MEETING REPORT

Nineteenth Meeting of the RBM Partnership
Monitoring and Evaluation Reference Group (MERG)
6-8 June 2012
London, England

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Acronyms

ACT	Artemisinin-Based Combination Treatment
BCC	Behaviour Change Communication
CHAI	Clinton Health Access Initiative
CHERG	Child Health Epidemiology Reference Group
CDC	Centers for Disease Control and Prevention
DFID	Department for International Development
DHIS	District Health Information System
DHS	Demographic and Health Survey
DQA	Data Quality Audit
DRC	Democratic Republic of Congo
EPI	Expanded Program on Immunization
ESP	Elimination Scenario Planning
Global Fund	Global Fund to Fight AIDS, TB and Malaria
GMAP	Global Malaria Action Plan
GMP	Global Malaria Programme (WHO)
HMIS	Health Management Information System
IEC	Information, Education Communication
IGME	Inter-agency Group for Child Mortality Estimation
IHME	Institute for Health Metrics and Evaluation
IPTp	Intermittent Preventive Treatment in Pregnancy
IRS	Indoor Residual Spraying
ITN	Insecticide Treated Net
JHUCCP	Johns Hopkins University Center for Communication Programs
LEC	Low Malaria Endemicity Countries
LLIN	Long-Lasting Insecticidal Net
LQAS	Lot Quality Assurance Sampling
LSHTM	London School of Hygiene and Tropical Medicine
M&E	Monitoring and Evaluation
MAP	Malaria Atlas Project
MDG	Millennium Development Goal
MERG	Monitoring and Evaluation Reference Group
MICS	Multiple Indicator Cluster Survey
MIS	Malaria Indicator Survey
MNCH	Maternal, Newborn and Child Health
MOH	Ministry of Health
NGO	Non-governmental Organization
NMCP	National Malaria Control Programme
pHI	Proportionate Hole Index for Integrity
PCR	Polymerase Chain Reaction
PMI	US President's Malaria Initiative
PSI	Population Services International
RBM	Roll Back Malaria
RDT	Rapid Diagnostic Test
SP	Sulfadoxine-pyrimethamine
TOR	Terms of Reference
UN	United Nations
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WHO	World Health Organization

Participants

Chair: Richard Cibulskis (WHO)

Participants: Fred Arnold (MEASURE DHS/ICF International), David Brandling-Bennett, Nichola Cadge (DFID), Liliana Carvajal (UNICEF), John Paul Clark (World Bank), Justin Cohen (CHAI), Marlize Coleman (Liverpool School of Tropical Medicine), Erin Eckert (PMI/USAID), Thom Eisele (Tulane University/ MEASURE Evaluation), Lia Florey (MEASURE DHS/ICF International), Peter Gething (University of Oxford), Laura Gibney (Malaria Consortium), Jamie Griffin (Imperial College London), Judith Kallenberg (CHAI), Albert Kilian (NetWorks); Eline Korenromp (Global Fund), Megan Littrell (PSI/ACTwatch), Michael Lynch (WHO), Deborah McFarland, Diana Measham (Bill and Melinda Gates Foundation), Sylvia Meek (Malaria Consortium), Eric Mouzin (RBM Secretariat), Clotilde Narib (Namibia National Malaria Programme), Peter Nasokho (MEASURE Evaluation/ICF International), Sarala Nicholas (Malaria Consortium), Carrie Nielsen (PMI/CDC), Stephen Poyer (PSI/ACTWatch), Melanie Renshaw (ALMA), Trent Ruebush (USAID/PMI), Arantxa Roca-Feltrer (Malaria Consortium), David Schellenberg (LSHTM), Sanie Sesay (Liverpool School of Tropical Medicine), (Anja Terlouw (Liverpool School of Tropical Medicine), Thomas Teuscher (RBM Secretariat), Leopoldo Villegas (MEASURE Evaluation/ICF International), Rachel Weber (JHCCP), Michael White (Imperial College London)

Logistics: Elizabeth Patton (MEASURE Evaluation/ICF International)

0.0 Meeting Objectives

1. Review ongoing MERG taskforce work
2. Receive updates from partner organizations
3. Discuss tracking GMAP Objectives, Targets and Milestones
4. Review sub-national level monitoring tools and analysis
5. Discuss MERG business issues

1.0 Ongoing MERG taskforce work

Survey and Indicator Guidance Taskforce

1.1 Update to Household Survey Indicators for Malaria Control

Elizabeth Patton-MEASURE Evaluation/ICF International

Three revisions to the Guidelines for Core Population-Based Indicators have been released to date (2004, 2006, 2009). Several drafts of the document, now titled *Household Survey Indicators for Malaria Control,* have been produced by MEASURE Evaluation with feedback from the Task Force; it is now in final draft form and is expected to be released sometime in August 2012.

There are a number of new indicators for vector control and case management as follows:

- Proportion of households with at least one ITN for every two people
- Proportion of population with access to an ITN in their household
- Proportion of population who slept under an ITN the previous night
- Proportion of children under 5 years old with fever in the last 2 weeks for whom advice or treatment was sought
- Proportion receiving first-line treatment according to national policy among children under five years old with fever in the last two weeks who received any antimalarial drugs

A table is being added to the final draft to illustrate the relationship of all of the indicators to the Global Malaria Action Plan. No changes to the questionnaires were needed to add or revise these indicators.

The group discussed the branding and approval process of the document which has caused some delay in its release. Thomas Teuscher indicated that this is an RBM MERG document and should be produced as such. The cover should reflect who made the document, the RBM MERG.

Routine Systems Taskforce

1.2 Malaria Surveillance Manuals

Michael Lynch-WHO Global Malaria Programme

The WHO Surveillance Manuals were recently released to provide guidance to malaria-endemic countries on the operation of malaria surveillance systems for malaria control and elimination. WHO malaria surveillance guidelines have not been issued since the 1950/1960s, yet tools and strategies have changed. These documents focus on surveillance, routine information systems and decentralized analysis and provides guidance on interpretation and use. It aims to cover all stages of the malaria transition and covers strategies for data collection, setting up systems and using data for program management.

These manuals were developed by WHO with help from MERG members and launched in April 2012. There are two volumes (i) *Disease Surveillance for Malaria Control* (ii) *Disease Surveillance for Malaria Elimination.* The contents include: 1. overview of malaria surveillance in different phases of malaria control; 2. key concepts in malaria surveillance; 3. data recording, reporting, analysis and use; and 4. establishing surveillance systems.

A large print run will take place in the near future and copies will be disseminated to country offices. They will be available in Arabic, English, French and Spanish and possibly Portuguese. After feedback is received, the manuals will be revised, and a second edition will be released. A suggestion was made to also disseminate these manuals at the African Leaders summit and subregional RBM networks, which are having meetings in the near future. This would be a key opportunity to disseminate and possibly orient folks on the guidelines during a two hour clinic at the RBM network meetings.

A question was posed as to how to clearly define a case versus an infection as the surveillance manual for elimination defines a malaria case as any infection, even with no symptoms. It was questioned whether this is in line with other disease areas. Dr. Lynch responded that this type of surveillance case definition is seen in other areas, includingfor malaria in the US. The idea is that for programs in elimination phase, every infection in these settings is important. Moving forward this can be discussed.

1.3 Capacity Building Taskforce Update

Elizabeth Patton-MEASURE Evaluation/ICF International

This task force will function mainly as a community of practice to connect individuals involved in capacity building and circulate information regarding: upcoming capacity building activities, best practices, and opportunities for collaboration. Membership is open to anyone who has an interest. To become a member, contact Elizabeth Patton at: epatton@icfi.com.

1.4 Proposed BCC Taskforce

Rachel Weber-JHCCP

There is a group at JHCCP interested in exploring various BCC issues related to malaria including predictors of net use. The group wants to work with people who have a lot of data to investigate other predictors. They proposed the creation of a BCC taskforce within the MERG. Dr. Weber passed around a signup sheet so that meeting participants could indicate their interest in the task force.

