom Priso, Cameroon: We initially thought we would use the existing system to monitor pharmacovigilance, but this wasn't really working well. This year, we decided to help countries strengthen their pharmacovigilance systems by training staff to aid standardise all aspects related to it in the country, and not just for PMC.

Marcellin Dougone, Côte d'Ivoire: To add to Lilly's comments on pharmacovigilance: one thing to note is that health care workers don't have a culture of notifying adverse health effects. Training was organised to report such events. We are working on retraining to ensure that adverse events are reported.

Anitta Kamara, Sierra Leone: In Sierra Leone, we work with the pharmacologists here for pharmacovigilance. There are forms they fill, although there are stockouts of these forms too. Many mothers do not like to report on adverse effects, but we have introduced community meetings to sensitise mothers and alleviate their fears.

Nelson Eze, Nigeria: To Lilly, was there an SP resistance profile performed as a baseline before commencing this project?

Lilly Claire Ekobika Ngom Priso, Cameroon: A resistance profile was done at the beginning of the project. We are planning multiple evaluations, but this will be dependent on the context of the country.

Marcellin Dougone, Côte d'Ivoire: In Côte d'Ivoire, we have sentinel sites in the framework of malaria elimination. These are research institutes, and its members are part of teams supporting the NMCP in certain decisions. They conduct resistance surveillance, with SP being part of it, as well as resistance in the vector.

Session 7: Closing

Brief Update on Monitoring for Malaria Case Management

Erin Eckert, PSI
Presentation: Click Here

Case Management Indicator Review
Many indicators can be improved changing wording (definitions, descriptions, calculations). Indicators could benefit from improved data collection systems so program managers can have access to data in a timelier manner.

Considerations in Routine Data Collection:

1. Use of "suspected case" as a denominator in some indicators
    - "Suspected case" is very subjective.
    - Instead, it is more useful to use fever, which is a more objective measurement of malaria, and easily done in field settings.
2. Stratification of ages for data collection:
    - Our data are collected in 2 categories: children under 5 vs. everybody else.
    - There is a growing burden of malaria in children older than 5.
    - We don't have an efficient means of tracking interventions in those age groups.
    - There are school based initiatives and SMC which, in many countries, has been extended to children up to age 10.
    - A consideration would be to breakdown routine data into 5-year age brackets, or at least 3 age brackets (<5. 5-10, >10).
3. Disaggregation by gender:
    - We also do not disaggregate by gender, nor track pregnancy status well.
    - This leads to confusion of what really is the burden in the different group.
    - Pregnant women constitute a special risk group.

All of this will require changes to surveillance systems and to standard DHIS2 data collection, which is a major undertaking.

Considerations in Data Sources:

- We need to improve our data systems to ensure that cases captured outside health systems are tracked appropriately.

- We need to increase private sector reporting as we don't really have good visibility of what is happening, we only see a portion of disease burden, and we also don't know the quality of the care provided and whether they are basing their treatment on a diagnostic test.
- We can greatly improve systems by linking lab, pharmacy, and supply chain data systems so we can view strengths and weaknesses of service delivery.

Brief Updates from Other RBM Working Groups
Chonge Kitojo (MiPWG)
Presentation: Click Here

MiPWG and CMWG Collaborations
MiPWG's purpose is to align RBM partners on best practices and lessons learned in MiP programming to help achieve higher coverage in MiP interventions globally. The use of ACT in 1st trimester is big area for collaboration with CMWG. We have disseminated a working group guide to partner countries. We are having a meeting in Geneva in September 12-13, 2023, in Geneva to discuss opportunities to prioritise MiP as part of the broader ANC platform, share and discuss new MiP research and innovations, disseminate learning from country experiences in improving coverage of MiP interventions, and create a 2024 action plan.

Conclusion
More information and resources can be found on https://endmalaria.org/our-work-working-groups/malaria-pregnancy.

Brief Updates from Other RBM Working Groups
Mariam Nabukenya Wamala (SBCWG)
Presentation: Click Here

SBCWG and CMWG Collaborations
Our objective is to align all SBC practitioners in all endemic countries to the three core areas of case technical guidance, coordination, and networking, and to continue making the case for SBC. We have 70 countries that have joined calls over the last 2 years. There is an intersection between SBC and case management. We noted health provider behaviour change, care-seeking for fever, and RDT and ACT adherence as key areas. SBC can be used to aid increasing treatment seeking from both patient and CHWs. We want CM to work with SBC to work on coaching and mentoring, as strengthening the service providers can improve treatment seeking and trust.

Conclusion
More information and resources can be found on www.bit.ly/RBMSBCWG.

Question & Answer:
Erin Eckert, PSI, Chonge Kitojo (MiPWG), Mariam Nabukenya Wamala (SBCWG)
Chair: Keziah Malm, Ghana

Olugbenga Mokuolu, Nigeria: To Mariam, on the issue of malaria messaging, how can we amplify the voice of malaria the way it was done for COVID-19? How can we change the messaging around malaria to bring about more awareness on, for example vector control?

Mariam Nabukenya Wamala, SBCWG: The most important thing is how do we raise our risk perception as countries affected by malaria? For malaria, our risk perception is low, so we need more advocacy. I like that MiPWG is advocating that everybody needs to be involved.

Keziah Malm, Ghana: I agree, Mariam, why can't we give the same urgency to malaria like we did for COVID-19? What does the WHO have to say?

