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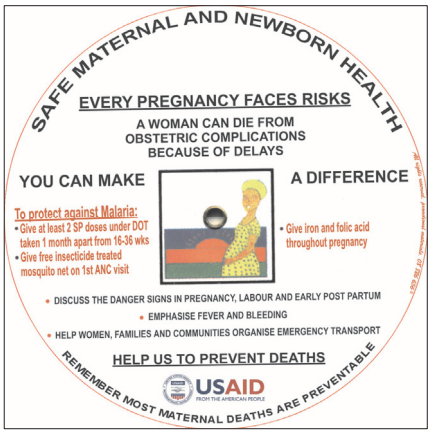
A MALARIA IN PREGNANCY COUNTRY CASE STUDY:

Malawi's Successes and Remaining Challenges for Malaria in Pregnancy Programming

September 2011



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BASICS

Central Medical Stores

Christian Health Association of Malawi

Malaria Alert Centre

Ministry of Health Directorate of Preventive Health Services

Ministry of Health Reproductive Health Unit

National Malaria Control Programme

Population Services International

World Health Organization

UNFPA

UNICEF

USAID DELIVER PROJECT

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Left: Aleisha Monique Rozario
Upper right: Republic of Malawi Ministry of Health
Lower right: Peter Chisambiro

The Maternal and Child Health Integrated Program (MCHIP) is the USAID Bureau for Global Health's flagship maternal, neonatal and child health (MNCH) program. MCHIP supports programming in maternal, newborn and child health, immunization, family planning, malaria and HIV/AIDS, and strongly encourages opportunities for integration. Cross-cutting technical areas include water, sanitation, hygiene, urban health and health systems strengthening.

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Acronyms

ACT	Artemisinin-Based Combination Therapy
AIDS	Acquired Immunodeficiency Syndrome
AL	Artemether-Lumefantrine
ANC	Antenatal Care
BCC	Behavior Change Communication
CDC	Centers for Disease Control and Prevention
CHW	Community Health Worker
CMS	Central Medical Stores
DHMT	District Health Management Team
DHS	Demographic and Health Survey
DOT	Directly Observed Therapy
EPI	Expanded Program for Immunization
FANC	Focused Antenatal Care
HIV	Human Immunodeficiency Virus
HMIS	Health Management Information System
HSA	Health Surveillance Assistant
IDSR	Integrated Disease Surveillance and Response
IEC	Information, Education, and Communication
IPTp	Intermittent Preventive Treatment in Pregnancy
ITN	Insecticide-Treated Bed Net
JSI	John Snow, International
LBW	Low Birth Weight
LLIN	Long-Lasting Insecticide-Treated Bed Net
MCHIP	Maternal and Child Health Integrated Program
M&E	Monitoring and Evaluation
MICS	Multiple Indicator Cluster Survey
MIP	Malaria in Pregnancy
MIS	Malaria Indicator Survey
MOH	Ministry of Health
MPR	Malaria Programme Review
NMCP	National Malaria Control Programme
PMI	President's Malaria Initiative

PMTCT	Prevention of Mother-to-Child Transmission [of HIV]
PSI	Population Services International
RBM	Roll Back Malaria
RDT	Rapid Diagnostic Test
RH	Reproductive Health
RHU	Reproductive Health Unit
SP	Sulfadoxine-Pyrimethamine
SSS	Sentinel Surveillance System
SWAp	Sector-Wide Approach
TWG	Technical Working Group
USAID	United States Agency for International Development
WHO	World Health Organization

Executive Summary

Introduction and Background: Many countries in sub-Saharan Africa have made significant progress toward achieving their malaria in pregnancy (MIP) program goals. However, most countries are still far from achieving the coverage targets set by Roll Back Malaria (RBM) (90%) and the President's Malaria Initiative (PMI) (85%) for intermittent preventive treatment in pregnancy (IPTp) and insecticide-treated bed net (ITN) coverage among pregnant women.

Among sub-Saharan African countries, Malawi is closest to achieving its PMI goals, with 60.3% coverage for IPTp2 and 49.9% coverage for ITN use among pregnant women (MOH 2010b). Hence, Malawi is likely to have applied successful strategies or best practices that could potentially be adapted and replicated in other malaria-endemic countries. With support from PMI, the USAID Maternal and Child Health Integrated Program (MCHIP) conducted a country case study to examine MIP implementation in Malawi.

Objectives and Methods: The purpose of this case study is to gain an understanding of MIP programming in Malawi, specifically:

1. Best[1] practices/strategies that have supported MIP programming success;
2. Existing bottlenecks in MIP program implementation and how these are addressed; and
3. Lessons learned that could inform future MIP programming.

This case study will also aid in the development of a standardized framework for analysis that allows country stakeholders to make better use of existing MIP-related information.

The methodology consisted of a desk review of secondary data sources followed by stakeholder interviews. The framework examines eight key areas of MIP programming:

- Integration
- Policy
- Commodities
- Quality Assurance
- Capacity Building
- Community Awareness and Involvement
- Monitoring and Evaluation (M&E)
- Financing

Malawi is the third country where the described framework for analysis of MIP programming has been applied. MCHIP conducted the process in Zambia during 2009 and in Senegal in 2010.

Best Practices: This case study has identified strengths in MIP program implementation in the areas of policy, community awareness and involvement, and financing. Key best practices that contribute to the strength of Malawi's MIP program include:

- Integration of MIP interventions with focused antenatal care (FANC) at the facility level;
- Leadership in the study and rollout of drug regimens for IPTp and MIP case management;
- Well-developed information, education, and communication (IEC) strategy with creative platforms for effective communication of malaria messages;
- Delivery of maternal health services, including MIP education and referral, closer to the household level; and
- Coordination of funding for MIP programs through sector-wide approach (SWAp).

[1] For the purposes of this assessment, the term best practice will be used in the context of innovative practices because the assessment will primarily be based on existing data analysis and qualitative interviews.

Bottlenecks and Lessons Learned: A number of challenges were also identified in this case study. Areas that require further strengthening include integration, commodities management, M&E, capacity building, and quality assurance. Some specific challenges, mitigation strategies, and lessons learned are listed below.

COMPONENT	CHALLENGE/BOTTLENECK	CURRENT MITIGATION STRATEGIES	LESSON LEARNED
Integration	Weak collaboration between Ministry of Health (MOH) Reproductive Health Unit (RHU) and National Malaria Control Programme (NMCP)	NMCP renewing joint planning; MIP focal person attends RHU annual planning meetings	Failure to actively partner in the planning and implementation of MIP interventions results in disjointed and duplicative programming and missed opportunities for leveraging of funds.
Commodities	Stock-outs of sulfadoxine-pyrimethamine (SP)	Tracking SP supplies through quarterly end-use verification surveys by USAID DELIVER PROJECT; Developing Central Medical Store (CMS) roadmap	Frequent facility-level stock-outs thwart efforts to scale-up IPTp; the current CMS system is not adequate to ensure that SP reaches facilities.
	Low usage (50%) of ITNs/long-lasting insecticide-treated bed nets (LLINs) by pregnant women	Encouraging use through mass media campaigns and community-level IEC; Moving toward universal coverage through mass distribution; Health Surveillance Assistant (HSAs) assisting in hanging nets in selected communities	Distributing ITNs through ANC is not effective if supplies are inconsistent. Providing ITNs and IEC may not be enough to encourage routine usage of nets. More programs in which HSAs assist with hanging nets may result in higher rates of usage.
Quality Assurance	Weak diagnostic capability at the health facility level	Procuring rapid diagnostic tests (RDTs) in Global Fund Rounds 2, 7, and 9	Limited confirmatory testing for malaria results in misdiagnosis of fever, overuse of antimalarials, and presumed endemicity.
	Skepticism of SP efficacy by clients and health care providers	Malaria Alert Centre/Centers for Disease Control and Prevention (CDC)/PMI conducting study on SP efficacy for IPTp and case management in pregnant women	Providers and clients perceive mixed messaging in promoting SP for IPTp, but using ACTs for case management in the general population. If SP is to remain the drug for IPTp, more nuanced IEC is required.
	Irrational use of antimalarials	Procuring RDTs in Global Fund Rounds 2, 7, and 9; Conducting malaria case management training	The availability of RDTs may reduce some irrational use; however, further IEC efforts are needed to encourage clients to obtain diagnostic testing and to secure community trust in artemisinin-based combination therapies (ACTs).
Capacity Building	Inadequate number of facility-level health care providers	Roll out community midwife cadre	Pre- and in-service training will have limited impact if health facilities are understaffed and workers overburdened. The skilled health workforce must be augmented to increase quality of care.
	Inadequate district-level personnel dedicated to reproductive health (RH) and malaria programming	Hiring district staff dedicated solely to RH and malaria control (as recommended in 2010 Malaria Programme Review [MPR]	The level of management and support required by RH and malaria control programs requires full-time attention by district staff to implement and sustain quality programs.

COMPONENT	CHALLENGE/BOTTLENECK	CURRENT MITIGATION STRATEGIES	LESSON LEARNED
Community Awareness and Involvement	Late initiation of ANC attendance	Developing Community-Based Maternal and Newborn Care Package and Services	Increased community sensitization on FANC and referral mechanisms may help to overcome cultural barriers that prevent access to antenatal care (ANC) in the first trimester.
Monitoring and Evaluation	Weakness in health management information system (HMIS) data management systems	Roll out cohort-based ANC register; Collecting data via supportive supervision visits	Data management must be a core component of all in-service trainings for health care providers. However, providers will not prioritize data management unless they recognize its usefulness to programming.

Recommendations:

- Re-establish the MIP Working Group to ensure prioritization of MIP
- Harmonize RHU and NMCP policies, strategies, guidelines, and quality assurance standards and dedicate increased resources to guideline dissemination
- Re-evaluate the 36-week limitation on administration of IPTp for extension of SP delivery
- Advocate through the MIP Working Group and other for a to ensure consistent stocks of SP and ITNs at ANC clinics
- Promote capacity-building strategies, including strengthened pre-service education, on-the-job training, mentorship, and supervision in addition to group-based, in-service training
- Establish an in-service training database and evaluate training outcomes
- Strengthen quality assurance systems, including linkages between performance assessment and supervision, and ensure harmonization of RHU and NMCP tools
- Introduce district-level officers dedicated specifically to RH and malaria control
- Strengthen existing M&E systems and surveys to better capture key, high-quality MIP data
- Support community-directed initiatives to overcome barriers to care-seeking
- Develop more nuanced IEC regarding potential causes of fever and appropriate use of SP

Some of the above-mentioned recommendations are not specific to MIP alone, and apply to malaria and maternal, newborn, and child health systems in general that affect MIP program implementation.

A Malaria in Pregnancy Case Study:

Malawi's Successes and Remaining Challenges for Malaria in Pregnancy Programming

INTRODUCTION

Throughout sub-Saharan Africa, malaria in pregnancy (MIP) programs are at a crossroads. Many countries have achieved significant progress in achieving their goals; however, most are still far from achieving the Roll Back Malaria (RBM) Initiative targets (90%), or the President's Malaria Initiative (PMI) targets (85%) for intermittent preventive treatment in pregnancy (IPTp) and insecticide-treated bed net (ITN) coverage among pregnant women.

Although multiple challenges remain, Malawi is one of the few countries in sub-Saharan Africa that have shown improved malaria outcomes (e.g., 60.3% uptake for IPTp2 and 49.9% ITN usage) for pregnant women. In 1993, Malawi was the first country in Africa to adopt IPTp as a component of comprehensive antenatal care (ANC) services (Malaria in Pregnancy East and Southern Africa Coalition [MIPESA] 2004). Compared to other sub-Saharan African countries, Malawi is considered "high performing" with respect to MIP and likely to have applied successful strategies or best practices that could potentially be adapted and replicated in other malaria endemic countries.

The number and type of surveys that collect data related to MIP have increased during the last decade. Despite the variety of these nationally representative data surveys, it is still not fully understood why MIP prevention and control services/programs in most African countries are not making greater progress. Gaps in information still remain, and countries have unique challenges. As this case study report describes, linking coverage data with MIP programming documentation is necessary to determine implementation bottlenecks, success stories, and lessons learned. This information can help malaria-endemic countries to accelerate MIP programming and improve outcomes for mothers and their newborns.

The 2010 Malaria Indicator Survey (MIS) and preliminary report of the 2010 Demographic and Health Survey (DHS) provide the most recent national information on Malawi's coverage of key malaria control and prevention activities (see Table 1).

Table 1. Information from DHS and MIS Surveys

INDICATOR	DHS 2010 (PRELIMINARY REPORT)	MIS 2010
Proportion of women who received 2 or more doses of IPTp during their last pregnancy leading to a live birth within the previous 2 years	-	60.3%
Proportion of households with at least 1 ITN[2]	56.8%	59.8%
Proportion of pregnant women who slept under an ITN the previous night	35.3%	49.9%

[2] For the purpose of this report, the term "ITN" has been used because most secondary sources of data refer to ITNs. LLINs are mentioned specifically when data sources have indicated LLINs.

BACKGROUND

Located in east-central Africa with an area of 118,500 square kilometers, Malawi comprises three regions and 28 districts. It is bordered by Zambia on the west, Tanzania on the north, and Mozambique on the south-east (Figure 1). Malawi has three main ecological zones: high plateaus (1,500–2,500 meters above sea level) in the north, rolling grasslands rising to high plateaus (1,000–1,200 meters above sea level) in the central region, and the southern region. The southern region has a diverse topography with the Shire valley in the far south, Mount Mulanje on the eastern border to Lake Chirwa and the surrounding plains in the north, and the cool fertile Shire highlands (Centers for Disease Control and Prevention [CDC] 2004). Malawi is permanently sub-tropical with two main seasons: a dry season between May and October and a wet season between November and April.

The population of Malawi is estimated at 13,077,160 (National Statistics Office [NSO] 2008). The five leading causes of death are human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS), lower respiratory infections, malaria, diarrheal diseases, and conditions related to the perinatal period World Health Organization (WHO). This review focuses on malaria, the third leading cause of death, and specifically on MIP. Malaria poses a particularly high threat to the pregnant woman and her unborn baby, contributing to elevated levels of maternal and neonatal death and morbidity. According to a report on key indicators preceding the release of the 2010 DHS, Malawi's maternal mortality ratio currently is 675 per 100,000 live births.

Figure 1. Map of Malawi

PURPOSE AND OBJECTIVES OF CASE STUDY

As countries expand their MIP programs and work toward scale-up, there are critical lessons learned and best practices that should be considered, adopted, and applied, based on the contextual needs of each country. In 2010, with support from PMI, the Maternal and Child Health Integrated Program (MCHIP) conducted a case study to examine MIP program implementation in Malawi. The country was purposively selected based on its progress on two MIP-related indicators: IPTp uptake[3] and ITN use,[4] as well as its widespread malaria endemicity. The purpose of the case study is to gain an understanding about:

1. Best practices[5]/strategies that have supported MIP programming success;
2. Existing bottlenecks in MIP program implementation and how these are addressed; and
3. Lessons learned that could inform future MIP programming.

METHODOLOGY

The case study is a compilation of a desk review of secondary data sources and interviews with key stakeholders. For the desk review, data were analyzed from existing population-based surveys, such as the DHS, Multiple Indicator Cluster Survey (MICS), and MIS; from peer-reviewed articles, existing documents and reports on MIP in Malawi by PMI, Global Fund to Fight AIDS,

[3] IPTp uptake is defined as percentage of pregnant women, in areas of stable malaria transmission, who receive at least two doses of IPT at least one month apart (WHO 2007).
[4] ITN use is defined as the percentage of pregnant women who report having slept under an ITN the previous night (WHO 2007).
[5] For the purposes of this assessment, the term best practice will be used in the context of innovative practices because the assessment will primarily be based on existing data analysis and qualitative interviews.

