Monitoring and Evaluation of Malaria in Pregnancy Services
Practical Tips and Recommended Indicators

November 2020

The purpose of the brief is to provide malaria-endemic countries, particularly country-level government and private-sector stakeholders and policymakers, with guidance on monitoring and evaluation (M&E) of malaria in pregnancy (MiP) services, including recommendations on standard indicators for tracking progress toward meeting national and global targets for preventing and managing MiP. The focus is primarily on routine indicators captured through national health management information systems (HMISs) and used for monitoring within countries at all levels of the health system. The brief is intended to consolidate existing MiP M&E guidance from the World Health Organization (WHO), complementing the new WHO guidance for malaria program managers, the 2018 malaria surveillance guidelines, and the WHO MiP M&E guidelines from 2007.[1,2,3] The content of the brief further aligns with the *Global Technical Strategy for Malaria 2016–2030* and *A Framework for Malaria Elimination.*[4,5] Key core recommended routine MiP indicators for ongoing tracking at facility level and reporting to the district and higher levels are presented in the box at right.

Recommended Core Routine MiP Indicators

- Percentage of pregnant women attending one or more antenatal care (ANC) visits
- Percentage of pregnant women attending four or more ANC visits
- Percentage of women attending eight or more ANC visits
- Percentage of pregnant women attending ANC in the first trimester
- Percentage of pregnant women attending ANC who received (one/two/three) doses of intermittent preventive treatment in pregnancy (IPTp1, IPTp2, IPTp3, IPTp4)
- Percentage of pregnant women attending ANC who received an insecticide-treated net during ANC
- Percentage of pregnant women with suspected malaria tested for malaria who tested positive
- Percentage of pregnant women with suspected malaria who tested positive for malaria who were treated

Background and Rationale

MiP is a major public health problem with substantial risks for pregnant mothers and their babies. Ministries of health (MOHs) require timely and high-quality information to inform program planning and management for the provision of MiP interventions, and to track progress toward national and global goals. Given the WHO-revised global policies for control of MiP in 2013, previous global MiP M&E guidelines are not up to date. Despite the policy change promoting monthly dosing of intermittent preventive treatment of MiP (IPTp), many countries have not updated their antenatal care (ANC) registers and/or electronic data platforms (e.g., the District Health Information System 2, or DHIS2) to capture routine HMIS data.

Madagascar. Photo by Karen Kasmauski, MCSP.

Pregnant women are at greater risk of malaria than women who are not pregnant. The main effects of MiP include maternal anemia, low birthweight (LBW), preterm delivery, and increased infant and maternal mortality. MiP causes 20% of stillbirths and 11% of newborn deaths in sub-Saharan Africa, and approximately 10,000 global maternal deaths annually.[4,5,6.] To control MiP, WHO recommends delivery and use of insecticide-treated nets (ITNs) and effective case management (including prompt diagnosis and effective treatment of malaria infections). In areas with moderate to high transmission of *Plasmodium falciparum*, WHO also recommends the administration of IPTp monthly, beginning as early as possible in the second trimester using quality-assured sulfadoxine-pyrimethamine.[6]

Core Routine Programmatic MiP Indicators

This section provides an overview of a set of nine core **routine** MiP indicators that are recommended by WHO, Roll Back Malaria working groups, and other stakeholders for monitoring by malaria-endemic countries due to their utility for programmatic decision-making. (Five of the core indicators are recommended for monitoring by all endemic countries and an additional four for endemic countries with IPTp as national policy.) All of these indicators are expected to be captured in national HMISs. Annex A provides the list of recommended core MiP indicators and a menu of additional routine and periodic MiP indicators in a detailed matrix that shows, for each indicator, the operational definition (numerator and denominator), data source, frequency of collection, and important notes. Many of these indicators overlap with the indicators in the new WHO malaria surveillance guidelines,[1] but additional indicators and details, including disaggregation for case management of MiP, are also outlined here as options for MOHs to consider tracking.

Feasibility of Tracking Recommended Core Routine MiP Indicators versus Additional Routine and Periodic Indicators

- The recommended core routine MiP indicators are already widely collected across countries and can be analyzed and used for decision-making on a regular basis. They can be easily integrated into HMISs if not already present.

- The recommend additional routine and periodic MiP indicators consist of a mix of indicators to be collected through national HMISs and household surveys (e.g., Demographic and Health Survey and Malaria Indicator Survey) and are generally more difficult to collect than the core MiP indicators. Further, as survey data are only collected every few years, they are not positioned to drive ongoing program management decisions.

Any antenatal care attendance (ANC 1+): The percentage of pregnant women attending one or more ANC visits, calculated as the number of pregnant women attending ≥ one ANC visit divided by the estimated/expected number of pregnant women in facility catchment area multiplied by 100. This indicator is useful to understand what proportion of all pregnant women attend any ANC visits. ANC 1 is also used as the IPTp indicator denominator for cross-sectional register ANC registers.

ANC 4+ attendance (ANC 4+): The percentage of pregnant women attending four or more ANC visits, calculated as the number of pregnant women attending ≥ four ANC visits divided by the estimated/expected number of pregnant women in the facility catchment area multiplied by 100. This indicator is useful to understand what proportion of all pregnant women attend four or more ANC visits and can indicate whether additional effort needs to be placed on improving repeat ANC attendance. Every ANC visit is an opportunity to provide IPTp to eligible pregnant women.

ANC 8+ attendance (ANC 8+): The percentage of pregnant women attending eight or more ANC visits, calculated as the number of pregnant women attending ≥ eight ANC visits divided by the estimated/expected number of pregnant women in facility catchment area multiplied by 100. This indicator is useful to understand what proportion of all pregnant women attend eight or more ANC visits, which is a relatively new recommendation by WHO (2016).[7] As noted above, every ANC visit is an opportunity to provide IPTp to eligible pregnant women.

ANC attendance in the first trimester: The percentage of ANC clients who attended ANC in the first trimester, calculated as the number of pregnant women who have their first antenatal care contact during the first trimester (less than 12 weeks) divided by the total number of pregnant women who have their first ANC contact multiplied by 100. This indicator offers insight as to whether women are seeking early ANC and which key interventions, such as iron folate, IPTp, and ITNs, should or should not have been offered.

IPTp by dose (doses 1–4): The percentage of ANC clients receiving IPTp by dose number. At minimum countries should be collecting and reporting IPTp1, IPTp2, IPTp3, and IPTp4. Countries can also choose to collect and report additional doses (beyond IPTp4). IPTp uptake is calculated as the number of ANC clients receiving the specific IPTp dose (separate for dose 1, 2, 3, or 4) divided by the total number of clients attending their first ANC visit during the same time period multiplied by 100. In countries where IPTp is national policy, this indicator provides an understanding of trends in IPTp coverage on a regular basis. ANC 1 serves as a proxy for the eligible number of ANC clients for IPTp.