Peter Olumese, WHO: The declaration of a pandemic, changes everything including the risk-benefit assessments. Though, everyone knows children are dying of malaria, we need new ways of discussing malaria to increase urgency, for instance, climate change and malaria or return on investment and malaria.

Busiku Hamainza: To Erin, I am concerned about using fever instead of 'suspected cases'. Wouldn't we miss cases of people infected with malaria parasites? AND Keziah Malm, Ghana: I feel we are going backwards if we consider every fever as malaria. For age-group categorisations, why don't we just put the age/raw data in and let the system categorise it instead of stratifying age groups?

Larry Barat, PMI Impact Malaria/PSI: The current case management indicators are not fit for purpose. We need to discuss how we can strengthen these. I understand the logic behind using fever rather than suspected cases because many countries have different definitions of suspected case. If the definition works for a country, they should use it. The one advantage of fever, however, is that the definition is unambiguous. The downside is that, particularly in countries which dropping burden, fever no longer means malaria, so is an area of further discussion.

Anonymous, Online: There is a push to all countries for community IPTp. However, most countries are struggling with SP availability. How are we tackling this? Secondly, countries are finding it difficult to understand test positivity rate as an indicator. It routinely features in our monitoring. However, when testing rates are low, how can we use this indicator?

Chonge Kitojo, MiPWG: We understand procurement and availability of SP is a huge challenge. We are working with countries to ensure they prioritise procurement of SP. The challenges of SP availability are both at a higher and lower level. We want to work with the lower level to make sure facilities perform proper quantification and ordering so that preventive medicines can be available at the lower level. We want to work with case management so we can support supervision and address challenges of SP availability.

Prudence Hamade, Malaria Consortium: When we are looking at malaria cases and measuring, we really need to know what our case definition of a malaria case is, as this may vary in a high transmission or elimination setting. WHO definition is fever with parasite in blood. However, there are asymptomatic cases. Is it someone who is infected with parasites, or someone with a fever and parasites, that counts as a malaria case?

Keziah Malm, Ghana: This goes back to what we are saying about Peter was saying about what exactly are we trying to measure and what is the objective of the indicator you are measuring.

Molly Robertson, Global Fund: I want to reiterate from the Global Fund perspective that this review of the indicators and our discussion of indicators in general is to make sure that the indicators are more about what is useful in-country at a granular and timely basis, rather

than what is useful for the Global Fund. We need to ensure all indicators serve a purpose, rather than just be reviewed at HQ level.

Discussions on the Field Visit & Improvements to Working Group

Prudence Hamade, Malaria Consortium: Can we focus more on diagnostics? Malaria Consortium is working with Imperial College London in the development of digital diagnostics, which is a field advancing rapidly for point of care diagnostics.

Olugbenga Mokuolu, Nigeria: It is impressive that Ghana has a single health information management system, and they are using a single website deployed throughout the country, working their way down to community level.

It was interesting to see herbal medicines amongst orthodox medicines and significantly standardised. The hospital could pull out a specific case of successful treatment using *C. sanguinolenta*. Can we call for some level of tracking so we can see what lessons can be learned and if it can be scaled up?

Gladys Tetteh, Jhpiego: Sometimes implementation doesn't occur after CMWG meetings. We have been talking about the updating indicators of case management for a long time. Will this be RBM-led? WHO-led? Donor-led? We also need to systematise the process of updating indicators from time to time. Secondly, 2 CMWG meetings ago, we addressed stockout issues and possibly setting up a sub-committee on procurement and supply chain management. We have partners who are willing to support. We had a procurement and supply-chain working group that was independent to CMWG. It would serve us better if it was a subcommittee of this group. Lastly, we have talked about having a joint RBM meeting, where all the working groups are sitting together in one meeting. Even if it's once every 2 years, let's collaborate.

Daouda N'Diaye, Guinea: SODH was impeccable, especially the organisational structure. It is important to talk about paediatrics and case management. The major problems we face with paediatrics are the delays we face. At SODH, there is a blood bank, that we don't have. I believe we need to focus on microscopy, perhaps even for the next field visit. Lots of structures are not integrated. Also, *Anopheles stephensi* is a huge threat. It is important to have some presentations on the threat of this vector.

Koulo Bie Pivi, Guinea: I would also like to thank the team from yesterday at the hospital. In Guinea, we don't use traditional medicines in hospitals as no doctor has the authorisation to send patients to get access to herbal medicines. I wonder how this can be integrated in Guinea, as in Ghana, there are degrees and trainings that can be done to be able to administer herbal medicines.

Molly Robertson, Global Fund: I want to comment on behalf of the SMERG. We identified a person from another working group that can consult on both working groups and bring issues that are related to both groups. We really want to focus on the case management cascade indicators here at the SMERG, as they aren't serving the country and donor leads.

Peter Olumese, WHO: There will be a meeting in early November with all partners of the WGs.

Degu Mehari, Ethiopia: We received a lot of future directions from the work done in Ghana. In Ethiopia, we don't use IPTp because malaria is in our country is seasonal, and SP resistance is common, so instead we use AL. What will be the next drug to replace SP for IPTp?