Additionally, there will be a NetWorks meeting on monitoring BCC programs on July 20th in Baltimore, Maryland. Networks may be able to fund one or two people to attend this meeting.

Mortality Taskforce

1.5 RBM MERG guidance for program impact evaluation

Erin Eckert-USAID/PMI

Increased funding for malaria control in the past decade in SSA has led to scale up of key interventions (ITNs, IRS, IPTp, treatment) and there is need for an assessment of the effect of this scale up on malaria burden for further improvements. The RBM partnership developed a guidance

document for tracking progress and showing results (Rowe et al., 2007). This document proposed a plausibility design to measure impact of malaria control programs. There is need to update this guidance in light of the 2010 measurement needs and new evidence. A decision was made at the RBM Expert's Consultation on Mortality Measurement in April 2010 to revise this document. The target audience of this document is the staff of NMCP, MoH, and funding agencies and individuals with background and understanding of M&E. This is meant as a menu of options. Countries can pick and choose based on the situation and data available in country. It is not intended to be an exhaustive resource on statistical modeling techniques.

Since the last MERG meeting, the Mortality Task Force has held several conference calls and met in person once in May. Several changes to the outline of the document were made at this meeting. Most notably, a chapter will be added on the process of carrying out an impact evaluation and the resources needed to do this.

The mortality task force plans to release this document by November 2012.

It was recognized that some countries which are doing well have to justify continuation of funding through cases prevented. This is not covered in this document. Looking into this may be an important next step for this group. As countries transition, marginal gains in reduced mortality become smaller. The MERG needs to start thinking about this in terms of the messages it sets forth.

1.6 Economics Taskforce Update

Nichola Cadge-DFID

The TOR for the Economics Task Force was finalized about two months ago. The objectives are to:

- Identify knowledge gaps and propose options on how these can be addressed to MERG and RBM partners
- Provide an expert economic perspective on policy and operational questions
- Endorse recommendations for policy, research, methodologies and operational responses
- Support the dissemination of economic data related to malaria control.

A primary role of the task force will be to prioritize gaps in knowledge, which will be helpful to funders. It is comprised of a small group of 8-12 people with a range of skills.

Within the taskforce, there will be a number of work streams. The group will start by mapping existing work relevant to the taskforce and identifying evidence gaps which will be assigned to the various work streams. There is a lot of work out there and evidence to build on. This underlines the need for mapping.

The process for establishing priorities needs to be transparent and was discussed at the first face-to-face meeting of the Economic Taskforce occurred after the close of the first day of the 19th RBM MERG meeting. These priorities will need to be costed. This will make it easier to pull together resources to move forward with this work.

The task force is not commissioning work. It will work with other partners to move work forward. It was recognized that organization of the task force, mapping evidence and coordinating streams of work is time intensive. Members of the group are aware of this and planned to discuss it at the face-to-face meeting.

2.0 Updates from partner organizations

2.1 DHS/MIS update

Lia Florey-MEASURE DHS

Dr. Florey presented a list of recent and future DHS, MIS and SPA surveys. Those which say "malaria" included parasitemia testing.

A number of MIS were conducted by organizations other than MEASURE DHS. Despite repeated requests, only one of these 15 surveys has made their data publicly available. It is recognized that the research community is a bottleneck to releasing data sets due to the desire to use them for publication purposes. NMCPs are often hesitant to release data as well. Discussion in the MERG strongly urged people responsible for these surveys to provide data and documentation to Lia Florey so that it can be made available on the www.malariasurveys.org website. Organizations which fund these surveys were urged to require data sharing in their contracts with implementing countries and agencies.

Some other issues surrounding MIS surveys were raised. Some countries have not released reports for various reasons. For example, Eritrea had 2010 survey, but a report has not been released due to some possible methodological issues. Creation of a register of surveys in progress showing those which are discarded or delayed was suggested. Additionally, there are countries that have implemented "MIS" that don't have good methodology. There was some discussion on whether these surveys should go on the malariasurveys.org website and how MERG can provide guidance that will help partners ensure that future surveys are conducted using proper methodology.

A list of minimum methodological requirements for posting a survey on the site was proposed. Surveys should be: nationally representative of the population; use a transparent sampling methodology; include content suggested by MERG in the MIS package; be conducted independently, i.e. the people collecting data should not be those implementing interventions. The implementation of a grading process was suggested. It was decided that this would be revisited when more datasets were received.

2.2 UNICEF Data Collection Activities

Liliana Carvajal-UNICEF

Round 4 of MICS surveys will conclude in 2012. A list of these surveys was presented. MICS5 fieldwork will start as early as the end of this year and run until the end of 2014. A global pilot survey will be conducted in Bangladesh in April-June and final survey tools will be available in the second half of 2012.

As much as possible, UNICEF will keep all modules comparable with MICS4. Nonetheless, there are some changes in MICS5, Previously, there was no way to tell if someone was seeking care or receiving treatment at the community level. Now this is being aligned with the DHS method.

A combined list of UNICEF and MEASURE DHS surveys is available HERE.

2.3 ACTwatch update

Megan Littrell-PSI Kenya

ACTwatch is a 5 year, 7 country project funded by the Bill and Melinda Gates foundation with the objective of providing policy makers with evidence on trends in availability, price, and use of antimalarials. PSI, London School of Hygiene and Tropical Medicine (LSHTM) and Ministries of Health (MoH) work in partnership to implement this project which is finishing this year (2012). ACTwatch has completed a number of research studies to determine what affects access to antimalarials. These include outlet surveys carried out by PSI which examine the trends in the availability, volumes and price of antimalarials. LSHTM has implemented supply chain studies which look at the determinants of the price and availability of antimalarials at different levels of the supply chain. PSI also conducts household surveys to examine the trends in the levels of use of different antimalarials and determinants of use.

The outlet surveys provide national-level data on the total market, encompassing the public/not for profit and private sector. The market share of the various outlet types varied substantially by country and time and ACT market share increased over the span of the project. During these outlet surveys, ACTwatch was able to standardize methods to ensure reliable data collection, cleaning, and analysis. In the process, the project faced a number of challenges to auditing antimalarials as many medicines had inadequate label information. Defining the "total market", including the informal sector, finding community health workers and mobile providers, and achieving a good response rate among various provider types was also difficult. There is no list of many of these providers, especially in the informal sector, so creating a sample frame requires a lot of effort.

The household surveys collected nationally representative data on household fever and treatment and antimalarials. These surveys revealed a number of challenges understanding treatment. Respondents have a difficult time classifying where they sought treatment. For example, they may not know if a shop was licensed or unlicensed. Home treatment is also difficult to define. It is not clear what constitutes home treatment when this could mean many things to respondents.

ACTwatch also had the experience of studying supply and demand in low transmission settings in Cambodia. Large sample sizes were needed and there was low availability of antimalarials in outlet studies. Very low fever prevalence was reported, particularly when focusing on "malaria fever" (~1%). Drug cocktails were very common in this setting, so people with "malaria fever" don't know what they received. This makes it difficult to interpret market share results. Currently, Shen Mai in England is looking at chemical components of drug cocktails that were collected by ACTWatch. This is quite difficult.

The results of these surveys bring up a number of other pertinent research questions, including: how do our results compare with continuous information on stock and stock-outs and treatment-seeking behavior?; how are fever cases being managed? is treatment based on malaria blood test results?; what do changes in relative market share over time mean?

2.4 Global Fund M&E Evaluation Plan

Eline Korenromp-Global Fund

Dr. Korenromp provided an update on the Global Fund Evaluation strategy for 2012-2016, aligned to the *Strategy 2012-2016: Investing for Impact*. This strategy will use a partner approach to coordinate joint evaluations with other donors, technical, and in-country partners. Supported programs are encouraged to conduct Impact Evaluations using a plausibility design to assess the

overall impact on case and death burden due to the three diseases. Evaluations will assess causation and Global Fund contribution, without direct attribution to any individual agency or effort, focusing on impact, outcome and effectiveness.