ITN distribution during ANC for malaria prevention among pregnant women: The percentage of pregnant women attending ANC who received an ITN during ANC, calculated as the number of pregnant women who received an ITN during any ANC visit divided by the total number of clients attending their first ANC visit during the same period multiplied by 100. This indicator should be implemented in countries where ITNs are distributed through ANC and provides information on the percentage of targeted women who are reached.

Malaria test positivity rate for symptomatic pregnant women: The percentage of pregnant women with suspected malaria at the health facility who tested positive for malaria, calculated as the number of pregnant women at the health facility with suspected malaria who tested positive for malaria divided by the total number of pregnant women at the health facility tested for malaria multiplied by 100. This indicator gives some sense of the burden of malaria among pregnant women. Women also experience asymptomatic infection, so this indicator would not capture that.

Treatment of MiP: The percentage of pregnant women at the health facility who tested positive for malaria who received treatment, calculated as the number of pregnant women at the health facility who tested positive for malaria who received treatment divided by the total number of pregnant women at the health facility who tested positive for malaria multiplied by 100. This indicator gives a partial measure of the quality of malaria case management services for pregnant women, although it does not measure if the appropriate drug was given based on the trimester of pregnancy.

MiP Monitoring and Evaluation Framework and Indicators

The M&E Reference Group developed a malaria M&E framework as a guide for onene M&E system for malaria that outlines the different levels of data needed by program managers to assess program performance for disease control. This brief presents an adapted version of this M&E framework customized to show select MiP indicators along the impact pathway (Figure 1).

Figure 1. Malaria in pregnancy monitoring and evaluation framework
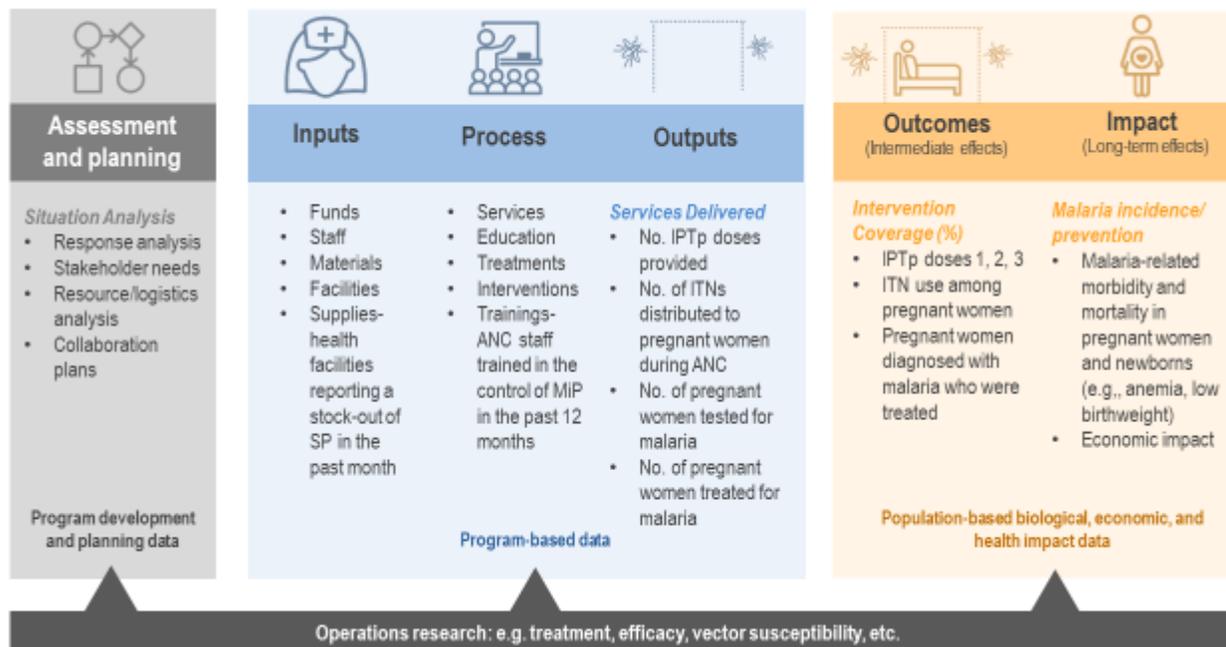
Data Visualization and Use

Recommended Standardized Data Visualizations

Below are a set of recommended data visualizations for select core MiP indicators. These are intended to help program managers track trends over time, interpret the meaning of the data, and inform decisions when actions are needed by facility or district staff to improve quality of care. These analyses are most useful if done at a subnational level (especially district or facility level) and on a monthly or quarterly basis. Frequent review of data provides the insight needed for program managers to be able to direct support, when coverage is below target levels. For example, this may include: mentoring of service providers through targeted supportive supervision and introduction of job aids, reorientation of particular training modules or comprehensive training, or community orientation to promote ANC utilization, IPTp uptake, ITN use, and comprehensive care.

IPTp Uptake during ANC (Doses 1, 2, and 3)

Figure 2. Uptake of intermittent preventive treatment of malaria in pregnany doses 1–3 (IPTp1–3) during antenatal care (ANC) services over a 6-month period in (facility or district)
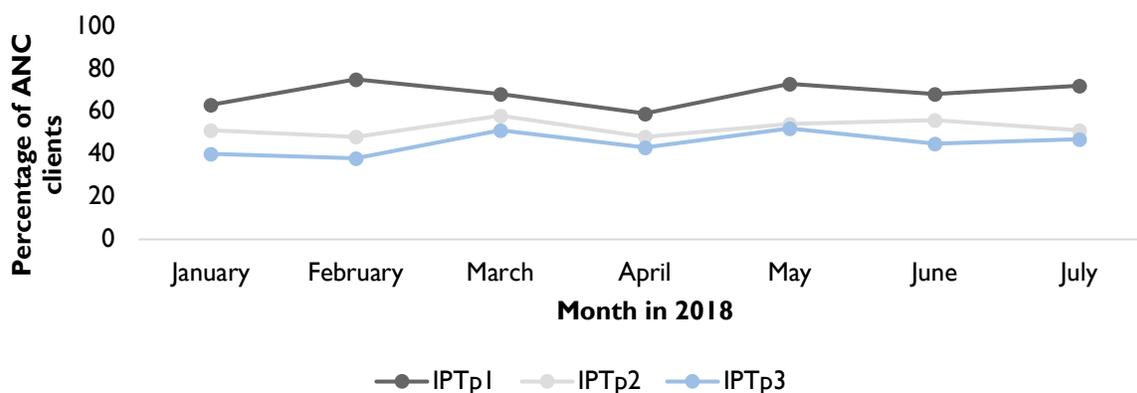
Plotting the percentages of ANC clients who received IPTp1, IPTp2, and IPTp3 on a monthly basis can provide useful information about progress over time, help identify barriers to care and missed opportunities for delivery of IPTp, and assist with forecasting the required amounts of sulfadoxine-pyrimethamine (see Figure 2).