Session 8: Severe Malaria, Pre-Referral Interventions, and Referral

WHO Update on Rectal Artesunate (RAS)

Peter Olumese, WHO
Presentation: Click Here

WHO Information Note on Use of RAS as Pre-Referral Treatment: Efficacy vs. Effectiveness
The technical review found that the design of the CARAMAL study left it susceptible to several biases, particularly in terms of impact of RAS on mortality and referral completion. There were deficiencies along the cascade of care. Health system weaknesses and inadequate quality of care were revealed. However, when RAS is properly deployed, for instance, in Zambia, case fatality rate decreased from 3.1% to 0.1% in two high-intensity intervention districts.

WHO Information Note on Use of RAS as Pre-Referral Treatment: Resistance
When RAS alone, when not followed by referral and complete treatment with a full course of ACT, may select partial artemisinin resistant parasites with the K13 C496Y mutation. Antimalarial resistance surveillance should be strengthened, most urgently in East Africa, by prioritising interventions to holistically address resistance selection.

WHO Information Note on Use of RAS as Pre-Referral Treatment: Risk Mitigation
Countries that are already implementing or considering implementation for RAS as pre-referral treatment of severe malaria need to:

- Strengthen all aspects of the continuum of care.
- Ensure support for adequate supply chain.
- Address barriers of referral completion.
- Ensure effective community sensitisation.

There needs to be an understanding that artemisinin-based monotherapies (both rectal and parenteral) are only used for treating severe malaria cases, and must always be followed by a full oral course of an effective ACT.

Next Steps:

- Publication of the WHO Implementation Manual for effective deployment and RAS as pre-referral treatment of malaria (draft copy shared with members at the *in-person* meeting).
- Support countries in effective deployment of RAS through strengthening of the quality of care and services.

Question & Answer:

Peter Olumese, WHO
Chair: Olugbenga Mokuolu, Nigeria

Degu, Ethiopia: Previously, RAS was given for all patients, including both children and adults. Since 2015, WHO said its only for those over 16 years of age. What provoked this change?

Peter Olumese, WHO: We only started making recommendations for RAS from 2015. Looking at studies, it showed that the benefit of RAS in terms of reducing mortality was in children <6 years only, so we restricted its use to reflect that.

Hans Rietveld, MMV: On one of the first slides, you mentioned that for use of injectable artesunate in adults, there was high certainty evidence and a strong recommendation, whereas for children, there was a strong recommendation, but no high certainty of evidence. Can you explain?

Peter Olumese, WHO: Strong recommendation and high certainty does not refer to the quality of evidence.

Prudence Hamade, Malaria Consortium: What is the prevalence of artemisinin monotherapies(AMTs) in the private sector? In Asia, when we found drug resistance, the first thing that was done was to get rid of the sale of artemisinin monotherapies. I'm unsure if there is a concerted effort in Africa to see where AMTs are being sold. When I was in Kano State, Nigeria, someone bought injectable artesunate to treat their child with severe malaria. This use of artemisinin monotherapies may be more widespread than we think.

Peter Olumese, WHO: The greatest challenge, I believe, is the continuous availability and use of oral artemisinin.

William Houndjo, Benin: For children of less than 20kg they are given injectable artesunate at 3mg/kg. However, if they weigh over 20kg, you give them 2.4 mg/kg. What is the basis of this dosage?

Peter Olumese, WHO: This dosing was based on pharmacokinetics. More efforts are being put into producing paediatric formulations.

Olusola Oresanya, Nigeria: On taking a decision at the country level on the deployment of RAS, and taking a cue from RAS, in Nigeria, one of the big drawbacks was that the referral system was very weak. What do you recommend countries when the referral system is poor?

Peter Olumese, WHO: The only reason why we are discussing pre-referral systems is because we have weak systems, so there is the need to continuously strengthen health systems.

Country Experiences with Pre-Referral Interventions and Referrals: Zambia

Busiku Hamainza, Zambia
Presentation: Click Here

Severe Malaria Management in Zambia

In Zambia, there were >7M cases and >1,200 deaths in 2022. Our current NMESP plan for 2022-2026 is to reduce burden in high transmission areas. Although cases increased between 2021-2023, there was a plateau in mortality. Some provinces have seen some marginal reductions in mortality. Cases in under 5s are increasing. We use our inpatient data as a proxy of severe malaria cases. From 2022-2023, we almost doubled the number of inpatient cases in healthcare facilities. Our policy is that all severe malaria cases need to be treated with IV or IM artesunate for at least 24 hours until oral medication can be tolerated, then 3 days with the ACT AL. RAS is available at community level. We look at 2 months - <6 years. We have challenges with availability, so we do rely on parenteral quinine.

Integrated Case Management

We target hard-to-reach regions, classified as being beyond 5km radius of health care system. As of 2023, access to CHWs has gone up to 23%, up from 11% in 2019 Pilot study in 2 districts (Green et al., Bull WHO, 2023:101-371-380A). HMIS reported deaths from severe malaria reduced significantly from 3.1% to 0.5% between 2018-2021. In terms of best practices, ours is to try and scale to all 116 districts. We are also emphasising on consistent availability of CHWs and drug supplies, as well as proper data management systems, audit, and review.

Challenges
There is inadequate supportive supervision and mentorship, and an attrition of CHWs due to lack of motivation and poor selection criteria. Supply chain at the health facility and community levels need to be strengthened.