Key outcome/impact questions include: have mortality/morbidity, incidence and/or prevalence changed? Are there changes in outcomes and behaviors? Are these changes positive or negative? Additional questions to assess contributions and causation include: has coverage of key services increased, and have interventions reached groups at risk? Has access by age, sex, equity and quality of services improved? Have finances been disbursed for key services and contributors? Is there sufficient quality data to assess changes in service coverage, outcomes and impact? Are there sources of bias? What was the Global Fund contribution to scale up resources and coverage of key interventions and outcomes? Are there other possible explanations and contributing factors to changing outcomes and impacts? How can contributions of the Global Fund be improved to better contribute to outcomes and impact? Are there management recommendations resulting from the impact evaluations?

There are 24 countries which Global Fund is prioritizing for impact evaluations; these include most of PMI's focus countries. Global Funds investment plan for M&E strengthening utilizes a checklist on M&E systems and capacity, which takes into account overall HIS and disease programs, data quality, and M&E gaps for investment. Global Fund will support comprehensive national evaluation plans, starting from a mapping of recent/ongoing/planned evaluations National Program Reviews and data collection systems; and identify gaps, partners and opportunities. In 2012 6-12 evaluations will take place across the HIV, TB and malaria portfolios combined; there will be M&E capacity assessments in 2-3; and 6-12 Data Quality Assessments will take place.

All supported programs require a National Program Review and/or evaluation every 3 years for grant renewals (Phase 2, Periodic Review). A standardized country impact rating (by Secretariat, using national program and WHO data) will complement grant performance reviews. This will help to determine the Phase 2 funding amount, potential reprogramming, possible recommendations to strengthen M&E and data quality, and the M&E grant budget allocation. Examples of Phase 2 Reviews, Periodic Reviews and Joint National Program Reviews from Eritrea, Bangladesh and Cambodia were given.

At institutional and portfolio level, the Global Fund will synthesize individual country evaluations into an institutional 12-year evaluation in 2013-2014. Every year, furthermore, the Global Fund estimates the lives saved through supported programs. The 2012-2016 Strategy has as overall goal to save 10 million lives through Global Fund-supported ITNs, ART and DOTS. These numbers are calculated from grant-reported service delivery results, using models agreed with WHO and UNAID. For ITNs, estimated to save lives from children under-5 in sub-Sahara Africa, this methodology is not inconsistent with the LiST / RBM / PMI methodology, estimating around 30% more lives saved when applied to national-total ITN distributions over 2002-2010.

2.5 Update on the Malaria Atlas Project

Peter Gething- University of Oxford

The Malaria Atlas Project (MAP) aims to develop an open-source cartographic information suite to inform malaria control and elimination globally. This includes P. falciparum endemicity maps, P. vivax endemicity maps, and maps on burden, anopheles distribution and inherited blood disorders. Data for these maps will be available open access via ROAD-MAP. Dr. Gething demonstrated examples of these various thematic maps from 2010.

MAP has created a model *P. vivax* endemicity. There are 95 *P. vivax* endemic countries and ~2.85 billion people at risk. This parasite is less amenable to control than *P. falciparum*. *P. vivax* has been thought of as a 'benign' infection, but this perception has been increasingly challenged by new evidence. Cartography of the burden of *P. vivax* has been largely neglected in the past. MAP uses an approach similar to the modelling approach as for *P. falciparum*, but estimates of burden are much less common and usually are based on special studies rather than representative data and some key differences in biology must be considered. For example, the nature and magnitude of the relapse effect is unclear. MAP is also looking into how to combine *P.vivax* maps with *P. falciparum* maps to provide composite risk map. All data on parasite prevalence included in these maps comes from RDT or microscopy. MAP is working to add Steve Meshnick's PCR data from Democratic Republic of Congo (DRC) to create a more nuanced picture of malaria prevalence there.

Maps are available on MAP website.

2.7 Elimination Scenario Planning

Michael Lynch-WHO

Dr. Lynch reviewed the elimination status of countries, as of 1 December 2011; Morocco, Turkmenistan, United Arab Emirates and Armenia were all certified malaria free within the last 5 years. Eight other countries are in the prevention of reintroduction phase. There has been substantial progress in fighting malaria worldwide and the magnitude of progress in some countries raises the question of malaria elimination. Countries considering elimination would benefit from a tool to provide rigor for program planning. WHO and partners (Clinton Health Access Initiative, Imperial College, Global Health Group) are developing an Elimination Scenario Planning (ESP) tool in response to a need for a malaria elimination planning.

The ESP tool has two main components: a manual, which reviews key concepts in elimination planning (technical, operational, financial feasibility of elimination) and a malaria transmission model. This model establishes a baseline transmission level and allows the user to explore the effect of different combinations of interventions. The software also includes a component for assessing the financial feasibility of elimination.

The manual and software were evaluated in a workshop held during May, 2012, in Banjul, including NMCP staff and partners from the Gambia and Senegal. The workshop aimed to assess the feasibility of eliminating malaria in Senegal and The Gambia using the ESP toolkit (with available country data) and evaluate the utility of the ESP toolkit for country-level strategic planning. Countries thought that the tool was useful for program planning and could be applied elsewhere; however, certain parts of manual could be made more clear, e.g. figures for determining baseline transmission, worksheets. Overall, the software was well received.

As a next step WHO and partners will revise the manual and software based on workshop feedback, share the tool more widely for review and test it again the Gambia and Senegal and a new setting before determining the best format for eventual release.

2.8 NetWorks Update

Albert Kilian-NetWorks

Between 2009 and 2012, universal LLIN distribution campaigns have taken place in 11 states in Nigeria with funding from USAID or DFID. NetWorks and partners have conducted post-campaign

surveys and evaluations in each state, applying new recommended universal coverage indicators to test their feasibility and usefulness. Ownership and use of ITNs varies by state. The gap between individual "access to an ITN" and ITN use shows substantial differences by state. In Kano, Nasarawa and Niger States, ITN use is approximately 5-10% less than access, i.e, 5-10% of individuals with access to an ITN did not sleep under an ITN the previous night. This "ownership gap" is much greater in other state such as Sokoto (~40%) and Katsina (~25%).

NetWorks is supporting community and school-based continuous distribution schemes and evaluating impact to sustain universal coverage. In Ghana a mixed model utilizing ANC, EPI and schools is in place. In Nigeria, distribution is taking place in CRS schools, and Nasarawa community. In South Sudan, community continuous distribution is ongoing.

NetWorks has also been involved in creating methodology to assess LLIN durability. There has been increasing interest in LLIN durability with respect to value for money and procurement decisions. Ideally this work would be able to calculate the "cost per useful life" for each LLIN product, but the methodology for this is not currently available. Savings could be as high as $1 billion in the next five years for an LLIN with a five year useful life and $ 1.5 billion for a seven-year LLIN. Significant progress in LLIN durability methodology was made with the publication of the WHOPES guidelines. It clarifies the two principle components that need to be considered when estimating durability of the fabric: attrition and physical integrity. One key aspect of physical integrity is the Proportionate Hole Index for Integrity (pHI) which classifies nets by the surface area of holes in the net. A common misconception is that once an ITN or LLIN has holes, it is no longer effective, but this is not true and effectiveness varies by pHI.

There are still gaps in measuring LLIN durability. There is no set methodology for interpreting and combining attrition and integrity data to get to a "useful life". It is not known above which pHI a net "useless". There is no exact definition of the "average useful life". In order to include all possible products in procurement and rate by durability need textile tests that reflect expected performance are needed. A study is taking place in Nigeria to help answer some of these questions.

A case-control study, led by Swiss Tropical Public Health Institute, on the impact of deterioration of nets on morbidity markers in children will take place in Kinshasa, DRC. Children attending health facility for malaria will be matched with non-malaria cases from same neighborhood and their nets will be assessed for pHI.

There are two studies in progress in Nigeria and Uganda to determine whether an intensive behavior change communication (BCC) program to promote repair and preventive maintenance can improve the "useful life" of the net. The outcome measure is *% of nets in good condition*.

There is also work being done on measuring the BCC impact on net use by Marc Boulay (JHCCP) using propensity score for exposure to BCC to internally match respondents in order to evaluate impact on net use. Several data sets have been explored so far (Tanzania, DRC, Nigeria).