Provision of ITNs during ANC

Figure 3. Antenatal care (ANC) clients who received an insecticide-treated net during ANC over a 6-month period in (facility or district)
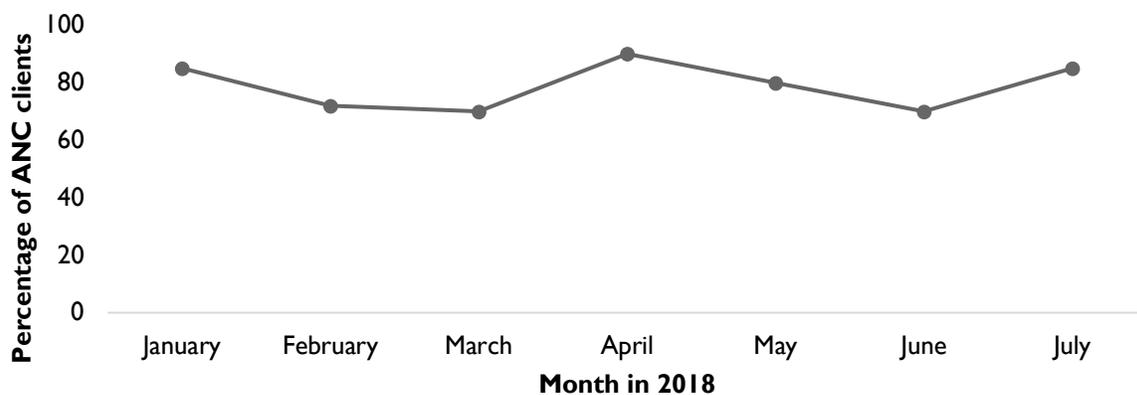
Tracking the percentage of ANC clients receiving ITNs in countries where ITNs are distributed via this channel helps to understand the quality of care during ANC and to project the numbers of ITNs needed (see Figure 3).

Figure 4. Testing and treatment for malaria in pregnancy over a 6-month period in (facility or district)


Month in 2018

■ Pregnant women with suspected malaria tested for malaria who tested positive

■ Pregnant women with suspected malaria who tested positive for malaria who were treated
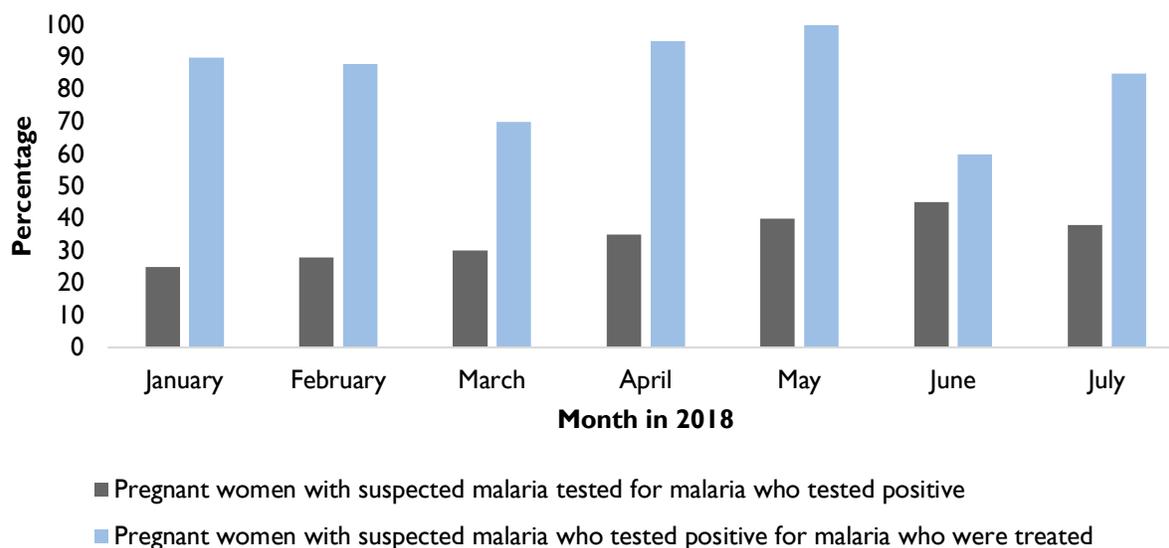
Monitoring trends for testing and treatment of malaria in pregnant women at health facilities helps to understand the burden of disease in this vulnerable group and determine if all positive cases are all receiving treatment. It can further assist with assessing the quality of care with respect to treatment guidelines and identifying the quantity of commodities needed (see Figure 4).

Facility Data Dashboard Wall Charts/Posters and Electronic Data Dashboards

Developing a culture of data use for program management is a challenge and requires a country's commitment to applying new data tools and processes that build capacity at all levels of the health system. In addition to ensuring that the right information systems are in place, there is a need to cultivate a community of data users at each level of the health system who understand how to use the tools, extract meaningful insight from the data, and translate those insights into actions that improve service delivery. Relevant actors must be empowered to make strategic and programmatic decisions on MiP programs based on insights gained from routine and survey data. One way to help empower frontline health workers is to put control over charting their facility data into their own hands. For example, several West African countries (Burkina Faso, Chad, etc.) use laminated, reusable poster dashboards (or wall chart data dashboards) to track provision of MiP and other malaria services, while Liberia uses a MiP poster data dashboard (Annex B).