Tuberculosis and Malaria, and CDC; and from recent press releases by leading local news agencies (Appendix 1). Then, interviews were conducted with key stakeholders in MIP programming from the Ministry of Health (MOH), including the National Malaria Control Programme (NMCP) and Reproductive Health Unit (RHU), and in-country United Nations and international nongovernmental partners that directly or indirectly support MIP programming in Malawi.

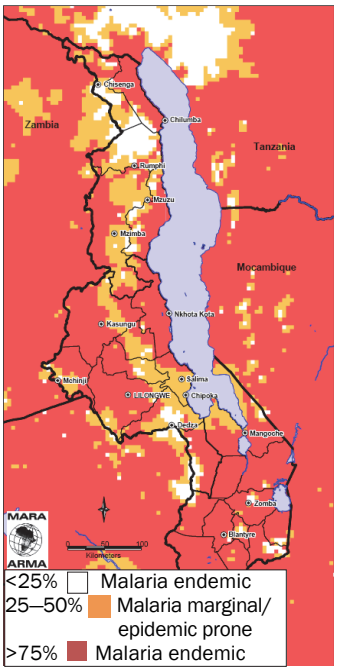
To obtain a comprehensive picture of the levels of MIP program implementation, an MIP framework (Appendix 3) for analysis was developed in 2008 by the USAID-supported Malaria Action Coalition[6] to make better use of existing MIP-related information. The framework examines the following eight key areas of MIP programming:

- Integration
- Policy
- Commodities
- Quality Assurance
- Capacity Building
- Community Awareness and Involvement
- Monitoring and Evaluation (M&E)
- Financing

The framework offers specific guidance on:

- Identifying and obtaining MIP-related coverage data available at the country level;
- Determining a country's level of MIP program implementation on a scale of 1–4 across the eight key areas (Appendix 2);
- Suggesting methods to gather additional information based on gaps in coverage data and program implementation; and
- Linking coverage and implementation information to identify bottlenecks and best practices.

Figure 2. Distribution of Endemic Malaria in Malawi



FINDINGS

Epidemiological Profile of Malaria in Malawi

Endemicity

Malaria is endemic in Malawi, and the entire population is at risk. Specifically, 97% of the population is reported to be at endemic risk and 3% at epidemic risk (RBM) (Figure 2). Kazembe and Macheso (2001) reported a predicted prevalence of malaria ranging from 0.7% to 94%. Prevalence is significantly higher in rural (47%) compared to urban areas (14.4%). The higher prevalence areas are the central and northern districts, the southwestern region, and the eastern lakeshore districts. Lower prevalence rates (0.7–16%) are predicted for the northwestern region, which is highlands (1,260–2,400 meters above sea level). Peak transmission occurs during the rainy season (October to May).

The most common malaria vectors are *Anopheles gambiae*, *A. funestus*, and *A. arabiensis*. It is estimated that Malawians receive

[6] From 2002–2007, the USAID-funded Malaria Action Coalition provided technical support for the prevention and treatment of malaria in Africa, in support of the Roll Back Malaria (RBM) Partnership. The Coalition consisted of CDC; Access to Clinical and Community Maternal, Neonatal and Women's Health Services (ACCESS) Program led by Jhpiego; Rational Pharmaceutical Management Plus (RPM Plus)/Management Sciences for Health (MSH); and WHO.

between 30 and 50 infective bites per year. At least 85% of malaria infections are caused by *Plasmodium falciparum*. The 2010 MIS reported that parasitemia prevalence in children less than five years old is 43.2%.

Morbidity and Mortality

Although progress in malaria prevalence reduction has been made, the MOH in Malawi estimates that the disease accounts for 33% (PMI 2010a) of all outpatient visits and remains the leading cause of hospital admissions among children under five years. Pregnant women and people living with HIV/AIDS are particularly vulnerable to malaria disease (PMI 2009). MIP has many negative effects for both mother and unborn baby. For the mother, the most common effect is anemia, which reduces the mother's ability to cope with bleeding, leading to hemorrhage during childbirth. When the malaria parasite is sequestered in the placenta, there are additional risks for premature birth, intrauterine growth retardation, low birth weight, spontaneous abortion, stillbirth, and congenital malaria in the newborn. Morbidity and mortality specific to MIP in Malawi are difficult to gauge because many pregnant women who are infected do not exhibit signs or symptoms of the disease. MIP stakeholders further contend that because few health facilities (25% according to the 2010 Malaria Programme Review [MPR]) can conduct confirmatory testing for peripheral parasitemia via microscopy, reported prevalence of MIP more likely reflects prevalence of fever than of malaria infection.

Malaria and HIV Interactions

In Malawi, it is estimated that 12.9% of pregnant women are HIV-positive, with the majority living in malaria-endemic zones (National Statistics Office 2011a). Several studies conducted in Malawi have suggested that co-infection with malaria and HIV in pregnant women negatively impacts maternal and neonatal outcomes. A study by Verhoeff et al. (1999) in rural Malawi showed that HIV infection is associated with significantly greater malaria prevalence among pregnant women. A retrospective study of mothers and infants from 1987 to 1990, also conducted in rural Malawi, suggested that the odds of post-neonatal death of an infant born to a mother with both placental HIV and malaria was 4.5 times higher than an infant born to a mother with only placental malaria (Bloland et al. 1995). A cross-sectional study of HIV-infected pregnant women in 2004 with and without placental malaria suggested that placental malarial infection is associated with an increase in peripheral and placental HIV-1 viral load (Filler et al. 2006; Mwapasa et al. 2004).

Strategy

At the Abuja Summit in 2000, the Government of Malawi joined 43 other African countries in a global commitment to reduce the incidence of malaria. At this summit, regional leaders set a goal to reach 60% of pregnant women in malaria endemic communities with key interventions by 2005. Specifically, Malawi set to attain the following targets by 2005:

- 60% of pregnant women should have at least two scheduled IPTp doses of SP,[7]
- 60% of people with fever should have access to correct and affordable treatment within 24 hours of onset of symptoms, and
- 60% of pregnant women and children under five years will sleep under an ITN (MOH 2006).

The Malawi National Malaria Control Strategic Plan for 2005–2010 articulated the national strategies for malaria prevention and control. According to this plan, all pregnant women should receive at least two doses of IPTp with SP at least one month apart at health facilities through direct observation during the second and third trimesters and should be provided an

[7] Target was reached by 2010 MIS.

ITN at the first antenatal care (ANC) visit. This strategic plan also addressed the need to develop human resource capacity; strengthen information, education and behavior change; and develop systems to strengthen M&E to measure program progress (Global Fund 2009).

This plan was recently revised for 2011–2015 with the new MIP targets indicated as follows:

- 80% of pregnant women have access to and receive two or more doses of IPTp for malaria prevention by 2015, and
- 80% of pregnant women sleep under an ITN by 2015 (MOH 2011).

Table 2 summarizes the existing status and progress of malaria control interventions and the 2015 targets.

Table 2. Current Status and Targets for Malaria Control Interventions, Malawi

INDICATOR	CURRENT STATUS (2010)	UNIVERSAL ACCESS TARGETS (2015)
% of households owning at least 1 ITN	59.8%	90%
% of children under 5 years of age sleeping under an ITN	55.4%	80%
% of pregnant women sleeping under an ITN	49.9%	80%
% of pregnant women who have access to and receive 2 or more doses of IPTp for malaria prevention	60.3%	80%

Source: (MOH 2010b; MOH 2011).

The plan further articulates MIP priorities for NMCP, RHU, and the MOH Health Education Unit, notably to:

- Ensure that appropriate drugs for IPTp are available at all facilities and outreach clinics;
- Continue to promote directly observed therapy (DOT) by providing relevant equipment to health facilities;
- Provide guidelines, job aids, training, and supervision in all focused antenatal care (FANC) programs;
- Explore ways of expanding delivery of IPTp at the community level to increase access;
- Continue to encourage pregnant women to sleep under long-lasting insecticide treated bed nets (LLINs) through increased awareness campaigns and provision of LLINs;
- Revise and distribute guidelines and job aids on treatment of MIP; and
- Continue conducting joint supportive supervision of health workers for compliance with National Malaria Treatment Guidelines for preventing and treating MIP (MOH 2011).

Although FANC is not specifically noted as the platform for initiating MIP services, the inclusion of FANC service support demonstrates its centrality to the MIP program.

The primary vehicle for developing and revising Malawi's five-year strategic plans is the MPR, a collaborative effort by the NMCP, MOH, and cooperating partners designed to "identify achievements, progress and performance of the current National Malaria Control Programme, as well as identify major emerging critical issues, priority problems, and investigate the cause of problems and propose solutions with a view of program redesign to achieve better performance" (MOH 2010a). According to the NMCP manager, this report is "married" with the MIS to obtain a full picture of malaria programming and its impact in Malawi and to determine future strategies. At the time of this writing, the 2011–2015 strategic plan was in its final draft and due to be launched soon. The MPR was finalized, but awaiting approval from government administrators

before formal release. The draft MPR formed the basis for the revision of the 2011–2015 strategic plan and contributed to this case study. Key issues and recommendations highlighted in the draft MPR are highlighted below and will be discussed throughout this document.

2010 MPR: Key Recommendations for MIP

- Strengthen collaboration between NMCP and RHU on scaling up MIP interventions
- Mobilize more resources for the implementation of MIP activities
- Build capacity of health workers at all levels in MIP
- Review IPTp policy based on findings of the efficacy studies
- Strengthen behavior change communication (BCC) IEC for MIP interventions

Policy Development

SP for IPTp

Organized malaria control efforts began in 1984 following anecdotal reports of chloroquine-resistant *Plasmodium falciparum* malaria. At this time, pregnant women were advised to take chloroquine 300 mg weekly throughout pregnancy. The NMCP and the National Malaria Technical Committee were established to investigate reports of treatment failures and recommend effective control measures. With the support of CDC, NMCP led a series of studies comparing the efficacy of the recommended 300 mg weekly chloroquine doses with chloroquine alone and chloroquine in combination with other antimalarial drugs. One of these early studies showed that a two-dose IPTp regimen with SP was more efficacious than the other regimens (Schultz et al. 1994). Based on these findings, in 1993, Malawi adopted an IPTp policy of two doses of SP at least one month apart in the second and third trimesters given up to 36 weeks of gestation, becoming the first country to adopt SP for IPTp. Several stakeholders reported that this move was initially met with resistance from the international community. Malawi's strategic vision in MIP programming eventually positioned it to become a leader in the Eastern and Southern Africa region and among global and regional implementing partners.

In 2003, Malawi established guidelines for MIP prevention and treatment in alignment with WHO's three-pronged approach: IPT with SP, use of ITNs, and prompt and effective case management (MIPESA 2006). The national MIP policy revised one year prior, in 2002, reads: "All pregnant women should receive at least two treatment doses of SP at least one month apart at the [antenatal care clinic] under direct observed therapy." This policy, as did the original, stated that the treatment should begin no later than 36 weeks. The change to "*at least* two doses" was significant, however, because it allowed for more than the original two-dose stipulation and accounted for the recommended three-dose coverage for HIV-infected pregnant women. According to interviews, this policy change was partially spurred by studies conducted by the Malawi College of Medicine and other research organizations that had been piloting three-dose regimens and were seeing positive outcomes especially in HIV-positive pregnant women. From the outset, at all facilities IPTp was and continues to be provided free of charge to the client through FANC per MOH policy (Government of Malawi 2004).

In 2005, the NMCP again conducted various studies to test the efficacy of antimalarial drugs in children. The findings of the studies indicated in vivo parasite resistance to SP ranging from 5%–16% (Kabuluzi 2004). Thus, Malawi revised their national malaria treatment guidelines to indicate use of artemisinin-based combination therapies (ACTs) in children (MIPESA 2006). SP for IPTp remained the national policy as the study results did not have implications for use of SP for reducing parasite load in pregnant women. This decision was consistent with WHO guidelines, which recommend that countries in stable malaria transmission areas should continue to scale up the SP-IPTp strategy until relative data on effectiveness of SP are made available for review by WHO (WHO 2007).

ITN Rollout

ITNs were first rolled out in Malawi in 1998 by a Population Services International (PSI) pilot program, called Blantyre Integrated Malaria Initiative, which was funded by USAID, CDC, and the Government of Malawi (Yukich, Tedios, and Lengeler 2007). This program, which targeted pregnant women and children under five in the Blantyre District, initially used health surveillance assistants (HSAs)[8] to distribute ITNs at the community level. HSAs purchased the nets at a subsidized cost of approximately 50 cents each and sold them to clients for 70 cents, with the profit being equally shared between HSA and MOH (the MOH profit was used to help cover delivery cost). A program partner reports that, although this program was effective in incentivizing HSAs to provide nets, it also incentivized HSAs to sell outside of the target populations and communities in an effort to maximize their profit, thereby reducing the available ITN stocks for pregnant women and children under five. To exert more control over net distribution, by the time of nationwide scale-up in 2003, subsidized distribution was performed by health facility staff through ANC clinics.

After the 2002 Abuja Summit, NMCP developed formal guidelines for the distribution of ITNs in the commercial sector, health facility, and community to pregnant women and children under five (MIPESA 2006). In the commercial sector, ITNs are sold for profit through private shops and pharmacies. Initially, at health facilities, subsidized nets were sold by staff through ANC and expanded program for immunization (EPI) clinics, with a 10-cent profit retained at the health center. In 2006, the policy changed to free ITNs (MOH 2010a). Community distribution is achieved through periodic mass distribution campaigns. In 2008, community distribution was attempted countrywide by NMCP, and is currently conducted in selected districts and communities by nongovernmental partners, such as MCHIP, Nets for Life, and Concern Worldwide.

The revised draft 2011–2015 NMCP strategic plan calls for universal coverage of ITNs (i.e., one net for every two people) (MOH 2011). ITNs are still distributed through ANC and EPI clinics, but there will be also mass distribution targeting the general population. Using Malawi's Global Fund Round 9 funding, 4.7 million ITNs have been procured for this initiative. Stakeholders report that, beginning in September 2011 mass distribution will be rolled out gradually, beginning in five districts and then expanding to others the following month. The goal is to reach universal coverage of 90% through this campaign in 2011 and through a second campaign in 2014.

A History of Strong MIP Collaboration in Malawi

According to an interview with the current NMCP program manager, who was been with NMCP since 1999, before 2007, the success of this integration at the central level was rooted in both an active MIP Working Group and in strong collegial relationships among RHU and NMCP staff. In the early 2000s, there was reportedly a strong MIP Working Group chaired by RHU with an NMCP secretariat and composed of stakeholders in both RH and malaria. The working group met on a quarterly basis and facilitated the joint development and implementation of FANC/MIP in-service training and supervision for health care providers. The program manager further cited a working relationship that allowed her to "pick up the phone and call RHU any time of day," as central in the smooth functioning of the MIP program.

[8] HSAs are a cadre of community health worker trained and employed by the Government of Malawi to provide health education, some basic health services and referral at the community level.

Reproductive Health, Malaria Control and HIV Collaboration

From the beginning, national malaria control efforts and reproductive health (RH) initiatives were structured to be vertical programs. However, after recommendations by MIPESA,[9] a more integrated approach was adopted and closer collaboration was established between these two programs. When the MOH adopted FANC, and, as MIP interventions such as IPTp and ITNs became FANC components, control of MIP was no longer just a "malaria" program, but was integrated within the MOH RHU and district-level safe motherhood programs (MOH 2006). Although the text box above highlights Malawi's historical commitment to strong collaboration between the RHU and NMCP, since 2007, the relationship between RHU and NMCP has degenerated with significant consequences for MIP programming in Malawi.