2.9 ALMA Update

Melanie Renshaw-ALMA

The ALMA scorecard was conceptualized to improve accountability, monitoring and response to gaps in malaria control efforts and to help track progress against the Global Malaria Action Plan (GMAP). It is a simple tracking mechanism requested by ALMA Heads of State in order to trigger timely and targeted responses. The scorecard tracks national progress in each indicator on a quarterly basis on the ALMA website and is categorized and color-coded using a traffic-light system: red- "not on track", yellow- "some progress" and green-"target achieved/on track". There

are also quarterly summary reports with 15 high level impact indicators and recommendations and critical updates generated when key indicators are below established thresholds to generate rapid response to critical issues.

The scorecard has contributed to changes related to malaria programs. At the policy level, taxes on commodities have been taken off and artemisinin therapies have been banned based on these scorecards. Ministers have asked to be informed before bad news is given to presidents. There have been additional asks to the WB in terms of the finances due to highlights of financial gaps. Programs have also reprogrammed Global Fund grants to fill in gaps. There are other efforts which may have effected these changes, but ALMA believes it is contributing to changes. Targeting scorecards to other ministries, such as finance is on the agenda at this point. Interest in broadening this was expressed, for example to neglected tropical diseases. There have been discussions on this. It is a difficult balance between information overload and needs. There are a lot of other scorecards coming out. Even to get the malaria card required six months of discussion. Questions on scorecard priorities are being referred back to heads of states.

An iPad app has been created based on the original Excel tracking tool and iPads will be distributed to in country focal points to facilitate the use of this tool in English and French in 2012. The objectives of this tool are to: increase engagement of focal points on malaria and Maternal, Newborn and Child Health (MNCH) issues; facilitate tracking and monitoring of recommended action items from Global Scorecard; provide a central repository of malaria and MNCH-related information to focal points, including best practices to improve performance on indicators; encourage more regular communications between ALMA and focal points; and improve communications and transparency amongst the ALMA team.

2.10 PMI Impact Evaluations

Carrie Nielsen-PMI/CDC

The RBM MERG Framework for Impact Evaluation aims to assess trends in: all-cause under-five mortality; malaria morbidity (anemia, parasitemia); malaria control interventions; and alternate explanations for decreased mortality. It also seeks to conclude whether it is plausible that scale up of malaria control interventions reduced malaria-related deaths. PMI is currently funding impact evaluations based on this framework in 15 focus countries between 2010-2014, based on availability of data on mortality. Evaluations will be conducted in collaboration with or taking into account the work of other health partners when possible.

These evaluations utilize a variety of data sources including primary data such as nationally representative, population-based household surveys (DHS, MICS, MIS) and additional supporting data (demographic surveillance and sentinel sites, health facility and HMIS data, weather data (temperature & rainfall) and malaria mortality and risk models (e.g., LiST). There will be no new data collection, only existing data sets will be used. Dr. Nielsen provided an in-depth overview of where each country is in the evaluation process.

There was a Technical Advisory Meeting held on the first Evaluation report in April and participants expressed interest in hearing how recommendations from that meeting will be incorporated into future evaluations.

DRC, Nigeria and South Sudan were not on the list of countries to evaluate. Interest in evaluating the malaria control efforts in these extremely high burden countries was expressed. This was

discussed with DRC. These evaluations focus on 15 original PMI countries but other PMI focus countries may be included in future rounds of evaluations after the original round is complete.

2.11 RBM P&I Series Country Reports

Eric Mouzin-RBM Secretariat

There are three types of Progress and Impact Series reports including: overview reports, country reports and specific topic area reports. To date, 12 reports have been released as part of the RBM P&I series, including: Country Funding and Resource Utilization; World Malaria Day 2010: Africa Update; Saving Lives with Malaria Control: Counting Down to the Millennium Development Goals; Focus on Senegal; Mathematical Modeling to Support Malaria Control and Elimination; Business Investing in Malaria Control; Economic Returns and a Healthy Workforce; A Decade of Partnership and Results; Eliminating Malaria; and Malaria Outside Africa. Country specific reports on Senegal, Zambia, Mainland Tanzania and Nigeria have also been released. Reports on Angola, Madagascar, Malawi, Rwanda, Swaziland and possibly DRC are scheduled for the rest of 2012.

2.12 World Malaria Report 2012

Richard Cibulskis-WHO

The 2012 World Malaria Report will be launched on December 11, 2012. Last year there were inputs from ACTwatch. This year there will be inputs from the Tanzania impact evaluation report and other impact evaluation reports made available in time. Melanie Renshaw and Holly Newby reviewed the report last year. Individual chapters are also reviewed. Those interested in reviewing the entire report or chapters should contact Richard Cibulskis.

3.0 Tracking GMAP Objectives, Targets and Milestones

3.1 Review of GMAP Objectives, Targets and Milestones

Thomas Teuscher-RBM Secretariat

The Board recognizes that the objectives, targets, and milestones for 2012-2015 are aspirational but asserts that any effort short of achieving universal access to and utilization of available and effective preventive, diagnostic, and treatment measures is accepting continued intolerable suffering from malaria.

There are three Global Malaria Action Plan objectives: 1) Reduce global malaria deaths to near zero by end 2015 (in areas where public health facilities are able to provide a parasitological test to all suspected malaria cases, near zero malaria deaths is defined as no more than 1 confirmed malaria death per 100,000 population at risk); 2) Reduce global malaria cases by 75% by end 2015 (from 2000 levels) 3) Eliminate malaria by end 2015 in 10 new countries (since 2008) and in the WHO Europe Region.

The seven GMAP targets include: Target 1.1 Achieve universal access to case management in the public sector; Target 1.2 Achieve universal access to case management, or appropriate referral, in the private sector; Target 1.3 Achieve universal access to community case management (CCM) of malaria; Target 2.1 Achieve universal coverage with and utilization of prevention measures; Target 2.2 Sustain universal coverage with and utilization of prevention measures; Target 2.3 Accelerate

development of surveillance systems; Target 3.1 is the same as Objective 3. Each of these targets is associated with one or more milestones that were presented.

The next steps in the process of rolling out the GMAP are to launch the WHO surveillance guidelines and define a strategy to support implementation of guidelines; publish the updated MERG "blue book" on survey indicators, with MERG ownership, joint authorship and finalization within 60 days of the MERG meeting; effective dissemination and uptake in national plans; supporting countries in phase two of implementation.

Dr. Teuscher also suggested that the MERG review its TOR and membership to reflect the needs of the RBM Partnership.

3.2 Modeling the feasibility of achieving GMAP targets

Jamie Griffin-Imperial College London

The Imperial College Malaria Transmission Model includes the main current interventions: LLINs, IRS, IPT, Mass drug administration (MDA), with or without screening; pre-erythrocytic vaccine (RTS,S), and a switch to ACT regimens as first-line therapy. There is an individual-based model for flexibility in looking at combinations of interventions. The transmission model is identical to a deterministic compartmental model that Imperial College has fitted to multiple sources of data using Bayesian methods.

Jamie Griffin published an article entitled *Reducing Plasmodium Falciparum Malaria Transmission in Africa: A Model- Based Evaluation of Intervention Strategies* in PLos Medicine in 2010. The model-fitting was mainly to parasite prevalence and looked at impact of interventions on transmission, as reflected in prevalence. It only parameterized for several specific sites. To parameterize the model for Africa, an estimate of pre-intervention prevalence, data on recent and current interventions – LLINs and IRS, seasonality and mosquito species were used.

Results from the model showed a decrease in deaths and estimated incidence of clinical cases in under fives, and estimate prevalence in two to ten year-olds with a scale-up to 95% coverage of either LLINs or IRS, plus 95% effective treatment. To better link the model to disease and mortality Imperial College has recently fit the model to more extensive data of clinical incidence and to severe disease and mortality data.

Software, which has been developed to aid malaria elimination scenario planning at country level, called Malaria Tools is currently available for free from Imperial College.