Country Experiences with Pre-Referral Interventions and Referrals: Nigeria
Nelson Eze, Nigeria
Presentation: Click Here

Severe Malaria Management in Nigeria
In Nigeria, there were >63M cases and >200K malaria deaths in 2021. The NMCP's objectives are to achieve a parasite prevalence of less than 10% and reduce mortality attributable to malaria to less than 50 deaths per 1,000 births by 2025. There is a chain of referral linkages, from the community via CHIPS, CHWs, and midwives, to the primary health care facilities (the general hospital). At the community or primary health facility levels, pre-referral treatment is given to children. RAS is first choice for children <6 years, but not yet implemented, and artesunate IM is first choice for children over 6 and adults.

Recommendations on Referrals
A severe malaria stakeholders meeting was held in early July 2023 where challenges and recommendations were discussed on referrals in Nigeria. Challenges included unavailability of RAS, weak referral linkages, weak data management systems, and waste associated with reconstitution and dosing of artesunate. We are planning to introduce multiple strength artesunate injections and improved surveillance strategies. We are also planning to scaleup the implementation of CHIPS nationally.

Country Experiences with Pre-Referral Interventions and Referrals: Sierra Leone
Anitta Kamara, Sierra Leone
Presentation: Click Here

Severe Malaria Management in Sierra Leone
In Sierra Leone, there were >1.8M malaria-related outpatient cases, and 2.2% of all malaria cases were severe malaria in 2020. The vision for the SLNMESP of 2021-2025 is to gradually move towards elimination, reducing malaria mortality and case incidence by at least 75%.

RAMS (Rectal Artesunate for Malaria Strategy) Implementation
RAMS is part of a severe malaria case management system that we have rolled out and is performed at a health facility level. Other recommended pre-referral treatments are; IM artesunate/artemether. Our referral system is not robust as we faced a number of challenges in ensuring prompt referrals. Data inconsistencies in recording and reporting into the HMIS. Mentoring, coaching and supportive supervision of health staff to ensure correct data documentation is carried out whenever the opportunity arise.

Lessons Learned
Some communities operate a community awareness and sensitisation program to ensure there are consequences (fines) for those refusing hospital referral or using traditional healing treatments. However, there are loans and savings to aid families in case of referrals.

Question & Answer and Panel Discussion
Busiku Hamainza (Zambia), Nelson Eze (Nigeria), Anitta Kamara (Sierra Leone)
Chair: Olugbenga Mokuolu, Nigeria

Marcellin Dougone, Côte d'Ivoire: To all, what measures are being taken to reduce the time of referrals from diagnosis to administering of drugs? AND Munira Ishmail Mustapha, Nigeria: To Zambia, I understand you have a very effective referral system. I think this is one of the problems in severe malaria in Nigeria (referrals). How have you been able to sustain the effective referral system because you said it is a community-based effort?

Busiku Hamainza, Zambia: In Zambia, the use of pre-referral treatment (RAS) will buy us some time, so we can increase the chances of the person surviving. We lack the infrastructure for many ambulances. However, there are bicycle ambulances. To maintain the sustainability of this, it was handed over to CHWs so that they had ownership over it. We want to replicate these kinds of approaches. We also need to do our part in sensitising communities. An issue is prompt presentation of the patient, so we need to encourage changes in social behaviour.

Anitta Kamara, Sierra Leone: If the patient is referred from the community or comes straight to PHU and are a suspected case, they are given RAS. If referral is requested, but not available, the patient is continued to be retreated with RAS for us not to waste time. However, we use all available avenues to ensure an ambulance is available to take a patient to the site of necessary care. The community also supports this process.

Daouda N'Diaye, Guinea: To Sierra Leone, your approach has enabled an increase of referrals to health centres, however, deaths increased between 2020 and 2021. Could you comment on how you are trying to reduce deaths?

Anitta Kamara, Sierra Leone: One of the concerns for Sierra Leone are the death rates. In my presentation. I mentioned that our reporting system is not that robust at all levels. Hospitals are not fully equipped to handle severe malaria cases, or that some deaths were not actually malaria deaths. However, we are conducting a Routine Data Quality Assessment (RDQA) of the reported data to ascertain the correctness, consistency and completeness of data collection.

Hans Rietveld, MMV: To Nigeria, the ratio of the number of CH volunteers in Zambia is 22,000 for 22M population. In Nigeria, there are 20,000 CHIPS volunteers to a population of 200M, which is 1:10,000 ratio. What are the aspirations in Nigeria with regards to the number of CHIPS agents? To Sierra Leone: I wasn't quite sure to which extent you were joking about the non-adherence to referral recommendations and how fines are funding initiatives. How many fines have been issued so far?

Busiku Hamainza, Zambia: Not every community is targeted to get a CHW/volunteer. Our ratio applies to those that are in most need, which are people living beyond 5km from the nearest health facility. This means it is 1:500, not 1:100. We have 22,000 CHWs, which is 50% of our need.

Nelson Eze, Nigeria: There are tertiary, secondary, and primary health facilities. These facilities are run by health professionals. At the community level, we have private health sector engagement. CHIPS are not the only workforce engaging.

Anitta Kamara, Sierra Leone: We don't know how many fines have been issued! The important thing is that CHWs are doing all they could to ensure increase and prompt referrals.

An overview of severe malaria case-management support to countries by Global Fund and PMI

Jordan Burns (PMI), Htin Kyaw Thu (Global Fund)
Presentations: Click Here

PMI Strategic Focus Areas (2021-2026) in Context of Severe Malaria Case Management

1. Reaching the Unreached: making pre-referral treatment available to those in need and building functional referral systems.
2. Strengthen Community Health Systems: supporting CHWs and equipping them so they can serve communities so malaria can be treated early.
3. Keeping Malaria Services Resilient: maintaining continuity in health services, even in the presence of disruptive threats, and monitor and respond to antimalarial drug resistance.
4. Investing Locally: finding creative ways to promote community ownership of these activities and leveraging and identifying local solutions to service barriers.
5. Leading and Innovating: closing central gaps in access and quality experienced by severe malaria patients themselves.