Figure 5. Sample DHIS2 data dashboard with intermittent preventive treatment of malaria in pregnancy data
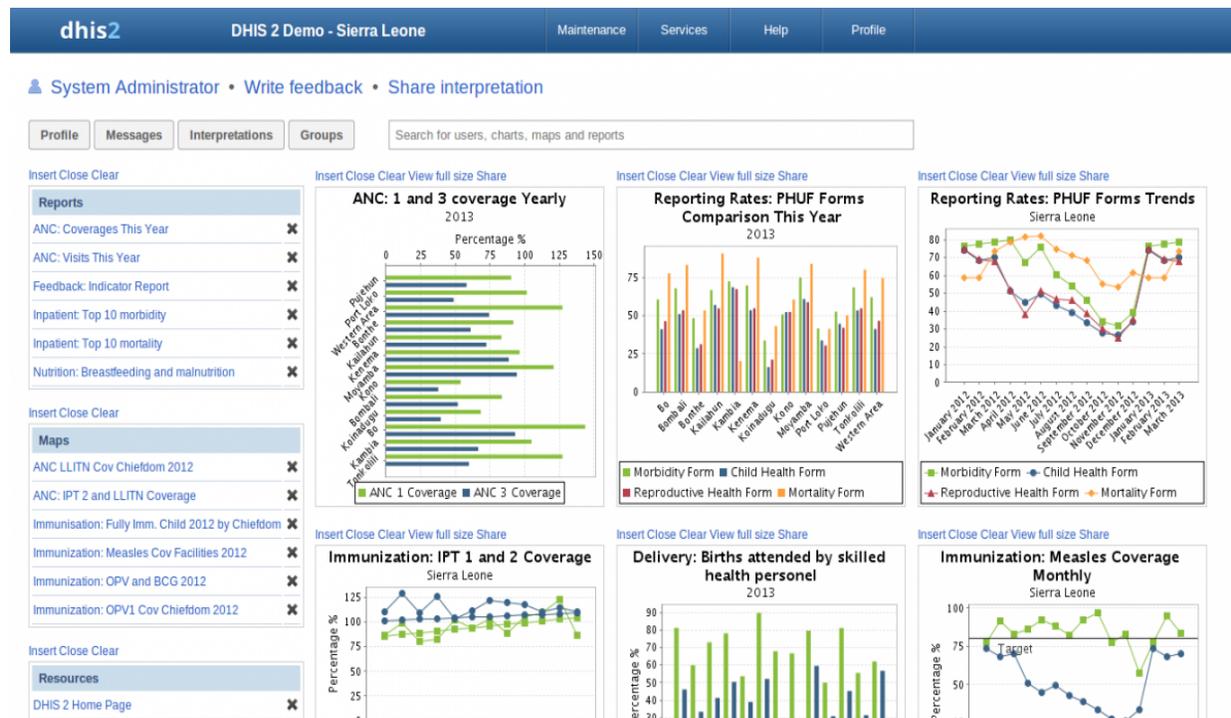
Many countries are now using the DHIS2 to capture, analyze, and display their national HMIS data. Among these, several malaria-endemic countries, including Sierra Leone (Figure 5), have created standardized data dashboards within these systems to allow program managers at different levels of the health system—from community to national—to track service delivery and health outcome trends for different clinical areas, including MiP. This has the potential to not only help inform service delivery and policy decisions but also provide data transparency, improve data quality, and promote accountability.

References

1. WHO. 2018. *Analysis and Use of Health Facility Data: Guidance for Malaria Programme Managers.* Working document. Geneva: WHO.

2. WHO. 2018. *Malaria Surveillance, Monitoring & Evaluation: A Reference Manual.* Geneva: WHO.

3. WHO. 2007. *Malaria in Pregnancy: Guidelines for Measuring Key Monitoring and Evaluation Indicators.* Geneva: WHO.

4. WHO. 2015. *Global Technical Strategy for Malaria 2016–2030.* Geneva: WHO.

5. WHO. 2017. *A Framework for Malaria Elimination.* Geneva: WHO.

6. WHO. 2014. *WHO Policy Brief for the Implementation of Intermittent Preventive Treatment of Malaria in Pregnancy Using Sulfadoxine-Pyrimethamine (IPTp-SP).* Geneva: WHO.

7. WHO. 2016. *WHO Recommendations on Antenatal Care for a Positive Pregnancy Experience.* Geneva: WHO.

Practical Tips for M&E of MiP Programs and Services

Indicator Definitions, Disaggregation, and Calculation

- Remember, the denominator for calculating provision of IPTp doses during ANC using service statistic data will be different for longitudinal and cross-sectional ANC registers. For cross-sectional registers, ANC 1 is used as a proxy for eligible pregnant women. The new WHO malaria M&E module suggests to use estimated pregnant women, which has been included here as a recommended additional indicator.
- OPD registers need to capture if patients diagnosed with and treated for malaria are pregnant to help understand the disease burden and management practices among this group, and to monitor quality of care for MiP.
- Countries with subnational implementation of IPTp should limit calculation of IPTp coverage to the eligible areas.
- Ideally, MiP malaria testing indicators should use "pregnant women with fever" as the denominator, but this is not always tracked in HMIS registers.

Data Review and Interpretation

- To improve the operation of national malaria programs, managers must ensure that there are regular, formalized opportunities for review of routine malaria data, including surveillance system data. A schedule of meetings should be established at different levels of the health system (facility, district, national levels) to review malaria data (this can be part of an integrated review, such as ANC or primary outpatient care).
- Since malaria increases during the rainy season, implementers should expect the number of cases diagnosed and treated among pregnant women to also increase seasonally.
- Remember, IPTp coverage estimates derived from routine data may not approximate coverage estimates derived from household surveys due to differences in denominators (women attending ANC versus all women) and should not be directly compared.
- Improved tracking of IPTp and testing and treatment of malaria in pregnant women can help with forecasting of MiP commodities, particularly when commodities are in full supply.

Data Quality and Completeness Considerations

- IPTp3 should always be lower than IPTp2, which should be lower than IPTp1 when examined on a quarterly or longer period of time.
- As co-trimoxazole prophylaxis is a contraindication for IPTp, consider the feasibility of removing this group of women from denominator of IPTp-eligible women (ANC 1), particularly in areas of high HIV prevalence.
- Women who receive treatment for malaria will not be eligible for IPTp but will be protected.
- The completeness of civil and vital registration systems needs to be improved as part of efforts to improve accuracy of measuring malaria deaths, including for pregnant women, as most patients with malaria do not seek treatment in formal health facilities.
- Private-sector facility reporting practices around MiP data are important to understand, especially if the private sector provides a substantial proportion of the services accessed by pregnant women.

MiP M&E Capacity

- Increase the number of skilled malaria M&E staff at the national and subnational levels in particular, and at the regional and global levels.

Annex A. Recommended core and additional malaria in pregnancy indicators

Menu of Recommended Core Routine Malaria in Pregnancy Indicators for Collection by Country Programs

	Intervention/Topic	Indicator*	Definition (N = numerator; D = denominator)	Data Source	Notes and References
Indicators to be Measured through Routine Data Collection Mechanisms (HMIS, Supervision Visits, Human Resource Information Systems, etc.)					
Health Facility Service Contact					
C1	Any antenatal care attendance (ANC 1+)	Percentage pregnant women attending 1 or more ANC visit	N: Number of pregnant women attending ≥ 1 ANC visit multiplied by 100 D: Estimated number of pregnant women in facility catchment area population	Monthly ANC register or monthly facility summary form	Routinely-collected health facility data may not be representative of the general population if health care is sought at facilities that do not report into the health management information system (HMIS). Number of first ANC visits can also be used for a health facility-based denominator (see WHO's draft Analysis and Use of Health Facility Data: Guidance for RMNCAH programme managers)
C2	ANC 4+ attendance	Percentage pregnant women attending 4 or more ANC visits	N: Number of pregnant women attending ≥ 4 ANC visits multiplied by 100 D: Estimated number of pregnant women in facility catchment area population	Monthly ANC register or monthly facility summary form	Routinely-collected health facility data may not be representative of the general population if health care is sought at facilities that do not report into the HMIS. Number of first ANC visits can also be used for a health facility-based denominator.
C3	ANC 8+ attendance	Percentage pregnant women attending 8 or more ANC visits	N: Number of pregnant women attending ≥ 8 ANC visits multiplied by 100 D: Estimated number of pregnant women in facility catchment area population	Monthly ANC register or monthly facility summary form	Routinely-collected health facility data may not be representative of the general population if health care is sought at facilities that do not report into the HMIS. This is a relatively new recommendation by WHO so some HMIS may not yet track this. Number of first ANC visits can also be used for a health facility-based denominator.