3.3 Targets 1.1-1.3 Universal access to case management

3.3.1 Review of existing case management indicators and those suggested by Survey and Indicator Task Force and other sources

Richard Cibulskis-WHO and Misun Choi-PMI/USAID

Richard Cibulskis presented a video on T3: Test, Track, Treat, which is a new WHO initiative. After reviewing the targets for case management, including the GMAP objectives and targets, he presented the WHO recommended indicators from the World Malaria Report, Disease Surveillance for Malaria Control (2012), Universal Access to Diagnostic Testing (2011).

It was agreed by the Survey and Indicator Task Force at their meeting in May 2012 that the diagnostic indicator from household surveys is not problematic and that focus needs to be put on finding better treatment indicators. He then discussed the issues with previous treatment indicators, which included *the percentage of children with fever in past two weeks receiving any anti-malarial treatment*. However, not all fever cases should receive antimalarials. This indicator is difficult to interpret because diagnostics allow programs to exclude non-malarious fevers from treatment. In this case, the previous indicator would go down rather than up, as in the case in Rwanda where diagnostic capacity is high and most cases are confirmed before treatment.

One way to deal with this issue in surveys would be to ask caregivers about their test results so that non-malarias fevers could be excluded from the denominator. Getting information on diagnostic results from patients or their care givers does not seem to be accurate. Results from Zambia (Kilian) show that when asked about the malaria test results that were provided to the patient, almost everyone reported a positive test. There could be reasons for the high proportion of positive results. Individuals may have been given the final result incorrectly, or may have assumed that they had malaria because they were tested for it.

Additionally, research on patient recall of test results is being carried out by Thom Eisele. This will hopefully clarify the accuracy of collecting these data through surveys.

The interim indicator *Proportion receiving first line treatment, among children under five years old with fever in the last two weeks who received any antimalarial drugs* will be presented in the document *Household Indicators for Malaria Control*. The Survey and Indicator Task Force concluded at their May 2012 meeting that they would use the Universal Access to Diagnostics manual as starting point and add two more indicators: *percentage of test –ve cases receiving antimalarials* and *percentage of presumed malaria cases receiving antimalarial* . The task force also recommended a service readiness index for malaria that would come from facility surveys.

3.3.2 An Inventory of PMI-Supported Health Facility Surveys

Carrie Nielsen-PMI/CDC

Relying solely on population-based household surveys or routine data to measure malaria case management indicators may not be best for providing most accurate data as there are concerns about recall when using household surveys to measure "prompt and effective treatment". The quality of routine data is also uncertain in many instances. Health facility surveys could be an alternative, but not necessarily a replacement, to provide more valid measures; however, there is an inherent selection bias we need to deal with since health facility surveys only capture data for those seeking treatment at health facilities. This bias might potentially be mitigated if a high (or known) proportion of the population uses the formal health sector, though appropriate means of dealing with these biases deserve further investigation. Therefore, health facility surveys might address "effective", but not necessarily "prompt" treatment. Health facility surveys do, however, provide data on determinants of effective case management, including as commodity stocks, health worker training and lab capacity.

Six PMI-supported surveys from Angola, Benin, Ghana, Malawi, a SPA from Rwanda, and Uganda that were conducted between 2007 and 2011 were inventoried. All of these surveys were conducted at the national level with the exception of Angola, which was conducted only in the Huambo province The surveys were stratified on various factors but the three main methods of stratification were by hospital vs. non-hospital settings, by whether the facilities were public vs. private practice. The survey in Malawi reported by region as well as by type of patient. Findings from the health facility survey inventory were summarized regarding whether the survey addressed: commodities stock (either stock availability or stockout of ACTs, SP, RDTs), lab capacity,

national case management policy, health worker performance, personnel indicators at the health facility and patient adherence.

Specific indicators varied widely across the surveys and a great deal of summarizing and collapsing of categories was necessary in order to contain the indicators that were reported in the surveys. For ACTs, all six of the surveys reported on whether the facilities either had stock or a stock out on the day of the survey or in the past three or six months. Only four of the surveys reported on whether the facilities had stock or a stock out of SP on the day of the survey and only two surveys reported on any history of SP stock or stock out in the past three to six months. All six surveys reported assessing diagnostics stock. Five of the six surveys reported on if they looked for a diagnostics and/or treatment benchaid or copy of the national case management guidelines at the facilities. Only half of the surveys reported anything on quality assurance/control of the laboratories.

Surveys measured health worker performance in two ways. In countries where the national policy was clear, surveys used this national policy to assess health worker performance. This was the case in three of the surveys. Alternatively, when the aspects of the case management policy were either not clear, had not been effectively communicated, or a key commodity, such as RDTs, had not reached some of the facilities, then surveyors applied a gold standard algorithm to assess health worker performance as was the case in three of the surveys. One survey did not measure health worker performance and another survey applied both approaches. All six surveys reported on some measure of health worker training but the type of training and the length of time since the training varied greatly. Across different aspects of health worker performance all but one assessed identification of a suspect case or a patient with a fever and on testing. Four of the surveys reported on treatment. In addition, five of the six surveys reported on IPTp.

After this inventory it was concluded that the current indicators in health facility surveys vary widely and are not standardized. It is clear that there are great complexities in measuring health worker performance in the absence of clear national case management policy. Dr. Nielsen asked the group whether health worker performance should be included as a recommended indicator.

The next steps are to have a consensus on core indicators; create clearly-defined indicator definitions; discuss suitable data sources for each indicator; and consider appropriate and feasible methods for capturing indicators in health facility surveys as there are multiple methodologies that are currently used.

3.3.3 Validation of questions in standardized household surveys for assessing caregivers' recall of diagnosis and antimalarial treatment for their children at health clinics

Thom Eisele-Tulane University

Malaria control programs increasingly rely on national household surveys to assess the *proportion of children <5 with fever in ≤2 weeks who received an effective antimalarial within 1-2 days from fever onset*. However, what is really needed under current control efforts is the *proportion of children <5 with fever in ≤2 weeks with a malaria parasite infection who received an effective antimalarial within 1-2 days from fever onset*. Caregivers are now asked by surveys if a child received finger/heel stick (malaria diagnosis), but they are not currently asked if they recall the result of malaria diagnostic test. These indicators are subject to a caregiver/mother's recall of what happened during fever episode and there is the potential for information bias. The indicators and their means of measurement have yet to be validated against a gold-standard to assess accuracy of a mother's recall.

The aim of this study is to assess the effect of recall on accuracy of measuring a primary coverage indicator for malaria diagnosis and treatment collected from household surveys. The objectives of the study include: compared to a gold-standard of direct observation of a child's care for a fever at health facility, 1. assess mother/caregiver's accuracy of recalling if child received a finger/heel stick for malaria diagnosis, up to 2 weeks after visit date; 2. assess mother/caregiver's accuracy of recalling the result of malaria diagnostic test up to 2 week after visit date; 3. assess mother/caregiver's accuracy of recalling if malaria treatment was given, including the type of antimalarial given, up to the second week after the visit. Results from this study will allow the measurement and interpretation of standardized indicators on malaria diagnosis and treatment in children with fevers to be improved.

The study is taking place in five rural, public, out-patient health facilities in Kaoma District, Western province, Zambia covered by new rapid malaria reporting system. The target population includes mothers/caregivers 18-49 years old of children under five who were taken to outpatient clinic with fever. The study is comparable to DHS, MIS and MICS to a large degree and is using modified DHS/MIS women's questionnaire to ascertain details of diagnosis and treatment sought by mothers or caregivers. The study measures sensitivity and specificity of mother/caregivers' recall of: whether child with fever received a finger/heel stick for malaria diagnosis; results of malaria diagnostic test and; antimalarial treatment given to the child.

A prospective case-control study design will be used to meet the specific objectives of this study. The study will identify mothers/caregivers who live in the house of children 1-59 months with suspected malaria fevers taken for care at selected health facilities. Details of diagnosis, result and treatment will be captured during the clinic visit (to serve as gold standard against which accuracy of recall will be assessed). Mothers/caregivers identified will be asked if they could be followed-up at their home within two weeks where they will be asked questions related to their recall of the care their child received during the clinic visit.