Global Fund Strategy 2023-2028

A key objective is to expand equitable access to quality early diagnoses and treatment of malaria, through health facilities, at the community level, and in the private sector, with accurate reporting. To do this, we are improving severe malaria treatment including linkages and referral systems from community and through public sector through leveraging of Resilient and Sustainable Systems for Health (RSSH) programming within the grants. Central African Republic, Mali, Cameroon, Republic of Congo, Democratic Republic of Congo, Eritrea, Mozambique, and Uganda have included RAS with Global Fund financing in the current Grant Cycle (Grant Cycle 7). Injectable artesunate remains countries preferred pre-referral option.

Conclusion

Rectal artesunate has proven efficacy to greatly reduce mortality among children. We can close the efficacy-effectiveness gap if we consider all aspects of improving the continuum of care. The Global Fund and PMI are aligned in supporting countries for systems strengthening, community health workers, human resources for health, and other critical interventions for the severe malaria continuum of care.

Question & Answer

Jordan Burns (PMI), Htin Kyaw Thu (Global Fund)
Chair: Olugbenga Mokuolu (Nigeria)

Adam Nothem, PMI: Who is preferring injectable artesunate, and at which level?

Jordan Burns, PMI: We are following WHO's guidelines. The ideal is injectable artesunate being the first listed in order of preference for pre-referral treatment. The reality on the ground, however, is that when you go to more isolated communities, they are not likely to be set up with supply to administer injectable artesunate.

Htin Kyaw Thu, Global Fund: Countries keep it as preferred for larger facilities that have capacity to provide injections.

Peter Olumese, WHO: I want to comment that at the community level, the ideal is RAS, not injectable artesunate. I want us to be careful with the use of the word "ideal". It would be great to manage severe malaria at the highest possible facility but is not always possible.

Hans Rietveld, MMV: Is there a rule of thumb within your organisations with regards to the percentage of funding to severe malaria vs. uncomplicated/all malaria?

Jordan Burns, PMI: PMI budgets and operational plans are tailored year to year based around country conversations. We do not have a cut off.

Prudence Hamade, Malaria Consortium: What sort of support is available to countries in conflict situations?

Jordan Burns, PMI: Within US government funding and USAID support, there is a specific category called humanitarian assistance. There are limits on what PMI can do to fund those situations. In cases like the cyclones in Mozambique for example, we try and help with the continuity of services and ensuring access to vector control interventions. For examples in the case management space, it could look like developing mobile clinic options or maximizing virtual training and supervision platforms.

Htin Kyaw Thu, Global Fund: It depends on the country's strategic planning. Areas where the country has planned to deliver services, we can quickly mobilise. There are some mechanisms that can be expedited in conflict. We have utilised emergency funding not just around conflict, but also natural disasters.

MMV-Supported Projects

Hans Rietveld (MMV)
Chair: Olugbenga Mokuolu (Nigeria)

There was a question this morning about the replacement of ACTs and what is being done to prepare the new product pipeline. MMV updates the R&D pipeline for new antimalarials yearly, both for treatment and prevention. There are numerous partnerships that MMV has in place with academia and early research discovery which are available to peruse online (https://www.mmv.org/sites/default/files/content/document/Global_Portfolio_June_2023_0.pptx). The most advanced is a project led by Novartis in collaboration with MMV which is ganaplacide-lumefantrine), which is entering Phase 3. This will be available to patients by 2027 earliest.

Session 9: Continuum of Care

Role of Pre-Referral Antibiotic Treatment of Severe Febrile Illness in Children

Nicholas White (Oxford/MAHIDOL)
Presentation: Click Here

Pre-Referral Antibiotics
We do not have a rectally available broad-spectrum antibiotic comparable to RAS. We have been trying to develop a rectal formulation of ceftriaxone to prevent neonatal sepsis deaths. In 2007, we tried to produce a rectal formulation of azithromycin but could not get funding.

Conclusion
If a patient reaches a health centre where parenteral treatment is possible, they should receive artesunate and a broad-spectrum antibiotic because bacterial sepsis and severe malaria cannot be clinically distinguished. Although the patient may have parasitaemia, it may not be the cause of their illness/symptoms. I strongly support the continued use of

microscopy in hospitals. Development of a rectally bioavailable antibiotic formulation or coformulation would be helpful in treatment of severe febrile illnesses.

Question & Answer
Nicholas White (Oxford/MAHIDOL)
Chair: Olugbenga Mokuolu (Nigeria)

Karen Barnes, SA MEC: The way IMCI guidelines are presented imply that any respiratory symptoms will be bacterial, ignoring that severe malaria can cause respiratory distress too. Could this not inspire that children should be given RAS + oral antibiotics in the community?

Nicholas White, Oxford/MAHIDOL: Completely agree that both should be given!

Felicia Amoo-Sakyi, Ghana: Considering that 1/3 of febrile children have sepsis, and we are thinking of giving prospective antibiotics, are we not going to promote antibiotic resistance?