	Intervention/Topic	Indicator*	Definition (N = numerator; D = denominator)	Data Source	Notes and References
Indicators to be Measured through Routine Data Collection Mechanisms (HMIS, Supervision Visits, Human Resource Information Systems, etc.)
C4	ANC attendance in first trimester	Percentage of pregnant women who have first antenatal care contact in the first trimester (less than 12 weeks)	N: Number of pregnant women who have first ANC contact during first trimester (less than 12 weeks) multiplied by 100 D: Total number of pregnant women who have first ANC contact	Monthly ANC register or monthly facility summary form	Routinely-collected health facility data may not be representative of the general population if health care is sought at facilities that do not report into the HMIS. Included and as a core facility indicator in WHO's draft Analysis and Use of Health Facility Data: Guidance for RMNCAH programme managers.
MIP Prevention Interventions
C5	Intermittent preventive treatment for malaria –IPTp1	Percentage of pregnant women attending ANC who received one dose of intermittent preventive treatment in pregnancy (IPTp1)	N: Number of pregnant women attending ANC who received one dose of intermittent preventive treatment in pregnancy (IPTp1) multiplied by 100 D: Total number of first-visit ANC clients	ANC register Monthly facility summary form	First ANC visit approximates the number of eligible clients that should receive each dose of IPTp: IPTp1, IPTp2, IPTp3 This is a facility-based denominator, rather than a population-based denominator (such as estimated number of women in the facility catchment area, which some countries are using) and lets providers/managers understand the quality of care they are providing in their facility/district. Assumes that direct observation is enforced at the ANC, but is not recorded/tracked. Included as a context-specific indicator in draft WHO Monitoring Framework for ANC and as a core facility indicator in WHO's draft Analysis and Use of Health Facility Data: Guidance for RMNCAH programme managers, Working document, March 2019. Included in WHO's MIP: Guidelines for Measuring Key Monitoring and Evaluation Indicators, 2007.

	Intervention/Topic	Indicator*	Definition (N = numerator; D = denominator)	Data Source	Notes and References
Indicators to be Measured through Routine Data Collection Mechanisms (HMIS, Supervision Visits, Human Resource Information Systems, etc.)				
C6	Intermittent preventive treatment for malaria-IPTp2	Percentage of pregnant women attending ANC who received two doses of intermittent preventive treatment in pregnancy (IPTp2)	N: Number of pregnant women attending ANC who received intermittent preventive treatment in pregnancy (IPTp2) multiplied by 100 D: Total number of first-visit ANC clients	ANC register Monthly facility summary form	First ANC visit approximates the number of eligible clients that should receive each dose of IPTp. This is a facility-based denominator, rather than a population-based denominator (such as estimated number of women in the facility catchment area) and lets providers/managers understand the quality of care they are providing in their facility/district. Assumes that direct observation is enforced at the ANC, but is not recorded/tracked. Included in WHO's MIP Guidelines for Measuring Key Monitoring and Evaluation Indicators, 2007. Included as context-specific indicator in draft WHO Monitoring Framework for ANC and as a core facility indicator in WHO's draft Analysis and Use of Health Facility Data: Guidance for RMNCAH programme managers.

	Intervention/Topic	Indicator*	Definition (N = numerator; D = denominator)	Data Source	Notes and References
Indicators to be Measured through Routine Data Collection Mechanisms (HMIS, Supervision Visits, Human Resource Information Systems, etc.)
C7	Intermittent preventive treatment for malaria- IPTp3	Percentage of pregnant women attending ANC who received three doses of intermittent preventive treatment in pregnancy (IPTp3)	N: Number of pregnant women attending ANC who received intermittent preventive treatment in pregnancy (IPTp3) multiplied by 100 D: Total number of first-visit ANC clients	ANC register Monthly facility summary report	First ANC visit approximates the number of eligible clients that should receive each dose of IPTp. This is a facility-based denominator, rather than a population-based denominator (such as estimated number of women in the facility catchment area) and lets providers/managers understand the quality of care they are providing in their facility/district. Assumes that direct observation is enforced at the ANC, but is not recorded/tracked Included as context-specific indicator in draft WHO Monitoring Framework for ANC and as a core facility indicator in WHO's draft Analysis and Use of Health Facility Data: Guidance for RMNCAH programme managers.
C8	Intermittent preventive treatment for malaria- IPTp4	Percentage of pregnant women attending ANC who received four doses of intermittent preventive treatment in pregnancy (IPTp4)	N: Number of pregnant women attending ANC who received intermittent preventive treatment in pregnancy (IPTp4) multiplied by 100 D: Total number of first-visit ANC clients	ANC register Monthly facility summary report	First ANC visit approximates the number of eligible clients that should receive each dose of IPTp. This is a facility-based denominator, rather than a population-based denominator (such as estimated number of women in the facility catchment area) and lets providers/managers understand the quality of care they are providing in their facility/district. Assumes that direct observation is enforced at the ANC, but is not recorded/tracked Measuring IPTp4+ coverage from routine data requires that ANC registers include columns for more than three doses of IPTp.

	Intervention/Topic	Indicator*	Definition (N = numerator; D = denominator)	Data Source	Notes and References
Indicators to be Measured through Routine Data Collection Mechanisms (HMIS, Supervision Visits, Human Resource Information Systems, etc.)					
C9	Insecticide-treated net (ITN) distribution during ANC for malaria prevention among pregnant women	Percentage of pregnant women attending ANC who received an ITN during ANC	N: Number of pregnant women who received an ITN during routine ANC multiplied by 100 D: Total number of first-visit ANC clients	ANC register Monthly facility summary report	This indicator is only relevant where routine distribution of ITNs through ANC is part of the national strategy. Data from health facilities are not representative of the population at large, including women who do not attend ANC. However, ANC1 is generally above 90%.
MIP Testing and Treatment					
C10	Treatment of MiP	Percentage of pregnant women with suspected malaria who tested positive for malaria who were treated	N: Number of pregnant women with suspected malaria who tested positive for malaria and received ACTs or quinine at the health facility multiplied by 100 D: Total number of pregnant women with suspected malaria who tested positive for malaria at the health facility	OPD register, laboratory register, ANC register	This information may or may not be available from ANC records: pregnant women often go to the OPD when they are sick or are referred there from the ANC clinic for malaria testing and treatment. For diagnosis and treatment, indicators need to be tested, not currently routine in most countries.