A central theme in interviews with individuals from the MOH, NMCP, and partner organizations was that the MIP program has in many ways been "*de*-integrated." Several stakeholders, including from those from MOH, believe that weak communication and collaboration was exacerbated when, in 2006, RHU and NMCP were placed under separate directorates. Before this time, both RHU and NMCP reported to the Directorate of Preventive Services, which promoted coherent management of MIP programs at the central level. For reasons that remain unknown to stakeholders interviewed, RHU was moved under the Directorate of Clinical Services, which thus far had focused primarily on curative programs. The result has been a competition for attention and funding among programs. As one MOH staff person stated, "We're busy protecting the [health] area that we are each looking after." Indeed, MOH and other stakeholders reported that RHU is further vying to become its own directorate, allowing it to report directly to the Permanent Secretary for the MOH—a move that could further negatively impact integration of programs.

RHU and NMCP state that they do, on occasion, attend each other's working groups and planning meetings; however, they are not actively collaborating on MIP programming implementation. A stakeholder stated that when RHU does attend NMCP meetings, they are often represented by junior-level staff and that the information from these meetings is not communicated to higher RHU levels. Both RHU and partners alike acknowledged that NMCP is guiding MIP policy development and FANC and MIP implementation with minimal participation from RHU.

Stakeholders repeatedly attributed the poor communication between the RHU and NMCP to a dispute during the past three years regarding community-level distribution of IPTp through HSAs. In 2008, NMCP, with the support of partner organizations, initiated plans to train HSAs in the community distribution of IPTp to circumvent the continuing challenge of late ANC attendance that had been identified as inhibiting uptake of IPTp2. RHU opposed this intervention, fearing it would serve as a disincentive for women to attend ANC. Further supporting the argument, a study published in 2009 assessed the uptake of IPTp in the rural Chikwawa District in southern Malawi through a community-based distribution program with village volunteers. The authors found that IPTp uptake significantly increased, but associated the introduction of community distribution with a decrease in ANC attendance as compared to the control group (Msyamboza et al. 2009). Personal correspondence with a study author confirmed that community distributors encouraged women in the intervention group to attend ANC, but the extent to which they encouraged ANC attendance was not documented. According to the author, further research was not done to determine other potential causal factors for the decreased ANC attendance (Bernard Barbin, 25 March 2010). Notably, a recently published article on a pilot study examining the impact of community-directed interventions, including community delivery of IPTp, on MIP outcomes in Akwa Ibom State, Nigeria, showed different results regarding ANC attendance. In communities in which IPTp was delivered via

[9] MIPESA was formed in 2002 as a coalition of five countries—Kenya, Malawi, Tanzania, Uganda and Zambia—including global and regional development partners, to support the implementation of intra-country MIP interventions and to share inter-country resources and expertise (MIPESA 2006).

community-directed distributors, there was no effect found on ANC attendance, and the percentage of women taking at least two doses of IPTp increased by 35.3% versus the control group (Okeibunor et al. 2011). The Malawi 2011–2015 strategic plan includes the directive to "explore ways of expanding delivery of IPTp at community level," indicating that NMCP will continue to pursue implementation of community-level distribution of IPTp.

Although this debate was often credited as a primary factor in the weakened relationship between RHU and NMCP, stakeholders also speculated that the dispute may be more a symptom of poor communication rather than the cause. Indeed, both RHU and NMCP reported that they have yet to seriously discuss the issue of community IPTp, having left it to their respective directorates, which have thus far failed to address it.

In addition to RHU and NMCP integration, there should likewise be program integration with the HIV Unit to adequately provide for malaria prevention and treatment in HIV-positive pregnant women. According to stakeholders, although there is not a division between RHU/NMCP and the HIV Unit, neither is there active collaboration. This separation is partially attributed to the HIV Unit becoming its own directorate that no longer reports to the Directorate of Preventive Services. As was explained by an MOH staff member, "the Reproductive Health Unit is its own thing, and the HIV Unit is its own thing."

The distinction between the HIV Unit and NMCP affects the distribution of LLINs to non-pregnant, HIV-positive women and men. Theoretically, HIV-positive persons should receive LLINs through the planned mass distribution, and there are currently no programs that specifically target these individuals. An MOH source working with both the NMCP and the HIV Unit, reported that, when preparing the application for Global Fund Round 9, the HIV Unit attempted to include LLINs for all HIV-positive persons, but was informed that they could not initiate this as LLINs are the provenance of NMCP.

Clinical Guidelines

Prevention Guidelines

According to WHO MIP prevention recommendations, pregnant women should be provided with a free ITN at their first visit to the ANC clinic, preferably in the first trimester. The National Reproductive Health Service Delivery Guidelines published in 2007 provide a Matrix for Focused Antenatal Care, which lists all of the services that should be provided to a woman during ANC at: the first visit or <12 weeks, 26 weeks, 32 weeks, and 36–38 weeks (see Table 3). Preventive treatment with SP is recommended as a two-dose schedule on the subsequent visits to the ANC clinic, during the second and third trimester (MIPESA 2006). IPTp is indicated at 26 and 32 weeks, as the guidelines note that SP is contraindicated in the first trimester and after 36 weeks. On the next page is an abridged version of the matrix from the guidelines, including those FANC elements most relevant to MIP.

Table 3. Matrix for Focused Antenatal Care

	WEEKS OF GESTATION			
Parameter	First visit or <12 weeks	26 weeks	32 weeks	36–38 weeks
Physical examination:				
▪ Head-to-toe including:	☐	☐	☐	☐
– Pallor	☐	☐	☐	☐
Laboratory investigations:				
▪ Hemoglobin	☐		☐	
Drug administration and immunization:				
▪ Iron	☐	☐	☐	☐
▪ Folic acid	☐	☐	☐	☐
▪ IPT under DOT		☐	☐	
Client education and counseling:				
▪ Schedule of return visits	☐	☐	☐	☐

*See 2007 National Reproductive Health Service Delivery Guidelines (MOH 2007c) for complete matrix.

Stakeholders noted that using this matrix, by indicating services at specific gestational weeks, could thereby limit the provision of IPTp. Stakeholders reported that some health providers follow the guidelines literally, only providing IPTp if a woman is at exactly 26 or 32 weeks. Further, because some providers have difficulty determining gestational weeks, the malaria control guideline to provide "at least two doses after quickening" is more easily understood and applied.

The policy on providing IPTp only up to 36 weeks is controversial and was cited by several partner organizations as a barrier to increasing IPTp2 uptake in Malawi. Although the WHO MIP strategic framework states that SP is considered safe in the second and third trimesters, there is reportedly a strong country resistance to change the policy (WHO 2004). ITNs/LLINs are notably missing from the matrix, and MIP is not included in the "client education and counseling" section, which addresses a variety of other topics including danger signs, STIs/HIV, and family planning.

The 2007 National Malaria Treatment Guidelines, however, offer conflicting guidance on IPTp, indicating, "At least *three* doses of SP, three tablets for each dose, are given after the first trimester, at least four weeks apart, under direct observation by health personnel" [author's emphasis] (MOH 2007b). The MOH's 2007 Guide for the Management of Malaria, which should, in theory, reflect the National Treatment Guidelines, rather indicates, "at least two doses of SP, three tablets for each dose, are given after the first trimester, at least four weeks apart, under direct observations by health personnel" (MOH 2007a). In addition, neither document mentions the provision of ITNs or a 36-week limitation for IPTp, as stated in the RH Service Delivery Guidelines. That these services should be provided in the context of ANC is only mentioned in the health education section of the Guide for the Management of Malaria, under Specific Messages for Pregnant Women. The messages also list that "TBAs [traditional birth attendants] may be supplied with SP for use in their antenatal care clinics." NMCP was not available for comment on this message. Stakeholders stated that TBAs' mandate comes from RHU, which does not endorse this; therefore, it is not being implemented. This message, however, has the potential to be confusing in light of the debate over distribution of IPTp by HSAs. Indeed, several stakeholders spoke of discrepancies between or lack of clarity in the MIP policies and

guidelines of RHU and NMCP, which reportedly do, on occasion, interfere with smooth program implementation.

The current prevention of mother-to-child transmission of HIV (PMTCT) guidelines provide specific guidance on IPTp for HIV-positive, pregnant women. The guidelines indicate that health workers should "provide malaria prophylaxis," but should not give SP if the client is on cotrimoxazole (MOH 2008). The guidelines do not further indicate the specific number of doses of IPTp, but refer the provider to the RH Guidelines. It should also be noted that the National Malaria Treatment Guidelines, in providing guidance on IPTp and MIP case management, make no mention of HIV-positive pregnant women.

Case Management Guidelines

According to the National Malaria Treatment Guidelines, case management of MIP includes treatment of malaria, management of complications, and management of labor (MOH 2007b). The first line of treatment for uncomplicated cases of malaria in the first trimester is oral quinine, while artemether-lumefantrine (AL) is recommended in the second and third trimesters. In cases of severe malaria, use of quinine is recommended either as intravenous (IV) or intramuscular (IM), with special precautions to avoid hypoglycemia (see Table 4).

Table 4. MIP Case Management Guidelines

TRIMESTER	UNCOMPLICATED MALARIA	SEVERE MALARIA
First	Oral quinine, dose of 10 mg/kg body weight administered 8-hourly for 7 days	Quinine, 20 mg/kg body weight loading dose, followed by 10 mg/kg 12 hourly for 7 days, and start IV quinine in 10% glucose infusion or 5% in normal saline. If quinine cannot be given by infusion, give 10 mg/kg dosage by IM injection and refer immediately. Change to oral quinine as soon as patient can take orally.
Second/Third	AL because women are susceptible to hypoglycemia with quinine	Initial treatment similar to first trimester, with special precautions to avoid inducing hypoglycemia. Shift to LA as soon as patient can take orally.

Specific treatment guidelines have also been developed for managing complications, such as pulmonary edema, hypoglycemia, anemia, renal failure, and shock resulting from MIP.

In June 2011, NMCP reported that the National Advisory Committee had recommended a change in the treatment of uncomplicated malaria during the first trimester, now indicating a combination of quinine and clindamycin. At the time of this report, how and when these new guidelines would be rolled out was still to be determined.

Guidelines Development

According to interviewees, the malaria clinical guidelines are updated with each revised strategic plan. The new guidelines are created through the collaborative effort of NMCP and partners, via the various malaria working groups, and are released through a highly publicized event during the annual "Malaria Week" in November/December. The event seeks to quickly and broadly inform health care providers and potential clients alike that they should expect changes in their malaria care and treatment. The guidelines are then rolled out to the entire country simultaneously through dissemination to and orientation of district health management teams (DHMTs) who then orient their health care providers. The funding for these activities reportedly comes from the Sector-Wide Approach (SWAp), Global Fund, and WHO. Human

resource constraints at the district level, discussed in more detail later in this report, can, however, inhibit orientation of all service providers. The 2010 MPR states that only an estimated 22% of health workers have been trained in the revised 2007 MIP guidelines, which indicate treatment of uncomplicated MIP with ACTs in the second and third trimesters. As a result, the MPR reports that some facilities are continuing to treat with SP (MOH 2010a).

One stakeholder suggested that releasing the new guidelines at the centralized event hinders timely implementation. Because the launch is a costly event with many high-profile participants, organization and planning are time-consuming and delays are frequent. From the time that the clinical guidelines are revised, it can reportedly take up to six months before service providers have them in hand. This delay further prolongs incorporating the guidelines into pre- and in-service training curricula, resulting in many training gaps and incorrect training. This discrepancy in updated information is illustrated by the fact that, although the MIP case management guidelines were updated in 2007, the Focused Antenatal Care and Prevention of Malaria in Pregnancy Training Manual for Healthcare Providers, last updated in 2006 and currently used by NMCP for MIP in-service trainings, still stipulates SP for case management in the second and third trimesters. The MIP focal person acknowledged the need to address this gap, stating that providers are, however, given the correct guidelines verbally during training.

MIP Program Management and Coordination

Planning and Implementation

At the central level, MIP programming is managed by the MIP focal person within NMCP. The focal person is responsible for linking the various MIP program elements—IPTp, case management, SP commodities, vector control (LLINs)—for the implementation of a holistic MIP program. Routine coordination of programming begins with the annual MOH planning process during which the past year's progress is reviewed and the following year's programming planned. Both RHU and NMCP state that they invite representatives of the other to participate in this process, but stakeholders interviewed reported that mutual participation in the planning process has been minimal for the last several years. The reason for the lack of active, joint planning for MIP interventions is clear—RHU and NMCP are implementing parallel programming. The NMCP program manager reports that, before 2007, NMCP and RHU jointly implemented a FANC in-service training package with a strong focus on MIP. In 2007, RHU and the RH partners, in an effort to have an integrated approach to maternal and newborn health and reduce the number of in-service trainings removing providers from their facilities, rolled out the Integrated Maternal and Newborn Care Package. This package was developed from a six-week basic, essential obstetric care training course, to which were added FANC, MIP, PMTCT, and a variety of other maternal health topics, and was scaled down to a three-week training. Because NMCP and the HIV Unit did not feel that FANC/MIP and PMTCT were adequately covered in the three-week course, counter to the purpose of the integrated package, two parallel trainings for FANC/MIP and PMTCT were maintained. Both RHU and NMCP state that they do not share information on who each is training. Thus, it is unknown how many providers are receiving two or more of these trainings and whether the integrated package is imparting sufficient knowledge and skills to render the others redundant. Further illustrating this disconnect, in referring to the NMCP FANC package, the RHU deputy director stated that she was not familiar with the content and that there could, in fact, be some duplication. At the time of the interview, RHU did not have any information available on whether the integrated package was effective, but acknowledged that there was anecdotal feedback stating that "three weeks is not enough [time]" for the training course.

Coordination of partners for the implementation of annual plans is managed by the Interagency Coordinating Committee and the various RH and malaria technical working groups (TWGs) led by the MOH. As mentioned above, these TWGs lead the way in policy and guideline revision and rollout, as well the implementation of interventions. Although the MPR reports that currently

there is an existing MIP working group, it does not meet regularly. The MIP focal person stated that the group only meets when there is a specific issue that needs to be addressed, and although it could be argued that there are several pending issues related to MIP, few stakeholders could recall the last time a MIP working group meeting was held. The inactivity of the MIP working group has been linked by many to the degeneration of the relationship between RHU and NMCP. When this issue was raised, the MIP focal person reported that NMCP will explore avenues for reviving the working group and improving overall coordination with RHU. Currently, RHU manages its non-FANC/MIP-specific maternal health programs through the Safe Motherhood Committee and NMCP manages FANC/MIP through its Case Management Working Group. The 2010 MPR did not note any specific challenges; however, it did recommend "strengthened collaboration with reproductive health on scaling up MIP interventions."

Quality Assurance

The quality assurance system for the MOH in Malawi reportedly has two primary components—performance assessment and supportive supervision. There is a specific Quality Assurance Unit within the MOH, but, according to stakeholder interviews, the MOH technical units assume primary responsibility for quality assurance activities.

For performance assessment, the MOH, with support from implementing partners, developed the National Integrated Infection Prevention, Reproductive Health and PMTCT Performance Standards tool. Intended to be used biannually at all health facilities, the tool assesses performance quality, identifies areas for improvement, and helps target supervision activities. The tool was reportedly last updated in February 2011, but no stakeholders were able to produce a version dated later than 2010. Stakeholders interviewed for this report were unable to confirm whether the MOH still used this tool. RHU was not available for comment.

The 2010 tool includes MIP verification criteria to provide routine medications, including malaria intermittent preventive treatment. The criteria also include checking for allergies to cotrimoxazole and other sulfides, providing accurate timing and dosage of routine IPTp with SP, and checking for treatment for HIV with cotrimoxazole and amending IPTp accordingly. Specifically, the performance assessment standards state, "If the woman has received the first dose of IPT and still has less than 32 weeks of pregnancy, [provider] administers the second dose of IPT 4 weeks after the first dose." This standard conflicts with the RH and NMCP guidelines that prevents provision of IPTp after 36 weeks, and it is worded in such a way as to provide for only two doses of IPTp rather than at least two. The criteria for HIV-positive pregnant women indicate, "If the woman is living with HIV, has received two doses of IPT, and she still has less than 32 weeks of pregnancy, and she is taking cotrimoxazole for HIV prophylaxis, [provider] suspends bactrim, administers the third dose of IPT 4 weeks after the second dose, and resumes cotrimoxazole after 7 days." These criteria contradict the PMTCT guidelines, which, as noted earlier, state that a woman should not be given any SP if she is taking cotrimoxazole.