Nicholas White, Oxford/MAHIDOL: We are dealing with children who may die here (>5% mortality). This would be a tiny fraction of all antibiotic use so the risks vs. benefits are very different to those in a community where we are managing undifferentiated febrile illness. I believe there should be no concern overantimicrobial resistance. WHO has recommended co-administering of antibiotics and parenteral artesunate to manage severe malaria in hospitals, but many children will die before they reach hospital, and I was making an emphasis on children in the community.

Marcellin Dougone, Côte d'Ivoire: Can we distinguish complications linked to bacteria vs. malaria infection at a clinical level? Further, there are antibiotics that are antiparasitic. Would it be better to target these as opposed to giving antibiotics in addition to antiparasitic drugs?

Nicholas White, Oxford/MAHIDOL: There is not a good way to distinguish severe malaria from sepsis clinically. We used to say coma without focal sigs was more specific to malaria, but investigators in Malawi, found this was not the case. The antibiotics which have antimalarial activity, such as macrolides and lincosamides, are not particularly good as primary broad-spectrum treatments for bacterial infections. The "right antibiotic" is whatever is recommended currently in the community for severe infections, which is usually amoxicillin or even broader spectrum ceftriaxone. They do not have antimalarial activity, but they are very good bactericides.

Prudence Hamade, Malaria Consortium: Could you describe some of the barriers existing in developing new compounds that could be used rectally for antibiotics? We have representatives here from MMV and Novartis. Can they also give some idea of why we can't develop this important drug?

Nicholas White, Oxford/MAHIDOL: No money! We should be assessing the rectal bioavailability of the antibiotics we have already. That is why we chose ceftriaxone in the first instance. However, it requires some pharmaceutical investment. For example with artesunate, we have a rectal bioavailability of 20-35%. Because the drug is safe, the dose is 3-4x higher than what we give parenterally.

Nekoye Otsyula, Novartis: The further development of existing drugs into additional formulations is dependent on what the unmet need is. We always have academia working to broaden science, but we need to ask, who needs it? We need a company that is already producing that drug.

Nicholas White, Oxford/MAHIDOL: There are at least 200,000 deaths in children in Africa each year ascribed to malaria but likely to result from bacterial sepsis (this is 1/3 of the estimated total malaria mortality). That is quite a large unmet need.

Overview of Best Practices for Continuum of Care for Patients in Rwanda

Noella Umulisa on behalf of J. Damascence Niyonzima (Rwanda)
Presentation: Click Here

Rwanda Health Sector Structure

Health Post are a new structure, like CHPS in Ghana, that are between CHWs and Medicalised Health Centres. An increasing number (55%) of cases are being managed by CHWs. 90% of all cases are treated at the community level. From 2011, iCMM was extended country wide. In 2016, the country decided to extend it to include children over the age of 5.

Strengthening Early Seeking of Health Care Services

From 2011, iCMM was extended country wide. In 2016, the country decided to extend it to include children over the age of 5. Rwanda made treatment free for the poorest people in the community, based on financial stratification. When a patient has symptoms of severe malaria at a community level and are being referred, the CHWs send a special code via SMS to the health facility, so they are prepared for the patient's arrival. There has been an 87% decrease in severe malaria cases and deaths between 2016-2022, with less than 100 malaria deaths.

Challenges and Best Practices

Resistance and the asymptomatic reservoir are our biggest challenges. Our CHWs are unpaid. We are trying to target vulnerable and high-risk groups. There is a malaria death auditing to understand the reasons why children have died from malaria. We perform drone-based larviciding, and are collaborate cross-borders via the Great Lakes Malaria Initiative.

Improvements in Quality of Care: Cameroon

Germaine Ekoyol (Cameroon)
Presentation: Click Here

Champion's Program

We established the Champion's Program in 2 northern regions in Cameroon, supported by PMI. The program seeks to reinforce the quality of facility-based care, through OTSS and mentorship. There were statistically significant positive associations between post-Champion's Program rounds of OTSS+, compared with R3 for overall management of severe malaria. Health facility readiness and material availability also improved. After the Champion's program, we organised the training of 65 mentors in the 8 other regions, and OTSS+ was started in prioritised health facilities. Despite challenges in resources, equipment quality, and staff turnover (particularly medical doctors), the Champion's Program has helped to improve capacity reinforcement of health personnel after the cascade training method and improve the quality of malaria case management.

Question & Answer

Noella Umulisa (Rwanda), Germaine Ekoyol (Cameroon)
Chair: Olugbenga Mokuolu (Nigeria)

Daouda N'Diaye, Guinea: What is the prevalence of malaria in Rwanda? What collaboration is being done with the private sector?

Noella Umulisa (Rwanda): In 2015, it was 2%. In 2017, it was 8% In 2019, it was less than 1%. Collaboration with private sector is insufficient, but we are trying to strengthen it as we are moving towards elimination.

Paul Boateng, Ghana: To Cameroon, did you include medical schools in your training, and if so, has this evolved your training materials? To Rwanda, you indicated that you are not implementing IPTp due to SP resistance. What levels are there? What about other countries that still use IPTp despite SP resistance and it is still effective? Can you expand on prioritising preventing interventions to reduce workload?

Germaine Ekoyol, Cameroon: The initial training was done for the health workers from two regions, that spent 2 weeks training in Yaoundé. This training was done in the University Teaching Hospital at first. We also included The Central Hospital and a Paediatric Hospital for the subsequent training sessions. We originally focused on severe malaria, but realised it was necessary to include a module on uncomplicated malaria, so we expanded our modules to train the health workers from the other 8 remaining regions. We also performed training in a central hospital and Chantal Biya Foundation (a paediatric Hospital), so that those being trained could see the different types of complications and pathologies.