	Intervention/Topic	Indicator*	Definition (N = numerator; D = denominator)	Data Source	Notes and References
Indicators to be Measured through Routine Data Collection Mechanisms (HMIS, Supervision Visits, Human Resource Information Systems, etc.)
Impact Indicators
C11	Malaria test positivity rate for pregnant women with suspected malaria	Percentage of pregnant women with suspected malaria tested for malaria who tested positive	N: Number of pregnant women with suspected malaria who tested positive for malaria at the health facility (in ANC and/or OPD) multiplied by 100

D: Total number of pregnant women with suspected malaria who tested for malaria at the health facility (in ANC and/or OPD)

Optional disaggregator: by type of test (RDT, microscopy) | OPD registers, laboratory registers, ANC registers | This information may not be available at ANC as pregnant women often go to OPD when sick. OPD does not typically disaggregate recorded malaria tests by pregnancy. Some countries, like Kenya and Tanzania , screem all pregnant women at the first ANC visit regardless of symptoms. Thus, they would need to use a different indicator.

Knowing the number of pregnant women tested for malaria helps to predict RDTs needed. This information may or may not include pregnant women seen in both the ANC clinic and the outpatient department (OPD).

Indicator collected where feasible. This information may not be available at ANC as pregnant women often go to OPD when sick. OPD does not typically disaggregate recorded malaria tests by pregnancy.
For diagnosis and treatment, indicators need to be tested, not currently routine in most countries. |

*These indicators could also be collected during a health facility assessment by conducting a review of facility records.

Menu of Recommended Additional Routine and Periodic MiP Indicators for Collection by Country Programs

(* included in WHO's MIP: Guidelines for Measuring Key Monitoring and Evaluation Indicators, 2007)

	Intervention/Topic	Indicator	Definition (N = numerator; D = denominator)	Data Source	Notes
Indicators to be Measured through Routine Data Collection Mechanisms (HMIS, Supervision Visits, Human Resource Information Systems, etc.)
MIP Testing and Treatment
R1	Gestational age at first ANC	Average gestational age (in months) of pregnant women attending ANC for the first visit	N: Gestational age at first ANC visit in months D: Number of pregnant women attending first ANC visit	Monthly ANC register or monthly facility summary form	Gestational age at first ANC is not now included in monthly facility summary forms, as such would require review of ANC registers, which is time consuming. If it is included, it is often included as months rather than weeks.
R2	Training in ANC/MiP*	Percentage of antenatal clinic staff trained in the control of malaria in pregnancy during pregnancy in the past 12 months	N: number of antenatal clinic staff trained in the control of malaria during pregnancy in the past 12 months multiplied by 100 D: total number of antenatal clinic staff during the same period	Collect during supervisory visits, training activity reports/human resource information systems, and health facility assessments such as the Service Provision Assessment or the SARA	
R3	Frequency of Stock-outs of sulfadoxine-pyrimethamine (SP) for IPTp*	Percentage of health facilities reporting a stock-out of SP in the past month	N: Number of health facilities reporting stock-out of SP (at least one day) in antenatal clinics within the past calendar month multiplied by 100 D: Total number of health facilities offering antenatal services	Collect during supervisory visits, LMIS, EUVs in PMI-supported countries	

	Intervention/Topic	Indicator	Definition (N = numerator; D = denominator)	Data Source	Notes
Indicators to be Measured through Routine Data Collection Mechanisms (HMIS, Supervision Visits, Human Resource Information Systems, etc.)					
R4	Testing pregnant women for malaria	Percentage of pregnant women tested for malaria	N: Number of pregnant women tested for malaria at the health facility (in ANC and/or OPD) multiplied by 100 D: Total number of pregnant women (ANC and/or OPD)	OPD register, ANC register	Knowing the number of pregnant women tested for malaria helps to predict RDTs needed and the burden of MiP among pregnant women. Indicator collected where feasible. This information may not be available at ANC as pregnant women often go to OPD when sick. OPD does not typically disaggregate recorded malaria tests by pregnancy. For testing and treatment, indicators need to be further tested as not currently routine in most countries.
R5	Malaria test positivity rate for pregnant women with fever	Percentage of pregnant women with fever tested for malaria who tested positive	N: Number of pregnant women tested for malaria at the health facility (in ANC and/or OPD) who tested positive multiplied by 100 D: Total number of pregnant women with fever(ANC and/or OPD) Optional disaggregator: by type of test (RDT, microscopy)	OPD register, ANC register	Knowing the number of pregnant women tested for malaria helps to predict RDTs needed and the burden of MiP among pregnant women. Indicator collected where feasible. This information may not be available at ANC as pregnant women often go to OPD when sick. OPD does not typically disaggregate recorded malaria tests by pregnancy. For testing and treatment, indicators need to be tested, not currently routine in most countries.

	Intervention/Topic	Indicator	Definition (N = numerator; D = denominator)	Data Source	Notes
Indicators to be Measured through Routine Data Collection Mechanisms (HMIS, Supervision Visits, Human Resource Information Systems, etc.)					
R6	Intermittent preventive treatment for malaria- IPTp1-3	Percentage of pregnant women attending ANC who received (one, two or three) doses of intermittent preventive treatment in pregnancy (IPTp)	N: Number of pregnant women attending ANC who received a specific does of intermittent preventive treatment in pregnancy (dose one, two or three) multiplied by 100 D: Total estimated/expected number of pregnant women in the facility catchment area	ANC register Monthly facility summary form	This additional indicators uses a population-based denominator and lets providers/managers understand the coverage of IPTp by dose in their catchment area. Assumes that direct observation is enforced at the ANC, but is not recorded/tracked. Included in draft list of WHO DHIS2 malaria module indicators and the draft WHO manual, *Analysis and Use of Health Facility Data: Guidance for Malaria Programme Managers,* working document, September 2018. Also included in the new WHO malaria surveillance manual.
Impact Indicators					
R7	Measuring low birthweight prevalence	Percentage of institutional low-birthweight newborns	N: Number of low-birthweight singleton live births (<2,500 grams) born at a health facility multiplied by 100 D: Total number of singleton live births born at a health facility	Maternity registers, health facility monthly reports	Measuring the prevalence of low birthweight is necessary to show the impact of malaria control interventions in pregnancy. This indicator is best measured from surveys but can also be measured at health facilities. While data from facilities or delivery records are the main source of data, they are not representative, as they are limited to the few women who deliver in facilities.