If the performance assessment tool is being used, these discrepancies in information between the guidelines and the tool could confuse the provider regarding administration of IPTp and result in inconsistencies in IPTp practices across facilities. Performance standards should be based on service delivery guidelines; if providers are being trained from a tool that differs from the guidelines, they may be inadvertently encouraged to provide incorrect care.

Supervision of MIP programs is conducted at two levels: the central to the district level and the district to the facility level. The RHU uses the RH Monitoring Tool for RHU at the central level and the Focused Antenatal Care Supportive Supervision Tool at the district level. The NMCP uses the Biannual Supervision Checklist and the Harmonized Malaria Assessment and Supervision Tool at the central and district levels, respectively. In past years, national level

joint supervision of MIP programs was undertaken biannually by a team composed of malaria and RH program representatives, as well as international partner organizations (MIPESA 2006). Stakeholders report that now, at the central level, supervision of MIP programs is conducted independently by both RHU and NMCP. Although NMCP stated that it invites RHU on supervision visits, RHU is unable to participate because of competing activities. When queried as to who is ultimately responsible for MIP supervision, the RHU deputy director stated that it is the responsibility of NMCP because all of the MIP money goes to NMCP, where MIP partners direct their resources. When questioned further as to how the supervision was coordinated, taking into account the fact that MIP interventions are delivered within FANC, the deputy director further maintained that NMCP is responsible for FANC supervision, as well as program implementation. In fact, the "RH Monitoring Tool for RHU," which is designed for biannual, central-level supportive supervision to the DHMTs and for gathering data for the SWAp reviews, captures MIP under only two indicators: number of pregnant women receiving two doses of IPT and number of pregnant women receiving ITN. SP is notably missing from the list of drug stocks reviewed, and malaria is missing from the list of causes of maternal death. Conversely, the NMCP Biannual Supervision Checklist captures both SP and quinine stocks and has two separate survey sections for LLINs and IPT. Because NMCP is responsible for the procurement and distribution of LLINs and SP, it is logical that they would monitor these indicators. However, it is surprising that NMCP is also monitoring the number of health workers trained in FANC and MIP, availability of antenatal records, and number of pregnant women who first visited ANC in the past three months, among several other FANC indicators that RHU does not monitor. NMCP also stated that they had discussed the resource issue with RHU and clarified that donors are providing funding to RHU for FANC-related MIP activities and funding to NMCP for case management, LLIN procurement/ distribution, IEC and "strengthening activities to improve uptake of the second dose of SP at health facilities, which is a component of FANC." Attempts to obtain further detail on what these "strengthening activities" include were unsuccessful.

All stakeholders nevertheless agreed that integration of RH and malaria control has been maintained at the district level, where safe motherhood and malaria coordinators routinely collaborate. These coordinators ensure that health care providers are properly implementing MIP guidelines and have consistent supplies of ITNs. Whether from necessity (i.e., lack of human resources) or active planning, it appears that at the district level, MIP service provision and supervision is less affected by the disconnect between RHU and NMCP. At this level, the Focused Antenatal Care Supportive Supervisory Tool captures information on both FANC and MIP, including SP and IPTp, LLINs, and IEC. This tool was revised in February 2010 with joint participation from the NMCP MIP focal person and the RHU safe motherhood focal person. With funding from BASICS, all district malaria and safe motherhood coordinators received orientation to this tool and currently receive funding to conduct joint supervision to all health facilities in their districts biannually (with the goal of scaling up to quarterly visits pending available funding). These visits are reportedly monitored by random "spot checks" by teams from BASICS, NMCP, and RHU and through collection of supervision reports. The findings from these reports are then aggregated into a national report that is shared with partners at stakeholder meetings and with the district malaria and safe motherhood coordinators at regional review meetings.

The Harmonized Malaria Assessment and Supervision Tool further captures the same FANC, IPT, and LLIN information as the NMCP Biannual Supervision Checklist, and is intended to be implemented quarterly at all health facilities. Inadequate financial and human resources sometimes prevent this quarterly frequency. Another challenge both the MPR and stakeholders noted was that malaria control and safe motherhood officers are also active health care providers in MOH facilities, and therefore have limited availability to perform their secondary role as

district supervisors. According to the MPR, because of these competing job responsibilities, malaria control officers only spend "a third or less" of their time on malaria (MOH 2007a).

Financing

Several donor partners support the Malawi NMCP and MOH RHU, including the Global Fund, UNICEF, WHO, PMI, Japan International Cooperation Agency (JICA), the Government of Norway, the United States Government, the United Kingdom Department for International Development (DfID), the World Bank, Welcome Trust, and the European Union. Some of these partners contribute direct funding to the MOH, and some fund distinct interventions through local and international nongovernmental organizations (NGOs) (see Appendix 4). Together they accommodate a comprehensive approach to address malaria prevention and control in Malawi. For MIP, specific support includes the following:

- Training and supervision of health workers in FANC and MIP case management,
- Procurement and distribution of LLINs,
- Procurement and distribution of RDTs for malaria,
- Development and dissemination of messages and IEC materials for MIP prevention and appropriate use of LLINs, and
- Operations research on SP drug efficacy for IPTp.

All donor, UN, and NGO partners interviewed stressed that their primary role is to support MOH priorities and the implementation of national programs. RHU's weakened role in MIP programming was reflected among RH units in UN and NGO organizations, as well. In organizations with both RH and malaria units, malaria managers, rather than RH managers, often were best able to articulate MIP targets and the status of current interventions. No RH program managers interviewed routinely interacted with NMCP.

The SWAp coordinates MOH and partner funding to meet the cost of delivering the Essential Health Package, which covers priority health conditions in Malawi including malaria (Global Fund 2009). The Interagency Coordinating Committee is responsible for supplementing resources made available for activities funded through the SWAp (PMI 2010). Through the SWAp, the MOH and partners sign onto a memorandum of understanding. Some donors, such as the Global Fund and UNFPA, contribute to the SWAp basket fund, while others, such as PMI and WHO, directly fund specific activities and procure commodities. Stakeholders interviewed felt that the SWAp works relatively well as a coordination mechanism for funding; however, many noted that issues of accountability remain that inhibit more donors from giving directly to the basket fund. The benefit of the SWAp is that it allows the MOH to direct funding toward national priorities, but, as one partner commented, "The same small cake has to be shared amongst the many programs. Malaria is a priority, but funding is not enough." Further, because SWAp basket funds may be directed to a variety of priority areas, it is difficult for donors, such as PMI, whose funds are earmarked for a specific health area, to ensure that their funds are being used for the intended program.

In an effort toward decentralization, districts receive SWAp funding to implement their District Implementation Plans. According to the 2010 MPR, because districts are mandated to set their own funding priorities, "…malaria control may sometimes not be included on the priority list. As a result, some planned malaria activities may be skipped that year." The MPR thus recommends better training and supervision of district malaria coordinators and increased advocacy for malaria programming at the district level (MOH 2010a).

Progress in Interventions

According to NMCP's draft 2011–2015 Strategic Plan, Malawi aims to ensure that at least 90% of women have access to interventions targeted at reducing MIP by 2015. An analysis of Malawi's progress in meeting these goals follows.

Knowledge about Malaria

In terms of knowledge about transmission, symptoms, and prevention of malaria, the 2010 MIS reports that 95.6% of the women surveyed had heard of malaria, and 84.5% identified mosquito bites as the cause of malaria. Of the women interviewed, 65.9% were aware of the role of mosquito nets in the prevention of malaria, and rural women were more likely to report this awareness than urban women. Three-quarters of the women identified fever as a symptom of malaria, with again only slightly more women from the rural areas (75.9%) than urban areas (73.6%).

In addition, 74.3% of the women respondents had seen or heard malaria messages. More urban women (86.6%) reported having seen or heard malaria messages compared to women in rural areas (72.1%).

MIP Intervention Coverage and Output Indicators

The most recent data on the current status of malaria prevention and control come from the 2010 and 2006 MIS, preliminary reports of the 2010 DHS, and the 2004 DHS.

Antenatal Care Attendance

National and international guidelines stipulate that women should attend ANC as soon as they know they are pregnant. The 2004 DHS found that 94.8% of women attended at least one ANC visit, with 57.1% of women attending four or more visits. According to the preliminary report of the 2010 DHS, the number of women who attended at least one ANC visit increased to 96.5%; however, detailed data were not available regarding women attending four visits or the timing of those visits.

The 2004 DHS reported that only 7.7% of women started ANC before the fourth month of pregnancy. The majority of women began ANC in the second trimester, with 43.5% making their first visit between four and five months, and 41.2% of women between six and seven months (Table 5). These data indicate that a large percentage of women in Malawi are not receiving the benefits of early ANC, including those related to prevention of MIP. ITNs should be distributed to pregnant women at the first ANC visit and are most effective the earlier they are used. If women do not attend the first ANC visit during the first trimester, they may delay the use of this preventive method when they are not yet eligible for IPTp, thus increasing their risk of malaria infection.

Table 5. DHS Findings on ANC Visits

	DHS 2000	DHS 2004	DHS 2010 (PRELIMINARY REPORT)
Received any ANC from a skilled provider	94.4%	94.8%	96.5%
Attended 2–3 ANC visits	34.6%	35.2%	-
Attended 4 or more ANC visits	56.0%	57.1%	-
Attended first ANC visit at <4 months of pregnancy	6.5%	7.7%	-
Attended first ANC visit at 4–5 months of pregnancy	42.6%	43.5%	-
Attended first ANC visit at 6–7 months of pregnancy	42.6%	41.2%	-

Stakeholders interviewed most frequently cited two causes in late initiation of ANC: cultural norms and the cost of visiting the health center. Although it has not been formally documented in Malawi, the general opinion of the RH and malaria community is that women's unwillingness to publicly acknowledge their pregnancies in the first trimester partly inhibits their early uptake of ANC interventions, including IPTp. As an RH partner stated, "During the first trimester, many women refer to the pregnancy only as *chintu* ('something'). Pregnancy is a secret. If you go to ANC, it's like you're broadcasting it…they think that witches will fish the pregnancy [out] and you will no longer be pregnant." It has been documented in Malawi, and in many other countries, that the family hierarchy can also serve as an inhibiting factor. Even if a woman is aware of the importance of early ANC attendance, it is not only her decision to decide if she will attend; she often must adhere to the advice of her husband and/or elder female relatives, such as the grandmother and mother-in-law.

The cost of seeking health services can also act as a barrier to ANC utilization and IPTp uptake. An implementing partner noted, "People are poor. Seeking health care, even when it's free, still has a cost." Although all ANC services are provided free of charge by MOH health centers, there are associated costs, including transport to the health center and time away from work. Particularly in communities where distances to the health facility are long and patient loads high, attending ANC can incur high traveling costs (whether monetary via public transport or in time, if traveling by foot) and a lost day's work. Malawi's human resource crisis means that one health care provider may be responsible for attending to 40 women on a given ANC clinic day, resulting in long waiting times for women and making ANC an all-day event. The excessive workload and stress on providers and lack of basic medical supplies can further decrease the quality of care, an additional disincentive for women to visit the health facility.

Intermittent Preventive Treatment

According to the 2010 MIS, 82.7% of pregnant women receive at least one dose of IPTp and 60.3% receive the recommended two doses. Although both figures still fall short of the percentage of women attending ANC, the percentage of women receiving at least two doses has significantly increased since 2006, when the MICS reported it at 46.7%. This increase is much greater than that seen between any of the 2004 and 2006 reports. It should be taken into account that the 2004 DHS only asked whether women had taken SP during pregnancy and did not question about timing or dosages specific to the IPTp regimen, possibly resulting in deceptively high percentages if women were taking SP for case management or self-treatment (see Table 6).

Table 6. Coverage of MIP Indicators, MICS 2006, MIS 2010

INDICATOR	DHS 2004	ESTIMATED NATIONAL COVERAGE BASED ON 2006 MICS	MIS 2010
Proportion of women who received at least 1 dose of IPTp during their last pregnancy	78.7%*	80.7%	82.7%
Proportion of women who received 2 or more doses of IPTp during their last pregnancy leading to a live birth within the previous 2 years	46.5%**	46.7%	60.3%

*Percentage of pregnant women who took any SP.
**Percentage of pregnant women who took 2+ doses of SP.

Stakeholders attributed the low coverage of the second dose of IPTp to a number of factors, including lack of clarity in policy guidelines causing uncertainty among health workers regarding timing of doses,[10] lack of water and cups for administering directly observed treatment (DOT) for SP, concerns about administering "a strong drug" late in pregnancy, skepticism about the effectiveness of SP, and stock-outs of the drug.

To address some of these barriers to increasing uptake of IPTp2, in 2006, NMCP and partners implemented several interventions, including donating drinking cups and water storage containers to facilities, conducting in-service training for health care providers in FANC and MIP, training HSAs in community education and referral for FANC, and changing IEC messaging regarding IPTp administration. This last point is particularly important. Interviews revealed that the wording of the IPTp guidelines and much of the initial IEC targeting providers was, itself, inhibiting uptake. As mentioned earlier, in the current Reproductive Health Service Delivery Guidelines, the FANC schedule calls for IPTp at 26 and 32 weeks. Stakeholders report that some providers have been taking these guidelines literally, so that if a woman comes to ANC at 25 weeks or 33 weeks, they consider her ineligible for IPTp. As a result, in 2008, NMCP and partners altered IEC targeting health care providers, instead emphasizing two doses of IPTp one month apart from 16 to 36 weeks. The Focused Antenatal Care and Prevention of Malaria in Pregnancy Training Manual for Health Care Providers currently used by NMCP for its three-day MIP training for health care providers still lists the timing of visits at <16 weeks, 20–24 weeks, 28–32 weeks, and 36 weeks, with SP indicated at the second and third visit. Although these time periods are broader than that found in the RH guidelines, they could nevertheless be interpreted as limiting IPTp to 32 weeks.

Regarding the skepticism about the efficacy of SP, two partners noted that many providers and clients view a contradiction between messages that SP for treatment of malaria in the general population is obsolete, but is still effective for IPTp. Given limited data availability, it is difficult to ascertain to what extent SP is preventing poor pregnancy outcomes associated with malaria. According to interviews, this conflict contributes to providers' reluctance to provide SP via DOT and clients' reluctance to take it. SP resistance for antimalarial treatment has alerted the global community to assess SP efficacy for IPTp. The Malaria Alert Centre, with support from PMI/CDC, is part of a multi-country evaluation in association with the MIP Consortium, undertaking a two-year study on the efficacy of SP for IPTp and case management. The study will examine health outcomes (e.g., anemia, birth weight) of mother and child at delivery when the mother has taken IPTp, resistance markers in SP in pregnant women, and parasitemia over time when a pregnant woman is treated with SP for case management. These results, expected in late 2011, will inform future IPTp policy and may necessitate a change in the IPTp guidelines.

Stock-outs of SP are a significant inhibiting factor for increasing IPTp uptake in Malawi, as well as in many other African countries. Yet, stock-outs are one of the least addressed barriers. Stakeholders provided anecdotal reports of frequent SP stock-outs at the central and facility levels in Malawi. This information was corroborated by a visit to a health center in Lilongwe District, which had been out of SP for the previous four months. The USAID DELIVER PROJECT, which tracks the country pipeline for essential drugs, confirmed that these stock-outs are ongoing, however, but was not able to provide specific documentation. The reasons for these stock-outs will be discussed in more detail later in this report. When funds are available, some districts purchase SP from local suppliers. Without regulatory oversight of the quality of these drugs from this source, substandard SP may be making its way into MOH health centers.