Sensitivity and specificity, along with 95% confidence intervals, will be estimated using standard methods in STATA. Sensitivity and specificity will be disaggregated by child, caregiver and household characteristics. If statistical power allows, logistic regression model will be used to assess how individual and household-level factors influence mothers recall of diagnosis and treatment, while controlling for potential confounding factors.

3.4 Target 2.3: Development of surveillance systems

3.4.1 Surveillance checklist

Michael Lynch-WHO

To contribute to the achievement of GMAP Target 2.3: Accelerate development of surveillance systems, WHO has released two surveillance manuals: *Disease Surveillance for Malaria Control* and *Disease Surveillance for Malaria Elimination*. This guidance is currently being implemented. The initial steps of implementation involve the evaluation of current systems. CDC has a methodology for these evaluations presented in the CDC Guidelines for Evaluating Public Health Surveillance Systems. This is a Comprehensive assessment with multiple parts to engage stakeholders, describe the system, focus the design, gather credible evidence on the performance of the system, make conclusions and recommendations, and ensure use of recommendations.

There are also other approaches to evaluating surveillance systems such as DQA and ad hoc assessments. WHO is creating a checklist for this purpose. Evidence shows that using checklists simplifies complex tasks by identifying essential elements of a process. This allows for assessment of overall quality of system as well as identification of missing key components. Checklists have been used successfully in the fields of engineering, aviation and clinical medicine. Essential elements for surveillance have been identified for the checklist. These include: 1. diagnosis, 2. recording, 3. tallying, 4. reporting, 5. information system core data, 6. reporting rates, 7. quality and completeness of data, 8. consistency of data over time, 9. coverage of health services, 10. documentation, 11. use of information and, 12. resources.

There are a number of ways to utilize a checklist in the evaluation of surveillance systems. The checklist could be applied during an onsite visit or desk review; it could also be part of a self report. It can be used at the system or facility level. It can also be used to assess quality of data produced and identify gaps in a system.

3.5 Targets 2.1.-2.2. Indicators of universal access to and utilization of prevention measures

3.5.1 Review of MIP indicators and those suggested by Survey and Indicator Task Force and other sources

Erin Eckert-PMI/USAID

The Survey and Indicator Guidance Task Force met in May 2012. During this meeting they discussed data gaps for Malaria in Pregnancy (MIP) and recommended indicators to fill these gaps. MIP is a WHO-recommended 3-pronged approach including ITN, IPTp and case management of malaria illness (including anemia)in pregnancy. It is delivered as part of basic ANC.

Data from the PMI 2012 report show progress in most countries in terms of ITN use by pregnant women. However, all countries are still far from reaching the 85% target. IPTp2 coverage is even further from the 85% target; furthermore, in a number of countries progress is not being made. This finding was called out in the external review of PMI. Now PMI is challenged to explain why coverage is not better. Several potential explanations exist. Patterns of ANC use may not be conducive to this level of coverage if women begin attending ANC too late or do not frequent ANC enough. As there is high ANC attendance in most places, this maybe a timing issue. Providers may lack of knowledge, have concerns on outdated issues regarding IPTp risks (there have been changes in recommendations but training has not caught up). Guidelines and protocols are inconsistent recommending 2 or more doses when 3-4 should be recommended. There may be need for better prevention in low-transmission settings. It seems that there is also a lack of coordination between reproductive health and malaria programs at country level, which means that no one is fully taking responsibility for IPTp. There has been fragmented planning and budgeting (different groups responsible for ITN, SP, training, etc.). Finally, drug resistance to SP has been detected in some places (East Africa, especially, where was once a firstline drug).

Proposed MIP indicators were presented. Suggested facility based indicators include:

1. *Percent of facilities that offer antenatal care services*
2. *Among facilities offering antenatal services, percent that have:*
   - LLINs for distribution to ANC clients
   - SP in stock
   - Personnel trained in malaria in pregnancy

- IPTp protocol available/displayed on site
- No stockout of SP lasting longer than 3 days in the last 3 months

3. *Service Readiness for Malaria in Pregnancy*
   Numerator: # of ANC facilities with LLINs, SP, and personnel trained in MIP
   Denominator: # of facilities offering ANC
4. *Number/percent of ALL health facilities with* [Antimalarial] in *stock on the day of the survey*
5. *Number/percent of ALL health facilities that have had a stockout of greater than 3 days during the last 3 months for:*
   - 1st line treatment by presentation
   - Other ACT
   - SP
   - Artesunate monotherapy, etc.
   - Other non-artemisinin monotherapy
   - Injectable artesunate
   - Rectal artesunate
   - Oral quinine
   - Injectable quinine

6. *Percent of ANC clients eligible for IPTp1 (ANC clients in their 2nd or 3rd trimester who have not had a previous dose of SP)*
7. *Number and percent of all consultations that are for ANC*
8. *Percent of ANC consultations that are counseled on MIP issues*
9. *Percent of first ANC consultations that receive a bednet*
10. *Percent of eligible ANC clients who receive a dose of SP (excluding any ANC clients in their 1st trimester or who received a previous dose of SP < 1 month prior to the consultation)*
11. *Percent of IPTp1-eligible women who received a dose of SP during the consultation*
12. *Percent of ANC clients eligible for IPTp2 (ANC clients in their 2nd or 3rd trimester who have previously received a dose of SP more than 1 month prior to the consultation)*
13. *Percent of IPTp2-eligible women who received a dose of SP during the consultation*

3.5.2 Monitoring of IRS programs

Marlize Coleman-Liverpool School of Tropical Medicine

IRS is used in 73 countries, 36 of which are in Africa. IRS is an expensive, technically challenging activity, which has the potential to reduce mortality and morbidity. IRS programs need data to make decisions throughout the implementation process. Before spraying programs must budget, choose an insecticide and determine how much to order, decide where to spray, how many spray operators to utilize, ensure that there is enough spray equipment, transport, data collection forms and spray sheets and put an IEC strategy in place. During spraying, progress of spray teams and supplies must be monitored closely and spot checks must be carried out. After spraying takes place activities must be assessed against coverage targets and for quality and impact needs to be measured. All of this information needs to be used for future planning.

One major challenge to monitoring coverage of IRS is the unit of measure. This could be households, structures, rooms or population. Depending on the unit of measure, coverage rates may vary greatly. Dr. Coleman sought guidance from the MERG on which unit of measure to use.

There are many challenges in the process of monitoring IRS programs. It is difficult to standardize terms and definitions. There is a need to prevent data collection overload for spray operators so that good quality data is collected without compromising good IRS practices. There has been limited availability and use of quality tools for data collection, data entry, data storage, quality verification, data integration, data mining, data reporting and management. As with all interventions data sharing interpretation and use of information for decision-making among partners is a challenge. Data sharing amongst all stakeholders and partners.

Dr. Coleman presented a number of data collection forms and demonstrated the functionality of the Disease Data Management System (DDMS) that supports decision making in an operational environment. It offers a multi disease platform in a licensed, royalty free software that is available HERE.

3.6 Morbidity and Mortality Tracking: Measuring Objectives 1 and 2:

3.6.1 Estimating clinical incidence from parasite rate surveys

Peter Gething-MAP

The cartographic approach allows estimation in absence of routine case reporting. Using a map of stratified transmission intensity and active case detection data strata-specific incidence rates are defined. These are multiplied by the population to get the total number of cases or clinical incidence. A clinical incidence map using MAP 2007 data was presented showing the results of this approach.

There are strengths and weaknesses to this approach. In 35 African countries the parasite rate provides rich baseline. It is a direct metric of transmission, and the method can incorporate the effects of interventions. The incidence relationship is imperfect but avoids need to stratify into coarse strata and captures considerable uncertainty. Where routine reporting stronger, the parasite rate baseline is weaker because there are less parasite rate surveys and lower prevalence. The incidence relationship is noisy at the low end and there is large uncertainty.

In the future MAP will improve upon this with underlying prevalence rate map (greater precision, more contemporary). There is discussion of creating a similar map for *P. Vivax* and using surveillance data.