	Intervention/Topic	Indicator	Definition (N = numerator; D = denominator)	Data Source	Notes
Indicators to be Measured through Routine Data Collection Mechanisms (HMIS, Supervision Visits, Human Resource Information Systems, etc.)
Indicators to be Measured through Household Surveys Periodically
S1	Any antenatal care attendance (ANC 1+)	Percentage of women age 15–49 who received antenatal care from a skilled provider for her most recent pregnancy that resulted in a live birth in the previous five years.	N: Number of women age 15–49 received ANC from a skilled provider for her most recent pregnancy resulting in a live birth in the previous (five/two) years multiplied by 100 D: Total Number of women age 15–49 who had a live birth in the previous (five/two) years	Household surveys (DHS, MIS, MICS)	Skilled provider includes doctor, nurse/midwife, and medical assistant/clinical officer (definitions can be country-specific).
S2	Four or more antenatal care visits (ANC 4+)	Percentage of women age 15–49 who received at least four antenatal care visits from a skilled provider for her most recent pregnancy that resulted in a live birth in the previous five years.	N: Number of women age 15–49 who received at least four ANC visits (contacts with) from a skilled provider for her most recent pregnancy that resulted in a live birth in the previous (five/two) years multiplied by 100 D: Total number of women age 15–49 who had a live birth in the previous (five/two) years	Household surveys (DHS, MICS)	Skilled provider includes doctor, nurse/midwife, and medical assistant/clinical officer (definitions can be country-specific). Included as a core indicator in draft WHO Monitoring Framework for ANC
S3	Eight or more antenatal care visits (ANC 8+)	Percentage pregnant women attending 8 or more ANC contacts	N: Number of women age 15–49 who received at least eight antenatal care visits (contacts with) from a skilled provider for her most recent pregnancy that resulted in a live birth in the previous (five/two) years multiplied by 100 D: Total number of women age 15–49 who had a live birth in the previous (five/two) years	Household surveys (DHS, MICS)	Skilled provider includes doctor, nurse/midwife, and medical assistant/clinical officer (definitions can be country-specific) Included as a core indicator in draft WHO Monitoring Framework for ANC. Definition (numerator and denominator) not yet provided.

	Intervention/Topic	Indicator	Definition (N = numerator; D = denominator)	Data Source	Notes
Indicators to be Measured through Routine Data Collection Mechanisms (HMIS, Supervision Visits, Human Resource Information Systems, etc.)
S4	Pregnant women who began ANC during the first trimester of gestation	Percentage of pregnant women who began ANC during the first trimester of gestation	N: Number of women age 15–49 who have first antenatal care contact during first trimester (less than 12 weeks) multiplied by 100 D: Total number of women age 15–49 surveyed with a live birth in the previous (five/two) years	Household surveys (DHS, MICS)	Included as core indicator in draft WHO Monitoring Framework for ANC.
S5	ITN use for malaria prevention in pregnant women*	Percentage of pregnant women age 15–49 at risk of malaria who report having slept under an ITN the previous night	N: Number of pregnant women age 15–49 at risk of malaria who report having slept under an insecticide-treated net the night preceding the survey multiplied by 100 D: Total number of pregnant women age 15–49 at risk of malaria surveyed	Household surveys (DHS, MIS, MICS)	
S6	ITNs from ANC	Percent of households with pregnant women that own an ITN obtained from an ANC visit	N: Number of households with pregnant women that own an ITN obtained from an ANC visit multiplied by 100 D: Total number of households with pregnant women	Household surveys DHS/MIS/MICS	New standard questions on source of nets ask where each net owned by the household was obtained and specifically asks about ANC visits as a source.
S7	Intermittent preventive treatment for malaria-IPTp1+	Percentage of women age 15–49 at risk of malaria who received at least one dose of SP for prevention of malaria during her most recent pregnancy (IPTp1+) resulting in a live birth in the previous two years.	N: Number of women age 15–49 at risk of malaria who received 1 or more doses of SP to prevent malaria during their last pregnancy that led to a live birth in the past (five/two) years multiplied by 100 D: Total number of women age 15–49 surveyed at risk of malaria with a live birth in the previous (five/two) years	Household surveys (DHS, MIS, MICS)	

	Intervention/Topic	Indicator	Definition (N = numerator; D = denominator)	Data Source	Notes
Indicators to be Measured through Routine Data Collection Mechanisms (HMIS, Supervision Visits, Human Resource Information Systems, etc.)					
S8	Intermittent preventive treatment for malaria-IPTp2+	Percentage of women age 15–49 at risk of malaria who received at least two doses of SP for prevention of malaria during her most recent pregnancy (IPTp2+) resulting in a live birth in the previous two years.	N: Number of women age 15–49 at risk of malaria who received 2 or more doses of SP to prevent malaria during their last pregnancy that led to a live birth in the past (five/two) years multiplied by 100 D: Total number of women age 15–49 surveyed at risk of malaria with a live birth in the previous (five/two) years	Household surveys (DHS, MIS, MICS)	
S9	Intermittent preventive treatment for malaria-IPTp3+	Percentage of women age 15–49 at risk of malaria who received at least three doses of SP for prevention of malaria during her most recent pregnancy (IPTp3+) resulting in a live birth in the previous two years.	N: Number of women age 15–49 at risk of malaria who received 3 or more doses of SP to prevent malaria during their last pregnancy that led to a live birth in the past (five/two) years multiplied by 100 D: Total number of women age 15–49 surveyed at risk of malaria with a live birth in previous (five/two) years	Household surveys (DHS, MIS, MICS)	

	Intervention/Topic	Indicator	Definition (N = numerator; D = denominator)	Data Source	Notes
Indicators to be Measured through Routine Data Collection Mechanisms (HMIS, Supervision Visits, Human Resource Information Systems, etc.)					
Impact Indicators					
S10	Severe anemia screening in third trimester*	Percentage of screened pregnant women with severe anemia (hemoglobin less than 7 g/dl) in third trimester, by gravidity	*Among primigravidas, the indicator is defined as follows:* N: Number of women with severe anemia (hemoglobin less than 7g/dl) during the third trimester of first pregnancy multiplied by 100 D: Number of pregnant women screened for anemia during the third trimester of first pregnancy *For multigravidas, the indicator is defined as:* N: Number of pregnant women with two or more pregnancies with severe anemia (hemoglobin less than 7 g/dl) during the third trimester multiplied by 100 D: Number of pregnant women with two or more pregnancies screened for anemia during the third trimester	DHS optional module	Measuring the prevalence of severe maternal anemia in countries is important to show the impact of malaria in pregnancy and other maternal health interventions. As the risk of anemia has been shown to be higher among primigravidas than multigravidas, measurement of anemia must be differentiated by gravidity.

	Intervention/Topic	Indicator	Definition (N = numerator; D = denominator)	Data Source	Notes
Indicators to be Measured through Routine Data Collection Mechanisms (HMIS, Supervision Visits, Human Resource Information Systems, etc.)				
S11	Measuring low birthweight prevalence	Percentage of low-birthweight singleton live births, by parity	*For primiparous women, the indicator is defined as follows:* N: Number of low-birthweight singleton live births to women with first birth multiplied by 100 D: Number of singleton live births to women with first birth *The indicator for multiparous women is defined as:* N: Number of low-birthweight singleton live births to women with two or more births multiplied by 100 D: Number of singleton live births to women with two or more births	Household surveys (data abstracted from woman's health card and self-report) ((DHS, MIS, MICS)	Measuring the prevalence of low birthweight is necessary to show the impact of malaria control interventions in pregnancy. The numerator and denominator are defined according to parity. Low birthweight is defined as weight less than 2,500 g obtained within 24 h of birth, regardless of gestational age. This indicator is best measured from surveys. While data from facilities or delivery records are the main source of data, they are not representative, as they are limited to the few women who deliver in facilities.
S12	Malaria mortality in pregnant women	Number of institutional malaria-related maternal deaths	Number of maternal deaths at the health facility with Malaria as the primary cause	Health facility maternal death registers, maternal death audits	
Indicators to be Measured through Health Facility Assessments Periodically				
HFA1	Specific ANC services offered	Percentage of facilities offering each/all specified services as part of ANC (screening, treatment, prevention), including IPTp and ITN distribution	N:Number of facilities offering each/all specified services as part of ANC (screening, treatment, prevention), including IPTp and ITN distribution multiplied by 100 D: Number of facilities assessed	SPA, SARA, WHO harmonized HFA	