[10] Also cited by Holtz TH et al. 2004.

Insecticide-Treated Bed Nets

Regarding ITN coverage, the 2010 MIS reports that 49.9% of pregnant women interviewed slept under an ITN the previous night; a preliminary report of the 2010 DHS put this same indicator at 35.3%. Despite the significant difference between the figures in these two reports, both are a marked improvement from 2006, when only 25.6% of women reported the same (see Table 7). The majority of stakeholders interviewed credited the increase to the availability of free (rather than subsidized) ITNs through ANC and EPI clinics, as well as to targeted universal coverage campaigns, in conjunction with increased community-level IEC.

Table 7. Coverage of MIP Indicators

INDICATOR	DHS 2004	ESTIMATED NATIONAL COVERAGE BASED ON 2006 MICS	MIS 2010	DHS 2010 (PRELIMINARY REPORT)
Proportion of household with at least 1 LLIN*	-	-	56.8%	-
Proportion of households with at least 1 ITN	27.4%	37.8%	59.8%	56.8%
Proportion of pregnant women who slept under an ITN the previous night	14.7%	25.6%	49.9%	35.3%

*LLINs were not available in 2006 and the question did not include LLINs.

MIP-Related Impact Indicators

According to the 2006 MICS, 13.5% of weighed newborns were less than 2.5 kilograms, the measurement for low birth weight (LBW). This figure is drastically higher than both the 2002 and 2004 DHS (see Table 8). Stakeholders interviewed were unable to account for this increase.

Table 8. Findings on Birth Weights

	DHS 2000	DHS 2004	MICS 2006
Percentage of weighed newborns <2.5 kilograms	4.9	5.3	13.5
Percentage of births weighed	53.2[11]	48.7[12]	47.7

With respect to anemia in pregnancy, the 2006 MICS reports that 80.5% of women received iron tablets at ANC and 37.4% had a blood sample taken, as shown in the Table 9. Compared to the 2000 and 2004 DHS data, these figures suggest little or negative change in providing the full FANC package. Data is yet to be released for 2010.

Table 9. DHS Findings on Percentage of Women Receiving Iron Tablets or Having Blood Sample Taken at ANC

	DHS 2000	DHS 2004	MICS 2006
Percentage of women who received iron tablets at ANC	69.7	79.4	80.5
Percentage of women who had blood sample taken at ANC	43.2	35.9	37.4

[11] The 2000 DHS reported percentage of births not weighed. The percentage of births weighed is considered 100% minus the percentage not weighed.
[12] The 2004 DHS reported percentage of births less than 2.5 kg, more than 2.5 kg and "don't know/missing." The percentage of births weighed is considered 100% minus the percentage for "don't know/missing."

As mentioned previously, one of the primary symptoms of MIP is maternal anemia. Although data on maternal anemia and hemoglobin testing during ANC are not captured in Malawi, it can be inferred from the figure above that, at the time of the 2004 DHS, at least 64.1% of women were not tested for anemia at ANC. A district health officer confirmed these low testing rates in his district, where he estimated that only 5–10% of facilities have hemoglobin analyzers. Most facilities have the capability to test hemoglobin via pipette and centrifuge; however, a person in charge at a local health center stated that, because the district cannot procure sufficient pipettes to collect blood samples from all ANC clients, there is an unofficial policy that only HIV-positive clients receive testing. The district health officer did maintain, however, that all ANC clients receive a clinical assessment for anemia.

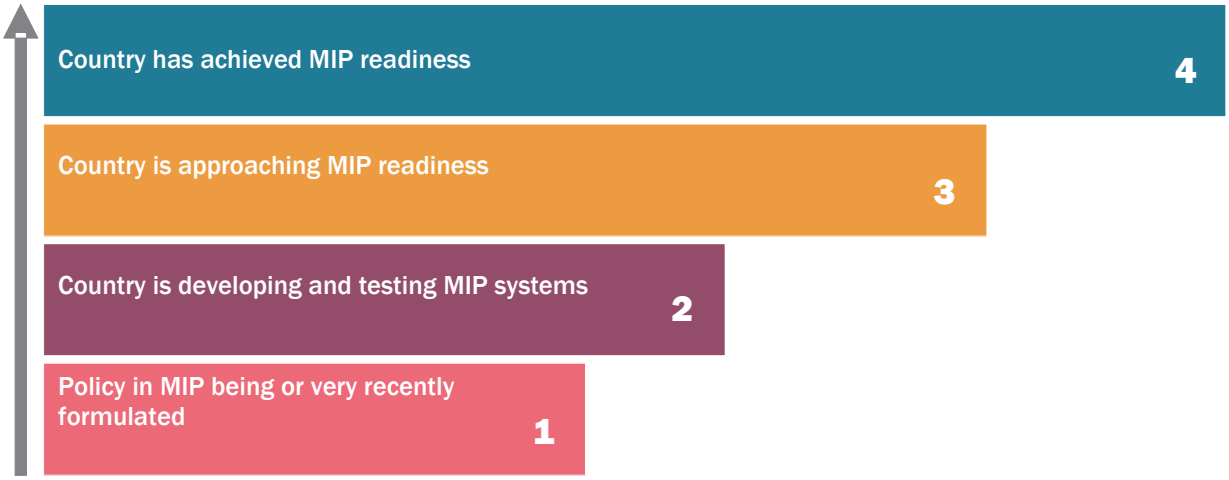
ANALYSIS—STAGES OF MIP PROGRAM IMPLEMENTATION

Data and interviews analyzed for the development of this report provide insight to Malawi's "stages" of MIP implementation. The Stages of MIP Program Implementation Matrix (Appendix 3), developed by Jhpiego in collaboration with WHO and CDC, as part of a broader MIP analytical framework, uses eight components to summarize and rank the MIP readiness in a country. Readiness is defined by a country's capacity and ability to implement MIP programs that will reach national-level scale and coverage. Table 10 and Figure 3 summarize the components of the stages matrix.

Table 10. MIP Readiness Scale

COMPONENT	SCORE = 0	SCORE = 4
Integration	No integration among ANC, RH, malaria, HIV, and other related MIP service areas	MIP is integrated with ANC and other related services through joint planning
Policy	No MIP policy	MIP policy disseminated and used
Commodities	No MIP commodities	No MIP commodity stock-out
Quality Assurance	No MIP quality assurance standards developed	MIP quality assurance standards have been developed, disseminated, and systematically used; reinforced through supportive supervision
Capacity Building	No MIP in-service or pre-service training; inadequate human resources devoted to MIP	Adequate graduates and providers with MIP knowledge and skills deployed
Community Awareness and Involvement	No MIP community education or involvement	Communities and facilities partner to ensure pregnant women receive appropriate MIP services
M&E	No MIP data collected through health management information system (HMIS)	Accurate MIP data available and used for planning
Financing	No MIP funding	Sufficient MIP funds available

Figure 3. Stages of MIP Readiness



Integration (Stage 2.5)

Malawi stands at Stage 2.5 in terms of integrating MIP with RH and HIV programming. Although MIP services are integrated with FANC and PMTCT at the facility level, and district supervision is a collaboration of safe motherhood and malaria coordinators, joint planning and implementation between the three central level units is weak. MIP policies have been developed and are included in the RH, malaria, and PMTCT service delivery guidelines, but there is a need to harmonize these documents.

When MIPESA initially made recommendations for integrating MIP into RH, Malawi became a model in RHU/NMCP collaboration for other countries in the region—a history of which NMCP is visibly proud. If this case study had been conducted in 2005 or 2006, Malawi would likely have been placed at Stage 4 for integration. During the last four years or more, several events have caused Malawi to regress. Ideally, MIP would be integrated with FANC service delivery, with FANC/MIP programs implemented by RHU and in collaboration with NMCP, which would ensure technical oversight and availability of malaria commodities (e.g., SP, quinine, LLINs) for the smooth implementation of MIP interventions. Although MIP is included in the Integrated Maternal and Newborn Care Package, RHU no longer considers it a core program area, leaving implementation and supervision to NMCP. RHU reports that NMCP implements a parallel FANC/MIP training package because the integrated package does not adequately cover the health topic, but because of its limited involvement in this area, RHU is not aware whether or not this reasoning is valid.

Despite the lack of integration at the central level, MIP interventions continue to be delivered within the context of FANC at the facility level. LLIN provision and IPTp doses are recorded on the ANC client's health passport and IPTp is documented in the ANC register from which data for the HMIS are tallied. Despite inadequate funding and human resources, quarterly supervision is conducted by both the district safe motherhood and malaria coordinators using the FANC and malaria supervision tools described earlier.

There is little evidence of active collaboration between the HIV Unit, RHU, and NMCP at the central level. Although the PMTCT in-service training package includes MIP interventions (IPTp and ITNs), and the 2007 national malaria guidelines contain special instructions for IPTp for HIV-positive women, they differ from those in the PMTCT guidelines.

Policy (Stage 3)

Malawi currently stands at Stage 3 in terms of policy. Malawi has been a leader in the region as the first country to roll out IPTp with SP in 1993. Since this time, MIP policies, strategies, and guidelines have been systematically reviewed and revised every five years in line with international recommendations. The MPR serves as an effective vehicle for reviewing MIP programs currently in place, identifying bottlenecks, and determining the way forward; however, it has been suggested that the amount of human and financial resources required to produce the MPR is excessive. In 2007, Malawi updated its MIP policies and guidelines in accordance with WHO's recommended change from case management with SP to ACTs in the second and third trimesters. There is an effort to translate policies into both RH and malaria clinical guidelines and into pre- and in-service training curricula; however, these documents contain inconsistencies in guidance on the ideal number of doses of IPTp and the time period in which it is to be provided. Some of these discrepancies appear to be due to a lack of communication between RHU, NMCP, and the HIV Unit, as well as to logistical delays in launching new guidelines. The 2010 MPR further indicates that, although many partners support the rollout of new guidelines and in-service training of providers and district-level staff, lack of funding and human resources to orient all providers to the revised 2007 guidelines results in non-adherence and the prolonged delivery of substandard care.

Adherence to guidelines is further difficult to assess, as quality assurance systems are weak. Stakeholders report that providers do not receive the degree of on-site mentorship required to maintain quality of care in limited-resource settings. Although it is not formally documented, stakeholders noted that, even when providers are well-versed in the MIP guidelines, low staff levels and high client loads often lead them to "cut corners" and provide an incomplete FANC package.

Commodities: Procurement and Supply Management (Stage 2.5)

Commodities procurement and supply management in Malawi currently stand at Stage 2.5. The WHO-recommended medicines for malaria are approved and available, but stock-outs of SP for IPTp do occur. Historically, ITNs have been consistently available through ANC, but based on recent reports of increasing facility-level stock-outs because of inadequate distribution mechanisms, availability of ITNs may be affected. The weak distribution mechanism for SP is questionable at best and is the primary cause of stock-outs.

Appropriate Pharmaceutical Management (Stage 1)

The national commodities procurement and supply management system for MIP drug commodities is at Stage 1 as the system is poorly functional and plagued by serious administrative problems. Administering IPTp at ANC has been limited by irregularity of supply and frequent stock-outs of SP. The documented reasons for supply challenges have been issues of quantifying SP, ordering the drugs in a timely manner, tendering, receipt, storage, and the logistics of distribution. At the time of this writing, according to Malawi's 2011 roadmap for malaria commodities, there was a 100% funding gap for both IPTp (2.07 million doses) and ACTs (6,640,800 doses). NMCP was not available for comment. However, Global Fund and PMI will reportedly be supplying USD 3.6 million for SP, and, according the PMI Malaria Operational Plan for 2011, PMI will also procure ACTs for community case management targeting children under five. It is not clear how this will impact the dosage gap in the roadmap.

The parastatal Central Medical Stores (CMS) manage the procurement, storage, and distribution of SP and quinine to all MOH health facilities. UNICEF and the USAID DELIVER PROJECT manage the same for ACTs and soon, RDTs. An initial objective of the DELIVER PROJECT was to strengthen CMS systems; however, because of extensive bureaucratic

bottlenecks, in the last quarter of 2010, DELIVER established a parallel logistics management information system to track and distribute pharmaceutical commodities purchased with UNICEF and Global Fund monies. DELIVER's support to CMS was thus limited to joint quantification of essential drugs and the provision of regular supply chain and consumption reports to CMS, including for SP. In mid-2011, PMI reported that, as a condition for receipt of further funding from the Global Fund, the Government of Malawi and donors developed a CMS roadmap and appointed trustees to reignite efforts at reform.

Recent stock-out reports have not been provided by DELIVER, but facility-level stock-outs of SP for IPTp are a challenge in increasing uptake of IPTp2. Pharmaceutical commodities in Malawi function on a pull system, wherein new supplies of commodities are not provided to health facilities until their consumption data indicate that they require additional stocks. The CMS director reported that this system was functioning effectively and that sufficient SP existed; however, an urban health center in Lilongwe had experienced a stock-out for the previous four months.

CMS lists various and contradictory reasons for SP stock-outs, but a consistent cause is the failure of districts to pay CMS for drug orders. At the time of this writing, the CMS director reported that the debt of districts to CMS is MK 4.1 billion (approximately USD 26.7 million). Therefore, the CMS reports it cannot procure adequate drug supplies to meet the country's needs. This claim may indeed be valid; however, it contradicts earlier statements that CMS has adequate SP, thus leaving the question of stock-outs inadequately answered.

Mismanagement at CMS is not the only contributing factor to the MIP commodity situation. According to several stakeholders, irrational use of SP and oral quinine occurs, particularly during, but not limited to, periods of AL stock-outs, such as that due to a Global Fund disbursement delay in 2010. It was further reported that many patients remain skeptical about the efficacy of AL and complain of its side effects, thereby pressuring health care providers to treat them with oral quinine. At least one district has dealt with this issue by decreasing orders for oral quinine and increasing orders for intravenous quinine to discourage this practice. It is unknown whether this action has improved appropriate use of AL or resulted in more irrational use of SP.

Distribution of Insecticide-Treated Nets (ITNs) (Stage 3.5)

The ITN commodity management system can be rated at Stage 3.5. The system for distributing ITNs to pregnant women is functional, but not efficient. Stakeholders reported that ITNs are frequently but not always available in ANC clinics. Because of recent changes in the distribution system, facility-level stock-outs are increasingly reported. To promote effective distribution, international partners, such as UNICEF, WHO, USAID, CDC, and DFID, provide policy input and technical support, and ground-level organizations, such as PSI, provide distribution, promotion, and on-the-ground training (PSI 2005). PMI and the Global Fund provide the majority of funds for ITNs in Malawi. In 2011–2015, Global Fund monies will further enable mass distribution to complement these efforts; however, at the time of this writing, the 2011 roadmap showed an approximately 50% gap of 3,581,798 to reach universal coverage (approximately one LLIN per two persons). Although NMCP was not available for comment, the PMI Malaria Operation Plan for 2011 calculated that with support from PMI, other donors and Global Fund Round 9 funding, Malawi should have sufficient LLINs to reach this goal. The concern was whether there would be sufficient operational funds for planning and follow-up at the district and local levels to ensure usage (PMI 2011).

The majority (about 90%) of ITNs and LLINs have been channeled through collaborations with the ANC and EPI programs, a system that stakeholders agree has historically been effective in ensuring consistent and adequate supplies of ITNs for pregnant women and children under five. This system was altered in the last quarter of 2010. Although the method of country-wide

quantification has remained the same, facility supplies are now based on estimated target populations, rather than consumption, resulting in increased facility-level stock-outs. Whereas previously facilities could contact PSI, as the sole distributor, directly for emergency shipments to prevent stock-outs, facilities must now place all orders through district malaria coordinators, a process that can reportedly take up to three weeks. A second, private distributor has been introduced with many questions arising about its competency in conducting accurate and timely distribution. Delays are further caused by a failure to provide each distributor with specific distribution schedules and locales that would allow for more efficient use of time and resources. A January 2011 visit to a clinic in Lilongwe District was supposed to receive ITNs from the private distributor, but was currently experiencing a stock-out and reported erratic supplies since the last quarter of 2010.