3.6.2 Surveillance data

Richard Cibulskis -WHO

Richard Cibulskis presented WHO surveillance data control charts. These charts depict malaria incidence rates, proportional malaria incidence, general patient attendance, diagnostic effort, quality of diagnosis and reporting and the percentage of cases due to *P. falciparum*. WHO estimates for malaria cases per 1000 and deaths per 100 000 persons at risk showed a reduction of 17% in case incidence and 28% in the mortality rate between 2000 and 2010.

3.7 Progress towards GMAP 3: Malaria Elimination

Michael Lynch-WHO

Objective 3 of the GMAP is to eliminate malaria by end 2015 in 10 new countries (since 2008) and in the WHO Europe Region. The associated milestone is: by end 2013, malaria is eliminated in 3 new countries. Ten out of 53 countries in the European Region were affected by malaria in 2000. As of 2011, locally acquired malaria cases were reported in only three countries: Azerbaijan, Tajikistan and one case in Georgia. Turkmenistan was certified malaria-free by WHO in 2010, Armenia – in 2011. The milestone for this objective is on track to be met.

Certification of malaria elimination is granted by WHO after proving beyond reasonable doubt that the chain of local human malaria transmission by Anopheles mosquitoes has been fully interrupted in an entire country for at least three consecutive years. Criteria for certification include adequate laboratory and surveillance capacity to detect and respond to cases. WHO has established four phases moving towards elimination including control, prelimination, elimination and prevention of reintroduction. WHO started to classify countries by program phase following release of Elimination Field Manual in 2007

3.8 Next steps for tracking GMAP Objectives, Targets and Milestones

Richard Cibulskis-WHO

Richard Cibulskis presented a draft table linking indicators to the GMAP objectives and targets. This includes all indicators from the *Household Survey Indicators for Malaria Control* and a number of indicators which are derived from routine systems.

There are still some data gaps to tracking the GMAP, which were highlighted throughout the meeting. Specifically, tracking cases and deaths is problematic. One next step for resolving this issue is the convening of a WHO evidence review group. This group is composed of people not involved in burden estimation: half are general health experts and half are malaria experts. WHO is hoping to get independent advice and then engage with independent burden estimation groups. The group will go through different uses of data at the global and national level as a first step. If anyone has any important bullet points of what is of interest to their organization, Richard welcomes hearing about this. The first meeting will take place at the end of June and another two meetings will occur within 12 months. The group will report back in September 2013. On the way they may come up with recommendations. The need to have a more rapid turnaround was expressed. The sooner something is available on country estimation, the sooner funds can be programmed. It is important not to put too much weight on global mortality estimates. Country estimates are of more interest.

MERG will should link with next round of goals and targets for the GMAP. Goals and objectives should be more reality based in round two of the GMAP. MERG will play a role in the development of an M&E framework around GMAP targets from the beginning of the process. Work on this will occur in the 2013-2014 timeframe.

Some indicators have been suggested to fill the gaps in information on case management. These are mainly from routine systems and facility surveys. There are two SPA surveys being implemented in Tanzania and Malawi in the fall, which will include new indicators as a pilot. Data will be ready early next year, but not in time for presentation at the next MERG meeting. The thought is that these pieces will be included in the next round review of the SPA. A meeting on indicators coming from facility data will take place before the next MERG to define indicator definitions. Next week CMWG will meet and discuss the thoughts of MERG from this meeting. Routine indicators on case management will be added to WHO guidelines.

Criteria for elimination classification and subnationational classification will be clarified and reported back to WHO in September.

Diagnostics and ITN indicators are adequate for tracking the GMAP. The appropriate unit of measure for IRS indicators (household, structure, room, population, etc.) will need to be discussed. To answer this question it is important to know the minimum threshold of spraying for IRS to be effective. WHO guidance on this from the Eradication Program will be examined to determine whether or not it is evidence based.

4.0 Sub-national level monitoring tools and analysis

4.1 Using district-level routine data on confirmed malaria cases to evaluate the ITN program: an example from Zambia 2009-2010

Thom Eisele-Tulane University

Dr. Eisele presented methods and preliminary results of a district-level analysis in Zambia using data from 2009-2011 to assess the association of ITN program intensity and monthly routine in-patient confirmed malaria cases, while accounting for climate, routine reporting completeness, access to care and other factors. Compared to assessing trends over time, this is an alternative way of using routine data on parasitologically-confirmed out-patient malaria cases to evaluate malaria control programs.

Since 2006, Zambia has been scaling-up rapid diagnostic tests (RDTs) to improve diagnostic accuracy. Health facility reporting has also improved over this same time; the number of facilities reporting has increased from 1,327 in 2006 to 1,610 in 2010. Starting in 2009, facilities have reported both clinical and parasitologically-confirmed positive (by RDT or microscopy) malaria cases through HMIS on monthly basis. Differences in incidence risk are largely due to heterogeneity across districts. To assess how ITNs are associated with differences in incidence Dr. Eisele first used a Poisson model accounting for climate, completeness of reporting and access to care and smooth for spatial and temporal autocorrelation. He then used a negative binomial multivariate model to examine random effects at the district level. The outcome of interest was parasitologically confirmed cases at discrete district-month units. Geostatistical models were used to estimate continuous surface of ITNs per capita (ITN / people in primary sampling unit).

Some conclusions have been drawn at this point. An additional mean ITN per household was associated with a 19% reduction in confirmed malaria case incidence (i.e. going from 0.5 ITNs per household to 1.5 ITN per household) after accounting for climate, HMIS reporting, testing rates and access/treatment seeking. This analysis demonstrates that there are valid and useful ways routine HMIS (and malaria program data) can be used for program evaluations, especially as access to diagnostic and treatment and HMIS improve. They must account for climate, HMIS reporting, testing rate, treatment access and treatment seeking behavior to mitigate known bias of HMIS data. These type of analysis will be critical in helping to validate evaluations of full-coverage malaria control programs using an ecological (*i.e. plausibility*) study design. However, it was recognized that data quality in Zambia is better than most countries in the region. Data quality and completeness may restrict the use of these analyses in some countries.

Future analysis will attempt to account for spatial and temporal autocorrelation using a conditional autoregressive model (CAR) in Bayesian framework. Analysis will become more robust with inclusion of more years on observation of confirmed malaria cases (at least 2011). IRS will be included- perhaps stratified analysis limited to districts targeted for IRS. Dr. Eisele will include 2012 MIS data and 2011 estimates of program intensity before publishing.

4.2 Operationalizing Malaria Surveillance Dashboards

Peter Nasokho-MEASURE Evaluation/ICF International

Peter Nasokho reported on early findings from instituting a surveillance dashboard system in Kenya. The Division of Malaria Control, Kenya organized three stakeholder consultative workshops to review the WHO malaria surveillance dashboards to inform how the surveillance dashboards could be operationalized within the existing M&E system and HIS.

A pilot of the dashboards took place in six districts in Kenya with the aim of costing malaria surveillance data collection methodologies and plans; documenting evidence gathered for scalability to the national level and drafting a national roll-out plan for malaria surveillance data collection. Both a passive and mixed model for surveillance were piloted. The results showed that more cases tested than suspected in the passive model. There was low diagnostic capability to confirm suspected malaria cases; patients were treated with ACTs without confirmation; inpatient malaria deaths data was available at the facilities but not reported; and there were discrepancies in reporting data by the facilities.

A number of challenges were discovered during the pilot. There was incomplete data due to late reporting of some facilities. Records were not properly kept or recorded at facilities. Additionally, there were problems accessing remote facilities.

Based on the pilot, recommendations for improving the dashboard were made. An emphasis should be placed on malaria case management (diagnosis and treatment). Supportive supervision focused on data quality issues needs to be encouraged to improve reporting and reliability of data. Focused training on malaria surveillance should take place, including interpretation and monitoring of key indicators and uploading data from district into a centralized database. Furthermore, the system should provide a mechanism of communicating malaria data to stakeholders.