	Intervention/Topic	Indicator	Definition (N = numerator; D = denominator)	Data Source	Notes
Indicators to be Measured through Routine Data Collection Mechanisms (HMIS, Supervision Visits, Human Resource Information Systems, etc.)
HFA2	ANC service readiness	Percentage of facilities with staff and guidelines, equipment, and medicines and commodities (no stock-outs) to provide ANC services, including IPTp	N: Number of facilities with staff and guidelines, equipment, and medicines and commodities (no stock-outs) to provide ANC services, including IPTp multiplied by 100 D: Number of facilities assessed	SPA, SARA, WHO harmonized HFA	
HFA3	Provider knowledge on standards of IPTp	Percentage of interviewed providers who know all key elements for IPTp.	N: Number of providers interviewed who know all key elements for IPTp multiplied by 100 D. Number of providers interviewed	WHO harmonized HFA	
HFA4	Provider provision of IPTp according to standard during ANC	Percentage of ANC clients who received IPTp according to standard	N: Number of pregnant women attending an ANC visit who received a dose of intermittent preventive treatment in pregnancy (IPTp1) under direct observation multiplied by 100 D: Total number of ANC visits observed	SPA—ANC Observation	Note: Denominator does not remove ANC clients on cotrimoxazole for whom IPTp is contraindicated as not always feasible to determine during ANC observation.
HFA5	Specific malaria services offered	Percentage of facilities offering each/all services for malaria (diagnosis, testing , treatment, IPTp, ITN distribution)	N: Number of facilities offering each/all services for malaria (diagnosis, testing , treatment, IPTp, ITN distribution) multiplied by 100 D: Number of facilities assessed	SPA, SARA, WHO harmonized HFA	

	Intervention/Topic	Indicator	Definition (N = numerator; D = denominator)	Data Source	Notes
Indicators to be Measured through Routine Data Collection Mechanisms (HMIS, Supervision Visits, Human Resource Information Systems, etc.)					
HFA6	Malaria service readiness	% of facilities with trained staff and guidelines, diagnostics, and medicines and commodities (no stock-outs) for malaria services	N: Number of facilities with trained staff and guidelines, diagnostics, and medicines and commodities (no stock-outs) for malaria services multiplied by 100 D: Number of facilities assessed	SPA, SARA, WHO harmonized HFA	
HFA7	MIP service readiness	% of facilities with trained staff and guidelines, IPTp drug, ITN nets and no stock-outs	N. Number of facilities with trained staff and guidelines, IPTp drug, ITN nets, and no stock-outs multiplied by 100 D. Number of facilities assessed	SPA, SARA, WHO harmonized HFA	

Annex B. Sample facility wall charts/poster with routine malaria in pregnancy indicators from Chad and Liberia

Measuring Quality of Care Progress for Malaria Case Management and MiP

County: _____   Facility Name: _____   Year: _____

Suspected malaria cases tested
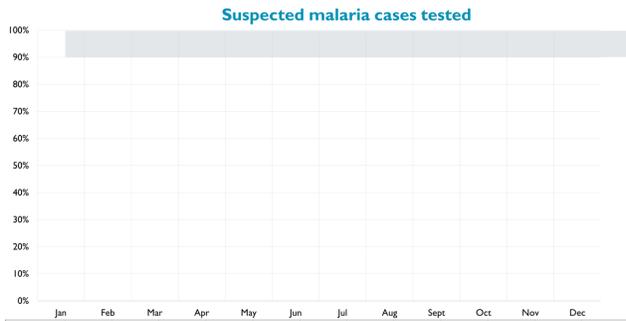
★ Target

Calculation:

$$\frac{\text{\# persons tested for malaria with RDT or microscopy}}{\text{\# suspected malaria cases}} \times 100$$

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
# suspected												
# tested												

Confirmed malaria cases treated with ACT
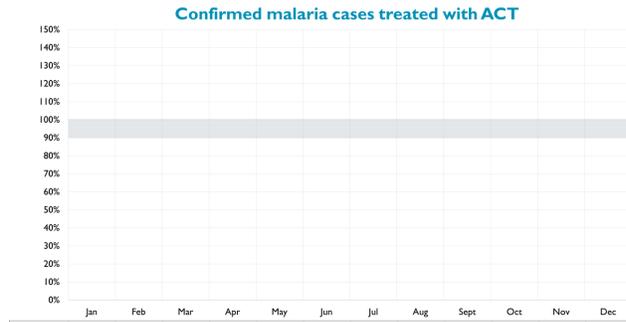
★ Target

Calculation:

$$\frac{\text{\# persons treated with ACT}}{\text{\# persons \textbf{tested positive} for malaria by RDT or microscopy}} \times 100$$

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
# treated ACT												
# positive tests												

Pregnant women who received 3rd dose of IPTp
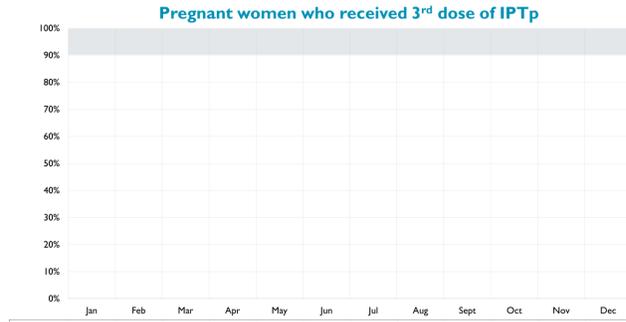
★ Target

Calculation:

$$\frac{\text{\# IPTp3 doses administered In the month}}{\text{\# 1st ANC visits in the month}} \times 100$$

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
# IPTp3 Doses												
# ANC 1 Clients												

Essential Commodity Stock Situation
(X = out of stock 1 or more days in the month)

Year: _____	Malaria RDT	ACT	SP	ITN
Jan				
Feb				
Mar				
Apr				
May				
Jun				
Jul				
Aug				
Sep				
Oct				
Nov				
Dec				

Key questions to consider when reviewing each indicator on each graph
1. Is the performance of the indicator the same across the months or does it change? If it is changing, why is it changing?
2. Is the performance of the indicator changing in similar or opposite ways compared to a related indicator or indicators?
3. Do trends in the indicator suggest care is improving, getting worse, or staying the same?

Action Items

Month/Yr	Action	Person responsible	Due Date