At the facility-level, LLIN distribution is recorded in two places: the client's health passport and a PSI-provided ITN register. PSI reports ITN distribution statistics to the MOH, but the MOH is not actively monitoring these data. Conflicting information was provided about whether the private distributor is also providing ITN registers to facilities. Time will tell whether these issues are merely the expected initial hiccups in implementing a new system, allowing Malawi to retain its status as a model for ITN distribution in the region, or whether these issues will become characteristic of LLIN programming in the country.

Quality Assurance (Stage 2.5)

Quality assurance in Malawi currently stands at Stage 2.5. MIP quality assurance standards have been developed, but degree of implementation remains unknown. Supportive supervision visits do occur, but are limited by lack of financial and human resources. Quality of MIP services is perceived to be moderate in light of human resource constraints and high client loads.

An integrated infection prevention/RH/PMTCT assessment tool contains MIP performance standards. However, it is not clear whether and how often performance assessment visits are conducted and whether the information gathered is regularly accessed by RHU or NMCP. Stakeholders were not able to provide this information, and MOH was not available for comment.

All stakeholders interviewed stated that the system is officially composed of quarterly supervision visits by RHU and NMCP to the DHMTs and quarterly visits to all health facilities by the DHMTs, but that due to a lack of financial and human resources at both levels, these visits occur much less often and less systematically. Interestingly, no stakeholders initially made mention of performance assessment visits. Indeed, one district-level stakeholder described the quality assurance system for MIP as "murky." The support provided by PMI through the BASICS Project has helped to bolster supervision activities for FANC, but the MOH has yet to achieve its goal of routine, quarterly supervision. In light of resource constraints, RHU and NMCP should pool their resources to conduct more frequent joint supervision for MIP.

Stakeholders consistently agreed that quality assurance as a whole currently lacks programmatic emphasis, which, as at least one partner noted, is partly because donors place more emphasis on "number of persons trained" in program-reporting indicators than on the number supervised or the impact of training those persons, with program design following suit.

Capacity Building (Stage 3.5)

Malawi currently stands at Stage 3.5 in capacity building for health care providers. The pre-service curricula for nursing, midwifery, and other health cadres include the most updated MIP guidelines. Competency-based in-service training is widely and variously conducted by RHU and NMCP; however, the effectiveness of these parallel trainings is unknown, and there may be

some duplication in material. The MPR further reports that there may be gaps in providing updates to the 2007 MIP case management guidelines.

Pre-Service Training

Malawi is one of the many countries in Africa that suffers a severe human resource shortage in the health sector, placing significant limits on the provision of quality services. In 2003, the Government of Malawi and partners implemented a six-year "Emergency Human Resource Plan" aimed at alleviating the shortages. This program, which ended in 2009, increased the number of health workers in the public sector by 53%; however, according to the final evaluation, only four of the eleven cadres "met or exceeded their target" (United States Global Health Initiative). The majority of skilled health care providers in the country are educated in pre-service institutions administered by MOH, Christian Health Association of Malawi, and University of Malawi Colleges of Medicine and Nursing. The capacity of these institutions is limited by insufficient numbers of instructors, weak infrastructure, and, as mentioned earlier, long delays between policy revision, launch of updated service delivery guidelines, and their translation into pre- and in-service curricula. Although training institutions benefited from Emergency Human Resource Plan infrastructure improvements designed to increase intake, the Christian Health Association of Malawi is currently exploring additional options to further increase training institution capacity and encourage enrollment, including constructing housing for instructors, providing student scholarships, and offering part-time student enrollment.

In early 2011, the First Lady of Malawi introduced an initiative to develop a "community midwife" cadre. At the time of this writing, the curriculum had yet to be developed, but the pilot program will reportedly recruit secondary school graduates and provide accelerated nursing and midwifery training for free at Christian Health Association of Malawi institutions in exchange for service in a rural health facility for a specified number of years. Contrary to the name of the cadre, these clinicians will be facility-based and will not be providing community services beyond the routine health center outreach.

In-Service Training

For in-service training, health care providers are trained by RHU using the Integrated Maternal Newborn Care Package and by NMCP using the Focused Antenatal Care and Malaria in Pregnancy Prevention and malaria case management training, with partners directing their support depending upon whether their monies are for RH or malaria control. According to stakeholders, training is effectively conducted using a cascading approach, wherein the MOH and partners train teams from the DHMT, including safe motherhood and malaria officers, and other selected, district-level clinical service providers, as trainers. These teams, in turn, train facility-level health care providers, with financial support and oversight from the partner organizations (MIPESA 2006). All stakeholders agree that training and using district trainers is essential to maximizing program resources and, the MOH's financial limitations aside, the sustainability of the programs.

With Global Fund Round 9 and Rd2/7 funding, in-service training will be conducted for the rollout of RDTs to health facilities without the capacity for microscopy. Currently, stakeholders perceive that many health care providers are over-diagnosing malaria because of high client loads and lack of time or skills for proper clinical diagnosis and the propensity of providers and clients alike to presume all fevers are malaria. RDT training will be included in the pre-service curriculum (PMI 2010). Ideally, incorporating this training will reduce over-diagnosis of malaria, increase appropriate treatment of fever, decrease irrational use of antimalarials, and provide a more accurate picture of the malaria situation in Malawi. Malawi should, however, heed the experiences of other countries, such as Zambia, where several years after the rollout of RDTs, many providers are reluctant to adhere to the test results and are administering SP for RDT-negative cases of

fever, leading to mismanagement of fever and stock-outs of SP (Wallon et al. 2010). Malawi must ensure that both health care providers and communities have confidence in the RDTs and are able to appropriately diagnose and treat the myriad non-malarial causes of fever.

Post-training supervision, which has the same human resource constraints as routine supervision, has the advantage of being associated with a particular partner-funded program and, therefore, is more consistently conducted. These visits are usually conducted by teams composed of trainers, district managers, and partner program staff and are conducted in conjunction with MOH quarterly supervision visits or as stand-alone, follow-up visits on a specific training. Training and capacity building are further augmented by the development and dissemination of job aids and program equipment (e.g., cups and water) to reinforce information learned in training and encourage best practices, such as IPTp administration by DOT (ACCESS 2009).

The effectiveness of these training programs, particularly the parallel Integrated Maternal and Neonatal Care Package and the FANC training, remain unknown. The amount of information added to the basic essential obstetric care package and the number of weeks cut from the training to create the integrated package are of concern; both the MOH and partners indicated that training participants have expressed that they are covering too much information in too little time. Thus, NMCP and the HIV Unit continue to conduct parallel FANC and PMTCT in-service training. It was further noted that the predominant model of in-service training employed by Malawi (and many other countries in the region) may not be the most cost-effective strategy. Currently, trainees are taken from their already-understaffed facilities for group-based trainings at hotels and hospitals in provincial and district capitals and are given costly per diems. Although off-site training may be required for the training in new and/or complex skills, such as emergency obstetric care, as one stakeholder stated, "Where is the rocket science in MIP? We present FANC like it's something new, but it's the same thing [health care providers] have been doing." Stakeholders indicated that in-service training is emphasized too much to the detriment of on-site supportive supervision and mentorship to reinforce knowledge and skills gained during pre-service training.

Community Awareness and Involvement (Stage 3)

Community awareness and involvement for MIP in Malawi currently stands at Stage 3. HSAs and Village Health Committees actively partner with health facilities to educate communities about health issues, including MIP, refer women for ANC services, and identify key health problems in the community. Partner organizations are increasingly funding community interventions. Stakeholders repeatedly cited community programs as the primary factor behind increased LLIN usage among pregnant women and improved maternal health outcomes in general. However, some resistance to uptake of IPTp and ITN use remains.

MIP community IEC efforts have focused on two primary areas: improving ANC attendance and encouraging ITN use. When asked what factors accounted for the increased ITN usage among pregnant women, stakeholders repeatedly cited distribution through ANC and EPI clinics in combination with community awareness campaigns. At the central level, NMCP and partners have organized nationwide print and mass-media campaigns composed of public service announcements, community radio spots, mobile video units, drama groups, wall paintings, and health center posters. Under the United Against Malaria campaign, Malawi recently leveraged the fervor surrounding the 2010 World Cup in South Africa for their *Malongo Zii* ("silence malaria") campaign, which utilized football events to bring attention to malaria. The central IPTp *Malongo Zii* campaign message was "first treatment in your fourth month." Although there was some discussion around whether women could interpret this message to mean they need not attend ANC until their fourth month, the message was approved by RHU.

Linking facilities with communities is critical to improving ANC attendance and increasing use of MIP services. Although 94.8% of pregnant women attend at least one ANC visit, most attend after the first trimester and miss early access to LLINs and other preventive services. To increase community-level knowledge of maternal health and encourage utilization of preventive services, RHU and partners are conducting a rollout of a Community Maternal and Newborn Care Package to complement the clinical package. Currently piloted in seven districts, with scale-up ongoing in three, the package includes community sensitization on FANC and MIP and client referral and tracking systems that are administered by HSAs in collaboration with Village Health Committees. Results of the pilot will not be released until later in 2011, but preliminary reports from implementing partners indicate that it has been highly successful, with participating communities seeing few or no maternal deaths since implementation began. Stakeholders partially credit this success to the institutionalization of HSAs into the MOH management and payroll, thus mitigating challenges of community health worker retention faced by many other countries in the region. Upon release of final, positive pilot results, funds will be sought to scale-up the effort nationwide.

In a few districts, some local NGOs and community-based organizations are also conducting activities related to MIP, as well as community case management for children under 5. PMI, through its Malaria Communities Program, is supporting two organizations in raising awareness of MIP and the importance of early ANC attendance. In selected areas, community-based organizations are also performing mass distribution of ITNs at the community level. These programs, such as Nets for Life, provide LLINs to households at a subsidized cost and provide assistance in hanging in them (PMI 2010).

Monitoring and Evaluation (Stage 3)

M&E of MIP interventions and outcomes currently stands at Stage 3. Malawi has established MIP indicators, and routine MIP service delivery data are available, collected, and reported on through the MOH HMIS. The quality of data quality is weak, and the data are not effectively used for decision-making. Epidemiological and program (particularly pilot study) research for MIP is conducted and is used to guide country programming.

In 2007, NMCP's M&E Technical Working Group developed a comprehensive M&E plan for malaria in Malawi. The National Malaria Monitoring and Evaluation Plan 2007– 2011 covers a broad range of issues including drug quality surveillance, strengthening of sentinel site surveillance for monitoring impact indicators, vector assessments for indoor residual spraying and ITN program monitoring, household and facility surveys (including the collection of biomarkers), and post-market surveillance, pharmacovigilance, and drug resistance testing after the introduction of AL (PMI 2010). A new M&E plan is in development to align with the NMCP Malaria Strategic Plan 2011–2015.

The HMIS is the country's key system for routine data collection, processing, analysis, presentation, and interpretation of health information (MIPESA 2006). The HMIS collects a standard set of indicators from the facility level, which it aggregates at the district and national levels. In line with the WHO "Guidelines for Measuring Key Monitoring and Evaluation Indicators," the HMIS routinely collects and aggregates data on ANC attendance and IPTp uptake, but does not have indicators on the number of staff trained in MIP control in the previous 12 months nor the percentage of facilities reporting stock-outs of SP for IPTp. These data are collected by the NMCP's supervision tools, but they are not routinely aggregated and available for use in decision-making. The HMIS faces a host of challenges, including incomplete data, delayed reporting from the facility to district level and district to national level, and lack of capacity at the district level to effectively analyze and use data. The two primary reasons that facilities have incomplete and delayed reporting are that health care providers are overburdened with service

delivery responsibilities and they do not understand the importance of data collection and reporting. Typically, there is one MOH staff person at the district level responsible for HMIS reporting; therefore, there is little additional time or resources for supervision in this specific area. Little or no feedback is given to facilities after submission of their reports, reinforcing their seemingly minor importance. As a result, HMIS reports contain incomplete data and are usually released 9–12 months later and often only biannually, rather than quarterly, in time for the SWAp reviews.

In 2009, the HIV Unit spearheaded the revision of the ANC register to make it cohort-based, providing a more complete sense of the proportion of women who receive at least two doses of IPTp. The introduction of the new register has reportedly led to a renewed commitment by the HIV Unit to conduct quarterly supervision visits, ensuring that providers are using the new ANC register completely and correctly. Time will tell if such efforts will be sustained, but stakeholders report that for the immediate term, it has resulted in some improved data quality for ANC indicators.

According to the MPR, there is an Integrated Disease Surveillance and Response (IDSR) system, which captures key malaria indicators. Partners interviewed were not aware of this system. The authors obtained from NMCP a raw data 2009 IDSR report that includes district data on the number of outpatient cases of MIP in 2009, which was 21,201 across what appears to be nine months. It is not known whether these cases were laboratory confirmed. NMCP was also not available for further comment on how the IDSR functions and whether reports are routinely made available to other units of MOH and partners. A national MIP assessment was also reportedly conducted in 2010; however, the authors were able to obtain only raw data on IPTp uptake in 48 facilities and not a full report.

For household surveys, such as the DHS and MIS, WHO recommends collecting data on the percentage of women who slept under an ITN the previous night and percentage of low birth weight singleton live births, which Malawi captures in both surveys, and data on the percentage of screened pregnant women with severe anemia in the third trimester by gravidity, which Malawi does not capture. According to stakeholders, there are currently no active plans to begin capturing this indicator or those indicators on providers trained in MIP or SP stock-outs via these routine M&E tools. For the HMIS, it was often reported that attempts to include more indicators for RH and malaria met resistance, as there are "already too many indicators." However, NMCP reports that there was recent success in including MIP morbidity and mortality into this reporting system.

The work of local research organizations, such as the Malaria Alert Centre and College of Medicine, are doing much to fill the information gaps. With support from donors and partners, they have conducted a variety of clinical studies that inform MIP prevention and management, including studies on community-based distribution of IPTp and SP efficacy (currently ongoing). Previously, the Malaria Alert Centre, with support from PMI/CDC, worked with NMCP to re-vamp four of its nine sites in the sentinel surveillance system (SSS), which is used to monitor in-and outpatient indicators, such as incidence of fever and diagnosed malaria cases, as well as drug stock levels, including SP. This support has since ended, and with it, so have the regular SSS reports. For quantitative data collection, partner organizations, such as PSI, conduct periodic Knowledge, Attitude, and Practice surveys, which better capture the "why" of the quantitative data.

Some community-level data relevant to MIP are being captured by HSAs, including demographic information on pregnant women in communities and referrals made for ANC. This information is not currently being aggregated by the district or central levels; however, one stakeholder noted that there are efforts by UNICEF to include more community-level indicators in the HMIS.

Financing (Stage 2.5)

Malawi is currently at Stage 2.5 for financing of MIP interventions. The national government has committed some funds to MIP programming, however, it still relies heavily on donor support.

As discussed earlier, the Government of Malawi and collaborating partners have agreed upon a SWAp mechanism for funding the health sector, from which an estimated 20% of the annual budget in the SWAp pool goes to malaria control (Global Fund 2009). As there are reportedly difficulties in obtaining financial reports and accounting of the funds from the MOH, many donors are reluctant to give directly to the basket fund, counterproductive to the goal of building capacity within the MOH to lead management and funding of health programs.