4.3 Sub-national level monitoring tools

Anja Terlouw-Liverpool School of Tropical Medicine

At the last MERG meeting district-level M&E methods were identified as a need for a several reasons. National level assessments may miss important variation in control interventions and progress within countries. As coverage targets move to universal coverage, knowledge on sub-national variation will become key to reaching national targets. There is a need to link data to the malaria control 'decision-unit' and risk strata, which contrasts with some current data collection which is not representative of the level at which many programs make decisions. There is concern about funding levels which may drive a more focused approach at sub-national level. There is more pressure to have regular data beyond that which comes from surveys every 3-5 years and other methods to fill in the gaps is needed. Rolling surveys could provide more programmatically relevant information. Furthermore, there is a need for guidance on M&E in low-transmission areas, especially in terms of sample size estimation. This is particularly a problem when testing for parasitemia in low prevalence populations.

Dr. Terlouw assessed interest of the MERG in providing guidance on the current M&E methods, including guidance on a review process and quality assessment of novel tools. The MERG could potentially assess: the role of existing data sources (e.g. DSS); burden estimate modelling; an adapted MIS survey tool; district level oversampling within household surveys; sub-national MIS in selected districts; continuous household surveys (e.g. 'rolling' MIS); adapted health facility routine

monitoring; sampling of 'easy access groups'; methods to reduce/eliminate bias from convenience sampling estimates of health indicators**;** Lot Quality Assurance Sampling (LQAS) and; follow up of hotspots/active case-finding / response-driven-sampling,

In Malawi some of these M&E methods are already being explored. There has been a continuous (rolling) MIS since May 2010, an Easy Access Group Evaluation project since May 2011 and there is a pilot of the MDSS. Representatives from MEASURE DHS voiced that there has been a continuous DHS in Peru for a number of years. It is difficult to get funding for this and it is difficult to implement.

It was also mentioned that there are a lot of subnational survey data in various countries. The experience so far is mixed. In some places it is difficult to detect changes. There is a need for more understanding of how these data change over time and the dynamic of these processes, such as anemia. After understanding the process, sampling methods can be examined to see how to best pick up these changes.

There have been several presentations on LQAS to the MERG and it has not been well accepted. It was initially presented as a tool to report annually for funding requests. Now it is being proposed as a tool for program management so that resources are better utilized. For this purpose, it may be worth reexamination as an alternative to surveys, facility surveys and routine information, which are expensive and time consuming. World Bank has used LQAS mainly to see if there has been an achievement of coverage targets. This is for program management so that managers can see if they are on track or not between baseline and end line surveys. The MERG has been uncomfortable with the idea of aggregating LQAS data to the national level to get an estimate that is similar to point estimates provided by surveys. However, in the Senegal River Basin, national aggregate estimates from LQAS data look credible. This will be compared with MIS results for the same indicators. This may be the first time that such comparison will be made under field conditions. UNICEF is also starting to use LQAS in Africa. This is to get more disaggregated data at the district level. There is also talk of oversampling in some districts for MICS. This can be discussed at MERG if this occurs in highly endemic malaria countries.

It was concluded that a formal process of reviewing alternative methods would be helpful in the case that these methods could be implemented at a large scale or modeled using other data as an example. Further discussion in MERG is also needed on how to use sub national level data in different settings. There is a need to take into account what is going on in other areas as this topic is explored further. There was a meeting on this in Bellagio last year organized by Jennifer Bryce. The conclusions were somewhat daunting

The topic of alternative and sub national data collection techniques will be put on the agenda for the next MERG meeting.

4.4 Preliminary results from district-level analysis of DHS data in Malawi

Lia Florey-MEASURE DHS/ICF International

Since 1989 there has been a decrease in all cause under 5 mortality in Malawi as demonstrated through DHS data and IGME estimates. Since 2000, there has been an increase in ITN coverage. Analysis is currently being conducted to model the association between increases in coverage of malaria control interventions and reductions in under-five mortality controlling for other changes in other variables associated with child survival.

There are some challenges faced in this analysis. Data on ITN ownership and use are cross-sectional and represent the day of and night previous to the survey, whereas mortality data cover a number of years preceding the survey. Data on ITN use do not include data for dead children. In addition, there is limited data for covariates (other factors related to child survival).

The analysis uses multivariable Poisson models to examine the outcome of deaths among children under five, by district and year, using several approaches to account for change in ITN coverage and controlling for other predictors of child mortality. The key predictor in the model is household ITN ownership and the number of ITNs distributed. A number of socioeconomic, maternal and child health and climatic covariates are included in the models.

Four models have been used thus far. The first model uses duration of ITN ownership information from 2010 to reconstruct history of ITN ownership going back in time. The second uses the district-level ITN ownership estimates from 2006 MICS and 2010 DHS. The third model employs ITN distribution data from PSI. An additional approach was attempted, which modeled the use of ITNs by siblings for dead children, but there were too many cases in which data was be missing to make this a tenable option.

Dr. Florey solicited ideas for other covariates from participants. A suggestion to include exclusive breastfeeding under six months or standard breastfeeding practice for children six months-two years was made.

It was recognized that the decline in mortality began before ITN ownership and use scaled up and that it may be difficult to show a plausible association between the intervention and outcome.

5.0 MERG business issues

5.1 2013 MERG work plan

Richard Cibulskis-WHO

The RBM-funded MERG work plan for 2012 included $41,250 of confirmed funding. This is allocated to a toolkit for measuring case management indicators and data quality, sponsorship for endemic country participants to attend MERG meetings and distribution of the Household Survey Indicators for Malaria Control.

Contributions to the RBM-funded 2013-2014 MERG work plan need to be made by November 2012. Suggestions included creation of guidance on measuring case management and MIP through facility surveys and surveillance; creation of a monitoring framework for GMAP 2; support to country participants to attend MERG meetings; and review of different M&E methodologies. All RBM working groups will be reviewed this year. It is important that the work done by the MERG link directly to work to the priorities of RBM.

It was recognized that a lot of work is done by RBM partners through in kind donation of time, but not recognized in the workplan. The MERG leverages enormous resources, but it has not been made clear how comprehensive this is. Participants decided to have the MERG Secretariat create a collective inventory of the work being done by partners for the MERG. This will take the form of a template for each partner to fill in regarding MERG work and costs of this work.

5.2 Upcoming MERG meeting

The next MERG meeting will take place in January 2013 in Namibia.

6.0 Summary of Agreements and Follow-Up Actions

Action Item	Deliverable	Person/ Organization Responsible	Tentative Due Date
Finalize update of HH Indicators for Malaria Control	Published document	Survey & Indicator TF	Aug 2012
Finalize MIS Package revisions	Published MIS package	MEASURE Evaluation/DHS	Aug 2012
Send MIS reports and data to Lia Florey	MIS reports and data on malariasurveys.org website	MIS implementers	Ongoing
Finalize and circulate guidance for evaluating impact of malaria control programs	Published guidance for evaluating impact of malaria control programs	Mortality TF	Nov 2012
Conduct meeting to define facility indicators and create indicator manual	Published indicator manual	Survey & Indicator TF	Before next MERG/Early 2013
Develop M&E framework alongside GMAP 2	M&E Framework for GMAP 2	MERG	2014
Criteria for elimination classification and subnational classification will be clarified and reported back to WHO	Documented classification criteria	WHO	September 2012
Convene group to discuss subnational and alternative methods of data collection	Meeting, report and action items	Indicator and data sources TF	Spring 2013
Finalize and release WHO Surveillance Checklist	Surveillance Checklist	M. Lynch	?
Contact Rachel if you would like to join BCC task force	Operational BCC Task Force	R. Weber	Ongoing
Contact Elizabeth if you would like to join capacity building task force/CoP	Operational capacity building CoP	E. Patton	Ongoing
Include agenda items on: discussion of identified country M&E needs, transition from surveys to routine information at next MERG, MERG's role in supporting phase 2 countries	Agenda for 20th RBM MERG meeting	MERG Secretariat	January 2013
The next MERG meeting will take place in January 2013 in Namibia	Meeting, report and action items	MERG Secretariat	January 2013