Noella Umulisa, Rwanda: Rwanda decided to stop IPTp in 2007. This is because several studies showed the growing problem of resistance. The WHO still recommends this intervention despite countries confirming resistance. Rwanda has decided to strengthen other interventions e.g., distribution of nets to pregnant women. More recent studies have shown resistance to SP remains.

Fla Koueta, Burkina Faso: To Rwanda, why did you opt for the strategy to manage severe malaria exclusively, knowing that it is uncomplicated malaria that will progress to severe malaria and that we have more cases of uncomplicated malaria?

Karen Barnes, SA MEC: To Rwanda, you do not use RAS at CHW level. Is that because your referral method results in children reaching the centres under 6 hours, or have I misunderstood?

Noella Umulisa, Rwanda: RAS was in our treatment guidelines in 2015 but is not in the current 2020 guidelines. Rwanda failed to procure RAS so are now focusing on AL.

Degu Mehari, Ethiopia: To Rwanda, at community level, if malaria is uncomplicated you treat, but if complicated you refer. Can you expand on your pre-referral treatment at community level? Your entomological interventions are prioritising ITNs and IRS. Do you also do larval source management, as that can be done at the community level?

Noella Umulisa, Rwanda: We have nothing at community level for pre-referral. CHWs have responsibility that patients get to health facilities with the SMS system. The central health system has access to this at real time on a dashboard. At health facilities, the pre-referral is IV artesunate until they are moved to the district hospital. We are working with farmers and ministry of agriculture so that Larval source management (LSM) is also part of our interventions.

We are moving to CHWs who are working on treating malaria only, and another group who work on family planning to polyvalent CHWs who are able to offer a comprehensive package

to the population. Rwanda is investing more and more in health posts. This is helping health centres to decrease the workload at health center and improve on quality of care.

Jordan Burns, PMI: Knowing that in many contexts, transportation and costs is a barrier to referral, I found it interesting that CHW travels with the patient. Is this because you have a robust ambulatory system or are there other ways transportation is facilitated? How are they reimbursed?

Noella Umulisa, Rwanda: No, we only have 4-5 ambulances for a single district hospital. The community really gets involved and contributes financially to send an ill person in their village to the health centre using motorbike .

Prudence Hamade, Malaria Consortium: To Rwanda, partial artemisinin resistance doesn't stop ACTs from working well, but instead, delays parasite clearance, increasing gametocytes. Do you know the level of day 3 positive cases? Would you introduce low dose primaquine? To Peter, do you have evidence of how effective low dose primaquine is in treating delayed parasite clearance?

Noella Umulisa, Rwanda: This is not something we are monitoring in a systematic way. We have some data, but in the sites where we have detected emergence of drug resistance, we had less than 10% of those cases having day 3 parasitaemia. Country is currently revising treatment guidelines regarding SLDP. Now we have districts with low endemicity, which can be considered for SLDP.

Peter Olumese, WHO: With RAS, there is an emphasis on the 6-hour limit. If the patient can to a health facility before 6 hours, they do not need pre-referral treatment. Rwanda did not stop IPTp because of SP resistance. They stopped the intervention based on local studies that indicated there was no difference between giving SP and ramping other interventions in improved birth outcomes for MIP.

Fla Koueta, Burkina Faso: To Rwanda, the malaria matchbox report is almost available in Burkina Faso. I really like that you do the auditing of each case. How was this accepted?

Noella Umulisa, Rwanda: I don't have enough information on the Malaria Matchbox report. We invest some money into it, but there are certain groups that we offer tailored interventions for. For instance, we distribute nets to students that are within dormitories at boarding school. We make sure that in each hospital, we have the malaria death audits as part of their practices. Auditors come once each quarter.

Session 10: Post-Discharge Malaria Chemoprevention (PDMC)

Malaria Chemoprevention in the Post-Discharge Management of Severe Malaria in Children

Titus Kwambai (Kenya)
Presentation: Click Here

PDMC Research Studies
Most healthcare workers do not follow up children once they have been discharged from hospital, largely, because there are no guidelines for post-discharge care. The greatest risk of death or readmission is within the first 6 months post-discharge. We conducted a systematic review and meta-analysis, including 3 trials which have been conducted in malaria endemic areas of Africa, and which gave monthly malaria chemoprevention for post-

discharge management of severe anaemia. The studies were conducted in The Gambia between 2003-2006 and used monthly sulphadoxine pyrimethamine (SP), in Malawi in 2008-2012 and used artemether Lumefantrine (AL) and in Kenya between 2016 and 2018 and used dihydroartemisinin-piperaquine (DP). Post Discharge Malaria Chemoprevention (PDMC) was associated with a 77% reduction in all-cause mortality and a 58% reduction in all-cause readmissions during the three-month intervention period. The effect of DHA-PiP and AL is highly malaria specific, with no effect on non-malarial outcomes. For the study in The Gambia that used SP, there were reduction in the incidence of non-malaria conditions such as gastrointestinal and respiratory infections. Delivery strategies for PDMC is still a challenge and not many studies have been conducted around this subject. A cluster randomised trial performed in Malawi tested the impact of community-based and facility-based delivery of PDMC for children with severe anaemia. In community-based delivery, all the three monthly courses of PDMC were issued to the guardian on discharge to be administered at home, whereas for facility-based delivery, caregivers needed to return to the facility on a monthly basis to pick their medications. There was a 24% better adherence to PDMC in the community-based delivery compared to facility delivery. However, there were challenges in getting CHWs to remind caregivers to administer treatment, and often, the drug was stored poorly.