Global Fund provides a significant amount of funding for Malawi's malaria programming, including LLIN and ACT procurement and distribution, indoor residual spraying, and, soon, RDTs. However, delays in disbursement of funds are frequent and have previously resulted in ACT and LLIN stock-outs. Stakeholders report that this delay results from delays both with the Malawi primary recipient and the Global Fund. On the Malawi side, stakeholders credit the delays more to routine inertia, than to any specific challenge related to the Global Fund process.

Funding for SP for IPTp is reportedly adequate with stock-outs being attributed to issues of financial and logistical management. Funding for FANC/MIP in-service trainings for health care providers is reportedly lacking, with NMCP unable to reach its desired number of providers. For LLINs, funding from the international community, primarily Global Fund and PMI, has so far been adequate to meet the needs of pregnant women and children under five, and currently Malawi is aiming toward mass distribution for universal coverage.

DISCUSSION AND LESSONS LEARNED

Factors Influencing Bottlenecks

The bottlenecks identified through this desk review overlap largely with constraints seen in other malaria-endemic southern African countries. Table 11 below highlights major bottlenecks impacting MIP program implementation.

Table 11. Bottlenecks, Mitigation Strategies and Lessons Learned

CHALLENGE/BOTTLENECK	CURRENT MITIGATION STRATEGIES	LESSON LEARNED
Weak collaboration between MOH RHU and NMCP	NMCP renewing joint planning; MIP focal person attends RHU annual planning meetings	Failure to actively partner in the planning and implementation of MIP interventions results in disjointed and duplicative programming and missed opportunities for leveraging of funds.
Weak diagnostic capability at the health facility level	Procuring RDTs in Global Fund Rounds 2, 7 and 9	Limited confirmatory testing for malaria results in misdiagnosis of fever, overuse of antimalarials, and presumed endemicity.
Irrational use of antimalarials	Procuring RDTs in Global Fund Rounds 2, 7 and 9; Conducting malaria case management trainings	The availability of RDTs may reduce some irrational use, however, further IEC efforts are needed to encourage clients to obtain diagnostic testing and to secure community trust in ACTs.

CHALLENGE/BOTTLENECK	CURRENT MITIGATION STRATEGIES	LESSON LEARNED
Weakness in HMIS data management systems	Roll out of cohort-based ANC register; Collecting data via supportive supervision visits	Data management must be a core component of all in-service trainings for health care providers. However, providers will not prioritize data management unless they recognize its usefulness to programming.
Inadequate skilled human resources for health	Rollout of community midwife cadre	Pre- and in-service training will have limited impact if health facilities are understaffed and workers overburdened; the skilled health workforce must be augmented to increase quality of care.
Inadequate district-level personnel dedicated to RH and malaria programming	Hiring district staff dedicated solely to RH and malaria control, as recommended by 2010 MPR	The level of management and support required by RH and malaria control programs requires full-time attention by district staff to implement and sustain quality programs.
Stock-outs of SP	Tracking SP supplies through quarterly, end-use verification surveys by USAID DELIVER PROJECT; developing CMS roadmap	Frequent facility-level stock-outs thwart efforts to scale up IPTp; the current CMS system is not adequate for ensuring that SP reaches facilities.
Late initiation of ANC attendance	Developing Community-Based Maternal and Newborn Care Package and Services	Increased community sensitization on FANC and referral mechanisms may help to overcome cultural barriers that prevent access to ANC in the first trimester.
Skepticism of SP efficacy by clients and health care providers	Conducting Malaria Alert Centre/CDC/PMI study on SP efficacy for IPTp and case management in pregnant women	Providers and clients perceive conflicting messaging in promoting SP for IPTp, but ACTs for the general population; if SP is to remain the drug for IPTp, more nuanced IEC is required.
Low usage (50%) of ITNs/LLINs by pregnant women	Encouraging use through mass media campaigns and community-level IEC; moving toward universal coverage through mass distribution; HSAs assisting in hanging nets in selected communities	Distributing ITNs through ANC is not effective if supplies are inconsistent; providing ITNs and IEC may not be enough to encourage routine usage of nets; more programs in which HSAs assist in the hanging of nets may result in higher rates of usage.

Successes and Best Practices

This case study has identified strengths in MIP program implementation in Malawi in the areas of policy, community awareness and involvement, and financing. Key practices include:

- **Integration of MIP interventions with FANC at the facility level**
  At the central level, there is weak integration of MIP with RH, but at the health facility level, MIP interventions remain fully integrated with FANC service delivery. Distributing free ITNs and administering IPTp during routine FANC visits have helped improve coverage of these interventions. Although several challenges remain to attain complete coverage, including ensuring adequate commodity stocks and human resources, integration of MIP and FANC is routine.
- **Leadership in the investigation and rollout of drug regimens for IPTp and MIP case management**
  With support from donors and implementing partners, Malawi has and continues to play a leadership role in investigating treatment failures with current drug regimens for MIP. In 2003, based on such investigations, Malawi was the first country to roll out SP for IPTp. Malawi's current participation in the multi-country evaluation on the efficacy of SP for IPTp and MIP case management will be significant, not only in informing Malawi's own MIP policies and guidelines, but those in other malaria-endemic countries, as well. The evaluation results will help to determine whether the international community should continue to promote SP for MIP prevention and treatment or whether alternative drug combinations must be introduced to sustain and further progress in reduction of MIP-related morbidity and mortality.
- **Well-developed IEC strategy with creative platforms for effective communication of malaria messages**
  Through successful use of print and mass media campaigns, malaria messages have reached more than three-quarters of the target population. Radio spots, posters, music videos, and public service announcements encouraging use of ITNs and IPTp by pregnant women have been disseminated nationally. Publicity surrounding high-profile events, such as the 2010 football World Cup, have been effectively utilized to promote use of malaria interventions. RH and malaria stakeholders credit such programs with the significant increase in ITN usage among pregnant women between 2006 and 2010.
- **Delivery of maternal health services, including MIP education and referral, closer to the household level**
  The pilot launch of the Community Maternal and Newborn Care Package is a significant step toward bringing health services closer to the family and strengthening referral systems for facility-based care, such as FANC. According to preliminary anecdotal reports, this intervention is increasing women's willingness and ability to access maternal health services, thereby reducing morbidity and mortality.
- **Coordination of funding for MIP programs through SWAp**
  Use of SWAp in Malawi has facilitated targeted use of donor funds to address concerns of national priority and reduce overlaps in funding. Although issues of government accountability have prevented more donors from contributing directly to the basket fund, the SWAp has served as an effective platform for coordinating direct and discrete funding. The SWAp meetings further serve as a motivating factor for MOH to report on national-level HMIS indicators.

Conclusions and Recommendations

The case study has identified several specific gaps in program implementation and scale-up. Based upon the findings, the following actions are recommended:

- **Reestablish MIP Working Group**
  The reestablishment of a MIP Working Group can serve as a forum for rebuilding an effective working relationship between RHU and NMCP, as well as the HIV Unit. Routine, quarterly meetings could serve as an opportunity to jointly plan MIP activities, leverage funding, and share expertise. Regular, constructive communication could further prevent inconsistencies in policy and programmatic strategies and prevent future disputes, such as that over community IPTp. Many of the recommendations that follow could most ideally be addressed as specific tasks of the MIP Working Group.
- **Harmonize RHU, NMCP, and HIV policies and messaging and dedicate increased resources to guideline dissemination**
  Inconsistencies in FANC and MIP policies, guidelines, and performance standards, specifically the timing and number of doses of IPTp and regimens for HIV-positive pregnant women, should be jointly reviewed and harmonized so that the MOH has one clear FANC and MIP policy that all health programs and service providers can follow. These guidelines should be consistent in language and should be reflected in pre- and in-service curricula, as well as facility- and community-level IEC. The MOH and partners must further work to overcome delays in the launch of new guidelines and dedicate increased resources to ensure that they are available and in use by all health care providers.
- **Reevaluate IPTp policy limiting administration to <36 weeks**
  WHO guidelines allow for the administration of SP for IPTp throughout the third trimester. Revising the policy that limits IPTp to less than 36 weeks of pregnancy may increase the number of women who are able to access two or more doses of IPTp, and, particularly for those clients who initiate ANC late in pregnancy, increase the number who can access at least two doses, leading to improved health outcomes for mother and child.
- **Advocate through the MIP Working Group and other fora to ensure consistent stocks of SP and ITNs at ANC clinics**
  Many countries across the Africa region are experiencing widespread and frequent stock-outs of SP. In Malawi, the primary reason for stock-outs has been mismanagement at CMS. The recent development of a CMS roadmap as a condition for receipt of Global Fund money holds promise for the future. Pending reform, donors and implementing partners must continue to exert pressure on the Government of Malawi to ensure consistent stocks of SP at the central and facility level. The MOH must likewise be engaged to ensure strengthened supervision in malaria case management, emphasizing appropriate use of antimalarials and correct diagnosis and management of non-malarial fever to minimize irrational use of SP.

  The distribution of ITNs through ANC has historically been considered a success in Malawi; however, recent changes to the distribution system have caused concern, as facility-level stock-outs become more frequent. Stakeholders, through a MIP Working Group, can play an important role in examining current bottlenecks and implementing solutions.
- **Promote capacity-building strategies, including strengthened pre-service education, on-the-job training, mentorship, and supervision, in addition to group-based, in-service training**
  MIP is already included in pre-service training, but Malawi may need to examine the quality of pre-service training and whether additional training is the answer, considering that issues, such as limited numbers of skilled providers and weak supervision, have been identified as primary challenges. Because off-site training is expensive and has reinforced a culture of per diems, a more cost-effective approach may be to direct funds toward pre-service institutions for training and strengthening infrastructure and, at the district and

facility levels, toward on-the-job training, mentorship, and supervision. All stakeholders agreed that these latter areas are weak and under-funded and diminish the returns from both pre- and in-service training. Strengthened pre-service training will further diminish the overall need for in-service training, and facility-based mentorship will allow for immediate problem solving of barriers to implementation of the full FANC package. Such interventions may take longer to reach large numbers of providers; therefore, MOH and donors will need to lead the way to align program targets with new strategies. For all training models, e-learning technologies, such as online and CD-ROM-based courses, can supplement and reduce the time required for training by external mentors.

- **Establish an in-service training database and assess training outcomes**
  Despite the implementation of an Integrated Maternal and Newborn Care Package, several parallel trainings, including FANC/MIP and PMTCT, continue to be conducted. The absence of information sharing between RHU, NMCP, and the HIV Unit and of a training database, have resulted in unknown and differing levels of provider training across the country. As such, it is difficult to assess how individual trainings are impacting service delivery and whether multiple trainings are necessary and effective. A training database could serve not only as a tracking mechanism, but also as a platform for planning among RHU, NMCP, and the HIV Unit. Competency assessments of providers could be compared in light of their exposure to the various trainings.
- **Strengthen existing M&E systems and surveys to better capture key, high-quality MIP data**
  Efforts toward this objective should be three-fold: 1) strengthen facility-level data collection and reporting; 2) build district-level skills in data use for decision-making; and 3) incorporate WHO-recommended indicators into the HMIS and/or household surveys. When human resources are lacking, facility-level data collection and management can be strengthened by focusing on the process. The importance of the HMIS system should be incorporated into all pre- and in-service trainings for clinical and support staff. Data management should not be separate, but an integrated component of service delivery. DHMTs, including program and technical officers, as well as HMIS staff, should be trained in the art of data management supervision and the use of data for decision-making (e.g., using data to advocate for and direct resources). As the system is strengthened, the remaining WHO indicators—number of staff trained in the control of MIP in the previous 12 months and percentage of facilities reporting stock-outs of SP for IPTp—should be added. Anemia in pregnancy, which can be difficult to capture in household surveys due to challenges in accessing a significant sample size, could also be captured by the HMIS, as it is already recorded on women's health passports. To facilitate this, the ANC register could include a box for clinical diagnosis of anemia and confirmed diagnosis of severe anemia.
- **Strengthen quality assurance systems**
  Quality assurance, including performance assessments and routine supervision, requires more emphasis by MOH, donors, and implementing agencies if inputs into the other MIP program components, particularly capacity building and commodities, are to be maximized. Greater collaboration is needed among the Quality Assurance Unit, RHU, NMCP, and the HIV Unit in conducting performance assessments and using assessment information to augment and more efficiently target supervision to address program and service delivery gaps. This collaboration would also create opportunities to leverage funding across programs, allowing for more frequent visits.
- **Introduce district-level officers dedicated specifically to RH and malaria control**
  Current district safe motherhood and malaria control officers, due to competing job responsibilities as managers and clinicians, are able to dedicate only approximately 20% of their time to safe motherhood or malaria control activities. This conflict limits MOH ownership of partner-supported programs and compromises sustainability through support

and supervision. Advocacy is needed to incorporate staff specifically dedicated to these programs into the MOH payroll so that they can play a more active role in quality assurance and data management at the facility level.

- **Support community-directed initiatives to overcome barriers to care-seeking**
  Many of the barriers that inhibit access to FANC and MIP interventions, including household power dynamics, lack of transport, and lost income can be addressed by community-directed interventions that raise awareness about the importance of FANC and MIP services and malaria prevention and also that bring services closer to the community. Training HSAs with the Community Maternal Newborn Care Package is one important program already under way that utilizes both of these strategies. Other targeted interventions, such as community-based agents demonstrating and assisting in proper hanging of LLINs in households, can also eliminate simple but significant barriers to implementation of malaria prevention strategies. Additional support for interventions, such as increased numbers of outreach clinics and/or development of community transportation systems, could further overcome the continuous and oft-cited barrier of far distances to service delivery points.
- **Develop more nuanced IEC regarding potential causes of fever and appropriate use of SP**
  The public health community in Malawi has effectively raised awareness of the causes, signs, and symptoms of malaria. The unintended consequence of this awareness, however, is the widespread association of all fevers with malaria. In light of the development of resistance to chloroquine and SP for case management, it is crucial that communities and service providers alike understand that although fever is a symptom of malaria, not all fevers are malaria. Providers and clients perceive a conflict between messages that SP, while ineffective for malaria treatment, is still effective for IPTp. Pending the results of the SP efficacy studies, it may be necessary to revisit this issue in MIP IEC campaigns so that misperception of the efficacy of SP for IPTp does not inhibit usage.

Some of the above-mentioned recommendations are not specific to MIP alone, and apply to malaria and even health systems in general that affect MIP program implementation.

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World Health Organization (WHO). 2004. *A Strategic Framework for Malaria Prevention and Control during Pregnancy in the African Region*. WHO: Geneva.

Appendix 1

COUNTRY DATA SOURCES FOR CASE STUDY

DATA SOURCE	REPORT
DHS	2000, 2004, 2010 (preliminary report)
MICS	2006
MIS	2010
Program and government documents and reports	Application to the Global Fund for AIDS, Tuberculosis and Malaria Round 9 Global Fund Grant Application, Government of Malawi
	Focused Antenatal Care and Prevention of Malaria During Pregnancy, Training Manual for Healthcare Providers, 2006, MOH
	Guide for the Management of Malaria, 2007, MOH
	IPTp Summary for Jan-March 2010, MOH
	Key Indicators from Malawi Demographic and Health Survey (2000, 2004, 2010), 2011, NSO
	Malaria Programme Review, 2010, MOH
	Malaria Strategic Plan 2011–2015, MOH
	Malawi Demographic and Health Survey 2000, NSO and Macro
	Malawi Demographic and Health Survey 2004, NSO and ORC Macro
	Malawi Demographic and Health Survey 2010 Preliminary Report, NSO
	Malawi RBM Country Consultative Mission Final Report, Essential Actions to Support Attainment of the Abuja Targets, 2004, [Malawi] RBM
	Multiple Indicator Cluster Survey, Malaria, 2006, National Statistics Office and UNICEF
	National Malaria Control Strategic Plan 2005–2010, MOH
	National Malaria Indicator Survey, 2010, MOH
	National Malaria Treatment Guidelines, NMCP, 2007, MOH
	National Reproductive Health Service Delivery Guidelines, 2007, MOH
	PMI Fourth Annual Report, 2010
	PMI Malaria Operational Plan, 2009, 2010
	Population and Housing Census Report, 2008, National Statistics Office
	Prevention of Malaria in Pregnancy in Malawi: A successful collaboration between malaria control and reproductive health, Ministry of Health and Population, Kazembe P and Macheso A
	Prevention of Mother-to-Child Transmission of HIV Guidelines, Second Edition, 2008, MOH
	RH Monitoring Tool for RHU, 2009
	Sector Wide Approach Program of Work, 2004, Government of Malawi

DATA SOURCE	REPORT
Research Studies	Achieving Abuja Targets for IPTp in Blantyre District (Coombes et al.)
	Antenatal care services and IPTp (Holtz et al. 2004)
	Community-based distribution of sulfadoxine-pyrimethamine for intermittent preventive treatment (Msyamboza et al. 2009)
	Cost-effectiveness of ITN and IRS programs (Yukich, Tedios, and Lengeler 2007)
	Developing National Malaria Policy (Malenga et al.)
	Effect of P. falciparum on placental HIV-1 RNA concentrations (Mwapasa et al. 2004)
	Efficacy of antimalarial regimens for pregnant women with SP and/or chloroquine (Schultz et al. 1994)
	Measurement of adherence and effectiveness of SP (Bell et al.)
	Placental maternal infections and infant mortality (Bloland et al. 1995)
	Prevalence of malaria in HIV-infected pregnant women (Verhoeff et al. 1999)
	2-dose SP in HIV-positive women (Filler et al. 2006)

Appendix 2

PRIORITY MIP INDICATORS AND CORRESPONDING DATA SOURCES—MALAWI

LEVEL	INDICATOR	DATA SOURCE	DATA	LOCATION OF DATA	COMMENTS
Outputs	▪ Percentage of ANC clinic staff trained in pre-service, in-service (or during supervisory visits) in the control of malaria during pregnancy during the past 12 months (IPTp, counseling on use of ITNs, and case management for pregnant women)	-	-	-	100% of ANC providers graduating 2006 or later trained during pre-service educator course; NMCP collecting data on in-service during supervisory visits, but not aggregated nationally
	▪ Percentage of health facilities reporting stock-out of recommended drug for IPTp (currently SP) in the past month or in the determined period (according to national guidelines)	National MIP Assessment 2010	77.1	IPTp Summary for Jan–March 2010	Available upon request from NMCP
		USAID DELIVER Pipeline Report 2010	-	USAID DELIVER Logistics Management Information System	Data not available for this report
Outcomes	▪ Percentage of pregnant women who received any ANC from skilled provider	DHS 2004	94.8	Chapter 9: Maternal and Child Health, p. 133–134	DHS 2010 currently in progress
		DHS 2010 (preliminary report)	96.5	Section F: Maternal Care, p. 13–14	
		HMIS	-	-	Available upon request from MOH HMIS Unit
	▪ Percentage of pregnant women who attended 2+ ANC visits	DHS 2004	35.2%	Chapter 9: Maternal and Child Health, p. 135	
		HMIS	-	-	Available upon request from MOH HMIS Unit
	▪ Percentage of pregnant women receiving IPTp under direct observation (first dose, second dose, according to national guidelines	DHS 2004	46.5	Chapter 14: Malaria, p. 258–260	Percentage of women who took 2+ doses of SP—did not specify IPTp regimen
		DHS 2010 (preliminary report)	55.0*	Section I: Malaria, p. 26–27	*Number of doses not indicated

LEVEL	INDICATOR	DATA SOURCE	DATA	LOCATION OF DATA	COMMENTS
		HMIS	-	-	Available upon request from MOH HMIS Unit
		MICS 2006	46.7	Chapter 9: Reproductive Health, p. 159	
		MIS 2010 (draft)	60.3%	Chapter 3: Coverage of key malaria interventions, p. 21–22	
		National MIP Assessment 2010	53%*	IPTp Summary for Jan–March 2010	*With cotrimoxazole included in enumerator; report available upon request from NMCP
		SSS	-	-	Data collected in SSS tools, but report unavailable
	▪ Number of MIP outpatient cases	IDSR (2009)	21,201	Raw data report	Available upon request from NMCP
		HMIS	-	-	Available upon request from MOH
	▪ Percentage of households with at least one ITN	MICS 2006	37.8	Chapter 7: Child Health, p. 105–106	
		DHS 2004	27.4	Chapter 14: Malaria, p. 251–252	
		DHS 2010 (preliminary report)	56.8	Section I: Malaria, p. 25–27	
		MIS 2010 (draft)	59.8	Chapter 3: Coverage of key malaria interventions, p. 14–16	
	▪ Percentage of pregnant women who report having slept under an ITN the previous night	DHS 2004	14.7	Chapter 14: Malaria, p. 256–8	
		DHS 2010 (preliminary report)	35.3	Section I: Malaria, p. 26–27	
		MICS 2006	25.6%	Chapter 9: Reproductive Health, p. 157	
		MIS 2010 (draft)	49.9%	Chapter 3: Coverage of key malaria interventions, p. 19–20	

LEVEL	INDICATOR	DATA SOURCE	DATA	LOCATION OF DATA	COMMENTS
Impact*	▪ Percentage of low birth weight singleton live births (<2,500g), by parity	DHS 2004	5.3%	Chapter 9: Maternal and Child Health, p. 144–145	
		MICS 2006	13.5%	Chapter 6: Nutrition, p. 76–77	Percent of live births <2,500g
	▪ Percentage of screened pregnant women with severe anemia (hemoglobin <7 g/dl) in the third trimester, by gravidity	-	-	-	Data not available; only recorded on client ANC card

Appendix 3

STAGES OF MIP PROGRAM IMPLEMENTATION MATRIX

MIP READINESS COMPONENT	STAGE 1	STAGE 2	STAGE 3	STAGE 4
Integration	▪ No meetings or communication between NMCP and RH Programs at national level ▪ Poor or coincidental integration at district level ▪ No integration of MIP with other public health programs	▪ Some meetings or communication between NMCP and RH program at national level ▪ Attempts at integration at district level ▪ Attempts to integrate MIP with other public health programs	▪ Sharing of information and regular meetings between the NMCP and RH program at national level ▪ Stated focus of integration at district level ▪ Some MIP, RH, child health, and/or HIV/AIDS services have been bundled together in health services	▪ Joint strategies, planning, and sharing of information between NMCP and RH programs at national level ▪ District level promotes integration of RH, child health, HIV/AIDS and MIP in administration and supportive supervision ▪ MIP, RH, child health, and/or HIV/AIDS are provided together in health services
Policy	▪ No or minimal MIP policies, strategies, or service delivery guidelines available in-country	▪ Some MIP policies, strategies, or service delivery guidelines developed ▪ Dissemination not done or not yet completed	▪ MIP policies, strategies, or service delivery guidelines developed ▪ Dissemination partial ▪ Utilization unknown or incomplete	▪ MIP policies, strategy, and service delivery guidelines developed and being used at all levels of the health system
Commodities	▪ Malaria drug and ITN procurement and distribution systems for ANC clinics poorly functioning (e.g., stockouts) ▪ WHO-recommended medicines for malaria and/or MIP have not been approved	▪ Malaria drug and ITN procurement and distribution systems for ANC clinics functional ▪ WHO-recommended medicines for malaria and/or MIP have been approved but not widely available ▪ ITNs available sporadically	▪ Malaria drug and ITN procurement and distribution systems for ANC clinics functional ▪ WHO-recommended medicines for malaria and/or MIP have been approved and are widely available ▪ ITNs available in many places	▪ Malaria drug and ITN procurement and distribution systems for ANC clinics efficient ▪ WHO-recommended medicines for malaria and/or MIP are always available ▪ ITNs always available

MIP READINESS COMPONENT	STAGE 1	STAGE 2	STAGE 3	STAGE 4
Quality Assurance	▪ MIP quality assurance standards have not been developed ▪ Supportive supervision not in place to maintain quality in MIP services ▪ Quality of MIP services poor	▪ MIP quality assurance standards have been developed but are not widely used ▪ Supportive supervision for MIP services in place to limited extent ▪ Quality of MIP services low	▪ MIP quality assurance standards have been developed and are used in some areas ▪ Supportive supervision for MIP services increasingly utilized ▪ Quality of MIP services moderate	▪ MIP quality assurance standards have been developed and are used systematically ▪ Supportive supervision for MIP services utilized systematically ▪ Quality of MIP services high
Training	▪ No competency-based training on MIP has been planned ▪ Pre-service nursing, midwifery, and medical curricula outdated regarding MIP	▪ Competency-based in-service training on MIP planned or has occurred on limited basis ▪ Pre-service nursing, midwifery, and medical curricula have been revised regarding MIP but not consistently taught to students	▪ Competency-based in-service training on MIP conducted for many health service providers ▪ Updated pre-service nursing, midwifery, and medical MIP curricula being taught at most academic institutions	▪ Competency-based in-service training on MIP conducted for all appropriate cadres of health service providers ▪ Updated pre-service nursing, midwifery, and medical MIP curricula being taught at all academic institutions
Community-based MIP Programs	▪ Community action and awareness on MIP low ▪ No resources available for community ▪ Low community acceptance of MIP prevention and treatment measures (ITNs, IPTp, and case management)	▪ Community action and awareness on MIP raised through research, advocacy and/or programs ▪ Few resources developed for communities ▪ Some community acceptance of MIP prevention and treatment measures	▪ Community action and awareness on MIP strong through research, advocacy, and/or programs ▪ Appropriate resources widely available ▪ Moderate community acceptance of MIP prevention and treatment measures	▪ Community action groups are strong partners in national MIP prevention efforts ▪ Appropriate resources widely available ▪ Widespread community acceptance of MIP prevention and treatment measures

MIP READINESS COMPONENT	STAGE 1	STAGE 2	STAGE 3	STAGE 4
M&E	▪ Routine data for MIP service delivery not available ▪ No MIP indicators developed ▪ No baseline[13] information or research results exist for country	▪ Routine data for MIP service delivery available ▪ MIP indicators designed but not integrated into national system ▪ Some baseline information or research results exist for country	▪ Routine data for MIP service delivery available, collected, and reported on ▪ MIP indicators agreed upon and data collection started ▪ Baseline information or research results exist for country	▪ Routine data for MIP service delivery available, collected, reported on, and used for decision-making ▪ MIP indicators being collected regularly ▪ Some endline studies designed to capture achievements and/or impact studies being conducted
Financing	▪ National government has not committed funds to MIP programs ▪ No donor funding exists for MIP ▪ No proposals submitted to donors for MIP funding	▪ National government has not committed adequate funds to MIP programs to cover projected costs ▪ Limited donor funding exists for MIP	▪ National government has committed funds to MIP programs, which significantly contribute to projected costs ▪ Strong donor funding exists for MIP	▪ National government has committed and disbursed funds to MIP programs that significantly contribute to projected costs ▪ Ample donor funding exists for MIP and is being used effectively

[13] Relevant baseline information includes: community utilization of MIP, epidemiology of malaria transmission and pharmacovigilance.

Appendix 4

MIP PARTNER ORGANIZATIONS—MALAWI

ORGANIZATION	FUNDING	IMPLEMENTING	CURRENT SCOPE OF MIP PROGRAM	LOCATION	FUNDING SOURCE	END DATE
BASICS (MSH)		X	▪ Procure and distribute IPTp "equipment" (cups, water storage) ▪ Conduct supportive supervision for FANC ▪ Conduct community-level IEC, BCC	Countrywide	PMI/USAID	Sept 2011
Christian Health Association of Malawi		X	▪ Provide 37–40% of all health services, including FANC, in country through Christian Health Association of Malawi hospitals ▪ Administer nursing and midwifery schools ▪ Distribute LLINs at community-level through Nets for Life (3 districts)	Countrywide	▪ Client user fees ▪ Government of Malawi ▪ Deutsche Gesellschaft für Internationale Zusammenarbeit ▪ Global Fund ▪ CDC ▪ Norwegian Embassy ▪ PSI	n/a
Global	X		▪ Provide grants for LLINs, ACTs, RDTs	Countrywide	Donor countries	Dec 2010 (Round 7)
Malaria Alert Centre		X	▪ Conduct clinical and entomological training ▪ Provide M&E support ▪ Conduct clinical and epidemiological research, including SP efficacy study	Countrywide	PMI/CDC	

ORGANIZATION	FUNDING	IMPLEMENTING	CURRENT SCOPE OF MIP PROGRAM	LOCATION	FUNDING SOURCE	END DATE
MCHIP		X	PSI ▪ Distribute ITNs ▪ Develop and distribute IEC materials; develop national campaigns Jhpiego ▪ Implement Standards-Based Management and Recognition quality assurance program Save the Children ▪ Implement Community Maternal Newborn Care Package	▪ Machinga ▪ Nkhotakota ▪ Phalombe ▪ Rumphi	PMI/USAID	Sept 2011
Mulli Brothers (Private Sector)		X	▪ Distribute LLINs	MOH-selected districts (transient)	Contract with MOH (GFTAM funds)	Dec 2012
PMI	X		Through CDC and USAID, fund implementing partners to: ▪ Procure and distribute LLINs ▪ Strengthen labs, roll out RDT ▪ Support IEC and BCC ▪ Mobilize community ▪ Procure and distribute IPTp "equipment" ▪ Conduct SP efficacy and entomological studies	Countrywide	US Government	2014
Save the Children		X	▪ Pilot Community Maternal and Newborn Care Package	▪ Chitipa ▪ Dowa ▪ Thyolo	Gates Foundation USAID Save the Children/Italy	March 2013
UNFPA	X		▪ Provide technical and financial support in sexual and RH at policy level and in selected districts	▪ Dedza ▪ Mchinji ▪ Nkhata Bay ▪ Chiradzul ▪ Mangochi	Donor Countries	Continuous

ORGANIZATION	FUNDING	IMPLEMENTING	CURRENT SCOPE OF MIP PROGRAM	LOCATION	FUNDING SOURCE	END DATE
UNICEF	X	X	▪ Procure LLINs (2009) ▪ Support Community Integrated Maternal and Newborn Care Package pilot in 3 districts ▪ Support male-to-male sensitization on maternal health and HIV (3 districts)	LLIN distribution: Karonga, Mzimba, Kasungu, Lilongwe, Dedza, Ntcheu, Balaka, Phalombe, Chiradzulu, and Nsanje Community Maternal Newborn Care Package pilot: Chitipa, Dowa, and Thyolo	Donor Countries	Dec 2012
USAID DELIVER PROJECT (JSI)		X	▪ Procure LLINs ▪ Distribute AL (funded by USG and Global Fund) ▪ Distribute RDTs (pending)	Countrywide	USAID	July 2011
WHO	X	X	▪ Conduct in-service trainings in Integrate Maternal & Newborn Care Package and post-training supervision ▪ Support conduct of MIS	Karonga, Mzimba, Kasungu, Lilongwe, Ntcheu, Dedza, Balaka, Chiradzulu, Nsanje	Donor Countries	Dec 2011

Appendix 5

REFERENCES FOR FURTHER INFORMATION

A Strategic Framework for Malaria Prevention and Control during Pregnancy in the African Region (World Health Organization)
http://whqlibdoc.who.int/afro/2004/AFR_MAL_04.01.pdf

Malaria in Pregnancy (MiP) Consortium
http://www.mip-consortium.org/

Malaria in Pregnancy Resource Package
http://www.jhpiego.org/resources/pubs/malarialrp/index.htm

Maternal and Child Health Integrated Program (MCHIP)
http://www.mchip.net

President's Malaria Initiative (PMI)
http://www.fightingmalaria.gov/

Roll Back Malaria (RBM) Partnership
http://www.rollbackmalaria.org