Conclusions
Overall, PDMC can be a valuable strategy for post-discharge management of recently discharged children who have recovered from severe anaemia. It is less costly and could avert 36,000 readmissions yearly. It is highly accepted by CHWs, facility staff, and caregivers. New WHO guidelines for malaria chemoprevention have been available since 3 June 2022 (https://app.magicapp.org/#/guideline/6287).

Country Experience with PDMC Implementation: Uganda

Gerald Rukundo (Uganda)
Presentation: Click Here

PDMC in Uganda
After treatment of severe malaria and discharge, we follow-up at day 7, day 14, and day 28. On the 28th day, when someone comes back, we then start the course of PDMC with DHA-PPQ. We give PDMC both children and adults. We prioritised high transmission settings. The delivery mechanism is via the health facility because we believed adherence would be better. However, there was a low completion rate of all 3 cycles of PDMC. Patients said that they don't complete the full course because they begin to feel better so don't feel the need to return. When we adopted the WHO PDMC guidance, we experienced stockouts and shortages, compounded by the fact that we use DHA-PPQ as a 2nd line treatment for uncomplicated malaria. In future, we hope that CHWs could distribute medicines for PDMC, like it has been done in other programmes, for example, in TB. However, this will require community sensitisation and engagement. Due to limited funding, our assumptions for follow-up are conservative because we don't want to rush.

Question & Answer

Chair: Olugbenga Mokuolu (Nigeria)

Prudence: When you focus just on post malaria discharge for children with severe anaemia, do you check their anaemia levels, and do you treat the child for anaemia? Do you look at the whole child in terms of malnutrition? PDMC can be coupled with treatment for severe malnutrition.

Titus Kwambai, Kenya: We conducted a systematic review and metanalysis of studies conducted in malaria endemic areas to determine the risk of post-discharge mortality and morbidity among children <15 year old who had been admitted for various conditions. We found that children admitted with severe acute malnutrition and severe anaemia had the highest risk of death or readmission in the first six months post-discharge, Currently, there are guidelines for the management of severe acute malnutrition, and recently WHO recommended PDMC for severe anaemia. For PDMC, the intervention is offered at discharge after the child has been treated for conditions that brought him/her to hospital, including immediate and long-term management of malnutrition. Most deaths do occur in the community after discharge without seeking any further care, for example, in a post-discharge study in Uganda over 70% of those who were discharged died in the community and in a HDSS in Mozambique >80% died.

Paul Boateng, Ghana: To Uganda, you are saying that your intervention involves both children and adults for PDMC. Was there an age limit to the adult group? To Kenya, you indicated that caregivers didn't appreciate being followed up by CHWs, do you give all the doses to the caregiver? How do you recommend delivery to be practiced?

Gerald Rukundo, Uganda: There is no cut-off. Any person who has been discharged of severe anaemia, regardless of age, should be given DHA-PPQ because in Uganda we discovered recently that we are having severe malaria in adults.

Anonymous, Online: To Kenya, was the state of the children, such as anaemia and nutrition, evaluated after they were discharged?

Titus Kwambai, Kenya: In the study in Kenya and Uganda, children were eligible to join the study if they had all-cause severe anaemia. Whilst in hospital, they got treatment for malnutrition and all other conditions they had. We only enrolled children when they were ready for discharge. We conducted home follow ups to deliver the monthly courses of PDMC and assessed the vital status of participants. Guardians were encouraged to bring the children to the clinic whenever they were sick and were treated as per the local ministry of health guidelines.

Olugbenga Mokuolu, Nigeria: To Kenya, the first two studies you mentioned were pre-ACT era, and the last study was within the ACT era. Do you think that the initial treatment could also play a significant role in some of the subsequent outcomes we have?

Titus Kwambai, Kenya: Only the study in The Gambia was pre-ACT. Recovery from malaria-associated severe anaemia takes about 42 days. What PDMC does is to protect children against malaria during that recovery period. The initial ACT, mostly issued before discharge as standard care will protect against malaria for 2-3 weeks post-discharge, therefore it is important to extend the post-treatment prophylaxis period by offering longer acting anti-malarials for 3-4 months post-discharge.

Peter Olumese, WHO: Related to Karen's question, we moved to this recommendation based on limited research evidence. There are no studies or evidence of ability to deploy outside of strict research conditions. Hopefully, we will have more information in the near future to help streamline our PDMC recommendations, or indeed, revisit them, if necessary.

Session 11: Next Steps and Closing Remarks

Next Steps & Closing Remarks
Noella Umulisa (Rwanda)

Thank you all for attending the 12th annual meeting for the CMWG. The most important thing is increasing the group's interactions and continue discussions. As co-chairs and organisers, we are available if you would like continued support and guidance. We are taking the recommendation of a sub-technical working group focusing on supply chain very seriously. We hope in the future, we can strengthen our collaboration with other technical working groups within RBM, including with the MIP, SBC, and SME working groups. The election process for a new co-chair to replace Larry as he steps down begins mid-October. You can nominate others and self-nominate. Thank you Larry for being a great co-chair, and thank you all for coming!